THE ANALYSIS OF EXISTING APPROACHES, METHODS AND TECHNOLOGIES FOR LEARNING OBJECTS DESIGN: LITHUANIAN CASE

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Abstract. The case presents e-learning approaches, methods and techniques on delivery fully distance education study master degree program at Kaunas University of Technology, Lithuania. The aim of the article is to reveal the most common organizational and technological approaches, methods and technologies used for distance education including learning objects design. Kaunas University of Technology deliver a totally distance master programme Information Technologies Distance Education. The Distance studies requires a deep knowledge in how to choose the best technologies to deliver a content and to design learning objects.

Keywords: Distance Education, Information technology, learning objects

INTRODUCTION

The programmes at Kaunas University of Technology are targeted towards specialists with a higher education degree in different fields, rather than exclusively for the graduates of *Informatics* or *Informatics Engineering*. The programme provides a possibility for the specialists with informatics or informatics engineering qualification to expand and for others to deepen the knowledge in the application of informatics engineering in distance learning and acquire the necessary skills and abilities. After graduating from the programme, the specialists with informatics or informatics engineering qualification will be able to design and implement IT tools, apply them in the learning process, organize and conduct distance studies using up-to-date IT and pedagogic approaches. A big challenge is to design the new learning objects (LO) based on semantic technologies improving the re-usability of preview LO and connecting re-used LO with new one by improving learning content or even study programmes. After graduation, the specialists will be capable of applying (selecting and using) up-to-date IT tools in learning, organizing and conducting distance studies by applying modern IT and pedagogic approaches.

1. DEFINITION AND THE MAIN FEATURES OF PHENOMENA BEING APPLIED FOR ELECTRONIC TEACHING WITHIN KAUNAS UNIVERSITY OF TECHNOLOGY

1.1 Technological aspects

Technical specifications are also important to consider when choosing the system for learning objects development. They can play a crucial role in determining whether the content can be used and reused. Besides the common used standards and specifications also influence which learning management system may be used for distance learning.

In this part of the decision-making process, the IT, finance and marketing staff will all have different interests that may not necessarily be compatible. It is advisable for the central

players to participate in considerations and discussions about a given system's features and limitations.

More specific points about the importance of ICT in the learning process (studies) are:

- Learning can be interactive & based on communication if ICT are used. This way a wider & more motivated learning environment in an education institution & beyond could be created. Learners solve problems communicating or working together
- ICT usage allows learning to be applied according to individual needs, learning content (*what do we learn?*) & methods (*where & how do we learn?*)
- Learning can be done anywhere, using a computer, mobile phone etc. In this situation it is important to make individual tasks for learners with special needs (blind, deaf or very talented ones)
- There is no need to teach all learners at once as ICT can control the process. This is very convenient for adult learners who have a job or look after their children.

In addition, there is a subset of educational institutions in the world that have not applied (or just starting) ICT in classes. To tackle this problem, topic about ICT & institution integration should be discussed. Especially: teaching about information communication technologies, using information communication technologies in various lessons or lectures, applying newest technological solutions into the management of educational institution, creating a virtual learning environment.

Another important thing about ICT is that it has many useful features related to continuous learning:

- Flexibility in respect of time & place (learning at home, using a virtual learning environment or distance learning)
- Flexibility in respect of learning material (courses are prepared for example according to organization needs)
- Easy access to information & other people
- Convenient communication with other people using online resources
- New approach to organizing learning (individualization of the process, better preparation & control of the learning material).

Despite many advantages of informational communicational technologies in adult learning, it is necessary to encourage adults to use ICT and show how they can facilitate the learning process.

1.2 Organizational & administrative aspects of e-learning

A stable structure of the administration of KTU and the Faculty of Informatics enables a smooth implementation of all study programmes, including the programme under analysis. Composition of the study programmes, including the programme under analysis, selection, update and certification of modules are carried out by the Study Programme Committee (hereinafter "SPC"), established under the Order of KTU Rector in the Faculty of Informatics (IF). It is governed by *Study Programme Committee Regulations*, as all such committees from other faculties [1].

Formal education of DE specialists in Lithuania was initiated in 2003 after preparing second-cycle study programme *Information Technologies of Distance Education* in three universities (Kaunas University of Technology, which is currently provided in cooperation by KTU and VGTU.

Many similar programmes are available worldwide, which is also proves the demand of DE specialists with knowledge and skills in information technologies and pedagogy. Internet search enquiries of both the bachelor and master's studies give more than a thousand of results.

Answering the question why standards are so important for content development, first of all ask ourselves what would happen if each country were used different connections for electrical devices?

E-learning standards and specifications are developed to facilitate:

- Description of e-learning content.
- Archiving and saving the e-learning content.
- Development of integrated learning content.
- Delivery of learning content.
- Reuse of learning objects.

