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Evaluation of master study of E-Learning: Case study from Serbia

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Abstract

The purpose of this study is to present the organization and evaluation of e-education based on the case study. The master programme in e-learning at Technical faculty in Čačak is the unique program in Serbia involving e-learning as the programme content as well as e-learning as the programme education technology. The quality of e-learning master programmes is evaluated at the end of its first year of implementation and the results are presented.

1. Introduction

Increasing development of Information and Communication Technology (ICT) as well as recent developments in the field of learning theories cause changes in education. ICT was first used to support the delivery process in distance education to overcome the spatial and time separation between the teacher and students, but nowadays it has even greater impact on learning and social activities.

In order to provide more efficient and assessable learning, the e-learning paradigm is offered as a promising solution. Prensky states that tutorial learning is more efficient than learning in traditional classes because of the personal one-on-one interaction between the instructor and the student. Although tutoring in traditional environments is still an expensive form of learning, he reminds us that the current technology enables more students to interact with a single tutor at lower costs and over greater distances (Prensky, 2003).

Educational systems around the world insist on using information and communication technologies to teach students knowledge and skills needed for the future knowledge society (Jimoyiannis and Komis, 2007; Anderson and Weert, 2002). Some of the formative activities to improve application of ICT and e-learning/teaching modalities in university education are creating the university curricula of e-learning and by applying e-learning for the e-teachers, e-managers, e-teaching designers etc.

There is a significant lack of e-learning studies at the universities in Serbia. At the same time there is a growing need for e-learning, not only at higher education level, but also at any level of education, within the programme of life-long learning and, finally, for industrial and organizational purposes.

In order to enable high-quality and specialized education in the field of e-learning, the new M.Sc. studies in e-learning intend to educate future experts for designing and implementing e-learning. These studies are established according to the principles of the Bologna declaration and under the framework of the Tempus project “M.Sc.

curriculum in e-learning" and are delivered online (http://www.tfc.kg.ac.rs/tempus-jep-41016-2006/).

Some of the preconditions for realizing different educational processes involve studying educational goals and student learning outcomes and achievements. Today, high-quality education demands the system of evaluation activities. "For some researchers and administrators, student evaluations of teaching (SETs) are a valuable tool designed to improve both the student learning outcomes and teaching performance" (Zabaleta, 2007: 55).

Evaluation in education is the process of monitoring, measuring and valorising education (Bjekic et al. 2007). As the part of different evaluative procedures, the following aspects and dimensions of the teaching process are commonly investigated: content and organization of instruction (teaching in general); effects and ways of learning; teachers' work; instruction technology; assessment criteria, testing, evaluation (Bjekic et al. 2007; Marsh, 1991; McKeichie, 1998). Zabaleta emphasised the formative impact of evaluation on instruction: "the process of evaluating teaching is useful as a tool to provide formative feedback to the instructor." (Zabaleta, 2007: 68). The evaluation of educational product and educational process are fundamental strategies of educational evaluation. The both of these evaluative approaches are implemented in e-teaching/learning.

According to CIPP model of e-learning/e-teaching evaluation (eLearning Implementation and Evaluation), the four components are considered: context evaluation, input evaluation, process evaluation, and product evaluation. There are some specificities of the evaluation of the e-learning as a process about e-learning as content.

2. E-learning master curriculum at Technical faculty Čačak (Serbia)

Development and application of e-education (e-teaching and e-learning) involve development and establishment of technological support and intensive training for teachers and students so that they could acquire information technology (IT) skills needed for implementation and application of IT in e-teaching and e-learning. It is the uses of e-learning as a vehicle for delivering professional development targeted to teacher specific needs and as a content of professional activities that is emphasized in the information society context.

The purpose of this study is to present organization and evaluation system of e-education through a case study. The master programme in e-learning at Technical faculty in Čačak is the unique programme in Serbia involving e-learning as the programme content and as the programme education technology, and teacher quality assurance procedures.

