ICT IN NON INFORMATIC SUBJECTS

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Abstract: *Suggested project provides an introduction to the concepts of strategic management of informations and knowledge in education and explains some key therms. This project is still in progress and will finish in first half of next year. Goal of research is finding fit spectrum interdisciplinar relations, where is possible to use ICT and develop key competences lerners and students, regarding of trends in todays information society and requirements in education and practice scope. In project are examined principles and strategies in educational process and is realized research of new approaches to leadership and management of outcomes, which are important in education. We explore the relationship between organisational theory and strategic management of informations and knowledge. By solving project's problem we combine quantitative and qualitative research methods, especially braistorming and case study (qualitative). We work with focus groups. This kind of research consist in discussion in groups. Consequently we will make statistical evaluation (quantitative) from discussions to compare results. Project will contribute to increase quality of education, especially in cross-sectional topics in curriculum.*

Key words: *ICT, interdisciplinar relations, key competences, focus groups.*

ICT V NEINFORMATICKÝCH PŘEDMĚTECH

Resumé: *Návrh projektu poskytuje úvod do koncepce strategického řízení informací a znalostí v oblasti vzdělávání a vysvětluje některé klíčové termíny. Řešení tohoto projektu stále probíhá a bude ukončeno v první polovině příštího roku. Cílem výzkumu je nalezení vhodného spektra interdisciplinárních vztahů, kde je možné využít informačních a komunikačních technologií a rozvíjet klíčové kompetence žáků a studentů, v návaznosti na trendy dnešní informační společnosti a požadavky v oblasti vzdělávání a praxe. V projektu jsou zkoumány principy a strategie ve vzdělávacím procesu a je realizován výzkum nových přístupů k vedení a řízení výsledků, které jsou důležité ve vzdělávání. Zkoumáme vztah mezi organizační teorií a strategickým řízením informačních a znalostních toků. Při řešení projektu kombinujeme kvantitativní i kvalitativní výzkumné metody, zejména braistorming a případové studie (kvalitativní). Pracujeme s „focus groups“. Tento druh výzkumu spočívá v diskusi ve skupinách. Následně provedeme statistické vyhodnocení (kvantitativní) od diskusí k porovnání výsledků. Projekt přispěje ke zvýšení kvality vzdělávání, zejména v průřezových tématech v učebních plánech.*

Klíčová slova: *ICT, interdisciplinární vztahy, klíčové kompetence, focus groups.*

1 Introduction

In the 21st century are apparent rapid changes in institutions, in accordance with ICT development. Today's students should be prepared for unexpected change. Rapidly changing information and communication technologies and growth of ICT-related activities in all sectors led to shortages of highly-qualified ICT professionals. There is indicated imbalances between existing skills and companies demands. ICT skills are obtained through formal education and training or informally through using ICTs and gaining experience with them (Hopkins, 1996). For schools it involves new standpoints in policy and research, qualitative assessment of skills and their relation to company demands, partnerships, encouraging higher achievements in education, and creation of high quality opportunities and integration. This paper deals with a new access of managing the teaching process at schools (this access is required by a dramatic development of information and communication technologies) and with potentials of ICT in the sphere of supporting inter-disciplinarity of subjects (Rabe, 2006). Lecturers' and students' opinions concerning chances and frequency of using the method of the e-learning education nowadays and in future are presented; the necessity of new skills in the information and communication technologies is required.

2 Problem of Research

This research aims to find a suitable range of cross-curriculum links where you can use ICT to develop key competencies of students, given the trends in today's information society and the requirements in education and the labor market. The authors focus on analyzing and testing the

efficiency of utilization of various educational resources and ICT and their impact on the knowledge base of students at elementary schools and high schools. Furthermore, comparative analysis of volume and continuity of knowledge and skills in using information and communications technology, multimedia materials, and if necessary educational programs. Project results should lead to more effective teaching in elementary and secondary schools with using information and communication technologies, regarding to requirements information society, based on needs and expectations of respondents.

3 Research Focus

Main objectives:

- Joining education with the practical requirements of school graduate in a knowledge society
- Possibilities of using multimedia materials and technologies for teaching in elementary schools and high schools - testing students successfulness
- Systematic approach to curriculum planning, with focus on the characteristics of inter-relationships, defining integrated subjects in regarding with generally didactic principles
- The selection of appropriate learning strategies that encourage personal development of learners and students

Secondary objectives:

- Obtaining data for more effective teaching at elementary schools and high schools with ICT
- Deepening the practical experience of students participating in research with a solution of projects

4 Methodology of Research

General Background of Research:

The project aims to research the effectiveness of the use of information and communication technologies in education (not only of informatics and computer courses) at the elementary school and high school and study the impact of ICT on the volume, the ability to remember and apply knowledge (Newton, 2003).

The technology can distinguish between information technology (Internet and its services world wide web, electronic multimedia encyclopedias, dictionaries, video and audio files, text), communication technology (e-mail, mailing lists, ICQ, video, mobile voice and data) and cognitive technology (technology and knowledge processes). The project emphasizes the possibility of communication in computer networks such as the possibility of pin-group work, teamwork. One of the aims of ICT and multimedia in teaching is the ability to give the student an opportunity to cooperate with the scientist. Computer environment provides high support for constructivistic approach to leasing (Littlejohn, 1999). With management of teaching the student himself can to detect any observation, procedure, strategies to solve the problem.

