

EDUCATION QUALITY IMPROVEMENT BY E-LEARNING TECHNOLOGY

Croatian Universities and EU partners joint TEMPUS project

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INTRODUCTION

The purpose of this article is to describe the current state and current needs, as well as efforts put in implementation of information and communication technology (ICT) into Croatian higher education practice. In order to do so, the article will cover following topics:

- ICT in education: e-learning
 - What is e-learning?
 - Features, advantages, disadvantages of e-learning
 - E-learning delivery
 - Implementation of e-learning – “Lone Ranger” model or institutional strategic planning?
- EDUCATION QUALITY IMPROVEMENT BY E-LEARNING TECHNOLOGY (EQIBELT) project – how to institutionally support e-learning implementation into Croatian higher education practice?
 - Background
 - Objectives
 - Methodologies
 - Outcomes

ICT IN EDUCATION – E-LEARNING

What is “e-learning”?

The prefix “e” in e-learning is a simple abbreviation of “electronic”, but in modern terms with a meaning of computer and internet technology use, in the same way the abbreviations as *e-banking*, *e-business*, *e-library*, etc. are used.

The e-learning definitions are numerous, but the shortest could be simply stated as “learning supported by ICT”. Looking more precisely, all the definitions describing the concept could be classified as “technological” or “educational”, depending on the weight they put to the technological part or the educational part. Examples are listed below, ranging from pure technological towards more educational definitions:

- Learning that is accomplished over the Internet, a computer network, via CD-ROM, interactive TV, or satellite broadcast [1]
- The delivery of a learning, training or education program by electronic means [2]
- Any technologically mediated learning using computers [3]
- Education offered using electronic delivery methods [4]
- Set of applications and processes such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration [5]

- Learning that is facilitated by the use of digital tools and content [6]
- Learning activities based on any electronic format [7]
- A process that facilitates education using a network [8]

Modalities of teaching and learning (T&L) with respect to use of technology could be systematized as shown in the Figure 1. The line goes from the complete absence of technology in T&L process (chalk and blackboard) on the left, to the complete absence of face-to-face contacts (fully online education) on the right.



Figure 1. Modalities of teaching and learning with respect to the use of ICT

The modalities are additionally explained in Table 1 where also the usual delivery modes are stated for every mode.

Table 1. Modalities of teaching and learning with respect to delivery modes and use of technology.

modality	delivery	technology
Face-to-face (f2f)	Exclusively classroom	Not in use (except for the preparation of materials)
f2f supported by ICT	Classroom, with the use of ICT	PPT presentations, multimedia, web, online assessment, e-mail, forum,
Mixed mode (hybrid, blended)	Classroom and/or web delivery	LMS, CBT/WBT (<i>Computer/Web Based Training</i>), videoconferencing
Fully online	Exclusively web delivered	Course is web delivered (web site or LMS), videoconferencing

Features, advantages, disadvantages of e-learning

E-learning gives many opportunities and advantages for student as well as for the teacher. For students, this type of learning provides asynchronicity in following the course

content, accessibility of learning materials anywhere and anytime, guaranteed content consistency, personalization of learning, availability of up-to-date learning resources, facilitated communication with the teacher and with the group. On the other side, the teacher has the opportunity to structure her/his teaching time better, to easily update course content, to communicate with students more easily and to provide direction for their development (individually and in groups) and to assure the realization and assessment of learning outcomes.

Table 2. Comparative analysis of some e-learning features that are considered as advantageous and disadvantageous for both students and teachers

Advantages	Disadvantages
Reduement of f2f hours	(<i>only teachers</i>) Preparation of educational materials is demanding <ul style="list-style-type: none"> - time consuming (1 hour f2f \approx 20->100h web) \rightarrow EXPENSIVE!!! - non-trivial course design and ICT skills needed
Flexibility	Social contacts reduced
Self paced learning	Strong self-discipline and motivation needed
Course content digitalized and available 24/7	Technical support problems
Asynchronicity	
Enhanced communication (new communication channels for student-teacher and student-student communication)	
Student centred T&L	
Interactivity	
Improving ICT literacy	

However, e-learning brings along some disadvantages too, both for the teacher as for the student. Preparation of the educational material to be put on the web delivered course is quite demanding; it is estimated from numerous examples that one traditionally delivered face-to-face hour of lecturing equals 20 to more than 100 hours of work to be transferred properly to web self-educating material. Not only it is extremely time consuming but is also very expensive in terms of institutional resources. Additionally, proper transformation of course content to e-learning content asks for special skills in course design, as well as for non-trivial ICT skills.

