Open Educational Resources and Lifelong Learning

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Abstract. *The role of Open Educational Resources (OER) for the success and wide implementation of Lifelong learning is investigated. Lifelong learning provision is based on the information technology and e-learning together with the emerging mobile learning technologies. Open source and Open standards are the means of "open" information technology support for learning processes.*

Basic idea, good examples, successful initiatives and development directions of the OER movement are presented in order to derive the development vision. Inevitability of innovative forms of teaching and learning for the success of OER is the most important concluding remark of the paper.

Keywords. Lifelong Learning, Open Educational Resources, E-learning, E-content

1. Introduction

It is more or less evident that the lifelong learning in general and the university continuing education will continue to experience the consistent expansion in the future. Being on the top of the political agenda, lifelong learning is presented as an answer to the challenges of globalization, new technologies and demographic developments. But to reach the generally acknowledged political goal: "free lifelong learning for all everywhere at all times", several questions will have to be answered and lifelong learning processes will still have to undergo a vast development in several areas.

There is practically no doubt that the foundation of lifelong learning provision is (going to be) the information technology and e-learning together with the emerging mobile learning technologies. E-learning has a major impact on thinking and pedagogical practice through the whole educational system. It creates new means of communication and even social relations between students and teachers and as a consequence new ways of knowledge transfer, for example, collaborative learning are evolving. As several shifts of the learning process are identified, one can conclude that the influence of e-learning on education in general will be very extensive.

At present a world-wide movement is developing which promotes unencumbered open access to digital resources such as content and software-based tools to be used as a means of promoting education and lifelong learning. This movement forms part of a broader wave of initiatives that actively promote the "Commons" such as natural resources, public spaces, cultural heritage and access to knowledge that are understood to be part of, and to be preserved for, the common good of society [1].

To relevantly describe the meaning of the Open educational resources movement for lifelong learning we have to introduce the Open source and Open standards first.

2. Open source model

The Open Source (OS) model as defined by Open Source Initiative (OSI - http://www.opensource.org/) has a lot to offer. It's a way to build open standards as actual software, rather than paper documents. It's a way that many companies and individuals can collaborate on a product that none of them could achieve alone. It is proved (the references are listed at the mentioned OSI web page) that OS generally means higher security and higher reliability. The real-world evidence shows that OS also brings robustness, clear flexibility and higher quality if compared to closed software in general. In the "Bazaar-mode" development as described in the highly cited and excellent source on OS philosophy "The Cathedral and the Bazaar" (http://www.catb.org/~esr/writings/cathedral-bazaar/) one can expect higher development speed and lower overhead.

What is the relation between open source software and open standards? Open source software is based on open distribution of the source code that forms the software's foundations. This means that any technically competent programmer can examine the inner works of the source code, and potentially make changes to the operation to the software. Open source software is typically provided free of charge or with a nominal distribution cost. Open standards are transparent descriptions of data and behavior that form the basis of interoperability. Interoperability is the ability of different software systems to exchange information in such a way that they can both act in equivalent ways on the information, leading to equivalent user outcomes. In practice, interoperability means that users are not locked to any one software system – they can substitute a standards-compliant system for another standards-compliant system. Open standards can be implemented by commercial systems and open source systems alike.

In the 1990s open source software has had success in horizontal applications, or applications that are useful in many different industries. These applications include operating systems, web servers, enterprise resource planning and customer relationship management. But open source has had less impact vertically, in applications specific to one single industry, such as e-learning. In addition, open source software tended to focus on rapid innovation rather than the slower consensus-building approach which is typical of open standards.

Open source software has become mainstream today. Applications such as the Firefox Web browser, Apache Web server, Linux operating system, MySQL database platform, and PHP programming language continue to gain popularity. Most importantly, these applications often equal or even surpass the quality of well-known commercial, proprietary software.

3. Open source and open standards in e-learning

E-learning technology went trough intense early development without standards or open source software; e-learning standards were initially developed without widespread vendor adoption or open source software examples.

