Supporting Teachers in Choosing and Reusing Open Educational Resources

Davor Orlič, Bojan Cestnik,Tanja Urbančič

Abstract: Open Educational Resources (OER) are gaining importance in design of course materials and study plans in different disciplines, especially in those developing very fast and demanding frequent updates of study materials. Although they affect also face-to-face learning, their biggest impact is on e-learning and blended learning. With their accessibility and diversity, OER promise to bridge the gap between big needs for new contents at one hand, and limited resources on the other. OER can become an important element on a way towards accessible and sustainable education, providing that appropriate mechanisms for supporting teachers in making, sharing, finding, selecting and reusing these materials are provided. It is important to take care that wide accessibility and big quantity of available materials will not decrease the quality of education, but rather contribute to its enhancement. We present ExplorEdu, a project that develops a web service for acquisition, structuring and analysis of all information relevant for open education, focusing in the beginning on educational context in Slovenia, but aiming at more general results in the further development. With an example of using services of this kind in the field of Business Information Systems we illustrate and discuss the need and the potential of IT tools supporting work with OER, together with a changed, but crucial role of autonomous, well-educated and skilled teachers.

Key words: Open Educational Resources (OER), e-learning, course material design, Business Information Systems

INTRODUCTION

Rapid development of knowledge and technologies requires a substantial degree of openness from educational programs and teachers. Computer science and informatics are among the disciplines that face these trends very intensively, but they are far from being an exception. While including new contents is easier in the framework of informal learning, the situation is more difficult in formal education where study programs must equip students with appropriate foundations and the corpus of standard knowledge that has to be mastered. At the same time, teachers as well as students must also learn how to cope with many changing issues that should not be ignored since they play an important role in professional activities. Therefore, there should be enough room for flexibility and modularity in education, providing the opportunity for following important developments and for adapting to different needs of students due to their different profiles and backgrounds.

Besides following the developments in the field, teachers are supposed also to establish a connection between important novelties and existing curricula, to refresh study materials for their students, or at least to provide additional materials quite often. Selection and preparation of suitable materials is even more exposed in blended learning and e-learning, where students' engagement with the materials presents one of the prevailing activities in the learning process. Not only appropriate materials, but also suggestions of successful study patterns dealing with right sequences and timing, together with individual recommendations regarding the use of educational materials should be offered [7]. These activities should be realized efficiently due to the limited time and resources [11].

Since 2002 when Open Educational Resoures (OER) were coined in a UNESCO document [10], the academic community discussed benefits and dillemas related to them, pointing out the importance of motivation, institutional strategic views and issues such as IPR and copyright [1]. An important step forward is the European Commission's communication »Opening up Education« [8] that stimulates high-quality, innovative ways of learning and teaching through new technologies and digital content, putting Open Educational Resources (OER) on the agenda as a very important issue. The degree to which IT tools support the community in opening, sharing and reusing educational resources has increased, and e-learning has considerably fostered this development. Due to the heterogeneity of EOR, semantic technologies, especially ontologies, learning object

metadata and semantic-aware learning object retrieval also gain importance to enable exchange and reuse of materials [2,6]. Related pedagogical concerns are also taken into account, e.g. in an approach using design patterns to design learning environments [5].

In Slovenia, a nationwide bottom-up created and top-down supported initiative called »Opening up Slovenia« [9] activated resources needed for this development in the whole country. In this initiative, all Slovenian universities, representatives of schools at other levels, research institutes, chamber of commerce and other partners joined their forces in concrete projects. One of these projects is ExplorEdu, in which a web service for acquisition, structuring and analysis of all information relevant for open education is being established, with the aim of supporting teachers in their new role. In particular, support is needed in making, sharing, finding, selecting and reusing OER efficiently.

In this paper we present a case study used to investigate OER related challenges from educational practice, and describe some concrete solutions being prepared as a response to these challenges in the ExplorEdu project. The approach was observed in a context of a Business Information Systems course at the first level university degree at the University of Nova Gorica, School of Engineering and Management, in which OER have been intensively used for several years. The case study is used to demonstrate the potential of the presented tools and to reveal lessons learned from the lecturer's perspective. In conclusion we discuss how these new possibilities affect the activities of teachers and which aspects of their work should be better supported in the future.

OER PORTAL ExplorEdu

ExplorEdu is a system of freely available web services and mobile applications for automatic identification, capture, enrichment, editing, in-depth analysis and intelligent use of Open Educational Resources (OER), existing web and mobile educational services, studies and results of research projects, lesson plans, rules and legislation in Slovenia, Europe and globally. It is run as one of the major assets for the UNESCO Chair on Open Technologies for Open Educational Resources and Open Learning that serves to promote an integrated system of research, training, information and documentation on online learning and OER.

The goal of the project is to establish an online service for automatic acquisition, structuring and analysis of all relevant data and information, open education, and mobile clients for contextual view, change-oriented and semi-automatic creation of freely available training modules for the needs of the target groups of teachers, trainers, teachers, learners and researchers. ExplorEdu web services constitute the core technology that will be used in existing information services such as SIO (teachers portal) and ScienceAtlas (web portal for analyzing the scientific community), OpeningupSlovenia portal as well as the base service for the UNESCO Chair of open technologies and open learning.

The ExplorEdu mobile application serves as a basis for contextual and targeted investigation and semi-automatic structuring of open educational modules. The baseline technologies and solutions are based on existing open services that have been developed at the Jožef Stefan Institute and are listed in Table 1.

