Communication teacher-student-computer

Ph.D. Nevenka Tatković

Faculty of Philosophy and Teachers Training College, Pula, Croatia
nevenka.tatkovic@vuspu.hr

Ph.D. Jusuf Šehanović

Faculty of Economics and Tourism "Mijo Mirković", Pula,
Croatia
jusuf.sehanovic@iptpo.hr

Maja Ružić, Assistent

Faculty of Philosophy, Pula, Croatia
maja@infosit.hr

Abstract

The work points out the importance of the use of the information and communication technologies in education. The overview of elementary, advanced and specialized informatics and information related knowledge and skills that every teacher should master and apply in the educational process is presented. Stress is laid upon the importance of the application of modern aspects of communication by using computers in schools. The work features a model of introducing and creating the knowledge base of high quality necessary for the application and use of information and communication technologies in the educational process in the Republic of Croatia.

Key words: Information and communication technology (ICT), teacher, student, information knowledge and skills, knowledge base, student-teacher-computer communication

1. The use of new communication technologies in education

Information technology education is based on the application of modern information and communication technologies and it represents a new form of communication in education of teachers. The modern information science technology has been changing the requirements related to the past (outdated) concept of education and forms of communication in it. The educational process becomes informational and communicational process, while education becomes multimedia orientated. Teachers are not limited to the use of the blackboard and the chalk any longer; they are faced with a great array of possibilities instead, in an unlimited, virtual and technological world. The dominant trait of the new type of education of future teachers is orientated towards keeping pace with innovations, lifelong learning and high-quality application of new forms of communication and new contents in curricula.

Information and communication technologies play an important role in the process of education of teachers today, because they enable educators to acquire new competence. "Until the appearance of computers, educational technology was limited to audio-visual devices and learning through television, which intensified even more the teacher's activity and children's passiveness"(Negroponte, 2002). Today the student is in the very centre of the curriculum, while the teacher's role is that of a mentor and advisor. If we want the teaching process to be held according to the modern educational concept, taking into account children's rights, wishes, needs and interests, then it is very important that teachers acquire basic information knowledge as well as following new trends so that they could improve the curriculum and their own teaching practice offering high-quality education to students and preparing them for the use of new technologies and lifelong learning.

Croatia is a candidate for joining the European Union, thus the ambition to enter the elite society of knowledge has brought to intensified activities in the field of designing of various proposals of development regarding the technological development of Croatia. The reform of the higher education of Croatia and the acceptance of guidelines of the Bologna Declaration by introducing the ECTS (European credit transfer system) are prerequisites for entering the European Union and European system of higher education. All the EU member countries support the use of information an communication technologies in all areas, and particularly in the field of education.

The information and communication technology has offered a number of possibilities for new forms of communication in the education system. The education about ICT represents a basic skill of individual learning and intellectual growth of every individual, and especially the collaboration and communication with other factors of the educational process. ICT facilitate the functioning in the context of lifelong learning because they contribute to the individual and social integration as well as the personal development of an individual.
Therefore, the development of teachers' communication competence by means of new technologies represents an essential necessity in their education.
Unfortunately, the majority of schools in Croatia still haven't got enough computers, the equipment is outdated, which renders the work and communication with students impossible. The Ministry of Science, Education and Sports of the Republic of Croatia has been investing means in the equipment of primary and secondary schools with computers, however, they still prove to be insufficient.

According to statistical figures of the Ministry of Science, Education and Sports of the Republic of Croatia the number of computers in primary and secondary schools in 1999 amounted to 12,323 while in 2003 this number amounted to 24,000. The number of students per computer in 2003 amounted to 28.5 in primary schools, and 16.91 in secondary schools. In 1999 there were 161 computer rooms logged on in primary and secondary schools, while in 2003 there were 1072. We can say that we have not reached ideal conditions yet in which every student would have his own computer. Today two or more students have to share the same computer, which makes the acquisition of contents inappropriate.

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In primary schools of Croatia information science still has not entered the curriculum, but it is regarded as an optional subject or an extracurricular activity. The majority of older teachers teach old information contents which results in greater passiveness of students. In secondary schools informatics is a compulsory subject, and the attention of students is directed towards acquiring basic information knowledge and skills. Students who want to learn more are free to choose informatics as an optional subject. Unfortunately, there are not many similar courses in the majority of secondary schools, and students are left to various information courses for which they have to pay considerable sums of money.

1.1 Basic knowledge of informatics

The notion of information science literacy covers all social fields and it should be given a special position in the field of education. Therefore, the Ministry of Science, Education and Sports of the Republic of Croatia intends for every teacher to be literate in informatics. Teachers are given the opportunity to take three level exams in information science: basic, advanced and specialist.

According to the extract from the project entitled »A Proposal for Training of Employees in Education Sector to Apply IT and Communication Technologies from 2004" a framework of IT content for beginners would amount to 80 lessons, at the advanced level a total of 94 lessons and at the specialist level 162 lessons (The Ministry of Science, Education and Sports of Croatia 2004).