While open source software has both historical and philosophical roots within universities, e-learning was not one of the major focus areas of the early open source software movement. The early development of e-learning technology was based on the rise of the web and the widespread adoption of e-learning software and courses, especially Learning Management Systems such as WebCT and Blackboard in the education sector, and Saba, Click2Learn, and others in corporate training. On the other hand there are early attempts to create open standards for e-learning software and content, driven by specification organizations such as IMS Global Learning Consortium, AICC and ADL, and relevant committees of international standards bodies such as the IEEE LTSC. Despite the potential relevance of these open standards for the proprietary e-learning systems, the consistent adoption of e-learning standards by LMS vendors was slow, particularly in the education sector.

When advocating OS in e-learning applications most of the readers will search for the benefits of the "customers" instead those of developers. What is the main advantage that the OS applications brings to the educational and training institutions? Generally the benefits of open source in e-learning are [2]: low initial cost, flexibility and customizability, extensive active user communities, multi-platform capabilities, adherence to standards and tendency to use and link to other open source software.

The past decade have seen wider adoption of standards by e-learning vendors, especially in corporate training through the adoption of the Shareable Content Object Reference Model (SCORM) from ADL, which builds on work from IMS and AICC. At the same time, there are a number of solid open source software development initiatives, especially in the LMS market like Moodle, OpenUSS, Ilias, Claroline, Dokeos and many others including the Sakai project in the US which is a good example where a consortium of universities is working together to develop a learning environment.

Open source software is already being used by educational institutions not only for basic IT infrastructures but also for educational applications such as Learning Management Systems (LMS), Learning Content Management Systems (LCMS), course authoring tools, tools to create media elements such as animations, audio, and video clips, browsers and players to present content and courseware libraries.

Recent empirical evidence comes from the OSS Watch Survey 2006 [5], conducted by the University of Oxford's Research Technologies

Services, with 103 ICT managers responding from UK Higher Education and Further Education institutions. The survey found that more than three quarters (77%) consider open source options when engaging in IT procurement exercises. The most important reasons for choosing OSS are an expected lower total cost of ownership (74%), lower likelihood of getting "locked in" by a software provider (63%), better interoperability with other products (59%), and the possibility to migrate data better across systems (52%). The use of OSS is most common for database servers (62% of institutions), Web servers (59%) and operating systems (56%); most institutions that use OSS on their servers rely on in-house support for the OSS. Of particular interest are the results regarding the use of Virtual Learning Environments, of which the two proprietary systems Blackboard and WebCT and the open source VLE Moodle were considered in the survey. In the Higher Education institutions there is a greater presence of the proprietary systems (WebCT 20%, Blackboard 17%) than the OSS Moodle (9%). However, 56% of the Further Education institutions make use of Moodle, while Blackboard is used by 21% and WebCT by 3%.

4. Open educational resources movement

The term Open Educational Resources (OER) has been introduced and promoted in the context of UNESCO's aim to provide free access to educational resources on a global scale. The term was first adopted by UNESCO in 2002 in the final report of the Forum on the Impact of Open Courseware for Higher Education in Developing Countries, to refer to "the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes". [6].

With regard to this definition, it is important to note that "resources" are not limited to content, but comprise "three major areas of activity: the creation of open source software and development tools, the creation and provision of open course content, and the development of standards and licensing tools. The outputs of all three may be grouped together under the term Open Educational Resources (OER)." There are also much broader interpretations of Open Educational Resources (OER). For example, the OECD's Centre for Educational Research and Innovation (CERI)

states on the webpage of their OER survey that this would comprise "Open courseware and content; Open software tools; Open material for e-learning capacity building of faculty staff; Repositories of learning objects; Free educational courses".

The most descriptive and practical definition comes from the cited report [3] which tries do define it with the statement that it is based on the following core attributes:

• that access to open content (including metadata) is provided free of charge for educational institutions, content services, and the end-users such as teachers, students and lifelong learners;

• that the content is liberally licensed for re-use in educational activities, favorably free from restrictions to modify, combine and repurpose the content; consequently, that the content should ideally be designed for easy re-use in that open content standards and formats are being employed;

• that for educational systems/tools software is used for which the source code is available (i.e. Open Source software) and that there are open Application Programming Interfaces (open APIs) and authorizations to re-use Web-based services as well as resources (e.g. for educational content RSS feeds).