ExplorEdu is:

- allowing open access to all collected freely available educational resources of different modalities (text, numeric, video, graphs, structured knowledge)
- offering a range of innovative services based semantic technologies for comprehensive empirical analysis of the Slovenian open educational resources as an in-depth search for text and video analysis of developments in the Slovenian educational environment, including the competence charts, graphs collaborative, prediction, trends and simulations, as well as tools for acquisition, assembly, reuse and optimization of educational content

- allowing bi-directional data transfers between existing services such as SIO database (with local educational data)
- enabling integration between databases States initiatives OpeningupSlovenia, VideoLectures.Net, scienceatlas.si and ist-world.org,
- allowing open access to other services such as web portal. SIO portal, portals, educational institutions, portals development departments, etc. with the aim of promoting wider Slovenian open educational content.

Table 1: List of services incorporated into the ExplorEdu platform for OER identification and re-use

http://eventregistry.org, http://enrycher.ijs.si, http://newsfeed.ijs.si	news analytics pipeline
http://seacrhpoint.ijs.si	contextual search
http://videolectures.net, http://opencast.org/matterhorn/	translating, segmentation and video recognition at
http://scienceatlas.si	analysis of Slovenian science
http://qminer.ijs.si	bigdata, real-time, multimodal analytics pipeline
iDiveriNews on App Store	news analytics App
http://www.ouslovenia.net	national Open learning initiative

The main objective of the project is to establish a uniform system for easy and open access to OER and data with the aim of centralizing dispersed materials into one-stop-shop and promoting new ideas, cooperation between local educators, institutions and industry, the promotion of educational content and national and global achievements and establishing creative environments in the field of innovative and intensive use of ICT in educational processes. The project is carried out within the framework of the OpeningupSlovenia initiatives and follows the EC communication "Opening Up Education".

When completely finished in September 2015, the project will make available to teachers highly advanced and searchable services for specific case scenarios:

- Collaboration diagram that visualizes collaboration between authors, teachers, faculty members creating OER,
- Shallow text processing with topic and keyword detection, named entity extraction for names of people, locations and organizations, dates, percentages and amounts,
- Periodical crawl a list of RSS feeds and a set of databases and obtain links to newly created OER,
- Expose all OER elements, teaching materials and articles to users.

Figure 1: ExplorEdu dashboard with a set of visualization tools presenting OER content to teachers

LESSONS LEARNED FROM THE TEACHER'S EXPERIENCE

With an example of using OER services in the field of Business Information Systems we illustrate and discuss the need for IT tools, as well as the impact such services have on the role of the teachers. Nowadays, teaching modern computer related subjects typically incorporates technologies and resources from the Internet. This affects all kinds of teaching practices in face-to-face learning, e-learning and blended learning. Students are versatile users of web and mobile technologies and without incorporating modern teaching practices in the course curricula they might lose their interest and attention. There is a constant need for novelties in teaching, making the lectures more dynamic and attention-grabbing for students, stimulating individual approaches, spawning discussions and creative exchange of ideas between teachers and students. The critical factor here seems to be how to wisely select supplemental teaching materials on the Internet. When searching for such materials, the most important decisions from the teacher's viewpoint can be grouped into three categories: (1) selecting education materials, (2) evaluating the selected materials, and (3) determining how to use the materials during the course.

Facing today's vast quantity of the Internet content, just selecting the appropriate education materials often turns out to be an intriguing issue. In this sense, the results of the projects like ExplorEdu help by indexing several trustworthy repositories. The Figure 2 shows the content of VideoLectures.Net that we use regularly within the Business Information Systems course. Note that the sheer quantity of supplemental materials might be counterproductive, since simply including more information about the studied topic does not necessarily lead to a better and more efficient learning process; the excessive burden and potentially conflicting information might also lead to increased insecurity of students.

The evaluation of the selected supplemental study materials found on the Internet is another delicate task. Typically, one of the goals of the curriculum is that the students should be able to distinguish between subjective view of a blogger and more universally accepted truth of a book author. The role of the teacher is to stimulate discussions with the students and explain the references and reputation of a given material source.

Figure 2: VideoLectures.Net portal search results for "business information systems"

Teaching resources stored on the Internet can serve as a valuable resource for students since they can be viewed at convenient times and places, and at a pace that is best suited to their individual needs, supporting various forms of e-learning and blended learning. However, the actual challenge for the teacher might be to determine how to use the selected material during the course. In face-to-face lectures during the Business Information Systems course we often use five-minute movies on a certain topic and then discuss the content and allow the students to answer certain selected questions. It turned out that such an approach typically triggers livelier discussions than when only asking questions after presented topic.

CONCLUSIONS

It has been observed that there is a discomfort on the part of content creators and users (teachers, trainers, faculty, learners and researchers) in the re-use of content from the web. There are problems in the terms of copyright, which is necessary to detect and use technology to solve it on a long-term basis. The project ExplorEdu is a pivotal attempt in making teachers understand what lies behind currently existing large amounts of decentralized and unstructured content of all kinds in different modalities (text, numeric, video, graphs, structured knowledge), and among these there is an especially large number of OER.

While many of the learning topics can be interestingly presented through the materials found on the Internet, the teacher's role still remains crucial in the learning process. This role is in particular required during discussions that might without a moderator diverge into subjective arguments without resolving conclusions at the end. With this observation in mind, we argue that one of the main contributions of the portal established by the project ExplorEdu is to enable centralized open access to trustworthy educational materials, to inform teachers about new resources and to help them orient themselves in big quantities of materials with informative visualizations and contextual search. In spite of irresistible trend of computerization of many professions, as stated in

[3], the profession of a teacher is among those with the lowest probability for being replaced by a computer. However, teachers will need many new skills for the new role they will have in the education of the future, and our job is to provide suitable IT support to make this easier.

ACKNOWLEDGEMENT

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The paper has been reviewed.