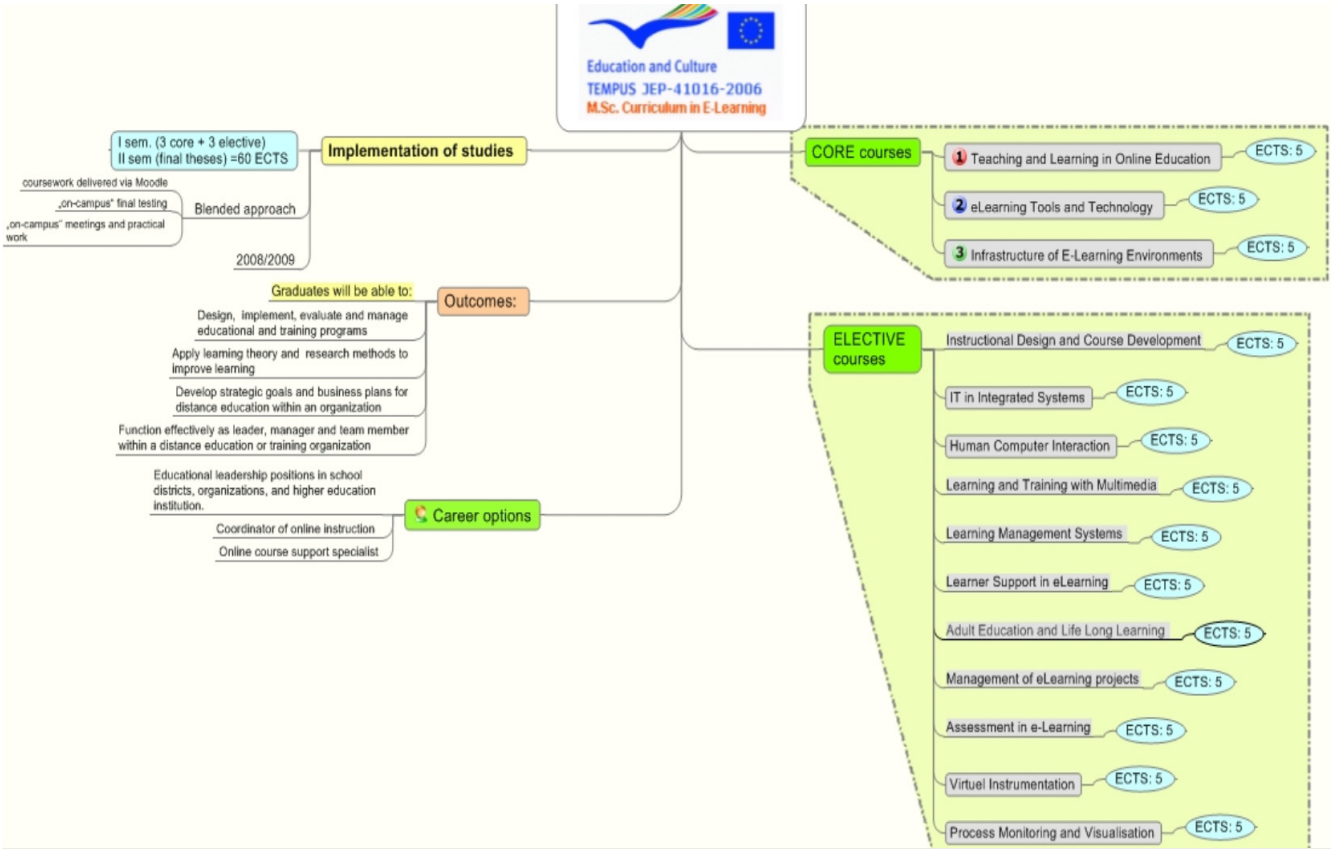

Figure 1. Structure of the master curriculum in e-learning at the Technical faculty in Čačak (Serbia)

The following text presents the curriculum designed for master study in e-learning and example of the programme realization. The university curriculum in e-learning was developed at Kragujevac University - Technical faculty in Čačak (Serbia). It was developed as a part of the international project (in cooperation with grant holder Maribor University in Slovenia, Brighton University in Great Britain, Graz University of Technology in Austria, and three universities in Serbia – Kragujevac University, Belgrade University and Niš University).

The curriculum has been created for professional groups with different prior education. However, all of them are going to use the e-learning and e-teaching procedures in some aspects of teaching and training in the future. Thus, different professional groups can follow a course of e-learning master programme. The capacities of peer e-learning are very useful in the master programme courses.

The curriculum is focused on the development of different e-roles (most of the e-learning professionalists): e-creator, e-designer, e-facilitator, e-tutor, e-moderator, etc.

This master programme in e-learning paves the way for the second level of teacher education (defined by the OECD and EC commission, European teacher education society, concepts of the national standards of teachers' professional activities, strategy of teacher professional). At the end of one-year master programme (60 ECTS) students become teachers of engineering technology (technics) and information technology – master in e-learning.

