INTRODUCTION

Currently, the implementation of information and communication technologies (ICT) into the process of instruction and forming a virtual learning environment are crucial aspects of developing educational projects, forms of education and designing e-learning products. These processes depend on the level of school technical equipment and computer literacy of students and teachers. It appears quite frequently that psychological, educational, didactic and didactic-technological aspects of preparation and running courses, evaluation of various virtual learning environments are the matter of research. Conferences, seminars and competitions are held focusing on e-learning, distance education, e-communities etc. Criteria of evaluation applied on e-learning courses in concrete virtual environments mainly focus on following features:

- Course content, i.e. how the educational objectives are defined, general course design, arrangement and originality, implementation of multimedia components, quality and adequacy of additional study materials.
- Ways of activating students, i.e. what tools are applied in communication, team work, application the knowledge in real life.
- Evaluation of planning and running activities according to the Syllabus and Calendar.
Feedback provided via tests, self tests and scheduled assignments.

This "operating" and in the virtual learning environment pre-defined framework, conditioned by strict accepting algorithm procedures, forms a pragmatic position of courses, their successfullness, efficiency, accessibility, interconnection and succession to other sources. Forming educational co-operating e-communities is in a certain sense the result of designers, both of the virtual learning environment and single e-courses. The possibility to continuously update the course content, engage new participants and relate them to others, broaden the space and time available to study are considered to be contributive, as well as the number of course participants who can be educated at once, the open access to systematic education for handicapped students etc. On the other side, objections appear against the trend of ICT implementation to the process of instruction, resulting from neo-phobic approaches in general, from fears of technization, depersonalization, algorithmization, undue rationalization, economization, and in a certain sense fears of a possible simplified approach to world, people and themselves. Technical scientist civilization considers the ICT an optimal tool for efficient and productive education towards the further development. The question, asked by philosophers, educators, psychologists, e-course designers and educants, is the question aiming at the content of education in differing world, and consequences of reducing the "being education" (i.e. education of man as the whole) to education for technocratic, bureaucratic civilization, for roles we play and have to play if we want to succeed (e.g. Palouš, 2009). Thanks to their potential the ICT and educational courses do not constrain the "being education", because they can substantially respect the necessity of setting student-oriented, teacher-oriented and content-oriented educational objectives. They can individualize the instruction from the point of pace, standard and non-standard educational offer. In the future the ICT do not have to be understood as a tool of technocratic dictate. ICT-based virtual learning environments can take into account value, emotional, ethic and aesthetic relations and consequences of cognitive contents, and thus contribute to personality development.

Authors contribute to the reflection of virtual learning environment by solving several research projects, e.g. "Interaction of real and virtual environment in early science education", "Evaluation of the modern technologies contributing towards forming and development university student competences", "A flexible model of the ICT supported educational process reflecting individual learning styles", and they have prepared a new project "Contexts of e-learning. Reflection of the Virtual (Learning) Environment in Education" dealing with other, not so commonly researched areas and approaches to e-learning contexts. The latest results of the projects are provided and discussed below. The field of e-learning is in the centre of pedagogical attention because of continuous search of new ways in education, and new strategies applying the information and communication technologies.

**PROJECT WORK**

The current society offers people new chances but at the same time requires new competences from them. In the last decade the lifelong professions were disappearing, and
competences aimed at one profession have become useless and non-contributive. It is necessary to find, define and develop such competences which will be useful in most (still unknown) professions, which enable solving (still unknown) problems, prepare man to cope with fast changes in professional, private and social life. It is not a private matter, but it requires a kind and helpful social environment.

University of Hradec Kralove (UHK), led by the Faculty of Informatics and Management (FIM), belongs to active new competence providers, project applicants and supporters of project work. It has been offering the staff (both academic and administrative) courses towards developing required competences, mostly in the distance electronic way for a decade, and the whole process of ICT implementation is closely connected to project work. It started at the beginning of 1990s by using shared directories where study materials were presented. Step by step the importance of electronic mail increased for communication between students, and students and teachers, then other services followed - electronic administration of credits and examinations, displaying syllabi, timetables, entrance exam results, university websites were designed and e-magazine Telegraph published. Teacher’s websites supporting instruction appeared, and in 1997 nearly 25% of teachers used them. Then the professional virtual learning environment Learning Space was bought, in 2001 it was replaced by WebCT. First distance on-line course was designed in 1998 within the Tempus Project MUDILT (Multimedia and Distance Learning for Teachers). Thanks to this project the first team was created which started to deal with this field actively. In 2000 within the Tempus Project PATTER (Public Administrators Training Towards EU) the ECDL (European Computer Driving Licence) course was the first one prepared in the electronic distance form, other courses follow. In 2001 the Institute of Further Education was established to offer the courses to public. Experience gained in designing and running these courses resulted in the OLIVA Project (On-Line Výuka, on-line learning) targeting at university students. Consequently, that was why the process of training teachers in designing and running on-line courses started. New courses for university students appeared. First, in the field of Informatics, Economy and Management, then in foreign languages, Psychology, Ethics etc. Some of them were designed for distance education, others supported present lessons. In January 2010 more than 170 courses are accessible in WebCT; 2,000 students of FIM use more than 10,000 chairs. Thus the WebCT implementation in the instructional process has become common standard, for both students and teachers. All WebCT users were trained in effective designing and teaching or studying, the newly interested have chance to gain this competence continuously. Training courses for teachers, future course tutors, are often run in the distance form where participants are in the position of students. It provides them important experience. Currently, having undergone the starting period of material and technical problems, the time came to deal with didactic aspects of ICT implementation into the instructional process. And what are the results?