The definition is concluded by the very brave statement: »It is expected that adherence to the principles outlined above can bring about tremendous benefits for education and lifelong learning in a knowledge society, not least of which is to eliminate many inefficiencies and bottlenecks in the current provision of e-learning opportunities.« For the detailed set of discovered benefits of OER as seen from the viewpoints of educational networks, teachers and students please consult the report itself.

It is pretty obviously that pedagogical model is not a key point in the OER as such. The discussion of OER has often been dominated by technical and management considerations rather than the perspectives of educational practitioners. To achieve the ambitious goals of the presented lifelong learning philosophy the didactics and pedagogy must be deeply involved into the practical solutions. This subject requires a wide and integral aproach that exceeds the scope of this paper. Obviously serious research will have to be invested in the direction of pedagogical models in lifelong learning.

5. Open educational resources idea and initiatives

With reference to the OER movement, the William and Flora Hewlett Foundation justifies their investment in OER as follows: "At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world's knowledge is a public good and that technology in general and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge. OER are the parts of that knowledge that comprise the fundamental components of education – content and tools for teaching, learning and research."

There is an established understanding that easy access to educational resources is required to promote lifelong learning by active learners of all ages. Also the role of such access in reducing social inequalities, fostering social inclusion of migrants, and supporting education in developing countries is often acknowledged. [4]. No doubt that open access to resources is an important element in educational innovation; on the other hand it is also clear that it doesn't solve all the problems. The decisive factor is that open educational practices are fostered by the appropriate institutional culture and mindset and supportive environment, including easily accessible and shareable tools, services and content.

There are a variety of "Open questions" on this subject among which the most important is: Who (and why) will create and provide educational content? The answer to this question is not easy. Probably the public and politics must answer it (and not the publishers).

Today, one can find several repositories of learning and teaching resources that are accessible freely by anybody. They are of several kinds but mostly project based with a lot of volunteering work invested. The amount of the learning material us usually very low and the diversity is limited.

Other type of repositories is in a way "public", but not free for all. The most important are those initiated by national Ministries of Education or other political initiatives. The special place has the European SchoolNet (EUN), which is a collaboration of ministry departments and national educational networks throughout Europe. The initial idea of the EUN, which was started in 1996, was a "bottom-up" process with the EUN as a central access point to educational resources from the national and regional networks. This included the idea that in the emerging digital environment educators would themselves increasingly create and provide content to a common pool of teaching and learning materials. Over the following years the EUN, and the national educational networks, learned that there are considerable barriers to an effective participation of educators in pooling educational resources. Consequently, the approach shifted towards a more "top-down" approach, which over the years has been massively supported through project-based EU funding. Today, the core longer-term initiative of the EUN is the European Learning Resource Exchange (LRE), which will be accessible to all interested Ministries of Education participating in the EUN and other public and private sector owners of educational content repositories. Important ongoing work is the creation of the LRE Application Profile, which provides a set of metadata elements and vocabularies that are to be used by all participating learning object repositories.

The MIT. Open Courseware initiative, which started in "early" 2001 was one of the first and the most well-known all over the world as a single institution effort for open content (in March 2006 about two thirds of MIT professors had their courses online). In the Higher Education, the "MIT broadened" Open Courseware Consortium with over a 100 participating universities from all over the world seems to have a critical mass for a serious breakthrough. There are also several other excellent repositories initiatives, like the US-based Connexions platform which has about 200,000 unique visitors per month who come from over 150 countries.

The special place among the "big plans" deserves the Google Print Library Project which has the ambitious aim of digitally scanning millions of books from the collections of major American libraries and making them searchable online via Google's search engine.

On a global level an encouraging example is the recent establishment of the Global Learning Objects Brokered Exchange (GLOBE) initiative, which is a collaboration of ARIADNE (Europe), Education.au (Australia), eduSource Canada, MERLOT (USA) and NIME (Japan).