From the e-learning user's standpoint, e-learning inevitably leads to reduced social contacts that are sometimes crucial as a motivational driving force. Moreover, in order to keep the pace of learning agenda, one needs a strong self-discipline and high motivation - when there's no fixed time schedule, very often the obligations are being postponed, and finally result in quitting. Additional non-trivial disadvantage of web delivered course content could be in experiencing technical difficulties with connections, speed, downloads, etc. all of which could bring frustrations.

All the disadvantages listed so far do contribute to the phenomenon that is actual from the very first beginning of the e-learning implementation – a high drop-out rate of the students!

E-learning delivery

In order to minimize the drop-out student rate in the first place, as a best choice and expert's recommendation is to use the so called *mixed-mode* (*hybrid, blended*) type of e-learning, which combines face-to-face occasional classroom meetings with online work. In this mode the occasional meetings are used to minimize the disadvantages of learning on the web. Through the classroom meetings the social contacts are enhanced, motivation could be raised and some encouragement to continue using web could be given; also, very often classroom meetings are a place to resolve some “technical” problems (here, “technical” in quotation marks, because sometimes students just need to re-try connecting or downloading or start the simulation with the guidance – both the teacher or the peer could help in such situations).

The ratio of the classroom-to-online hours in mixed mode is not prescribed, but adjusted for every course and its students. It should be the best left for the course tutor (or institution responsible for delivery) to decide, but generally it depends on the student's profile, institution's profile (primary/secondary school, university, commercial sector, etc), type of education (obligatory, formal, informal, continuous education, etc) and could be also adjusted during the course, if needed¹.

Implementation of e-learning – “Lone Ranger” model or institutional strategic planning?

Generally, any novelties (especially ones that change the long-term habits in everyday work) bring about resistance and opposition. It is normal and expected, since every change, as technology adoption is for example, inevitably goes with the new efforts and time and energy input. The curve that describes the stages of technology (or any novelty) adoption is presented in Fig 2.

There are always “innovators” that are first to embrace novelties and experiment with them; when they master the skills, they usually stimulate and motivate some of the people in their surroundings to adopt the novelty too; but all together that is usually not more than 20-25% of all potential users. Some major influence has to happen in order to attract more people to become users and to form so called “early majority” group. When this group achieves positive results after the technology adoption and when it becomes obvious that a change will be inevitable, the “late majority” comes to the scene and forms finally some 80-90% of all potential users. There are always “die hards” – people that won't adopt the novelty no matter what; some of them eventually do adopt some of the potential benefits, but do not become “full users” ever.

¹ The adjustment during the course is by all means limited by the course design on one side and the regulative acts of the institution that delivers the education on the other.

The same situation happens with the use of ICT in education - as the use of ICT in general has become more and more user-friendly and easy-to-use, the “innovators” and “early adopters” of e-learning have emerged. However, as numerous examples show, the disadvantages (listed and explained in previous section) of e-learning lead to limiting of the adoption just to this group – the time and energy input in order to get the skills of digitalizing the content, organizing materials, securing the delivery and taking care of technical problems has proven to be far too high for the early majority to embrace the e-learning. So, if nothing is institutionally done to stimulate the “early majority” group, the implementation of e-learning is bound to “Lone Rangers” group of innovators and early adopters, that are formally “out of the mainstream” and have no technical support, no long term financial support, no quality control of their work and their course content development is just left to their own judgement.

