

Imaginative acquisition of knowledge - strategic planning of e-learning

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Abstract. *The universities/faculties in Croatia should strategically implement e-learning in the existing academic activities because of the many functional benefits that e-learning brings.*

In our paper we will present major challenges about e-learning in Croatia on different levels: state, university, faculty and personal level.

We will also present results of the questionnaire about advantages and goals of e-learning implementation and about criteria that are essential for decision making about the most suitable form of implementing e-learning. These results are the most important parts of the e-learning strategy documents according to the examples of e-learning strategies of EU universities.

Keywords. e-learning, strategy, goals, advantages, criteria/subcriteria, decision making.

1. Introduction

E-learning is a type of learning supported by information communication technology that improves quality of teaching and learning. By definition of T. Bates [1], e-learning encompasses all computers and Internet – based activities that support teaching and learning both on campus and on distance.

Therefore, e-learning can serve as a catalyst for change in teaching and learning. It supports skills needed in knowledge-based society, such as collecting, analyzing and applying information appropriately and includes different teaching methods, for example information management, creative thinking, critical thinking, problem solving and collaborative learning.

Strategic implementation of e-learning at universities/faculties in Croatia can attenuate the consequences of some changes which are very often results of the economic situation and state policy towards higher education (HE): increased number of students and therefore lack of student-professor interaction, broadened teaching and learning requirements and as a result lack of time for students' learning as well as lack of time for scientific research of academic staff. The universities in Croatia should strategically implement e-learning in the existing academic activities because of many functional benefits that e-learning brings. We will explicitly mention them in the section about the results of the questionnaire.

Strategic planning and decision making about the e-learning implementation is one of the aims of Tempus EQIBELT project [17] coordinated by the University of Zagreb. The main purpose of the 1st Policy Workshop on Creating University E-Learning Vision and Strategy, held in March in Dubrovnik, was to help appointed university 'e-learning strategy teams' to create e-learning vision and strategy documents.

In our paper we will present the possibility to use mathematical models in strategic planning and decision making about e-learning as well as one of the outputs of the 1st Policy Workshop: the results of the questionnaire about the advantages and goals of e-learning implementation and about criteria and subcriteria essential for decision making about the most suitable form of implementing e-learning. These results are the most important parts of the e-learning strategy documents according to the examples of e-learning strategies of EU universities.

2. Higher education today

In the essay “*Universities and their Function*” (1929), A. N. Whitehead (1861-1947), well known British mathematician, philosopher and philosopher of education, close friend and coworker of Nobel-prize winner Bertrand Russell, explained the function of universities in the following way: “*The university (...) unites students and professors in the imaginative consideration of learning. The university imparts information, but it imparts it imaginatively. ...A university which fails in this respect has no reason for existence. This atmosphere of excitement, arising from imaginative consideration, transforms knowledge... Thus the proper function of a university is the imaginative acquisition of knowledge.*” The concept of excellence in HE has remained surprisingly unchanged down the years. E-learning can be viewed as “the fusion of experience and imagination”.

The Higher Education has become part of a global shift to a new way of creating and using knowledge. The new way is focused on solving problems and is sensitive to customers needs. It strives for quantity as well as quality. It cuts across interdisciplinary boundaries. It is enlivened by apparently infinite quantities of instantly accessible information. Accountability, QA, league tables and performance indicators have become permanent entities in the HE lexicon [16].

In knowledge-based economies, governments see universities as engines for social change and expansion of prosperity. Being competitive on world markets means that we must invest in HE. At the same time, universities must find new, non-public sources of funding. University teachers work harder and harder and they are required to be more businesslike and more accountable. The changes in technology have dramatically impacted how we communicate, manage information and even the way how we use our free time. In general, teachers are asked to do more with less – teach more students, supervise more research students, which must gain their degrees more quickly (three years PhD study!), publicize more and more relevant research results, raise more funds for university etc.

Students today grow up with expectations of staying connected 24-hours 7 days a week. They are harder to teach and less indulgent towards indifferent teaching. And the most important,

students have to survive after their study period in global competition and be prepared for lifelong learning.

3. How e-learning contributes to achieving strategic objectives of a university?

In short, every comprehensive university has a three folded mission: teaching, research and service to society.

E-learning system is a powerful tool for achieving strategic objectives of the university. It contributes to the solution on the level of institution but also on the personal level (professors and students). E-learning system must be measured in terms of its impact on the performance of the university in financial and non-financial aspects and must be pedagogically sound and cost effective. Furthermore, it must fit in the new system and change the way of learning, teaching, researching and make business.

