

# THE TEN-YEAR HISTORY OF THE PROCESS OF E-LEARNING IMPLEMENTATION AT CZECH UNIVERSITIES

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## Abstract

*In the course of last ten years eLearning has become a standard in tertiary education. It is time we considered the whole process, which is not long but has been part of everyday life, and influenced the current way of education at all levels. The article deals with the history of the process at Czech universities. It presents documents which supported establishing eLearning as an inseparable part and form of instruction but even set its role in the process of accreditation of new study programmes; it introduces ways of evaluation of the whole process and single possibilities which eLearning tools offer for teaching various subjects; it provides survey on how eLearning is really used at Czech universities. As the University of Hradec Kralove, mainly the Faculty of Informatics and Management, was the leader in this process, methods used in the process of ICT implementation and ways of evaluation could have been later applied at other Czech and other universities.*

**Key words:** eLearning, distance learning, university education.

## Introduction

The strategy of European Union in the field of education since the end of the 20th century has been defined by several important documents prepared by European Commission, e. g. Growth, competitiveness, and employment. The challenges and ways forward into the 21st century (European Commission, 1993); White Paper on Education and Training – Teaching and Learning – Towards the Learning Society (European Commission, 1995); etc.

The increase in quality of education must belong to priorities of every developed country. The Czech educational system underwent substantial changes in last decades but there still exist numerous problems to be solved. Open access to universities, i.e. to tertiary education in general, wide offer of study programmes to higher number of applicants, development of the system of lifelong education etc. belong to the topical ones (Šimonová, Poulová, Maněnová, & Bílek, 2009)

Currently the number of university applicants is not decreasing, and at the same time the interest in lifelong education is increasing. Limited financial sources and other restrictions are heading towards such a situation when universities will not be able to satisfy all applicants in the near future. Data from the Faculty of Informatics and Management, University of Hradec Králové, can illustrate the situation in 2008/09 academic year. Number of applicants was four times higher than number of those who could be enrolled (3,744 applicants, 895 students enrolled in the 1st year in October 2008). The situation is similar at most non-technical faculties.

One of a few ways how to satisfy the demand for university and further education under the

current restrictions is the **distance education**. In university environment the educational process usually runs in the form of interaction between teachers and students in classrooms, laboratories etc. according to the schedule. Instead of this traditional, present form of study, Act N. 111/1998 Coll., on universities, deals with the distance and combined form of study (Poulová, 2000)

The distance form does not exist long in the Czech educational system; it appeared after 1990. According to Průcha the distance education is a multimedia form of managed study where teachers and tutors are totally or partially separated from students during the process of instruction. The multimodality covers the use of all distance communication means which can support the explanation of the studied topics – i. e. printed materials, sound and video recordings, computer programmes on floppy discs or CD-ROMs, telephones, faxes, e-mail messages, radio and TV programmes, computer networks (Průcha, 1999)

The distance and combined forms of education are often the only way for busy people how to reach the necessary qualification and meet increasing demands of the labour market. High motivation and personal maturity of university applicants enable to use higher share of self-study supported by information and communication technologies (ICT). These approaches quickly penetrate the lifelong education but can be easily applied in the present form of study at educational institutions of all levels (Turčani, Bílek, & Slaby, 2003; Šimonova, 2005).

The distance education is often connected with the use of computers. Computer support in education has been researched and evaluated for several years. But only after personal computers had been launched, electronic instruction (e-learning, eLearning) became available for wide public. Mass development of the Internet contributed substantially to the process. This means enabled to integrate elements of management into the self-study activities, and thus increase its effectiveness.

During quite a short ten-year history the term eLearning has not been defined exactly. It depends on the author's view which features are emphasized. It resulted from putting together the original word *learning* and *e*-prefix, similarly to other terms relating to eLearning which appeared in last two decades in various human activities, e. g. in e-mailing, e-banking, e-commerce, e-business, e-book. The word *learning* is used in several meanings, e.g. a process of forming knowledge, education, process of cognition etc. To understand the word well, it is necessary to know, what the *e*-prefix means. The *e*-prefix is applied in names of electronic products and services. It indicates relation to computers, especially to the Internet.

