

When the mummy is digital: preservation and dissemination

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Abstract

Most educational institutions include nowadays a digital repository as part of their development and positioning strategy. The main goals of a digital repository are preservation and dissemination, which are some how contradictory, especially if the repository follows an open approach, as it is designed, built and managed from an institutional perspective, although it is intended to be used by teachers and learners. This fact may lead to a low level of usage, as final users are not able to integrate the learning object repository into their learning process. In this paper we will discuss how to promote open educational resources by connecting open repositories with open social networks, bridging the gap between resources and final users (teachers and learners).

Keywords

open educational resources, OERs, digital repositories, social networks, preservation, dissemination, learning process, virtual learning environments, e-learning

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Introduction

Virtual learning environments (VLEs) are nowadays in widespread use. From pure online virtual universities to traditional ones that offer learners a blended learning model, the use of web-based tools for teaching and learning has been steadily increasing, as wisely described by Taylor (1999). From an institutional point of view, VLEs may serve also as a mechanism for content management and dissemination. In fact, most universities have a digital library which reproduces the services from a traditional one, plus adding additional features. In the recent years, digital libraries have evolved to what we know as digital repositories, a basic piece of any educational institution (Lynch, 2003).

The term “repository” means, among other things, a place or container in which things can be stored for safety (i.e., preservation), as well as a place where things are kept for exhibition (i.e. dissemination), like a museum. But, at the same time, it also means a place of burial, a sepulchre, as well as a receptacle containing the relics of the dead. In this sense, preservation prevails over dissemination: repositories are designed to keep knowledge safe, rather than to allow “visitors” to manipulate it. This has been the traditional mission of libraries, where knowledge was only managed by experts and accessible to a few privileged cultivated people, due to the fragile nature of resources (papyrus and handwritten books). In this sense, we can think of repositories as pyramids, which were (naively but even though impressive) designed to keep the mummies of pharaohs forever. Notice that preservation means not only having an appropriate container but also applying some techniques to the object to be preserved, i.e., altering the original object in order to ensure it will be recoverable in a future when it will be needed.

Nevertheless, when we add the term “digital” to such definitions, things change radically, and new questions regarding the trade-off between preservation and dissemination arise (Levy and Marshall, 1995). Digital means that we can create exact copies which can be retrieved from the repository and further manipulated, without changing the original. In terms of education, we want everybody to go to the pyramid and see, touch and even leave with a copy of the mummy. Furthermore, we are interested in obtaining feedback from the audience, in order to know whether the mummy is of interest to them or not, if they have learnt something, if they have any question, and so.

The main problem with digital repositories is that, despite of they are virtual places, final users are obliged to visit them in order to find valuable resources. Although learning object repositories are an important piece of any educational initiative, they are not fully integrated into the learning process. The main reason is that digital repositories have emerged from an institutional initiative, created and managed by librarians and IT staff, neither by teachers nor students. As the learning process in virtual environments is evolving towards a more open social activity, taking advantage of the web 2.0 technologies (Downes, 2005), it seems natural to make digital repositories also part of this paradigm shift. As stated in (Margaryan and Littlejohn, 2009), repository curators focus on long-term, repository-centric goals, while final users are more concerned about the context and expect short-term outcomes. This is especially dramatic for open educational resources (OERs),

where dissemination is much more important than preservation, and final users need to be very involved with creation, management and sharing of learning resources.

Therefore, we need to think about how to make resources available, helping users to find them, but also allowing users to take the resources with them, and to organize such resources as part of their personal learning environment, whatever this means for each user. And, at the same time, repositories need to ensure that such resources will be available forever, following the appropriate preservation policies (Smith, 2005). On the other hand, creating a learning object repository is not a simple task but it must be accomplished from a bottom-up approach (i.e. a group of teachers) with a minimum institutional support (mostly from the IT support office), and organizational (from the library support office), although there are several preliminary questions that should be addressed (Margaryan and Littlejohn, 2009) to ensure the repository will be a valuable resource for the learning community, as well as many other critical issues that must be taken into account (McNaught, 2007).

