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EDUCATION FOR KNOWLEDGE SOCIETY: BASED ON THE EXAMPLE OF DIGITAL REPOSITORY BISER

Abstract: The usage of the information and communication technologies (ICT) in an everyday life, including the field of education, brought the need for both thorough and lifelong educational reorganization. It became clear that a standard educational environment, standard library and standard technological resources can not address at the best the new requirements that are being put upon by the need for a new education. In order to implement the education that is being requested by the knowledge society, a new environment is needed, the one with the foundations in the usage of modern ICT, respectively establishing the electronic learning (e-learning) environment that implements learning objects as its foundation entities. As an important place for storing the learning objects, digital repositories are emerging, such as BISER (Bibliotečki Sarajevski Elektronski Repozitorij), which is being used at the Faculty of Philosophy in Sarajevo, at the Department for Comparative Literature and Librarianship. This papers' goal is to introduce the creation and the usage of BISER, as a mechanism that enables a systematic handling of publishing processes, accessing processes and processes of storing the teaching/educational content.

Keywords: virtual learning environment, constructive aproach to education, BISER system, lifelong learning

Introduction

The usage of the information and communication technologies (ICT) in an everyday life, including the field of education, brought the need for both formal and informal educational reorganization. It has become clear that standard education environment and standard technological resources (blackboard and chalk) cannot meet at the best the new requirements imposed by the new environment.

In addition to marketing, which necessarily requires changes in education sector, there are first generations of students known as "digital natives" who also require major changes. These students grew up in a completely different environment surrounded with new technology which they use from the earliest times. Today's students are native speakers of the digital computer languages, video games and the Internet (Prensky, 2005). Their world is different from anything seen so far. Digital natives no longer need to be in the physical space of the institution, but can access information virtually from any place and at any time. It is confirmed by research (Prensky, 2005.) that today's students are thinking differently and

processing information differently. Their demands are different from those which their teachers use to have.[1]

Inspired by all these demands and the progress of ICT many projects started with the goal of creating a strong *e-learning* community which is oriented towards the progress of the educational process. New technology changed the nature of resources that store knowledge. Creators of digital environment have set a whole range of new media and communication channels. Creation of whole new strategy of media influences on all aspects and people involved in this process (teachers, students, libraries, administration). This material needs to be functionally and effectively used in accordance with emerging needs. The most important format of storing and managing these materials are digital repositories of educational material that store learning objects or e-learning objects.

In the early stages of implementing e-learning and creating digital repositories, commercial software solutions have been used. But with the development of open source software a completely new perspective of quick, cheap and mass communication was created and was used mostly in academic communities. This has allowed greater involvement of universities in the e-community.

Usage of new technology in education process raised a new paradigm of education that is oriented towards the constructive interpretation of education. This approach explains that knowledge is not passively received through the senses or communication, but it is created from an active thinking object (Špiranec, 2007, 15).

Constructive Education Direction

Mentioned changes marked the context of higher education in the last decade. In the education sector very important knowledge about how to learn and educate in this new way was achieved. One of the most influential theories of education comes from the fields of psychology and thinkers who are active in the field of cognitive science. The novelty of this approach in relation to the former predominantly behaviorist theory is that cognitive oriented researcher observes learning process as active process of students confronting with environment.

This theory fosters the notion that student develops and expands knowledge in constructive process. New information is integrating into the existing knowledge, it makes changes in the existing structure of knowledge, and (while integrating) gets additional quality (Ewert and Thomas, 2001, 56). The process of learning can be understood as a constant process of expansion and organization of knowledge which is frequently represented in the following way:

[1] So, we have a new generation of students who expect:
• recive information relatively quickly
• do more things at once
• see first graphics on display, and later text
• access information from any place at any time
• be praised and often rewarded
• have information systems that will work like Google.
Introduction text from Marc Prensky: Digital natives, digital newcomers, Are you really different?. Edupoint. February 2005. volume V http://edupoint.carnet.hr/casopis/32/clanci/2 (accessed 25th 3rd 2010.)