Table 1. Description of the competencies developed in the master study in e-learning

General competencies	▪ System of knowledge, abilities and skills of the vocational and scientific critical approach to investigation and problem solving; writing skills and skills of presenting vocational and scientific papers; research autonomy and self-reliance; ▪ Team competencies and effective communication skills in the work and research processes; ▪ Qualified persons for continual education and development of interdisciplinary approach; ▪ Professional activities in keeping with professional and scientific ethics.
Subject specific competencies	▪ Complex theoretical knowledge system of education processes and technological systems; ▪ Qualification for selection, application, investigation, evaluation, innovation and development of current methods as well as types of learning and teaching; ▪ Planning and managing skills of learning and teaching process, modelling the learning situation; ▪ Specialized knowledge and skills of the special domains of e-education, design, creation, implementation, delivering, evaluation and management of e-courses; ▪ Qualification to use complex theory and interpretation, to demonstrate practical knowledge and apply it online, synchronous and asynchronous mode, etc.

The outcomes of master curriculum in e-learning: at the end of the study, the master of e-learning is able to:

- functionally explain the processes and dimensions of e-education, e-teaching and e-learning;
- research the basic principles of learning based on the multimedia, analyze interaction as well as synchronous and asynchronous e-learning/e-teaching communication;
- select and apply the adequate technologies and tools in the effective creation of different e-learning solutions;
- understand the functioning of the hardware, software and communication e-learning infrastructure;
- create configuration and apply different multimedia devices, software tools, video conferencing solutions in the process of e-learning development and realization;
- design, develop and realize the e-learning procedures based on the specific educational needs of individuals, groups and systems;
- realize the multimedia project and teaching procedures on his/her own;
- critically analyze, apply and develop the system for help in learning and for student support; apply adequate technologies, tools and services for user online support;

- develop assessment plan and e-assessment techniques, collect data of the achievement, interpret the student's improvement in the context of formal, informal and social learning;
- effectively apply LMS in online teaching, coordinate online processes, assess effectiveness of the realized courses in e-environment;
- assess instructional frame for infrastructure defining and net demands for e-learning;
- analyze and improve roles of e-educator, e-manager, e-administrator, manage one's own learning and make plans for professional development,
- resolve e-educational problems and innovate e-learning and e-teaching process,
- develop and implement research project in the field of e-learning, and develop interdisciplinary approach to e-learning process;
- manage and transform work or study context which are complex, unpredictable and which require strategic approach in the e-learning fields;
- take responsibility for contributing to professional knowledge and practice and/or reviewing the strategic performance of e-learning teams.

There are many forms of e-learning courses. Most of these forms are used in these master programmes:

- e -learning activities in online professional learning community: graduated students – active teachers participate in a series of learning activities, exchanging ideas with other students and teachers; this form uses web-based technologies, asynchronous discussions, participation in school-based activities (lesson implementation, assessment procedures, class visits, etc.),
- e-learning programmes use broadcast formats, lectures reviewing, classes demonstration, reviewing other online materials; this form uses multiple sites, interaction via video conferencing, online text messaging; video conference-based teaching approach is important part of the (presented) curriculum;
- individualized self-paced instructional procedures: series of online learning activities which are delivered between e-teacher and teacher-participants who are e-learners in the curriculum; it includes some forms of the self-study without interaction, some interactions with instructor through online discussion, e-mail, Skype;
- hybrid teaching models: this form uses integrative onsite meetings, classroom visits, face-to-face workshops, coaching and mentoring programmes, small study groups;
- e-learning based on the extended communication in distance situation and without immediate connection.

The instruction is realized by applying the Moodle platform for e-learning which is selected on the basis of the leading university's experience. Moodle platform supports the creating and delivering different teaching materials and activities: e-books, multimedia interactive lessons, vocabulary, forums, wiki pages, chats, tests, quizzes, homework, workshops, etc. Hypermedia laboratory

(e-lab) is equipped with the videoconferencing system for teaching activities of visiting professors.

The modern concept of the programmes content gives direction to students' activities (there are week guides to learning) and learning plan development. The Moodle supports the evidence of student activities, automatic monitoring of student advancement, realization of pre-exam activities, etc., but it also supports the teachers and faculty staff.

In 2008/2009, the first generation of master students in e-learning at Technical faculty in Čačak attends the master programme.