Open Educational Resources

OERs have been the promise of providing people with high quality learning resources (Smith and Casserly, 2006). Initiatives such as MIT OpenCourseWare (OCW), MERLOT and others have shown the real possibilities of creating and sharing knowledge through Internet. We indeed live in an age of content abundance, and content can be considered as infrastructure for building adaptive and personalized learning paths, promoting both formal and informal learning. Nevertheless, although most educational institutions are adopting a more open approach, publishing huge amounts of open educational resources, reality is that these resources are barely used in other educational contexts.

The feeling about the current situation of the OER movement is that everybody (especially large educational institutions) is creating and publishing open educational resources, but it is difficult to know whether these resources are reused (and how) or not. But in order to be reused, any open educational resource should be, first of all, very visible and easy to find. Currently now, searching for OERs faces the problem of “content abundance” as opposite to “content scarcity”, as there are so many resources and so many channels (search engines, general purpose repositories, Wikipedia, ...) for discovering them that searching and browsing has become a experience similar to Google returning thousands of results in a flat list with no structure or hierarchy at all, which can be frustrating for non-advanced users (Ochoa, 2005).

As stated in (Paulsson, 2009), access to digital learning resources could be improved if common metadata schemes and vocabularies were used to describe them. This not even a reality for specific initiatives such as OCW, as every institution has created its own taxonomy and hierarchy or there is no structure at all. Furthermore, searching engines on top of OCW¹ use a Google-like search, by means of a textbox where the user specifies the search terms, with a few other possibilities (namely, language and source). Although repositories can be harvested (using the OAI and ORE protocols) in order to build large collections of educational resources, the lack of common metadata schemes and policies may make of searching and browsing a difficult task. Other well known problems about reusing open educational resources (and learning objects, in general) are, among other, granularity,

i.e. the size of what is considered a learning object, the use of proprietary file formats, the lack of widespread use of e-learning standards and specifications, the lack of information about its educational context and, especially, internationalization and localization issues.

Beyond visibility, our goal is to ensure that open repositories will promote the four “R” activities on open educational resources: reuse, revise, remix and redistribute (Wiley, 2010), while respecting basic preservation policies. In fact, “open” means no proprietary formats should be used to store objects in the repository, thus simplifying preservation. The main threat to preservation is revising (altering content) and redistributing (which ultimately means uploading new content to the repository), although all the four “R” may alter the learning object (including its metadata), as we will describe in the next section. It is out of the scope of this paper to define a preservation policy for learning objects under the “4R” paradigm, we only intend to define a new scenario for learning object repositories that will force the whole concept of preservation to be rethought.

Adding services on top of OERs

Learning in a virtual environment involves the use of a wide variety of learning objects, not only books or complete courses (such as those available through OCW), but also examples, exercises, simulations, multimedia documents, etc. These elements must be not only stored but also fully integrated into the learning process, helping learners to better contextualize these small chunks of knowledge. Browsing and searching for these resources should be a truly learning experience in itself. Therefore, learning object repositories should be designed taking into account not only the institutional requirements (i.e. preservation), but also the needs of the final users, namely teachers and especially learners (i.e. dissemination). This can be done by adding web 2.0 services to traditional repositories and making them to become more open.

New learning theories such as connectivism (Siemens, 2005) establish that learning is produced during the process of establishing new relationships between contents and concepts, rather than in the already acquired knowledge. Learning object repositories are important elements in the network built by the learner during his or her learning process, as they store not only the learning resources but also all the details of the learning experience itself. Learning occurs anytime, anywhere; learners do not need to go to a specific place to have a learning experience, on the contrary, they should be able to learn whatever, whenever, wherever. In this sense, social networks provide a basic support for this practice, but not the contents. Learners do not need to “know” everything; it is the ability to create, analyze and share connections between resources the one that generates knowledge. Learning is more than just content, which is just the infrastructure for the learning process (Wiley, 2001), so we need to provide learners with content but also with additional services to organize such content according to their own expectations and particularities.