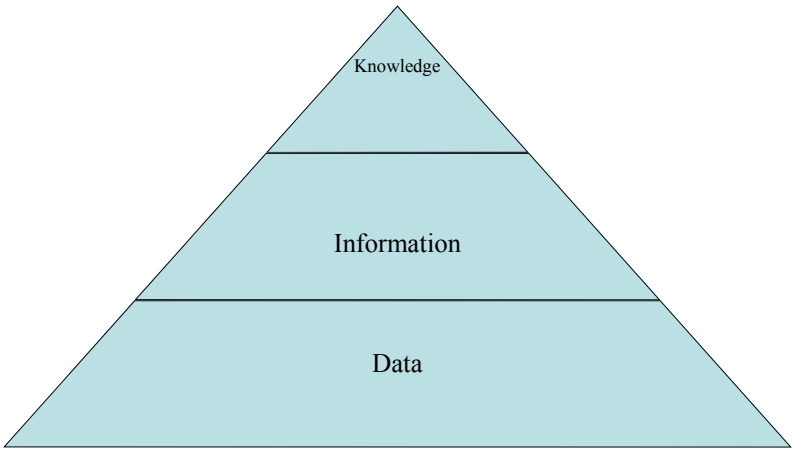

Figure1. Pyramidal representation of relations between data, information and knowledge

This paradigm can be used to show differences between traditional way of learning (closed paradigm) and constructive access (open paradigm) in education. Traditional learning is understood that a body of knowledge which is located outside individual for example in the textbook or lectures need to be well explained to the student. An important determinant of this paradigm is that the teacher helps students assimilate and absorb knowledge. New way of learning, constructivist learning, explains that education cannot be reduced to the level of information which comes from outside sources, yet it is ongoing and active process of construction. The role of educational media is to engage students in the process of constructing knowledge. Engagement relates to the interpretation, getting insights in the various aspects or awareness and training for knowledge management processes. Therefore the recommendations for designing the educational process, instead of the traditional paradigm of knowledge, require from the learner to question, examine, reject or modify the constructions of reality. The constructivist movement in didactics fundamentally changes the role of participations in education (in the center is one who learns) and seeks to create a new "learning environment" that encourages the ones who are learning (Špiranec, 2007, 17). From there we have got complementarity between constructivism and technology models. The role of computer technology is to provide an environment for constructive learning process.

However, here it is important to add that no matter how much attention is currently focused on issues of technology in the educational process, educational component has not been fully investigated and considered and therefore we do not know all the implications and consequences of the introduction of technology in education.

Educational Process and Information Sources

Should the introduction of Web technologies in educational process experience a boom will depend on the availability of quality digital learning resources. The digital age has changed the nature of flowing information sources therefore it is justified to speak about the evolution of information sources or information objects. In order to achieve a clearer terminology, the term information object (source) needs to be considered in relationship or correlation with two other terms: knowledge objects and learning objects. Information object is a higher birth term that includes both knowledge objects and learningobjects.

According to Metros and Bennett, it is necessary to distinguish between data, information objects and learning objects. An information object is a digital resource of information which does not include an educational component, such objects are typically stored in digital libraries. Learning objects on the other hand include learning objectives and outcomes, their assessment and information object itself.

The model that we have mention before can be used as a beginning step for interpreting the differences between these concepts, tree level pyramid: data-information-knowledge can help us track the conversion from data into knowledge. Information objects are on the bottom of the pyramid. Information objects are component of information or content (it could be any content available on Web but isolated from other content).

Knowledge objects are on the top of pyramid. Knowledge objects are related to information objects that are set in a meaningful way, for example by using standard indexing languages. Digital knowledge objects in a database are indexed on the basis of certain data scheme. Learning objects are located in the middle. They present knowledge objects that are contextualized in the learning domain. Learning objects include relevant metadata of learning objectives, content and activity evaluation. Knowledge objects are different than the information objects because we access knowledge objects from the position of agreed meaning (semantics).

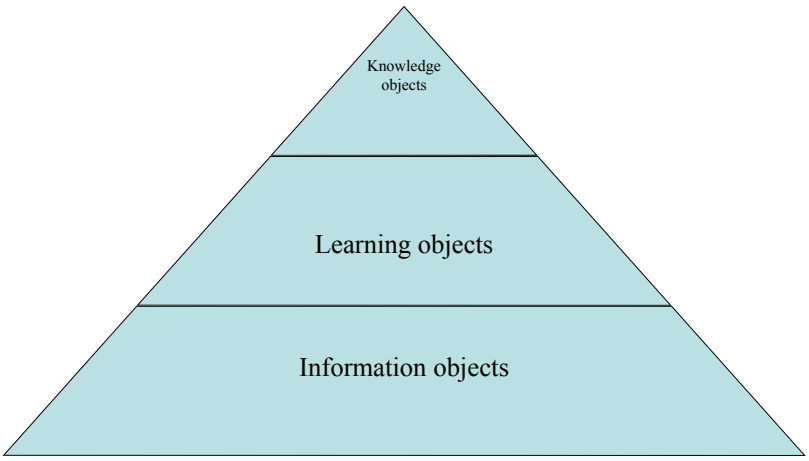

Figure2. Pyramidal representation of relations between information objects, learning objects and knowledge objects