3. Organization of evaluative action research

The problem of the research is derived from the group of questions considering e-teaching evaluation.

The research deals with evaluation of the effects, process and qualitative dimensions of the master study programme in e-learning.

The goals of the evaluative research are the master curriculum analysis, the courses improvement, and students' involvement in the curriculum development.

The variables used in the research are domains of the e-teaching:

1. content and structure of the curriculum,
2. goals and outcomes of curriculum,
3. organization of the instruction,
4. evaluation, monitoring and grading,
5. organization of e-materials and technology demands,
6. LMS and technical support,
7. evaluation of teachers,
8. general impressions.

The evaluation instrument applied is the assessment scale consisting of 63 items grouped in eight evaluative domains. The students assess the quality of the master curriculum at the five-level scale (5 is the best grade). The Scale is based on the evaluative procedures at Technical faculty in Čačak and adapted to e-learning procedures.

The target group consisted of online students of e-learning master study at Technical faculty in Čačak. The sample included 21 students enrolled as the first generation of online master programme (2008/2009).

The evaluation was successfully established and conducted using PollDaddy survey tool (www.polldaddy.com). PollDaddy was one of survey tools that students actively researched in the course E-learning Tools and Technology. Most students completed the evaluation during on site meeting at the faculty, while only a few of them completed it online from their homes. The evaluative procedure is performed at the end of the courses (April 2009).

4. Quality of e-learning master study – results of curriculum evaluation

The evaluation scale is the composite instrument. It consists of 63 items grouped in eight evaluation domains (Table 2, Figure 2).

Table 2. Evaluation of master study program in e-learning

Evaluation categories	Number of items	Absolute measures				Adopted measures (scale 1-5)			
		Min	Max	M	SD	Min	Max	M	SD
Content and structure of curriculum	11	44	55	48.38	2.97	4.00	5.00	4.40	0.27
Goals and outcomes	8	25	40	34.19	3.40	3.13	5.00	4.27	0.43
Organization of (e)teaching	13	46	63	54.71	5.41	3.54	4.85	4.21	0.42
Evaluation, monitoring, grading and testing	6	22	30	26.62	2.42	3.67	5.00	4.45	0.40
Organization of e-materials, resources	5	20	25	23.38	1.56	4.00	5.00	4.68	0.31
LMS and technical support	8	33	40	37.52	2.25	4.13	5.00	4.69	0.28
General Impression of the curriculum	7	23	35	31.81	3.22	3.29	5.00	4.54	0.46
Evaluation of the teachers	5	17	25	22.95	2.06	3.40	5.00	4.59	0.41
General evaluation (grade) of the curriculum	63	256	311	27.,57	16.56	4.06	4.94	4.44	0.26
N					21				

Among 25 enrolled students, a total number of 23 have successfully passed over 90% of exams so far, so we can claim a very low dropout rate. All of these indicate that students have very high motivation toward master study programme in e-learning. Standard deviation (SD) seems quite stable across all evaluated groups, thus showing balanced student opinion about the items. Figure 2 shows that mean values across different groups of items are pretty high, reaching over 4.2.

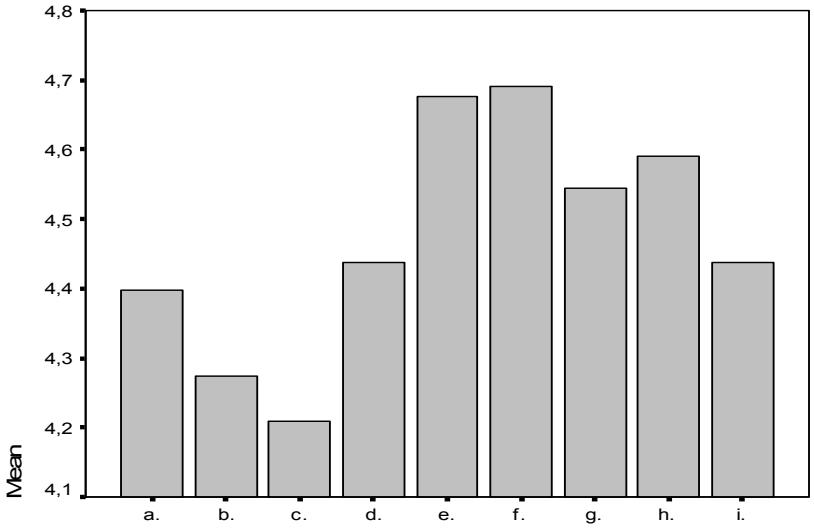

Figure 2. Evaluation of the curriculum in e-learning

a. Structure and content
b. Goals and outcomes
c. Teaching organization
d. Evaluation, grading and testing
e. E-content organization
f. LMS and technical support
g. General impression
h. Evaluation of teachers
i. Composite curriculum grade – sum of grades