The Basic Course of IT knowledge consists of the following curricula:

Curriculum	Lesson
Basics of Informatics	6
Operational Systems	12
Word Processing	18
Log & Chart Calculations	14
PC Presentations	8
Internet (e-mail, Web)	14
ICT in Training & Education	4
TOTAL	80

Table 1: The Basic Course of IT knowledge

The Advanced Course of computer literacy consists of:

Curriculum	Lesson
MS Office (Advanced)	36
Computer Labs Network	18
Integrated ICT into tuition	18
Internet (Advanced)	18
TOTAL	94

Table 2: The Advanced Course of computer literacy

The Specialist Degree of IT knowledge consists of:

Curriculum	Lesson
Programming	36
School IT System	18
Multimedia in tuition	18
Specific Software for Group Curricula	18
Programmes for Compilation of Curricula Units	18
Desk Editing – design of a school bulletin	18
Library & Info Centre	18
Networks and Communications	18
TOTAL	162

Table 3: The Specialist Degree of IT knowledge

»The project envisages that the employees (45.000 – 50.000 persons) acquire information knowledge and obtain a certificate by the end of 2006 and the deadline will depend on the amount of financial resources that will be invested in this aspect of today indispensable knowledge and skills. In the majority of European countries similar projects are completed or brought to a close. The Ministry of Science, Education and Sports of Croatia 2002)«.

2. Future teachers' training for the application of information and communication technologies (ICT) in education

The training of future teachers should be based on the application of modern information and communication technologies in the teaching process and especially on the development of global communication competences, which will result in the successfulness of achievement of personal and related aims. The study by Bolt and Crawford dating from 2000 indicates the use of the Internet and educational technology in general is worth as much as a teacher using them" (Castells 2001).

The need for information technology personnel, who would train teachers applying the interdisciplinary approach, is present in the majority of European countries. Therefore one of the most significant problems which slows teachers' information technology training down is the question of competence of the personnel at different levels of education". (Tatković, Ružić 2003).

In Croatian schools, the majority of information scientists have the background in engineering without the necessary methodical, didactical, pedagogical and psychological education, resulting in bad teaching. If school is an institutional model of important aspects of communication in a society, then interdisciplinary trained experts who would be able to integrate the knowledge of information science and pedagogy in the teaching process should teach the communication via ICT. Teaching about ICT as an indicator of the quality of education has resulted in the need to reconsider the curriculum in informatics, synchronisation of the

national plans and programmes, stimulating pupils/ students to learn informatics as well as reconsidering teachers' methods of teaching informatics.

2.1. Creation of the knowledge bas

Teaching based on ICT assumes the existence of a number of information technology classrooms that would contribute to the improvement of teaching. Students would be fully involved and the teaching process wouldn't depend on teachers' abilities to convey information. The supply of the high quality software is not simple. It is very difficult to find it on our market and the existing ones are too expensive and for schools in most cases not easily accessible.
The base of knowledge is also a problem. How to create a knowledge base of high quality with minimal expenses and a lot of good will? The answer is simple. The compulsory literature should be accessible via digital media and web pages of every school in order to enable students to access the needed information as quickly as possible and copy the necessary information in the knowledge base of their own interest.

Every school in the Republic of Croatia should digitally process a few books in accordance with the previously defined criteria and send it to the team of experts who would be in charge of their publication and further updating.
Schools should be grouped according to their interest on the basis of which experts' interest groups would be formed. The teams would include the following experts: a team of teachers, a team of librarians, a team of students, a team of information scientists. Every school would propose 2 members. The regional team consisting of 15 members from different schools would select the members. The appointed persons would constitute the national team that would be in charge of the realization and evaluation of school tasks in the Republic of Croatia.
Individual team roles would be determined in regard to their competency, interest group and particular subject data processing. The team of teachers would include the teachers from selected schools. Their task would be to choose material, to make questionnaires, to create a curriculum, which would offer creative and diverse spectrum of knowledge.
The team of librarians would be in charge of searching and recommending literature from different sources. Together with teachers they would be engaged in questionnaire's statistical processing and data analyses. The team of students: on the basis of the questionnaire students would choose the model of teaching, contents and themes they would like to listen to, information they would like to browse and topics of projects they would like to realize during the school year.
The team of ICT professionals would be in charge of creating informational pages and their regular updating.
The team of experts of various profiles would be in charge of keeping up to date and publishing the latest materials from particular fields of interest.
Every school would be responsible for their personnel's information literacy, because today it is impossible to be involved in new curriculum needs and challenges without being information literate.

3. Student-computer-teacher communication

In the traditional school the process of communication is based on one-way communication and on the traditional way of teaching. Communication is rarely a two way process. The teaching process that is led in a computer classroom results in the improved levels of communication. A student communicates with the computer and the computer gives him feedback. What is the teacher's role? A modern teacher inclines to democratic conduct while in the traditional school the teacher represented untouchable authority. Contrary to the traditional teaching where the teacher had a central role and was unreachable, today he has found his place among students leading them through the educational process. The teacher communicates with the computer the student is working on (network classrooms) , he can follow his work and in any moment he may help and lead the student towards the solution of a particular task or problem.