Explained from the analog environment, set of books is a set of information objects. The same books cataloged in the library are a collection of knowledge objects. Learning objects are therefore available only in the databases or repositories such as digital libraries, which are indexed with metadata for educational materials (Špiranec, 2007, 27). So, it is easy to conclude that the creation of educational resources is an important milestone in the redefinition, re-conceptualization of resources. But the creation of educational resources influences the entire educational process and allows conceptualist approach to education to become more present in the wider academic community. This testifies the implementation of system that supports learning at University in Sarajevo: BISER (Sarajevo University Library Electronic Repository). The distance learning system BISER is found on open source software called Moodle. Moodle was chosen because of his non-commercial basis, but also because Moodle successfully adjusts to education processes in educational institutions around the world.

Open Source Models

BISER is a system for distance learning which has been found on the system for managing online learning (LSE, Learning Management System) called MOODLE[2] (Modular Object-Oriented Dynamic Learning Environment).

Moodle is designed as compatible, flexible system. It is programmed in the PHP language that can be installed and run on any computer platform. It is designed in a very modular way, it is a flexible and fast tool. It supports two bases: MySQL and PostgreSQL, and includes a large number of languages. Simple and quick installation gave this tool great popularity. System itself has low demands and it is easily to integrate it into existing systems.

It is particularly important to stress out that the use of this solution is very easy even for non-informatics. That suggests that the organizational and social challenges are greater than the technical ones. This moment is additionally important since the use or installation of Moodle system does not require huge financial investments. Deciding to use this system for e-learning purposes is actually an evidence of recognizing opportunities that can raise education process into a new level of quality.

Moodle is acronym for Modular Object-Oriented Dynamic Learning Environment that is most beneficial to programmers and education theorists. Additionally it is the verb that describes the process of wiggling or lazy meandering through something, thought that frequently leads to creative solutions or comprehensions.

Creator of this application is Martin Dougimas, network administrator of Curtin University in Australia. Today this application is used to maintain a distance education worldwide. Moodle as open-source project provides an insight into the source code therefore it is possible to modify the application or to adapt it to own needs. The software holds GNU GPL license and the fact that it is possible to use it without compensation contributed to his great popularity and continued development.

Moodle provides to teachers and associates full computer support in organization, planning activities and execution of online courses, and is particularly effective as a supplement to traditional teaching in the classroom (so called blended learning). Creation of large number of courses in one unique system allows development of dynamic online communities. The courses are shaped and developed by teachers or assistants. Resources are generally all files, folders, links, all prepared educational contents, electronically available resources that represent a curriculum structure provided for each course (by the choice of teachers and /or associates).

All files that are entered into the system can be easily copied, modified, deleted, and compressed using a special module for managing files (File Manager). Websites can be created with tools that are specifically provided for that purpose. Teachers or associates have administrative license for specific course. That means when posting contents on the system copyright protection is an important component of correct usage of applications for distance learning. Moodle offers several types of course structures but three most important are: a thematic form (Topics Format) - units are arranged in the form of topics (topics are not specified, teacher marks a special theme that is currently being processed); Weekly Format – units are deployed weekly (the system itself accounts dates of weeks, depending on the

[2] LMS (Learning Management System) and LCMS (Learning Content Management System) is a complete solution for learning system which covers the registration of users, their monitoring, provision of materials to users and allows the verification of knowledge, ensures data security and allows administrators to define access levels for each individual user.

starting date of the course, and specifically indicates the current week), and social form (Social Format) - the entire course is conducted in the form of forums - discussion group.

Especially useful is the possibility of giving tasks to students, accepting term papers, giving online tests[3] or possibility of sending alerts to all participants of the course. Electronic communication via forums, email or chat allows users permanent access because all resources are put into electronic form. Students can choose their own "learning paths" or ways that wish to go though courses. Moodle also offers the option for making backups.