To come to the big repositories of high quality content which will be free for all, still a lot of answers have to be answered and finding them will be one of the major research trends in

lifelong learning and e-learning in the following years. Clearly open content itself (though high quality one and even localized for the end user) is not enough for effective lifelong learning. Before addressing useful open content, tools and licenses, one must consider the pedagogical approaches in which these resources could make a difference, i.e. by being used in innovative forms of teaching and learning.

6. The nature of open content

Open digital content has some fundamental differences when compared to the published commercial content. The roles of all the stakeholders in learning processes are different when open content is used as a learning material. Though there are several licensing, accessibility and copyright solutions for open content, we can draw some general principles of its lifecycle (creating, using, modifying, sharing, licensing, controlling quality and managing): Open content obviously has many authors, including professional authors, teachers and also learners and is therefore in the constant improvement process. Open content quality control is in the hands of learners and teachers (and is conducted simultaneously with the learning process) instead of instructional experts. The learning units are constantly evolving with various granularity of interlinked material, variety of micro content from different content feeds is present and updates are frequent. Wikis, Weblogs, RSS feeders & aggregators, are the authoring tools together with content acquisition and creativity tools which results in different formats and usually poor metadata structures. The creation of rich metadata will remain costly and OER initiatives will need to strike the right balance between the achievable richness of metadata and the costs they incur (e.g. due to the need to employ skilled personnel).

Open content licensing is a separate story, where the leading role is that of "Creative Commons" (CC). As a response to "open content unfriendly" commercial "all rights reserved" license, the non-profit organization Creative Commons provides an easy to use mechanism for choosing and attaching to a creative work one of six standardized CC licenses from the most liberal "Attribution" to more restrictive (but still open) "Attribution–NonCommercial–NoDerivatives". Creative Commons licenses have already been "ported" into several legal jurisdictions around the world and are in the process of integration into many others (http://creativecommons.org/worldwide).

7. The vision for the future of open educational resources

In the excelent recent publication »Open Educational Practices and Resources« [3] the vision for the situation in »Open educational resources in e-learning in 2012" is presented approximately like this:

Educational institutions from primary schools to universities and lifelong learning providers will foster and support open learning practices that help equip teachers, students and workers with the competences, knowledge and skills to participate successfully in the knowledge society. Educational institutions and teachers will understand their key role in a knowledge society much better, and will be encouraged to employ and experiment with innovative educational practices making use of a rich pool of open resources. The current dominant paradigm of teacher- and subject-centred learning in formal education will have given way to a learner-centred, competency-based paradigm. In particular, learning communities and collaborative approaches will flourish, making use of a new generation of easy-to-use Web-based tools and information services (e.g. Wikis for collaborative work on study projects, Weblogs for sharing ideas and comments, RSS feeders and aggregators for receiving current "real world" information, etc.).Open and easy access to e-content repositories of academic and educational institutions, public sector information agencies, libraries, museums and other cultural institutions will allow for making use of information sources as needed to carry out creative projects and study work. As a rule, all educational material as well as research publications, the creation of which has been publicly (co-)funded, will have to be published under an appropriate open content license. With respect to Open Educational Resources, teachers will not be simple "end-users", as they understand the importance of continuous questioning, evaluation and improvement of educational practices and resources. As members of communities of interest in different disciplines and subjects, they will share experiences, lessons learned and suggestions on how to better foster the development of students' as well as their own competences and skills.

8. Conclusion

Author believes that the most important e-learning development directions, in order to come to the lifelong learning reality, are open access to learning, open source software, open standards, and open educational resources. To come to the big repositories of high quality content which will be free for all, still a lot of answers have to be answered and finding them will be one of the major research trends in lifelong learning and e-learning in the following years. Clearly open content itself (though high quality one and even localized for the end user) is not enough for effective lifelong learning. Before addressing useful open content, tools and licenses, one must consider the pedagogical approaches in which these resources could make a difference, i.e. by being used in innovative forms of teaching and learning.

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