We try to give some answers to the question: How e-learning contributes to achieving strategic objectives of a university?, according to the three folded mission of the university. From the aspect of teaching, as a mission of a university, we can emphasize its contribution to the Bologna process and especially to quality assurance of teaching and learning. From our point of view, the Bologna process is an exciting process and a great opportunity to put new questions about roles, duties and aims at a university and can serve as a frame for solving some of the abovementioned problems. Let us mention the following example which shows that the role of e-learning is recognized in the frame of the Bologna process on the European level. One of the aims of the European University Association (EUA) 2006 European Rectors Seminar “Impact of the Bologna Process on Information Technology in European Universities”, was to answer the questions: How can distance learning help students to take modules from different universities?; How can blended learning help to teach the same modules twice a year so that students will not loose a year to acquire the required ECTS because of the unavailability of the required staff and classes? [13].

Research, as a second mission of the university, must be embedded in teaching and teaching must impact research. More and more e-learning tools and methodologies supported that paradigm.

Finally, from the aspect of serving to society, university must respect some of the principles of an entrepreneurial university. It must deliver courses for broader public and therefore contribute to competitiveness, employability and science communication and with these provide lifelong learning.

4. Problems and challenges of e-learning implementation at different levels

Comprehensive approach to e-learning implies aligning of e-learning system on different levels: state, university, faculty and personal level. The main question is: What has to be done on different levels and what are the problems? There are some answers.

The challenges at the state level are:

- Overreaching “soft strategy” (effective and with planned resources),
- Education development fund (interlinked with university/faculty funds),
- General infrastructure for e-learning,
- Motivation for HEI, professors and students to use e-learning,
- Intellectual property rights protection,
- Standardization etc.

At the University level the main challenge is to define university strategy for e-learning. Strategy for e-learning can be a part of teaching and learning strategy or can be separate. The results of the Observatory survey on online learning in Commonwealth universities in 2004, on the 122 respondents from 12 countries, have shown that half of universities have separate learning strategies and other half of them have e-learning strategy integrated into other strategies [14]. The EUA offers guidelines on strategy for ICT and e-learning [13]. The HECTIC report published by the Coimbra Group also provides a roadmap, based on the experiences of best practice [12].

At the Faculty level, implementation of e-learning must be related to the mission of the Faculty. The first step in this process can be needs analysis using methods and tools such as AHP, ANP, SWOT, balanced scorecard etc. The faculty must establish a professional learning plan and define indicators of success. Training and preparation for use of ICT technology should be an integral part of education and curriculum. Lecturers must be supported by both content and technical experts.

Furthermore, very important problem is motivation for all target groups at the faculty, including teaching assistants and also new faculty members, to use new technology and teaching and learning methods. E-competences are not longer only personal question and we must think and talk about institutional e-competences. Pressure from the students to have the information and to use modern ICT in teaching and learning and obligation for each teacher to be present in e-learning with her/his course is increasing.

The main problem on the student level is their readiness for e-learning. Students’ needs and preferences for learning media, structures and processes differ. Not all learners will be comfortable and successful with e-learning, just as not all learners are successful in a lecture setting. E-learning requires self-directed, motivated and independent learners with some comfort in computer literacy and navigation. To increase students comfort and skills, the faculty must provide orientation sessions and technical support.

5. Decision making and implementation process of e-learning

Strategic planning of e-learning implementation includes decision making about the most suitable form of implementing e-learning on different levels.

We have treated decision making in four phases: (1) intelligence, (2) design, (3) choice and (4) implementation (Table 1, [4])

During the Intelligence phase we have precisely identified our central decision problem and have performed situation analysis. The situation analysis has included a review and presentation of key facts and major trends concerning the problem. All of these factors influence the problem definition and alternative specification components. The tools that we have used are presented in *Table 1*.

In the Design phase we have developed alternatives and established criteria and subcriteria. We have completed background research, data acquisition and storage and retrieval. We have analyzed a lot of sources, but the most important for the developing alternatives and establishing criteria/subcriteria were e-learning strategy documents of leading EU universities. Among others we use the references: [2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15].

The alternatives in decision making process about the most suitable form of implementing e-learning on different levels are: ICT supported face-to-face learning; Blended learning and Learning that is entirely online. The criteria and subcriteria are presented in Table 2.