Standardised learning content may be accessible for wider audience. The possibility that such content will be reused and used in different learning environments is much bigger than possibility for not standardised learning content.

2. TECHNICAL ASPECTS: A DETAILED CHARACTERISTIC OF ELEARNING TECHNIC BEING USED AT YOUR KAUNAS UNIVERSITY OF TECHNOLOGY

The Information Technology Development Institute and the Centre for E-Learning Technologies, operating in KTU, provide resources necessary for the conduction of the programme, such as virtual learning environments (virtual learning system of the University, *Moodle* is most widely used) and video conference system *ViPS* (http://vips.liedm.lt/). The programme is also conducted using *Moodle* system administrated in institutional level where the experiments and individual tasks of the students may be placed. Another popular and widely used tool is video conference system *Adobe Connect*, purchased in the scope of the joint-university project INFRA of the EU SF IT National Integrated Programme.

Consequently, ICT pedagogical strategies can change the learning environment, modify the nature of interactions and relationship with knowledge, and expand the perspective of resources delivery, accessibility and understanding. In fact, we may observe an increasing number of studies that focus on the benefits of using ICT tools, activities and environment. The communication between teacher and student is carried out by exchanging printed or electronic media, or through technology that allows them to communicate in synchronous or asynchronous environments and through other online ways (Holmberg, 2005). We agree with Keagan (2002) perspectives when he stresses the importance of both interaction and communication between an instructor and learner. For this author, it may be called distance learning when there is (i) an usual separation of teacher and learner throughout the length of the learning process, (ii) a role of educational organization in the planning and preparation of learning materials and in the provision of student support services, (iii) available to all students enrolled the same technical media to unite teacher and learner and carry the content of the course, (iv) the provision of two-way communication so that the student may benefit from, or even initiate, dialogue, and (v) the absence of a learning group throughout the length of the learning process (people are usually taught as individuals rather than as groups).

On the contrary, f2f learning is an educational strategy where the pedagogy and teaching strategies are focused on being physically in the same room. Even though there are more traditional aspects on this educational strategy because it is focuses more on the role of the teacher (the main actor on the educational process), some educational pedagogical strategies are using ICT to develop innovative f2f sessions, using whiteboards or simulators to promote more active teaching and learning. The use, *per si*, of ICT and remote tools, like LMS or e-Portfolios, does not guarantee a distance learning strategy. The teaching materials have to be designed focusing on the potentialities of a virtual presence.

On the other hand there is another possibility of blended learning strategy usually congregates aspects of distance learning and f2f learning, offering to the teaching and learning process the benefits from

The third dimension that we will analyze "ICT & Learning Enhancement", emerged as a relevant factor for this work given the importance of ICT to enhance learning.

3. LEARNING OBJECTS DESIGN AND REUSABILITY

Sakarkar et al. (2012), Alsultanny (2010), Rutkauskiene et al. (2013) analysed intelligent online e-learning systems, the learning object integration and reusability. Besson et al. (2012) presents another interesting program authoring support system where dynamic contextual information about how, why and by whom the learning object is used. Aroyo et al. (2013) were working on the e-learning system challenges related with semantic relations between different learning management systems, learning objects etc.