Putting the *e*-prefix and word *learning* together, a term arises which means a modern way of education, which uses computer technology, computer networks and appropriate applications, i.e. it enables running such a process of education where information and communication technologies are implemented.

eLearning has been changing under the developing conditions, so does its definition. Various authors provide different terminology and definitions. Differentiated views are caused by a wide range of the field and influenced by the environment in which and how it is applied (Poulová, 2009)

Some authors emphasize a technological approach to eLearning. They understand it as a tool for designing, updating, distribution and evaluation of the process of instruction, knowledge management run by net technologies and computers with appropriate hardware and software equipment.

*eLearning covers a wide range of applications and processes, e.g. WBT (Web Based Training), CBT (Computer Based Training), forming virtual classes or digital cooperation. It includes delivering and transmitting course content via the Internet or Intranet (WAN/LAN), satellite broadcasting, interactive TV programmes and educational CD-ROMs (Květoň, 2003)* This definition mainly concentrates on technological aspects and ways of transmitting the educational content.

Other authors emphasize multimodality of eLearningu, e. g.

*eLearning can be understood as a multimedia support of the educational process related to modern information and communication technologies with the aim to increase the quality of*

education (Nocar, Hoblíková, Snášelová, & Všetulová, 2004)

*eLearning is way of instruction which uses presentations and texts with links to other sources, animated sequences, video recordings, voice comments, notes, communication with lecturers and other students, electronic tests, electronic modelling of processes etc.* (HP, 2006)

Another approach emphasizes eLearning in computer networks and on the Internet, and authors define eLearning as a tool which enables electronic transmission (either full, or partial) of data with the help of web browser, the Internet or Intranet using CD-ROMs or DVDs with the aim to use the data in the process of instruction (Květoň, 2003), or a network which enables transmitting skills and knowledge (Květoň, 2003)

In some cases eLearning does not require computer networks to be applied. The process of instruction which runs on CD/DVD ROMs is also understood as eLearning.

*Strictly defined, eLearning means any way of implementing electronic material and didactic means to reach the objective of education effectively, mainly / not only via computer networks. In the Czech environment eLearning is connected with management of study in a learning management system (LMS)* (Kopecký, 2005)

The pedagogic (didactic) approach provides another view. *eLearning is understood as such a way of instruction which uses information and communication technologies to managing the whole process, designing courses, distributing study content, communication between students, teachers* (Wagner, 2005)

According to the European Commission, Action Plan on eLearning, *eLearning is defined as a way how to use modern multimedia technologies and the Internet towards improving quality of education thanks to easier approach to sources and services* (European Commission, 2001)

Kopecký instead of multimedia support emphasizes the flexibility of eLearning – he understands *eLearning as a multimedia support of the educational process using modern information and communication technologies which usually runs in computer networks. The main objective is an open and unlimited approach to education* (Kopecký, 2006) Another, less traditional, aspect – communication – was emphasized in his definition in 2005, where he defined *eLearning as a form of distance education where educators and educants are in virtual contacts (chat, e-mail, IP telefonie, discussions, ICQ etc.)* (Kopecký, 2005)

As it is obvious from the above mentioned definitions, eLearning is approached from two main directions. First, it is an educational process which uses information and communication technologies. Second, it is understood as a set of technological tools applied in education. In the wide context, eLearning is the educational process supported by information and communication technologies. Computer applications integrate single elements, combine explanations in the text form with animations, simulations, graphics, diagrams, audio and video recordings, electronic tests. Students can choose the way which suits them best. eLearning includes not only educational systems available on the computer net but also educational software on portable media (CDs, DVDs).

It can be said that modern educational trends are supported by Internet technologies. Widely developing information technologies are applied in numerous fields of education and all phases of the process of instruction (Poulová & Šrámková, 2004), mainly as a source of information, a means of communication, feedback, virtual learning environments etc.

## **eLearning at Czech universities**

The eLearning forms of instruction at universities can be used in both gradual study programmes and lifelong education.

eLearning can be applied in the distance study programmes, in the combined (part-time) form of instruction or supporting present lessons (blended learning).

The process of accrediting a fully distance study programme is very demanding. It requires a precise preparation of all study materials; organizational and administrative background for students who will study independently, without traditional lessons and face-to-face contacts with

teachers and other administrative staff of university.

In 2001 the European Commission announced eLearning to be a strategic plan of developing new trends in gradual and lifelong education. The strategic objective of this action was the integration of European structural funds and European Bank sources to further development and support of educational activities (European Commission, 2001) Similar to this, in the Czech Republic strong emphasis has been put on education and improving competences in the field of ICT and foreign languages since the beginning of this century.