After background research, we have created a questionnaire concerning the importance of the various advantages, benefits, and goals with regard to the most suitable form of implementing e-learning. The survey was been conducted at the 1st Policy Workshop on Creating University E-Learning Vision and Strategy, held in March in Dubrovnik. We have collected 33 questionnaires (together with questionnaires, we have attached explanations of each criteria/subcriteria). The participants were: university vice-rectors, faculty vice-deans, members of university bodies responsible for teaching, quality improvement or university development, members of government bodies responsible for implementation of e-learning methodology and technology, members of EQIBELT project team and university strategy teams and university teachers and students involved or interested in e-learning; so we can speak about a sample of e-learning experts in Croatia.

The first aim of this survey was to provide basis for decision making for members of EQIBELT project team and university strategy teams in the process of creation of e-learning vision and strategy documents. Complete results can be found on the web page [17].

The second aim of the survey is prioritizing of the criteria/subcriteria. The most important criteria/subcriteria serve as input in multicriteria decision model that will be developed in the third phase - Choice phase (Table 1). We intend to develop mathematical multicriteria models - Analytic hierarchy process (AHP) and Analytic network process (ANP) that support decision making process on the most suitable alternative (form of implementing e-learning) on different levels. The AHP and ANP methods are powerful and flexible methods for decision making, which help people set priorities and make the best decision when both qualitative and quantitative aspects of a decision need to be considered [4]. These methods have been applied in management, governing, allocation and distribution for making strategy decisions of high importance and responsibility. AHP is one of the most widely exploited decision making methods and ANP is an upgrade of AHP method and it is the most comprehensive framework for the

analysis of societal, governmental and corporate decisions that is available today to decision-makers. ANP allows both interaction and feedback within clusters of elements (inner dependence) and between clusters (outer dependence). The complete model will be the topic of some other paper.

The fourth phase of the decision making is implementation of e-learning. The action plan and control system must be included in it.

Table 1. DSS for the Decision making and Implementation Process

DECISION MAKING	TOOLS
1. Intelligence phase (Identify the central decision problem) <ul style="list-style-type: none"> ▪ Perform a situation analysis ▪ Conduct search & scanning procedures ▪ Problem identification ▪ Determine problem ownership ▪ Present a problem statement 	Data Acquisition, Storage and Retrieval Data base management systems, Interactive query, Data bases Data analysis Spreadsheets, Graphics, Statistical analysis MS/management science/operations research models
2. Design phase Develop alternatives & establish criteria Search for alternatives <ul style="list-style-type: none"> ▪ Initial list ▪ Revised list Set criteria for choice <ul style="list-style-type: none"> ▪ Must criteria ▪ Want criteria Predict and measure outcomes	Data analysis Data Acquisition, Storage and Retrieval
3. Choice phase (Evaluate alternatives) <ul style="list-style-type: none"> ▪ Develop multicriteria decision model ▪ Solution to the model ▪ Sensitivity analysis ▪ Selection of alternatives 	Decision analysis: Expert systems (designed to replace decision maker), expert support systems (AHP, ANP..) Data analysis Data Acquisition, Storage and Retrieval
4. IMPLEMENTATION (Action plan and control system)	Data Acquisition, Storage and Retrieval Data analysis, Decision analysis

6. Results of the survey

In this section we present the results of the performed survey.

In all questions the discrete scale for validation of importance was from 1 to 5. Figure 1 shows the ratings of advantages of e-learning implementation. In Figure 2 we can find the results of prioritizing of goals of e-learning implementation and Figure 3 ranks importance of criteria. Details about ranking of the proposed subcriteria are given in the Table 2.

