

System Development e-learning for Higher Education

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Abstract

Better time use, decrease of educational costs, more effective learning and learning management from the user's side stimulate the changes in transmission of knowledge and learning, as it also has been recognized in our institution. So, the Faculty of Organisation and Informatics was also one of the places where the project for developing an e-learning system started in accordance with the user (student) demands and teaching process. Within this project the production of a system for managing e-learning as well as adjustment of teaching materials started. This paper presents our achievements and results of using developed e-learning management system in our institution.

Key words: e-learning, SCORM, LMS

1. INTRODUCITON

According to Conole (2004) the learning forms and models have been changing during the years on the one hand adjusting and coordinating the needs of pupils-students for undisturbed access to the flow of information and knowledge and on the other hand public-social and material possibilities for realisation of such a transmission. What is today actual is distance learning and it is particularly supported and encouraged by information-communication technology (ICT) that also reveals some new possibilities for learning from the material and technical side.

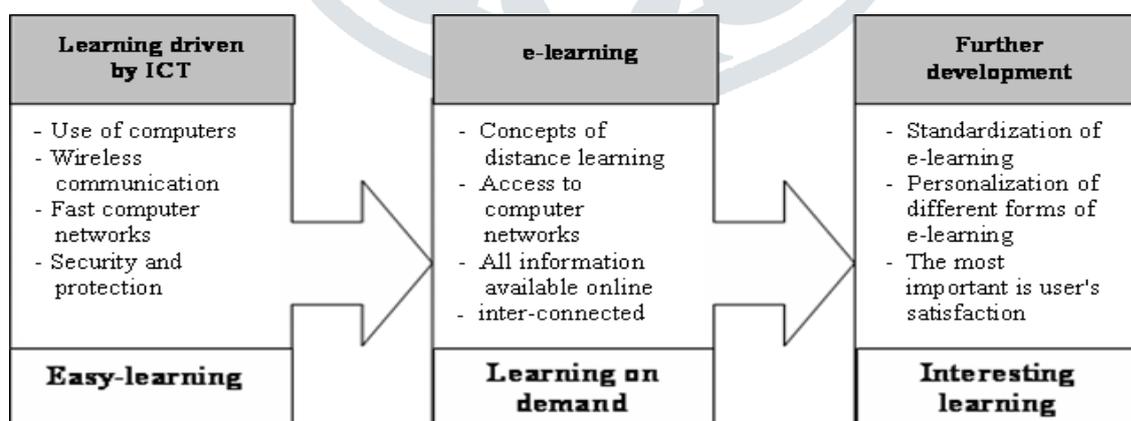


Figure 1: Development in the field of learning supported by ICT

E-learning is more and more widespread, and what is particularly pointed out is:

- important increase in the number of different tools and technologies for e-learning and companies developing them, and as well more adjusted contents for these systems,
- e-learning programmes are mostly developed by government institutions and big companies,
- in general the users have positive opinion about learning supported by ICT,

- it is not known if e-learning is of better quality compared to classical learning and
- introduction of e-learning demands high human, time and financial costs

One of the results in e-learning development plan is being presented in this paper. In accordance with the need for learning process promotion, learning process and transmission of knowledge, the Faculty of Organisation and Informatics started the project of e-learning system development. The desire was to support and promote classical forms of knowledge transmission by the use of ICT. In the structure of the project we started the construction of a system for distance learning management and the adjustment on learning materials and the learning process itself. Three aims were set:

1. to research which are the promotion possibilities of classical forms of learning process performance by the use of ICT, which are the possibilities of implementing modern forms of learning and which demands should be satisfied,
2. to form and build the system that will be a support and supplement to the classical form of learning, that will integrate the Internet service and will be developed according to the users' (students) demands and
3. to research if the formed system satisfies and contributes to the learning performance.

2. E-LEARNING INTRODUCTION PROCESS

On the basis of ideas matched to the problem area of distance learning, particularly e-learning, stated in the previous chapter and preliminary research published in Sajko (2005), in the framework of one course what was started were the possibilities research and e-learning application method project in educational process. The following tasks were set by this project: to offer the possibility for unlimited learning in the terms of time and space and following teaching via the Internet, to make easier the administration dealing with the evidence and checking students knowledge, make distribution easier and access to the teaching material and provide transparent teaching. On the other hand the task was not to create the system that would be a replacement of classical teaching.