These decisions led to substantial changes in the educational concept. Wide range of agreement and disagreement with new educational approaches could be seen both across the whole system and insight the single institutions. Teams were established dealing with the process of ICT implementation and eLearning in the tertiary education, at the beginning being very informal, joining enthusiasts, and their activities were hardly supported. Pioneering eLearning activities in this period were usually financed from various, mostly European projects. Despite the starting troubles the awareness of possibilities provided by eLearning was spreading slowly but steadily. Nowadays there exist university departments specialized in eLearning and its implementation into the process of instruction. There was also established a system for funding eLearning activities so it does not depend on random effort of single employees. These trends step by step have resulted in quantitative increase in ICT implementation and related activities in tertiary education, and in substantial shift in quality of formal and informal view on eLearning.

The process of eLearning implementation could be structured into three basic steps.

*First*, getting new **hardware, software** and other class equipment was essential. In real life new computers and programmes were bought, classrooms equipped with special computer furniture (tables, chairs) which are user-friendly to both students and academics and do not damage health after long hours of sitting in front of the computer, dataprojectors for presentations etc.

*Second*, forming **general media competence** followed. It means that all possible participants of the process had to learn how to work with computers and become computer literate, which covers academic, technical and administrative staff of the faculty, and students. Current understanding of what the expression media competence really means is explained from the point of basic computer literacy, which covers the use of computers and information and communication technologies. Knowledge management, i.e. the strategy how to work with information, gain and process it, apply in professional work, is closely related to it. This competence was formed by studying and testing for ECDL Certificate at most Czech universities, and both teachers and students participated in the courses. They were often run in the distance way, so participants received additional experience.

*Third*, applying the general **computer literacy in education**. This is the most difficult and demanding part, crucial for the process of instruction. It covers didactic training aimed at both teachers and students so that they know how to **teach and study** being supported or managed by ICT.

At the very beginning of this process, Step Zero was usually introduced at several universities which meant e.g. presenting study materials in shared directories, using e-mail for communication between teachers and students, designing a system administering study results and enrolling for exams, creating university web pages, editing electronic journals etc. None of the mentioned tools belonged to common services at 1990s.

But over few years quite static shared directories did not meet new requirements and were replaced by web pages supporting instruction of single subjects, then piloting of a learning management system started, either to be bought, or another system designed according to university requirements (Šimonová, 2008).

## The Process of eLearning Implementation at Czech universities

At the beginning of 2009 a research on eLearning implementation started under the Czech Science Foundation Project N. 406/09/0669 Evaluation of the modern technologies contributing

towards forming and development university students' competences.

There were 26 public universities accredited in the Czech Republic in April 2009. Annual reports of Czech public universities from 1999 to 2008 were the main source of information. Twenty-five universities were included in the research

- Academy of Art, Architecture and Design, Prague (VŠUP – Vysoká škola umělecko-průmyslová v Praze),
- Academy of Performing Arts, Prague (AMU – Akademie múzických umění v Praze),
- Academy of Fine Arts, Prague (AVU – Akademie výtvarných umění v Praze),
- Brno University of Technology (VUT – Vysoké učení technické v Brně),
- Charles University, Prague (UK – Univerzita Karlova v Praze),
- College of Polytechnics, Jihlava (VŠPJI – Vysoká škola polytechnická Jihlava),
- Czech Technical University, Prague (ČVUT – České vysoké učení technické v Praze),
- Czech University of Life Sciences, Prague (ČZU – Česká zemědělská univerzita v Praze),
- Institute of Chemical Technology, Prague (VŠCHT – Vysoká škola chemicko-technologická v Praze),
- Jan Evangelista Purkyně University, Ústí nad Labem (UJEP – Univerzita Jana Evangelisty Purkyně v Ústí nad Labem),
- Janáček Academy of Performing Arts, Brno (JAMU – Janáčkova akademie múzických umění v Brně),
- Masaryk University, Brno (MUNI – Masarykova univerzita v Brně),
- Mendel University of Agriculture and Forestry, Brno (MZLU – Mendelova zemědělská a lesnická univerzita v Brně),
- Palacký University, Olomouc (UPOL – Univerzita Palackého v Olomouci),
- Silesian University, Opava (SLU – Slezská univerzita v Opavě),
- Technical University of Liberec (TU – Technická univerzita v Liberci),
- Tomas Bata University, Zlín (UTB – Univerzita Tomáše Bati ve Zlíně),
- University of Economics, Prague (VŠE – Vysoká škola ekonomická v Praze),
- University of Hradec Králové (UHK – Univerzita Hradec Králové),
- University of Ostrava (OSU – Ostravská univerzita v Ostravě),
- University of Pardubice (UPCE – Univerzita Pardubice),
- University of South Bohemia, České Budějovice (JCU – Jihočeská univerzita v Českých Budějovicích),
- University of Veterinary and Pharmaceutical Sciences, Brno (VFU – Veterinární a farmaceutická univerzita Brno),
- University of West Bohemia, Plzeň (ZČU – Západočeská univerzita v Plzni),
- VŠB-Technical University of Ostrava (VŠB-TU – Vysoká škola báňská-Technická univerzita Ostrava).