- Are teachers able to apply suitable methods and forms of instruction, create and use appropriate didactic means which are offered by new technologies?
- Do students have higher level of knowledge if they attend lessons managed by ICT or run traditionally by teachers?
- Are the new didactic means (methods and forms supported by digital technologies) able to optimize the cognitive process of creating knowledge?
University of Hradec Kralove carried out several important project activities in cooperation with other Czech and international universities. In last five years the projects concentrated on interuniversity study based on virtual mobilities. Students can enroll at selected courses of any partner university and study the subject. The successful projects are e.g.:

- the RIUS Project (Run-up of InterUniversity Study in selected universities in the Czech Republic, CZ.04.1.03/3.2.15.1/0067, [https://www.uhk.cz/fim/projekty/1360](https://www.uhk.cz/fim/projekty/1360)) and
- the EVENE Project (Erasmus Virtual Economics & Management Studies, 2005-3857/001-001, [https://www.uhk.cz/fim/projekty/1740](https://www.uhk.cz/fim/projekty/1740)).
- The REKAP Project (Rozvoj e-learningových kompetencí akademických pracovníků, CZ.04.1.03/3.2.15.3/0406, [https://www.uhk.cz/fim/projekty/2080](https://www.uhk.cz/fim/projekty/2080)) deals with ensuring the continual process of developing e-learning competences of academics at university.

CURRENTLY RUNNING PROJECTS

As mentioned above, information and communication technologies and e-learning have become standard for both the teachers and students, and researches proving the efficiency and users’ satisfaction are available (Bílek & Skalická, 2009); (Bílek, Poulová, & Šimonová, 2009). The team dealing with this field consists of academics of the Faculty of Education (M. Bílek) and Faculty of Informatics and Management (P. Poulová, I Šimonová) being supported by specialists from other branches. The three-year projects the team is working on are supported by the Czech Science Foundation (GA ČR). Projects intentionally are of similar structure, methodology and outcomes so that results could be easily generalized and recommendations provided to the wide range of users.

The project “Possibilities and Limits of Real and Virtual Environment in Primary Science Education” arose from today’s situation when the Science teacher is expected to master not only his/her field and subject, but also have basic knowledge in Informatics and applied software. Progress in digital technologies and their applications in natural science and technical fields are rapid, so it cannot be expected teachers will minutely master most of the offered products. What is expected, it is general knowledge and orientation in principles, and paying more attention to perspective information systems according to the subject they teach. Focusing on new didactic means, both material and non-material, and their application into the process of instruction in a certain subject in theory and practice belongs to the field of didactics. It is not acceptable to define didactics as an intersection of a subject (branch) and didactics only, but it is necessary to discover wider relations and contexts. Currently, a new item has appeared connecting all field didactics – technology of education. This new stimulus should facilitate the implementation of latest technologies into the instruction. Simultaneously, it is possible to advocate that two sciences function each other as methodologies, mainly in situations when the science reflecting simplier fields of phenomena carries out the function of methodological tool towards the other science which solves more complicated problems. When using this approach it is necessary to realize that apart from specific functions (originating from natural sciences), computers can also have
another function, i.e. a didactic one. This results in the main objectives of the project which are as follows:

- Analysis of results in blended real and simulative experiment in natural science instruction abroad.
- Researching the effectiveness in application of selected simulative and animating experiments in primary chemical education by applying pedagogical research methods, especially direct and indirect observation, interview and pedagogical experiment.
- Researching the influence of preconcepts, individual learning styles and other pedagogical-psychological phenomena of effective learning on application of simulations and animations in primary Chemistry instruction.

This project is solved in three phases, starting from bibliographic search and concept activities. Results have been partly published in a monograph containing survey studies of authors participating in the project and other addressed national and international experts; it was published by the Faculty of Education, University of Hradec Kralove, in edition "Didactics of Science and Technical Subjects"; partly the research concept was specified according to the analysis results, i.e. preparation and choice of materials suitable for research activities (in the form of school chemical experiments and their simulations, including practice sheets) and tools for collecting data empirical research activities (Bílek et al., 2009).

The orientation of project "Evaluation of the modern technologies contributing towards forming and development university student competences" arose from the current state in the society (Poulová, 2005). Its changes are defined by generally acknowledged theses of fast development of ICT and their influence on the educational process, globalization of the world and the necessity of new key competences, availability of education and its influence on changes in lifestyle. The project aims at working up the theory of educational science on university level in the field of electronic education. Its main objectives are as follows:

- To find out the impact of different ways of the instructional process management on the quality and durability of students’ knowledge, i.e. research students’ results in the process of instruction managed by ICT, or by a real teacher.
- To evaluate the quality, meaningfulness, effectiveness and limits in the field of ICT implementation in the instructional process, present proposals to its optimum choice and extent.