1. communication services dispersion on numerous information services makes their use complicated and rejects less experienced users
2. the scope of a learning process and the quantity of material as well as bigger number of directions made updating and managing the contents which used to be available on-line more difficult
3. opening dislocated studies where a part of students do not have chance to attend classical teaching every day
4. students have become in higher measure interested in independent work and self-organised learning aside from their place of stay
5. more and more complex and long-term communication with students and their mutual communication as topical exchange of information

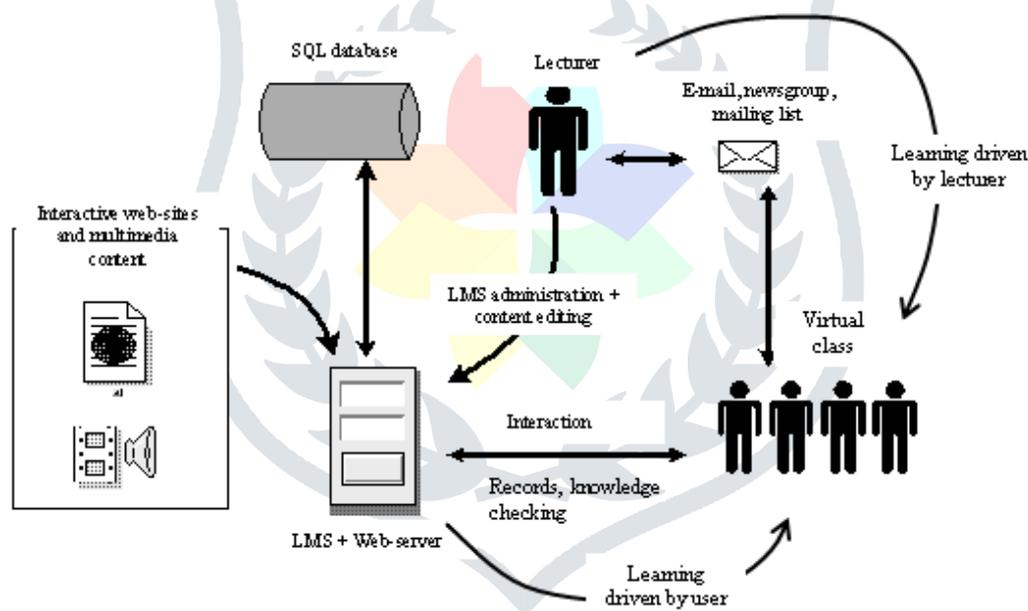
2.1. LEARNING PROCESS ORGANISATION AND DATA MODEL

Dilemma that was determining the system development was also a way how to organise learning process. It implies the role of a lecturer in a learning process, the way of ICT use and their combining with the classical form of learning as well as the distribution forms of learning contents. The experience and research of other authors, according to Rosenberg (2001), show that e-learning is the most effective in integration of class learning with e-learning architecture that includes the possibility for self-organised learning and training. Without any desire to exclude the classical form of learning performance, combined approach was chosen as a basic strategy of teaching organisation. This combined approach interweaves and combines the existing forms, and a learning process will be organised as a combination of learning led by a teacher and independent learning.

Table 1: Qualities of a learning process determined by the project

OVERALL LEARNING PROCESS			
	e-learning		standard (classic) learning
	Lecturer driven	User driven	
Learning process is driven by	lecturer	user	lecturer
material availability	limited	unlimited	limited
level of formality	formal	informal	formal
using ICT-a	combined with classic learning	fully	possibility of using ICT
knowledge check	lecturer driven	self organized	lecturer driven
communication	verbal	different forms	verbal communication
progress monitoring	self-supporting	system-supporting	self-supporting

Therefore, classical learning in classrooms will be combined with distance learning by the use of the Internet and e-learning toolkits, as we have summarized in Table 1. In any time the users will be able to have an access to learning material, communication services and knowledge check. On the other hand the teacher sets the tasks that follow the flow of a learning process and sets the deadlines for their mastering about which he also keeps records and checks the gained knowledge. The scheme of our developed LMS system is depicted in Figure 2.