Therefore, in order to promote the reuse of open educational resources, we propose to bridge both worlds, as introduced in (Córcoles et al., 2009). From the one side, by means of institutional repositories built on a top-down approach, more aimed towards preservation rather than promoting reuse and, from the other side, communities of practice and learning in the shape of social networks. We can combine the best of both worlds: reliable and permanent handles for well-described resources in learning object repositories with dynamic services available through social networks

and web 2.0 tools. So, once a user finds (and uses) a learning resource, whatever the source is, he or she should be able to add comments, to rate it, to make it favorite, to tag it with his or her own keywords, to share it with other learners and, finally, to subscribe to such resource, as follows:

- **Comment:** in order to promote a continuous improvement of resources, learners should be able to make comments, place questions, correct small mistakes and so, using communication spaces directly related to the learning object, not separately. These annotations can create a micro-community of learning around a given learning object. Currently now, learners in a VLE must go to a specific place (a forum, board, mailbox or so) for making a question or placing a comment about a specific resource which is not there.
- **Rate:** using a Likert-type scale, stars (from 0 to 5 or 10) or any other mechanism, the learner should be able to express his or her valuation of the resource. This information can be used to rank learning objects according to their explicit popularity.
- **Favorite:** for those resources that really capture learner's interest, it should be possible to mark them as a very valuable resource, analogously to what users do with links using the possibilities of web browsers or web 2.0 services such as delicious or Google reader "star", for example.
- **Tag:** learners should be able to describe learning resources using their own keywords, as a way of self-organizing concepts through the use of small notes. These tags can be analyzed to extract new keywords to be added as metadata.
- **Share:** all of the previous actions should be shared using learner's usual communication channels, such as twitter, facebook, delicious and so. This is the basic idea behind a personal learning environment, that is, allow users to take control of learning resources wherever they want to. Furthermore, using web services such as Burnbit, resources could be even shared through P2P networks, thus making them available to a very large number of potential users.
- **Subscription:** finally, learners should be aware of all interactions occurring around a specific resource, being able to subscribe to a given learning object, using RSS or any other similar technology, once again as part of their own personal learning environment.

Finally, although it is not a service on top of a particular educational resource, it would be very interesting to provide final users with a mechanism for proposing new resources that should be part of the repository, according to their opinion. Users should provide a link to the resource and as much information as possible about it. Depending on the repository policy for self-archiving, the resource will be available to the other users, once copyright issues and other aspects such as format have been validated. Obviously, in order to promote the "R" of redistribution, users should be able also to upload content to the repository, not only providing links to it.

As described in (Minguillón et al., 2010), all the interactions generated between resources and users through these services can be captured and stored in form of metadata as part of each learning object description. Although the proposed mechanism simplifies knowledge management as all the valuable information of a specific learning object is contained within itself, adding metadata to a learning object modifies it, thus jeopardizing preservation, strictly speaking. Obviously, a clean copy of the original learning object can be maintained for preservation purposes, but then all the interactions that change the content (such as the correction of minor mistakes) should be processed when the learning object undergoes any preservation procedure (i.e. an upgrade of its file format).

These interactions can be analyzed in order to better understand how learners use open educational resources, extracting useful information for improving both the system (i.e. the repository), as described in (Han et al., 2008), as well as the learning objects contained in it, as described in (Ferran et al., 2007). It may provide also useful information about the users, which can be used for profiling purposes, pursuing personalized services. The information stored as metadata can be used at three different levels, according to the respective user profile: repository managers, teachers and learners. Repository managers can analyze interaction data in order to detect and correct possible problems regarding repository usability, visibility of learning resources, patterns of searching and browsing and so. Teachers can see which resources are more (or less) valuable to learners, which are the most common questions and comments, etc. Finally, learners can share experiences through these services directly on top of the learning resources, learning one from each other.