Organizational dimensions of the teaching process are very important. We evaluated two of the organizational teaching domains: organization of (e)teaching and organization of e-contents and resources. Table 3 shows separate items in those two groups. Certain differences can be explained by uniting test items into groups for the whole master programme, while students may have different experience with various exams.

Table 3. Evaluation of teaching process and e-learning materials

Organization of teaching and e-content (items)	Min	Max	M	SD
Achieved modulated teaching and learning organization of different courses during semester	3	5	4.10	0.70
Study programme is flexible and conformed to individual student and teacher needs	2	5	4.19	0.81
Learning environment and teaching materials are universally designed and suitable to different student needs	3	5	4.19	0.75
Content provides frequent and synchronous interaction between students and teachers, also students with students	3	5	4.29	0.72
Content stimulates communication between e-students	3	5	4.19	0.75
Course activities corresponds to course objectives	3	5	4.52	0.68
Clear student guides for implementing defined tasks are given	3	5	4.24	0.62
The schedule of course activities corresponds to its requirements	3	5	3.86	0.65
Course week schedule is known since the very beginning	1	5	4.00	1.18
Pace and schedule for course tasks are conformed to individual student needs and abilities	2	5	4.00	1.05
Synchrony e-communication is used	2	5	4.00	1.00
Asynchrony e-communication is used	1	5	4.43	1.03
Partnership between e-teacher and e-student is established	3	5	4.71	0.56
Course navigation is intuitive and complied to course content	4	5	4.62	0.50
LMS is easily used and enables students to focus on course content	4	5	4.71	0.46
Web-based teaching possibilities and multimedia resources are used in courses to simplify learning	4	5	4.62	0.50
Learning materials are available on-line and off-line	3	5	4.67	0.58
Students are well informed about changed and edited e-learning content	4	5	4.76	0.44
N	21			

Each item can be interpreted autonomously. For instance, the item "*The schedule of course activities corresponds to its requirements*" has the lowest scores and majority of students share the same opinion (SD=0.65), thus showing that students agree that they have certain problems to satisfy the programme requirements, but that is only in general and not related to specific course.

On the composite evaluation scale, high correlations between results of evaluation of some e-teaching domains are found (Table 4).

Table 4. Correlations of measures of curriculum domains evaluation

Evaluation of curriculum domains	Goals and outcomes	Teaching organization	Evaluation, monitoring, testing	Organization of e-content	LMS & technical support	General Impression	Evaluation of teachers	Evaluation of the curriculum sum of scores
Content and structure	0.66**	0.65**	0.47*	0.52*	0.35	0.71**	0.60**	0.90**

Goals and outcomes	0.59**	0.16	0.20	0.27	0.56**	0.22	0.73**
Teaching organization		0.57**	0.48*	0.32	0.29	0.49*	0.85**
Evalution, monitoring, grading, test.			0.13	0.05	0.07	0.72**	0.57**
Organization of e-content & resources				0.67**	0.16	0.36	0.57**
LMS & technical support					0.21	0.16	0.48*
General impression						0.37	0.63**
Evaluation of teachers							0.67**
N = 21, ** p<0.01, * p<0.05							

According to high correlation between the composite general score (sum of scores), and evaluation of content and structure, evaluation of goals and outcomes and evaluation of teaching organization, the quality of the master study programme in e-learning is based on the general instruction domains. The specific domains of e-teaching (LMS and technical support, organization of e-content and resources) and composite general score are correlated, too; but the correlations are lower than the general instruction domains. The other correlations and relations between evaluated domains of e-teaching are the issues that should be studied further in the future.

5. Conclusion

The paper presents a carefully designed curriculum for master studies in e-learning. Since the first generation of students are just at the end of their studies, it is the time for evaluating their opinions in order to recognize the strengths and weaknesses which should be further improved. The evaluation results are remarkable high and partly presented in the paper. Besides, the separate course evaluation is a matter of another evaluation process and beyond the scope of this paper.

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