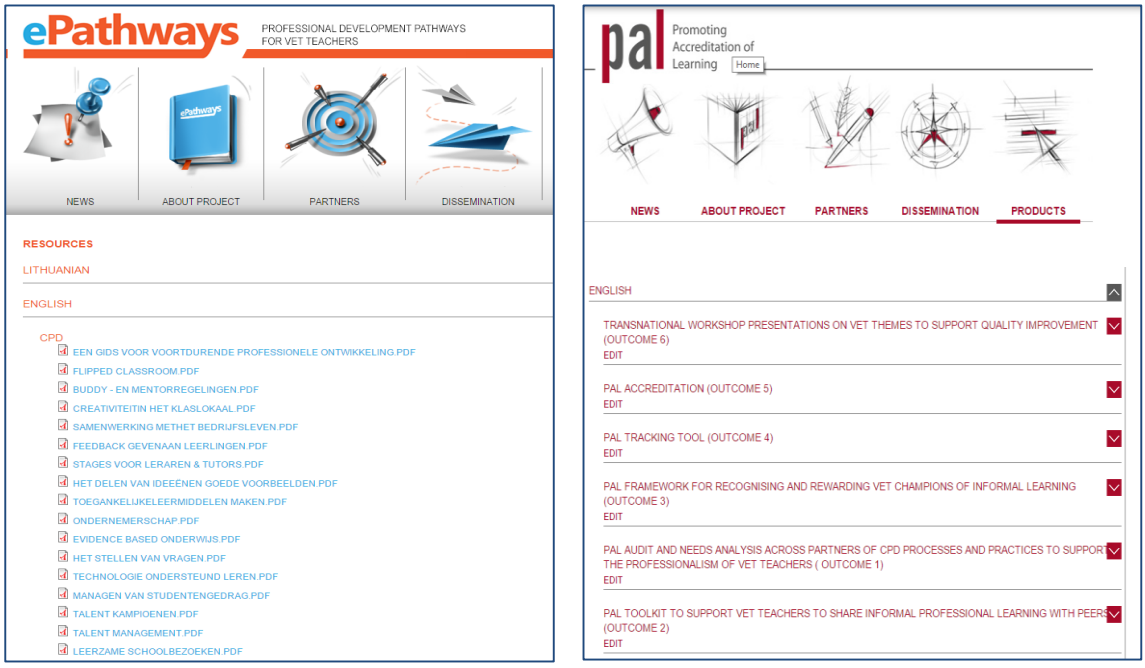

Figure 1. Presents the LO integrated directly to the information system.

The new experience on learning content and learning objects design is used by paper authors in national and international levels. There are developed the scenarios for presenting learning objects to users according to the needs. One of the examples the project PAL (www.palcpd.eu) and e-

Pathways (www.epathways.eu) were the learning objects are directly inserted to the information system and presented to users.
The next example is provided with the learning objects developed in the virtual environment Moodle at the projects (www.project-mwe.com) and the module by KTU authors developed for Master studies degree program (vma.ktu.lt).

Figure 2. Learning objects in the virtual environment Moodle.

Looking to the future of education the relations with a similar material in semantic web is very important. This will assure the reusability of designed learning objects and its improvement. In order to make relations with different learning objects or components it is necessary to have learning objects metadata and identified repositories of learning objects with a wide possibility of search and functionality.

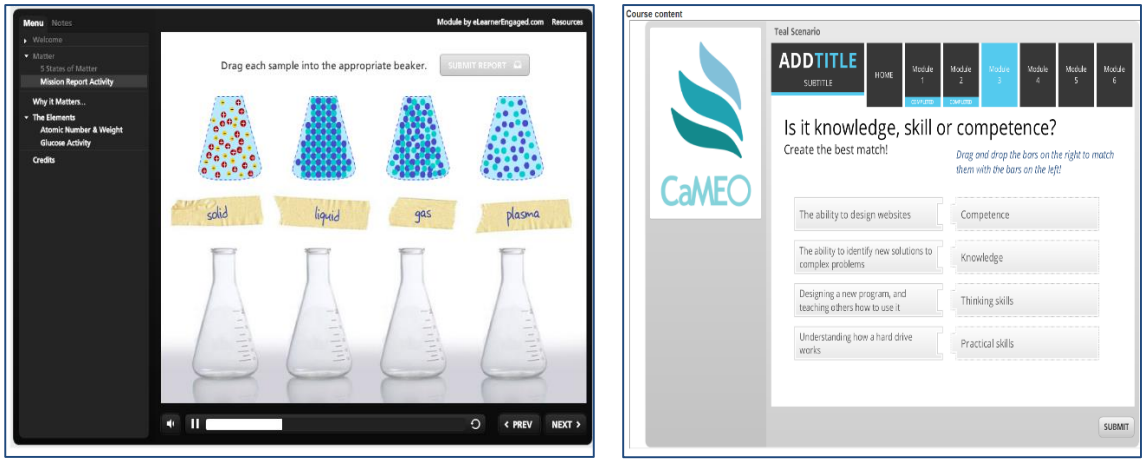

Figure 3. LO developed by Articulate.

The example with the learning objects designed by Articulate (www.articulate.com) shows that LO can be reused many times in the different curricular related to the content of Cameo project (eplatform.c-ameo.eu).

CONCLUSION (Times New Roman, 12 pt, Bold, All capital letters)

The aim of this paper was to analyze the different approaches, methods for learning objects design. There are analyzed integrated system based on semantic technologies by providing opportunities to the users to design, to reuse learning objects and to improve or adapt e-learning courses.

The authors pay attention to the international experience on LO design and delivery, where the Learning objects designed by different tools and presented in different environments reflects to the user's needs.

All in all, it can be stated that the learning process consists of learning material and tests, tests and the semantic relations between learning objects enriched with metadata that enables semantic analysis and relations establishment engine to build-in external references to learning objects. What can be shared between several learning objects is approximate conceptualizations based on a limited set of examples that are showing the actual circumstances where a certain conceptual relation holds.

Santrauka. Straipsnyje pristoma e-mokymosi galimybės, metodai ir technologiniai sprendimai teikiant magistro studijų program Kauno technologijos universitete. Straipsnio tikslas – apžvelgti technologiniuys ir pedagoginius sprendimus mokymosi objektų kūrimui beu jų teikimui. Nuotolinių studijų organizavimas reikalauja iš stusijų dalykų kūrėjų ir teikėjų išsamių žinių apie technologijas bei metodologinius aspektus reikalingus tiek mokymosi kursų tiek ir mokymosi objektų kūrimui ir teikimui.

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