Communication with the computer has many channels. If we take into account that there are at least five computers in the classroom, that students communicate and exchange information among them, that every one of them is led and advised by the teacher, who helps each of them individually on his/her own computer, the number of communication increases enormously.

If we include here the Internet, chat, forum and news groups as well, where 40 participants communicate simultaneously and exchange information, one may wonder how many levels of communication there are and where they begin and end? In these cases computer is a mediator in the development of the communicational chain between an individual and other subjects.

One of the most important goals nowadays is to learn how to learn. Is there anything better than a computer? Computer based learning opens new fields; new opportunities and gives rise to curiosity. Learning becomes individualized and adapted to its user. The student chooses the learning method and the time of learning on his own and with the teacher's assistance he provides solutions to exercises and problems. Solving tasks by using computer becomes amusing and interesting, because computer is regarded as "a loved one". First of all it serves for "playing", and learning through playing is much better, more interesting and more relaxing.

The application of computers in learning has shown that they are exceptionally patient teachers developing self-initiative and creativity in students. However, the mere technology without educated teachers is not enough. Teachers should incorporate modern technology into past learning and teaching styles. Particular learning and teaching concepts have the opportunity to come to surface, such as team work, pair work and cognitive learning. Student's frequent fear of labelling among teachers and peers appears very rarely today, because the computer makes it possible for the student to reveal his knowledge and find the right solutions with no fear and discomfort. Today we are able to perform different simulations of the real world on the computer and in this way prepare students in a much better way for the world of grown ups awaiting them.

"Personal computers will make future adults both mathematically more competent and visually more literate. In ten years time adolescents will enjoy a much richer spectrum of options, because the hunt for the intellectual achievements will not be the privilege of book- warms any longer, but an entertainment for the achievement of cognitive styles, learning and behaving"(Negroponte 2002).

Knowledge, information, communication skills and time are considered the biggest treasures today.

In order to ensure good teaching quality there should be one computer per student in every classroom, because student's possibilities are endless. Children's future is orientated towards knowledge and the possibility of applying new technologies, communication and storage of necessary information. What other means can better than a computer contribute to the clearness and purposefulness of problem solving?

The principles of educational work are the key in the lock of the information and communication technologies because computer will follow every student's step, react to his activities, display required results and of course change the ways of learning and teaching.
Is there any situation apart from computer based learning and teaching where the student is more active? This type of learning demands constant communication between the computer, the teacher and the student, constant involvement of senses, abilities and skills. If the problem is regarded from the perspective of the principles of the positive orientation, the application of the computer in the teaching process almost completely excludes the possibility of the negative orientation. Each step leads the student towards new cognition, ability or result, which contributes, to the expansion of the student's private knowledge base. Each student step, no matter how bad or good, results is in new outcomes and cognitions, stimulating him to try several methods and enabling him to pick up the most understandable one.

The principle of many sidednesses in the educational process represents an endless challenge.
Changes in the traditional patterns of living (globalisation) require better understanding of other people and the world surrounding us. In this respect UNESCO's Commission of Education for the 21st century concept of lifelong learning is very interesting. It has been founded on the basis of worldwide research and it defines three significant aspects of the lifelong learning (Miljković, Rijavec, Vizek-Vidović 2003).
Learn *to live* together, creating a new spirit, which will encourage people to realize common projects or settle imminent disputes in a clever and peaceful way;
Learn *to know* – encourage the unification of the general education with the possibility of specialization in the selected number of subjects
Learn *to do* – make it possible for people to acquire competencies, which enable them to manage different situations, often unexpected as well as teamwork
Learn *to be* – to develop independence while making decisions and a bigger sense of responsibility in the achievement of common goals; become familiar with oneself and make good use of all personal talents.
The highway of knowledge is open to all ages, it is sufficient to have a driving licence of necessary, basic information knowledge and readily and carefully set off for a virtual drive. Communication represents the basic means of understanding and learning of the "technological language", and the symbols lead us to an incredible number of sentences and ideas wondering in the virtual space waiting for the individual to recognize them, take them over and incorporate (store) them in the knowledge base of his own.

4. CONCLUSION

Today's society is defined as the society of knowledge ready to accept changes and learn, the society that doesn't tolerate "passivity". It rests on a few supportive pillars and one of the most important pillars today is the education for the application of ICT technology. The mirror of every society reflects the beams of knowledge towards other countries. The strength of these beams depends on country's investment in education and in return it receives priceless capital-knowledge.

The investment into information education and training of future teachers is the investment in the future of every child. Outdated knowledge, outdated technology, termination of learning and researching are an obstacle to every educational system and the negative consequences of this type of work are far reaching. Since the teacher is by his vocation orientated towards new challenges, lifelong learning has to become his "living style". By keeping up to date and applying new technologies in his work he provides the student, the environment and society with the high quality education, connected to the quality of life of every country and its individuals.

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