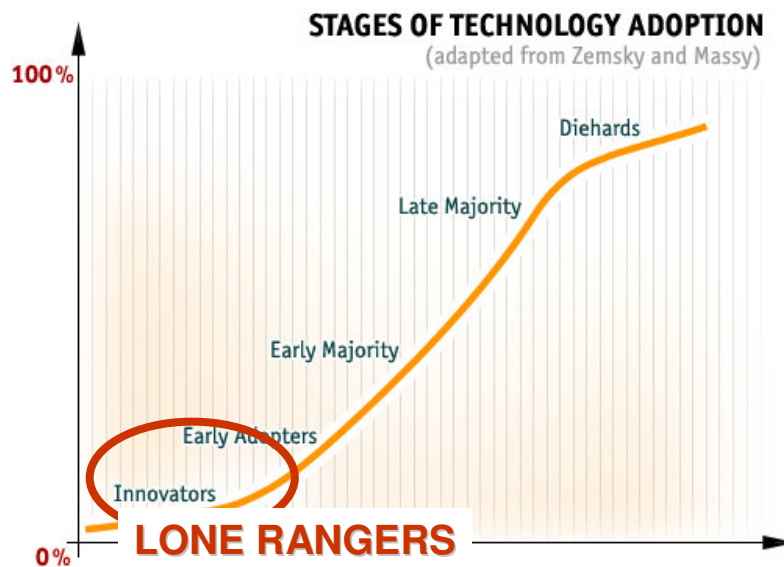


Figure 2. Stages of technology adoption (adapted from [9]).

Although the nowadays simplicity of the ICT use brings about “Lone Rangers” among teachers all around the world and all around the educational institutions on all levels, namely teachers that are early adopters and pioneers in implementation of technology, letting the process to develop through this model is not the suggested way for institutional development of e-learning. To assure the high-quality and cost-effective results on e-learning implementation (namely to bring about the major influence in order to attract the early majority group), the authorities in the field recommend an institutional project approach to support the e-learning implementation. Project approach comes with the definition of the strategic document (Mission statement, Vision statement, Current situation in the institution and surroundings, Project elements – time, goals, budget, Pilot projects, and Quality control) before the implementation takes place. Such a document serves as a milestone around which develops strong institutional consensus on infrastructure development, material and human resources for the use and support, stimulation for the use and development, sustainability and quality control when the systematic implementation takes place.

EQIBELT project - how to institutionally support e-learning implementation into Croatian higher education practice?

The Trans-European Mobility Programme for University studies (or shortly TEMPUS) funds projects between the higher education sector in the EU and its partner countries to facilitate university modernisation, mutual learning between the regions and peoples and understanding between cultures[13]. The Education Quality Improvement by E-learning Technology (EQIBELT) TEMPUS project has been approved by EC for realization in 2004 as a project that will stimulate the e-learning implementation in Croatian higher education system through gathering the valuable experience and knowledge provided by eight EU partner HE institutions (Table 3.).

Table 3. Partner institutions in TEMPUS Joint European Project for University Management UM-JEP 19105-2004EQIBELT project.

CROATIA	EU
University computing centre Zagreb (<i>Coordinator</i>) University of Zagreb University of Rijeka University of Dubrovnik CARNet Ministry of science, education and sports	Technische Universität Wien (<i>Grantholder</i>) University of Edinburgh Estonian e-University Katholike University Leuven University of Vienna Universidad Politécnica de Valencia Universidade do Porto Lifelong Learning Institute Dipoli at Helsinki University of Technology

The main framework of the project (background, objectives, methodologies, outcomes) is discussed in the following sections.

Background. At the beginning of 21st century Croatian universities, as universities all over the world, are faced with new challenges: how to maintain traditional values of university education and how to synergize them with new kind of knowledge and skills, demanded by students and their future employers. Quality issue of university education is at the top of priority list of university management. At the same time higher education is characterized today by significant physical resource constraints and growing class sizes. At last, but not the least, knowledge and education today is definitely global phenomena and university development strategies should consider that fact very seriously.

University management should respond to these new challenges by applying new technologies to the existing academic activities because:

- new technologies can offer new opportunities for teaching and learning and improve existing teaching and learning methods;
- these technologies are becoming increasingly available and part of students' everyday life, bringing social pressure to university staff to adopt them in their teaching process;
- they make teaching and learning more efficient, especially in the cases of physically dislocated faculties within an integrated university;
- they are the driving force but also basic prerequisites for modern lifelong learning and continuous education programs, offered by university and consumed by citizens of information society;
- they offer better quality control mechanisms for:
 - creation and delivery of course content;
 - online teaching activities;
 - student progress;
- They are likely to be adopted as standard part of higher education practice.