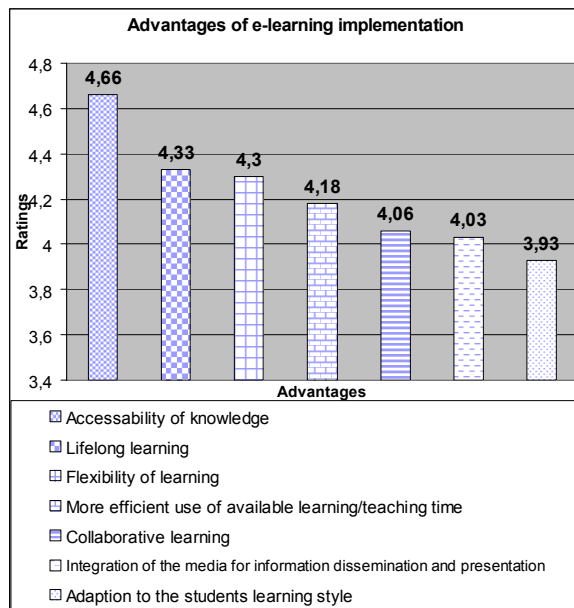


Figure 1. Advantages of e-learning implementation

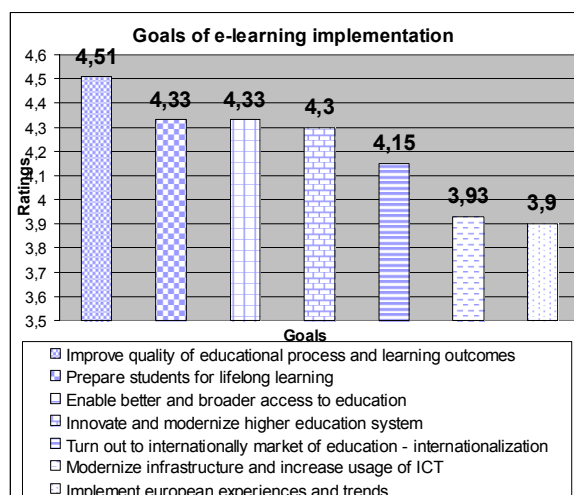


Figure 2. Goals of e-learning implementation

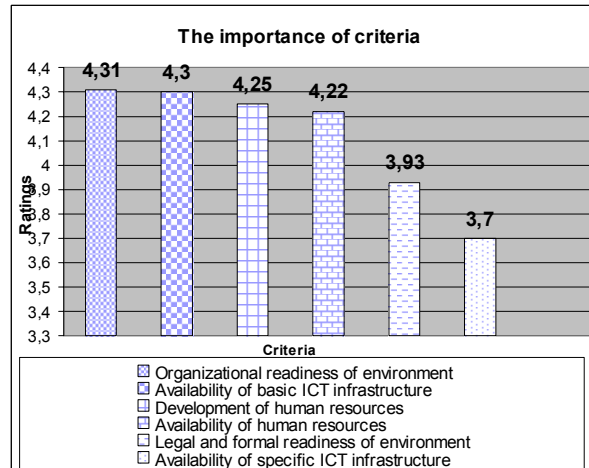


Figure 3. The importance of criteria

Table 2. The importance of subcriteria

ORGANIZATIONAL READINESS OF ENVIRONMENT	
Faculty strategy for development	4,52
University framework for development	4,30
Organizational readiness of universities/faculties for e-learning implementation	4,30
Financial readiness of universities/faculties for e-learning implementation	4,12
AVAILABILITY OF BASIC ICT INFRASTRUCTURE	
Network infrastructure	4,58
Teachers and students equipped with computers	4,39
Classrooms equipped for e-learning	4,24
Integral information system of universities/faculties	4,00
DEVELOPMENT OF HUMAN RESOURCES	
Continuous training of academic staff	4,54
Training of students for use of e-learning	4,12
Continuous training of support staff	4,09
LEGAL AND FORMAL READINESS OF ENVIRONMENT	
Evaluation and quality control at universities/faculties	4,12
System and criteria for academic staff promotion	4,09
Standardization of digital educational materials	4,03
Protecting intellectual property rights on state and academic level	3,48
AVAILABILITY OF HUMAN RESOURCES	
Specialized e-learning centers at universities	4,54
Availability of technical support staff for e-learning	4,36

Availability of support staff for methodology of e-learning	4,00
Availability of support staff for graphical design, animation and video	4,00
AVAILABILITY OF SPECIFIC ICT INFRASTRUCTURE	
Virtual learning environment (CMS, LMS, LCMS...)	4,15
Managed learning environment	3,82
Network videoconferencing system	3,82
Library management system	3,76
Exam management system	3,64
Video and audio streaming	3,57
Production of video and audio materials	3,52
Systems for simulation and virtual environment	3,39

7. Conclusion

E-learning has to be considered as an element of learning and teaching in general. It was recognized in the survey, since the highest ranking goal of e-learning is improving the quality of educational process and learning outcomes. The problems and challenges concerning e-learning implementation occur on the state level, university and faculty levels as well as on personal (teacher, student and staff) level.

Due to the survey, performed on e-learning experts in Croatia, the most important advantages of e-learning implementation are accessibility of knowledge, preparation of students for lifelong learning and flexibility of learning.

All proposed criteria were recognized as important, but four of them were ranked above the average mark of four. These criteria are organizational readiness of environment, availability of basic ICT infrastructure, development and availability of human resources. Legal and formal readiness of environment and availability of specific ICT infrastructure are ranked below the average. This last ranking reflects the state of the art of e-learning in Croatia, which is below the EU level, and therefore the importance of legal framework and appropriate ICT infrastructure is not recognized.

The survey emphasizes the need for strategy development, network infrastructure, continuous training of academics and specialized e-learning centers. These results are in accordance with the objectives of the Tempus project EQIBELT.

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