Sample of Research:

Last years by our departement were arranged a specific research in elementary and middle schools, focused on maximising potential ICT efficiency gains. Through interdisciplinarity of subjects students can discover new possibilities to create new ideas and ICT can be used for improving the quality of teaching and learning, sharing knowledge and information and improving efficiency of education. (it was published in scientific journal "Problems of Education in the 21 st Century", Rabe, 2008). This project is continuity of last research projects.

Instrument and Procedures:

The basic methodology of the project is (as in previous projects) benchmarking - a continuous, systematic process of monitoring and evaluation of teaching in schools, effectivity of using ICT in teaching informatics in both subjects (not only computer), in comparison with the demands of the information society. Goal is to improve efficiency and quality of teaching natural sciences subject by ICT support in view form and content.

The initial phase involve the preparation of questionnaires, covering exploitation of ICT and electronic learning materials for teaching at elementary schools and high schools. Initial survey was conducted. It detects the current state of education in a sample of primary and secondary schools – mostly in our region. Students have prepared a questionnaire and instructions to conduct an interview (if they can be given in advance). There was also used brainstorming and evaluation of results.

The survey is conducted through questionnaires, listening in the classroom, and excursions. Students work both in the ground, using the specified contact person in accordance with agreed timetable and meeting schedule. With regard to we prepare future teachers in elementary and secondary schools, teaching content should match what they need in practice (Sclater, 1999). According to the general

educational program is curriculum for elementary and secondary schools structured in thematic areas (themes, activities) and is understood as tool to achieve the expected outcomes. For their informative and formative function it is an essential part of the educational content. Subject matter defined in the General educational program for elementary and secondary schools is recommended to schools for distribution and further development for each year or longer time periods. At schools subject matter becomes mandatory. The educational content of training courses, each school divided into subjects and elaborate or supplement the curriculum to the needs, interests, focus and talents of students so as to ensure progress towards the development of key competencies.

Regarding to the potential for modification content and forms of educational programs will be presented project suitable to map the needs of schools in the area of informatics and computer technology as well as raw material for concrete improvements, completion of the education program, and the application of new forms of teaching computer science with a focus on the practice of future teachers .

For the needs of students' work will be purchased professional literature on the natural science and informatics subjects, which can also help for the individual work of students in full-time study, or as a supplement material on the WebCT environment for blended learning.

The task of students involved in the project is research of the quality of teaching at elementary schools and high schools not only in the level of computer subjects and the knowledge base of students. Will be performed analysis and statistical evaluation of the level of memorability and the application of knowledge for elementary, secondary and high school students. The survey will have included tests to be conducted using fixed set of metrics. The research will be conducted through questionnaires, auditions in classes and an excursion (Prucha, 1997). Subsequently, students participate in processing the collected information and a presentation of research results.

5 Schedule of Research

1st stage:

- the creation of questionnaires, materials for interviews, brainstorming
- pilot research, construction survey on a sample schools
- seting hypotheses

2nd stage:

- processing and statistical evaluation of research results
- confirm or refute hypotheses, formulation of conclusions

3rd stage:

- final report of research by authors of research

6 Data Analysis – Work with Focus Groups

Befor we make data analysis we work with focus groups. A focus groups are a form of qualitative research in which a group of people are asked about their perceptions, opinions, beliefs and attitudes towards any concept, idea etc. In this project focus groups are seen as an important tool for acquiring feedback regarding new ideas, as well as various topics.

Preliminary results of research:

We examined the score in didactic tests in two groups of students, which both learned same topics from natural science. In case of group A, in teaching were used advanced IT technologies (presentations, measuring and experimentation using computer systems, computer data analysis etc.), group B was control group.

Graphs in figure 1 shows average grades in tests from more topics learned by the students from groups A and B.

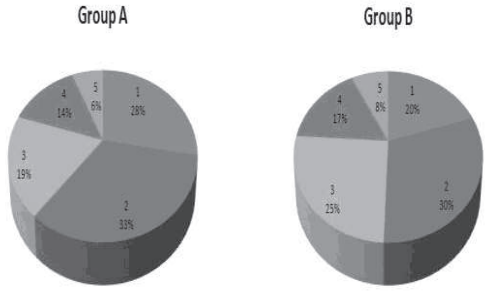

Fig 1: *Average grades in tests (lower the better)*

We decided to use statistical hypothesis testing to prove that average grades in natural science subjects are higher in group that uses ICT in learning (that is our null hypothesis H0). Hypothesis H1 (alternative hypothesis) says opposite is truth. At significance level of 95 % our null hypothesis H0 was confirmed (using statistical sample of about 240 students).

7 Discussion

ICT can create a new, open learning environment, and its instrumental role is in shifting the emphasis from teacher-centred to learner-centred environment. Teacher move from being the key source of information and

transmitter of knowledge to becoming a collaborator and co-learner and the role of students changes from passively receiving information to being actively involved in their own leasing (Riedl, 2003).

In past times schools were mainly asked to create and disseminate knowledge. Nowadays they try to change educational system, in which the ability to work in team is stressed - e.g. projected teaching, coping with changes, being flexible and innovative. Now these roles can be enhanced by promoting learning that ensures that people can take advantage of the information resources available to them.

New concepts of the European education systems are changing their focus from learning to do (or know) towards learning to learn. In individual countries, the concept of lifelong learning also corresponds with the broad political efforts and initiatives towards developing education related to ICT.

8 Conclusions

Information and communication technologies should be harnessed to support goals of new knowledge society. These technologies have a great potential in the sphere of knowledge dissemination, effective learning and the development of more efficient education services. This potential will not be realized unless these technologies serve to rather than drive the implementation of education strategies. The information and communication technologies support other subjects and can increase effectivity of learning.

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