A effective example of all mentioned before is BISER .

BISER – example of good practice

The starter and developer of BISER system for distance learning is the Department of Comparative Literature and Librarianship at the Faculty of Philosophy, University of Sarajevo. Implementation of distance learning system is the result of long-standing successful cooperation with the Department of Library and Information Science at University of Zagreb.

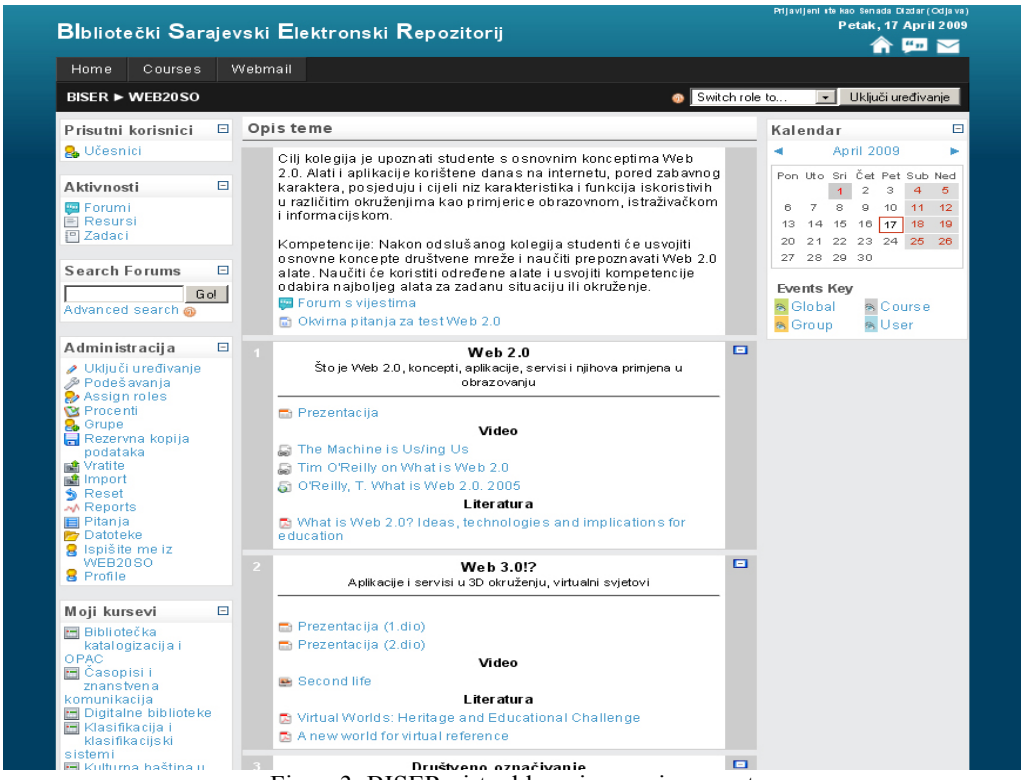

Figure3. BISER virtual learning environment

Within the Basileus Erasmus Mundus (2009.) project, department has hosted several speakers from the Department of Information Science, Faculty of philosophy, University of Zagreb. During the one month stay at our department they helped the creation and implementation of digital repository BISER. The implementation begun in February 2009. Our Faculty does not possess high-quality ICT infrastructure so we agreed that the entire

[3] Here is important to emphasize that Moodle does not provide one hundred percent user identification and although technically possible is not recommended for final tests, but rather for ongoing verification activities of students through online assignments during the semester.

system BISER needs to be located on the server at Faculty of Philosophy in Zagreb. BISER officially became active on March 18th, 2009.[4]

After software installation introductory presentations for teachers and students were organized. Because of complex user interfaces and various options that system offers separate workshops for teachers were organized. The next step was to organize more courses during the summer semester. Part of courses were organized to a similar model like those in Zagreb institutions, while others are organized by teachers themselves.

The usage statistics of BISER

Within a short period (March 2009. till May 2009.) during the test phase, system included four sections with the Faculty of Filosophy in Sarajevo:
- Department of Comparative Literature and Librarianship,
- Department of Slavic Languages and Literature,
- Department of Bosnian, Croatian and Serbian language and
- Department of Literature of Peoples of Bosnia and Herzegovina.