The project started with the pedagogical experiment dealing with comparison of study results in the present and distance form of instruction. Students’ knowledge was tested before the process of instruction started by a didactic test evaluating the entrance level of knowledge (pretest), then when it finished (posttest), and after a three-month period. According to the collected data the project will result in recommendations towards improving the efficiency (quality) of the process of instruction run in both ways. The first phase resulted in a monograph of bibliography survey of authors-project solvers and other outstanding experts in this subject field (Šimonová, Poulová, & Šabatová, 2009). The second phase was and will be divided in two parts (12 months each) in which the experiment was and will be organized twice (in 2009 and 2010). Then results of both experiments will be compared and conclusions presented. The final period will be devoted to summarizing final results. The research group consists of students of University of Hradec Kralove, Faculty of Informatics and Management and Faculty of Education. Outcomes are expected in the field
of educational science where appropriate proposals towards optimizing the process of instruction managed by LMS will be provided according to the gained results, and in the field of publishing activities where two monographs will be published. Another related topic is mentioned in the project "A flexible model of the ICT supported educational process reflecting individual learning styles". Teaching and learning styles play an important role in the instructional process (Lašek, 2006), (Mareš, 1998), especially if it is managed by a virtual learning environment, as they offer designers a wide range of tools which accommodate all learning styles, and students can choose those activities which suit them best. In spite of this advantage, there exist several conflicting ideas concerning practical application of learning styles which should be taken into consideration, so teachers’ and students’ awareness of styles may help substantially (Felder, 2010).

The main project objectives are as follows:

- To adapt the Learning Combination Inventory (LCI) (Johnston, 1996) the conditions of Czech university education, and pilot it. Run an experiment to find out whether using such methods of instruction which reflect individual learning styles results in significantly higher level of students’ knowledge in comparison to the traditional, majority way of instruction.
- To evaluate the quality, meaningfulness, effectiveness and limits of ICT/LMS implementation in the instructional process, and present proposals to its optimal contribution and extent.

A monograph dealing with the process of cognition and learning from the point of instruction (educational science), psychology, frequently used models defining student’s learning styles, and tools provided by ICT towards accommodating student’s needs will belong to the first outcomes. Then the process of determining students’ styles will run. According to the results students will be provided an electronic distance course offering a wide range of activities accommodating various learning styles. A newly designed electronic application will provide students the most appropriate activities according to student’s individual learning style and monitor what materials they really use (Kulič, 1992). Finally another monograph will be published presenting the received results and recommendations, partial results will be continuously published on conferences and in journals. Students from all faculties of the University of Hradec Králové will participate in the project. Their learning style will be determined by the adapted LCI in Czech language, their knowledge monitored by didactic tests evaluating the entrance and final levels of knowledge (pretest and posttest). According to the gained results appropriate proposals towards optimizing the instructional process in reference to individual learning styles will be provided. Partial project results will be published in journals and in conference proceedings.

PROJECT WORK IN THE FUTURE

The project "Contexts of e-learning. Reflection of the Virtual (Learning) Environment in Education" will examine and evaluate a VLE from the point of philosophy, axiology and ethics. Psychological, educational, didactic and didactic-technological aspects of e-learning have been relatively frequently researched, while generally-epistemological, axiological and
ethic relations usually have not frequently been a subject of reflection. If they are reflected, then it is done randomly only, or some authors apriori reject such a claim.

The above mentioned project team is led by Ilona Semrádová, Head of the Applied Linguistics Department, FIM, UHK.

The pre-defined framework of a virtual learning environment conditioned by strict accepting the algorithmized procedures forms a pragmatic position of courses, their successfulness, efficiency, accessibility, interconnection and succession to other sources. Currently, no complex concepts are available dealing with this field. Only isolated partial contributions appear which continue constructivist ideas in education, or mention e-learning cursorily, e.g. Liessmann, 2008.

The project main objectives are to identify and articulate philosophical, particularly axiological and ethic dimensions of e-learning; to set and define criteria of e-learning product evaluation which would taken into account contexts of using a virtual learning environment in education; to define the term of e-learning in the narrow and broad sense of the word; to set basic attributes of optimal educational practice from the philosophical point of view, while taking advantages and limits of e-learning into account; and last but not least to record basic trajectories, motivating incentives, experience of e-learning participants in different roles (teacher – tutor – course designer – student – administrator – technician – manager of the e-learning concept in the university institution).

CONCLUSIONS

Current orientation of university education, which is changing under the influence of latest technology development and new key competences, can be researched from various, different points of view. Education supported by ICT has been spreading because of growing popularity of digital technologies in general. Another reason is it enables easier and more complex realization of the instructional process, offers choice of place, time and pace for studying, allows an individual approach to students preferring various learning styles. These are the key values important for the effectiveness of the process. Material and technical requirements having been satisfied, strong attention must be paid to didactic aspects of the instructional process. To contribute to this process is the main objective of these projects.

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REFERENCES