Conclusions

Learning object repositories are nowadays a basic element of any virtual learning environment, but learners still need to go to the repository in order to manage their learning resources. Furthermore, they are not able to integrate such resources within their own learning process. Once a given resource is found, learners are only left with the possibility of consuming it, but nothing else. As repositories are still built and managed by librarians, final users have not the possibility of taking control on educational resources. The main reason is that repositories have been designed pursuing preservation, instead of dissemination from an open approach perspective, that is, reusing, revising, remixing and redistributing open educational resources.

In this paper we have described a collection of web 2.0 services that may be used by teachers and specially learners in order to integrate resources into the learning process. The main idea is adding some new functionalities on top of a digital repository, with the aim of creating a true learning community (even at a small scale) around every resource, making of it a valuable asset. Then, learners can build a learning path by adding the resources they find to their personal learning environment, keeping track of all the activity around a given educational resource. On the other hand, all the information captured during the interaction between learners, services and users can be analyzed in order to provide learners with better recommendations, thus improving browsing and searching for a specific resource. Teachers can also analyze these interactions to discover how learners use and evaluate educational resources, as well as improving them by keeping track of all comments and questions placed by learners.

Nevertheless, although new web 2.0 technologies can provide solutions for improving digital repositories, we need to change the way we organize learning resources. Educational institutions need to rethink the whole concept of digital repository. From large general-purpose institutional repositories, created and managed by librarians, it is necessary to evolve towards small thematic repositories managed by teachers, in order to be able to build true learning communities around a specific domain of knowledge. In this sense, e-learning (understood as web-based learning) needs to incorporate information science and knowledge management into the equation, following a user-centered approach.

Current and future research on this topic should include the development of a complete information architecture model for capturing and analyzing interaction between users, services and resources. This model should also take into account user profiling in order to provide personalized searches according to user's profile and context. We are currently now in the process of developing a layer of services on top of a DSpace thematic repository on Statistics² which will serve as a pilot experience for testing this architecture in a real scenario. This project is part of a largest one which tries to build a completely different user interface for DSpace based repositories, in order to replace term-driven searchers by a visual taxonomy, because browsing and searching for educational resources should be a learning experience in itself.

Finally, the possibility of connecting digital repositories with P2P networks and flooding them with OERs is also very interesting. P2P clients could include a new category (OER) and some new filtering options according to the desired characteristics of the educational resource (license, language, etc.), so finally resources will be available wherever learners are, that is, social networks and file-sharing networks, and not being confined into a particular digital repository. Mechanisms for tracking educational resources in such an open scenario will be needed, though.

Notes

1. <http://www.ocwconsortium.org/courses/search>.
2. <http://oer.uoc.edu>.

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Julià Minguillón (Barcelona, Spain, 1968) received his Ph.D. from the Universitat Autònoma de Barcelona (UAB) in September 2002. In January 2001 he joined the Universitat Oberta de Catalunya (UOC) where he is a faculty member of the Computer Science, Multimedia and Telecommunication Studies department. Currently now he is the Academic Director of the UOC UNESCO Chair in e-Learning. His main research interests include the formal description of the learning process by means of ontologies, personalization by means of adaptive itineraries based on reusable learning objects, and user modelling applying web mining techniques for improving user experience and usability, accessibility and mobility. He is also interested in open educational resources and the uses of social tools for teaching and learning. He was in charge of the UOC participation in the OLCOS (Open Learning Content Observatory Services) EU funded project. He led the Spanish Government funded PERSONAL(ONTO) and E-MATH++ projects, which promote the use of learning object repositories in virtual learning environments. He also leads the METAOER project which aims to create an organized collection of open resources about open educational resources and practices.

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