The evaluation which was made after a one year period provides the following information:

- 139 users
- 18 teacher / assistants
- 26 online courses (some of the exists only online)
- about 1GB (955 KB) course materials.

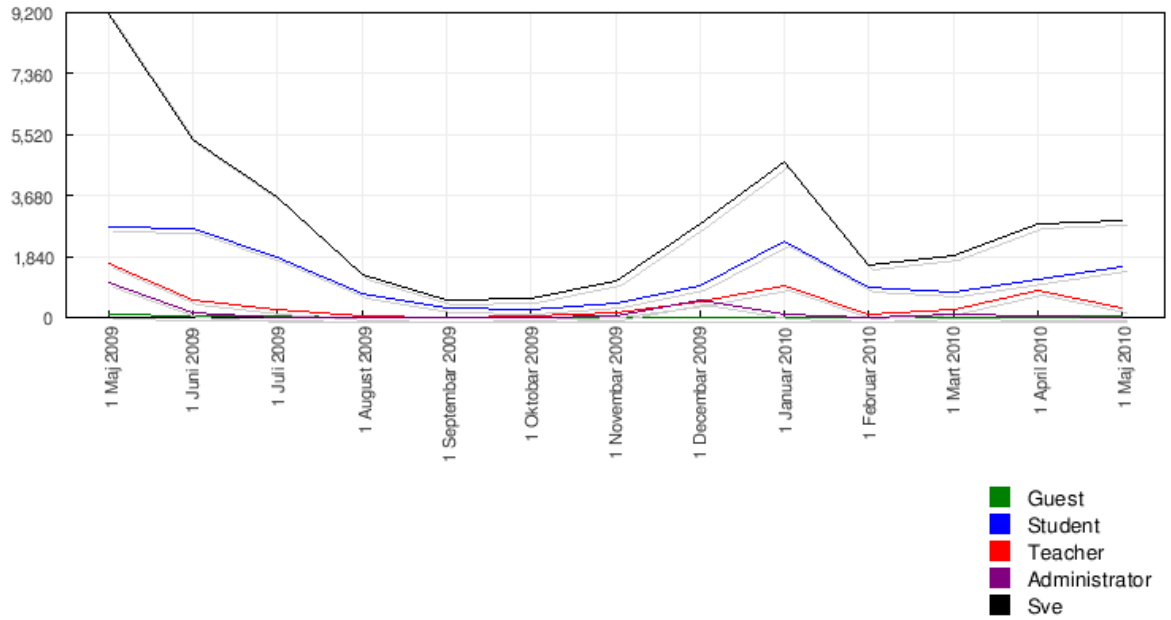

Figure4.Usage statistics

[4] In creating and implementing the BISER prof. dr. Jadranka Lasic-Lazic, Mihaela Banek Zorica, and Jasmin Klindžić participated. They have already implemented the Omega system for distance learning on Faculty of Philosophy, University of Zagreb, which was achieved under the project OIZEOO Ministry of Education, Science and Sport. As a technical basis the system uses FLOSS solution mood. OMEGA system for distance learning can be found at http:/omega.ffzg.hr (7.5.2010).

Interviews accomplished with students have indicated satisfaction with using the system and gave improvement in their educational environment. The Usage statistics in Figure 4. indicates that students are regularly visiting the system. These numbers are a good indicator of BISER success, but still there is a lot of work that needs to be done.

The future step should be integration with other important elements of educational process such as the faculty library. Cooperation with the faculty library will be essential for creating and maintaining a digital repository of learning materials.

Conclusion

1. Technology has significantly changed all spheres of human activity. In the education sector it has transformed the practice of European Universities contributing the implementation of the Bologna process.
2. The implementation of new technologies into traditional learning environment has resulted with the creation of virtual environments and has changed the old education model that was focused on teacher into a new model that has students in its center.
3. The usage of technology changed the way of recording knowledge and shifted the boundaries of thinking (especially in social and humanities sciences). Combined or hybrid learning, blended learning appears to be the most successful form of learning (particularly in the form of a system for distance learning).
4. The introduction of technology in education is promoting learning in accordance with the needs and demands of a new generation of students who grow up in a network environment.
5. Implementation of the BISER has enabled the appearance of the Faculty of Philosophy, University of Sarajevo in all major e-education environments.

The implementation of the BISER:

- provides major social and educational role of the Faculty,
- creates a new communication tool for the active cooperation of teaching staff and students,
- enables and encourages lifelong learning.

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