College of Technology and Economics, České Budějovice (VŠTE – Vysoká škola technická a ekonomická v Českých Budějovicích) was established in 2006, that is why it was not included. The research sample contained annual reports in 1999–2008. If universities published annual reports of single faculties, colleges etc. as well, these were not included in the research.

In total, more than 180 annual reports were included in the research. In some cases there were not all annual reports available, several years were missing e.g. University of Pardubice, University of West Bohemia etc.). Information on eLearning was searched, both in the form of single chapters and in the data mentioned in the text. Most frequently the topic of eLearning was included in the chapter on Information and communication technologies, which is an obligatory part of annual report structure given by the Ministry of Education, Youth and Sports. The collected data underwent the process of critical examination and evaluation from five points of view:

- chronological development of eLearning implementation,
- academic staff education,

- eLearning centres,
- eLearning projects,
- Learning Management Systems (LMS).

#### *Chronological development of eLearning implementation*

From the chronological point of view the electronic support of instruction was first mentioned in **1999** in the University of Ostrava annual report. There existed a database of approximately 60 CD-ROMs there which were available from university network, and LMS LearningSpace containing interactive educational courses available on the Internet.

In **2000** the annual report of University of Hradec Králové presented the use of distance courses in the virtual learning environment, University of Economics, Prague, described their eLearning project, they planned to design a course for academic staff on LMS WebCT and LearningSpace, University of Ostrava mentioned the LMS LearningSpace where interactive courses were placed and used to support the management of instruction.

One year later, in 2001, eLearning was mentioned in ten annual reports.

Czech Technical University, Prague:

- ICT integration into educational parts of their long-term plan,
- eLearning pilot projects,
- support to designing five eLearning courses.

University of Ostrava

- established eLearning Department in the IT Centre,
- organized training in distance education methodology,
- made decision which LMS will be used at the university.

Silesian University, Opava, Faculty of Business and Management:

- started activities towards building virtual university,
- started work in LMS Tutor 2000.

University of Hradec Králové:

- started the process of designing e-subjects for students,
- organized eLearning courses for public,
- ran training for academic staff to prepare them for running online instruction.
- solved several projects on eLearning.

Jan Evangelista Purkyně University, Ustí nad Labem:

- built the infrastructure,
- bought a videosever.

University of Veterinary and Pharmaceutical Sciences, Brno:

- started activities of the audiovisual centre,
- made several educational films on operations, laboratory experiments, lectures and seminars which were available for traditional lessons and eLearning.

VŠB-Technical University of Ostrava:

- prepared study materials for combined (part-time) and present form of study on university website.

University of Economics, Prague:

- prepared the distance form of master study programme in eLearning form for accreditation,
- organized training for academic staff,
- put a videosever into operation.

Institute of Chemical Technology, Prague:

- gradually built a virtual library of electronic study materials on university websites.

The Mendel University of Agriculture and Forestry, Brno, states no eLearning activities in the institution. Other universities do not mention eLearning at all.

In **2002** the number of educational institutions using eLearning increased. Czech University of Life Sciences, Prague, University of South Bohemia, České Budějovice, Technical University of Liberec, Tomas Bata University, Zlín, Mendel University of Agriculture and Forestry, Brno, joined the eLearning community and made some references to eLearning in their annual reports.

Since **2003** eLearning has been mentioned in annual reports of most universities instead of those of art – Academy of Performing Arts, Prague, Janáček Academy of Performing Arts, Brno, and Academy of Art, Architecture and Design, Prague. University of Pardubice and University of West Bohemia do not have their 2003 annual report available on their public websites.