**Figure 2: Learning process connections and relationships proceeding scheme with the use of LMS systems**

The realisation of such a system comprises the setting up four dimensions or components that we can consider as basic functional parts of the system:

1. learning contents
2. groups of system users and their authorities over the system (in the sense of communication and content management)
3. required communication forms among the users
4. ways of checking the results of users' knowledge

Considering the fact that there was a bigger quantity of digital contents that were already in use on the existing information services, the part of learning materials was directly transformed into SCORM compatible format. During this process the data were adjusted according to the SCORM standard. For construction of the new

learning object the toolkits as e.g. *MS Word*, *MS PowerPoint*, *Macromedia AuthorWare* etc. were used. According to that the learning objects were carried out statically (*MS Office* file format, PDF file html) or the dynamic ones. In e-learning object shaping SCORM model was consistently applied. According to SCORM model more RLO objects make and encircle one teaching unit and make a seminar, and more seminars make a programme (Curriculum). The content hierarchy is presented as follows (Figure 3):

1. Curriculum – teaching direction programme
2. Seminar – encircled topic unit from LEARNING programme
3. Lesson – responds to one lecture (RLO)
4. Topic – title within this lesson (RIO)

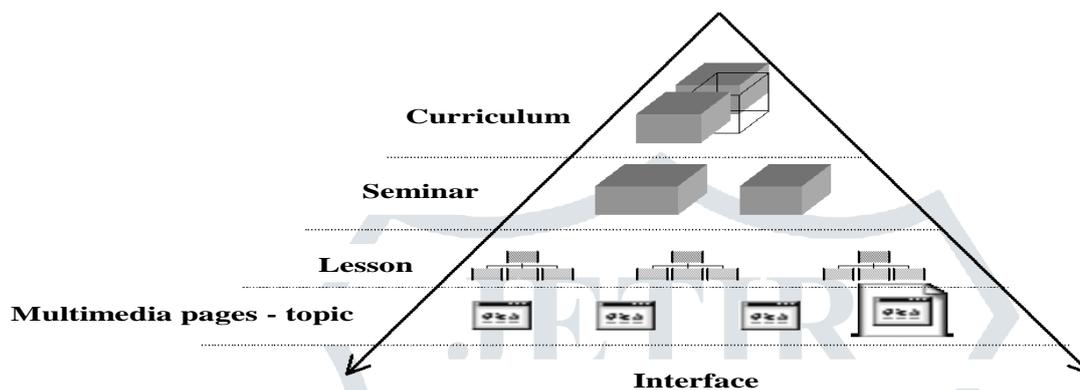


Figure 3: E-content hierarchy

The part for practice related to the contents offering to the course attendant the ability to apply the gained knowledge and skills. The examining contents were also shaped respecting SCORM standard, and their relationship with the learning objects was shown in Figure 5 (metadata within RIO object definition).

3. FINAL EXAMINATION OF SYSTEM QUALITY

It is important to stress their experience in working with similar systems as simplicity was one of the most important tasks in the system formation. The questioned students according to their own assessment are inexperienced in work with similar systems and mostly they meet them for the first time. From the total number of the questioned population 78% do not have any working experience with LMS systems and meet them for the first time (71%). Only 4 % of the questioned said that they have considerable experience in work with LMS systems. So we can conclude that the sample satisfied the criteria “*inexperience with the e-learning system implementation*”. The groups of question on the basis of which the quality of the made system were assessed are:

1. The user’s satisfaction with the system
2. The frequency of the system use and
3. User's opinion whether the system helps in teaching

CONCLUSION

The adjustment of the existing supplying materials for e-learning system has been successfully implemented. Also the system was examined and implemented in a teaching process what made concentration of different abilities possible:

1. combined teaching organisation in a classical way with a leader + distributive classroom unlimited space content distribution and all time access to learning contents
2. ability to follow and register students’ work and check their knowledge
3. different forms of communication and management among the users

4. ability to organise and manage different study programmes

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