Objectives. The wider objectives of EQIBELT project are:

- to improve quality of university management and quality of university education by implementation of e-learning concepts and technologies;
- to promote e-learning as universities' instrument to become modern, forward looking and ambitious institution - leading provider of education and training, including the field of lifelong education;
- to practically introduce e-learning as instrument to bring new quality and new opportunities to participants of university education;
- to influence change of laws and university regulations to foster usage of e-learning.

The specific objectives and related expected tangible outcomes of the project are:

- to learn from European universities and to adapt and transfer their experience and knowledge to Croatian academic community, resulting with general framework for implementation of e-learning methodology and technology. This framework should include:
 - development, consensus on and promotion of the vision of e-learning at participating Croatian universities;
 - development of the strategy and implementation plan for e-learning deployment at participating Croatian universities;
 - development of the university policy on e-learning, that should:
 - A) define and explain university long-term motivation and strategic goals of implementation of e-learning (e.g. to improve quality of education, to introduce new elements of active learning into education, to offer university programs on national or international arena to non-resident students, to provide necessary skills for students to enable them for consumption of lifelong education during their future careers, etc.);

- B) encourage and reward deployment of e-learning in university teaching and learning, including rewarding policy for university units and faculty, with outstanding results in e-learning;
- C) ensure sustainability of e-learning efforts (and results of this project), by establishing continuous and reliable lines of support to university units and faculty, willing to implement e-learning technology;
- to define technical framework for implementation of e-learning, consisting of set of standards, rules and guidelines for university e-learning projects, e-learning educational modules and reusable learning objects;
- to shape and establish university centres for e-learning at all participating Croatian universities, including centre's operational procedures and rules, as well as service level agreements with users;
- to carry out pilot projects oriented towards creative and contextual implementation of e-learning in concrete university programs and supported by newly established university centres for e-learning.

Methodologies. Usual Tempus project methodologies were applied:

- Study visits to EU partner institutions (so far all the partner institutions have been visited and valuable experiences exchanged *in situ*)
- Workshops – 4 workshops have been held (Workshop on Creating University E-learning Vision and Strategy, Workshop on E-learning Support Centres, Workshop on Standards in E-learning, Workshop on Pedagogical Opportunities of E-learning), with participants from EU partner institutions and numerous participants from all the Croatian higher education institutions.
- Expert lectures – project experts, with the e-learning as their expertise, have held the lectures that were visited extremely good, but also web-streamed.
- Inter-university meetings of Croatian partners – so far two such a meeting have been held.
- Work on documents (Croatian side) and “peer reviewing” (EU side) – all the documents reached so far (university strategies on e-learning implementation were reviewed by EU partners.
- Dissemination of the results and e-learning promotion
 - On the very beginning of the project, the EQIBELT web site has been designed [14] and is constantly updated and upgraded
 - 4 numbers of project Newsletters are issued (also reachable as .pdf files on [14])

Outcomes. The project objective on developing a general and technical framework for e-learning implementation has been realized through reaching two types of the documents by Croatian Universities - the University Strategy on e-learning and E-learning Standards. So far, both Rijeka and Zagreb University have adopted major strategical documents, while the document on E-learning standards is expected to be reached on interuniversity level. The second major project objective, to establish the e-learning support centres and the e-learning expert network at the Croatian universities has resulted up to now in its full extent only in Zagreb (employment of the e-learning managers,

design instructors and ICT specialists in one centre). Other universities have defined their needs and secured the basic infrastructure by equipment acquisition. Development of sustainable business model and definition of the Centre services, terms of its use and quality of services it offers is expected in last project year.

The third major project objective, namely starting of the pilot projects in which the proper use of e-learning technology will be demonstrated with the ultimate goal to promote and encourage e-learning implementation is in its realization. The workshop Pedagogical Opportunities of E-learning in October 2007 will present current state of pilots and suggest their development.

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