Academy of Performing Arts, Prague, first mentioned eLearning in 2005. Janáček Academy of Performing Arts, Brno, and Academy of Art, Architecture and Design, Prague, have not mentioned any eLearning activities. University of Pardubice and University of West Bohemia provide 2007 annual reports only; eLearning is mentioned in both of them. College of Polytechnics, Jihlava, was established in 2004 as non-university public institution, and mentioned eLearning just in that year.

#### *Academic staff education*

As mentioned above, in the process of eLearning implementation it is crucial to pay attention to academic staff education in the field of new methods, both from the technical point of view, and pedagogy and didactics. That is why universities often present ways and results of this process in their annual reports.

The first mentioned training of academic staff in methodology of the distance education can be found in 2000 annual report of University of Economics, Prague.

In 2001 the same information appeared in reports of University of Hradec Králové and University of Ostrava.

One year later, in 2002, other five universities joined this forward-looking group - Czech Technical University, Prague, Czech University of Life Sciences, Prague, Silesian University, Opava, Tomas Bata University, Zlín, and VŠB-Technical University of Ostrava.

#### *eLearning centres*

Several universities established special eLearning centres or departments, either as parts of IT centres, or working independently. Their names may differ, e. g. Virtual Education Laboratory, Centre for Electronic (or technological) Support of Instruction, eLearning Department, etc. In the course of ten years the centres were established in ten institutions.

#### *eLearning projects*

Financial funding and support of eLearning is another important field. Seventeen of twenty-five monitored institutions (68%) mentioned national or international eLearning projects which were a source of financial backing.

#### *Learning Management Systems*

The way how eLearning is applied in the instruction and what the efficiency of the process is substantially depends on the type of LMS which is used at the university. Twenty of twenty-five institutions 80% mentioned the used type of LMS in the annual report.

At the very beginning of the process sixteen institutions decided for a certain type, or started with two different types and later preferred the better one.

Four of 25 institutions changed the type of LMS for three or more times (University of

Ostrava, Jan Evangelista Purkyně University, Ústí nad Labem, VŠB-Technical University of Ostrava, University of Economics, Prague).

Six universities decided to design their own LMS (Czech University of Life Sciences, Prague, University of South Bohemia, České Budějovice, Masaryk University, Brno, Mendel University of Agriculture and Forestry, Brno, Technical University of Liberec, VŠB-Technical University of Ostrava).

LMS Moodle is the most frequently used system. It is used by six universities. Other frequently used systems were Tutor 2000 or iTutor (3 universities), LearningSpace (3 universities), EDEN (2 universities), WebCT (2 universities), eDoceo (2 universities), MS Class Server (2 universities), Unifor (1 university), IBM Workplace Collaborative Learning (1 university) a Oracle eLearning (1 university).

### **Ways of eLearning Evaluation**

In the last decade several competitions were run every year dealing with quality of eLearning courses and products.

Most universities apply their own system of quality assessment but the approaches differ substantially (Poulová. 2007)

In a few cases the assessment is done on university level (Technical University of Liberec) but usually it is organized by faculties or departments (Faculty of Informatics and Management, Faculty of Education, University of Hradec Králové; Faculty of Management and Economics, Tomas Bata University, Zlín, etc.)

The aim of the process is to support designer's motivation in further eLearning activities, e. g. competitions are organized and the best products are awarded, and all participants may gain more experience (Faculty of Education, University of Hradec Králové, Technical University of Liberec). Another approach applies evaluation according to given requirements and criteria. If they are met, the author receives a financial bonus (Faculty of Informatics and Management, University of Hradec Králové).

The way of presenting courses also differs. Either courses are introduced to the commission and the public (Faculty of Management and Economics, Tomas Bata University, Zlín, Faculty of Informatics and Management, University of Hradec Králové), or they are evaluated by single members independently (Technical University of Liberec, Faculty of Education, University of Hradec Králové).

Some institutions use internal evaluation (Faculty of Informatics and Management, University of Hradec Králové), others prefer opinions of external evaluators (Technical University of Liberec); the other institutions combine both approaches (Faculty of Management and Economics, Tomas Bata University, Zlín, Faculty of Education, University of Hradec Králové).

### **Conclusion**

The above mentioned facts prove that eLearning has spread to most universities in the Czech Republic and has become standard as it is in other developed educational systems. Future steps had to be taken towards researching and evaluation of university graduates' competences which were formed in the process of instruction supported by information and communication technologies.

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