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IMPROVING TEACHING PROCESS BY APPLYING INFORMATION-COMMUNICATION TECHNOLOGY

Nebojsa DENIC[1], Dalibor PETKOVIC[2] Nenad JOVANOVIC[3],
[1] Faculty of Science and mathematics, University of Priština, Kosovska Mitrovica, nebojsa.denic@pr.ac.rs
[2] Pedagogical Faculty in Vranje, University of Niš,, dalibortc@gmail.com,
[3] Faculty of information technology, Alfa BK University Belgrade, nenad.jovanovic992@hotmail.com

Abstract– The computerization of the education system plays an important role in the development of the information society, which strongly supports the introduction of computers and other information technology in the teaching process. Using of information technology is an innovation and modernization of education and teaching, where the teacher is the main starter for the modernization of teaching and student center of the educational process.

Key words– education, information technologies, teacher, student.

I. INTRODUCTION

DEVELOPMENT informatization society as one of the priority activities in the future, impose the need to intensify efforts to information and communication technology (ICT) to a significant extent and integrates the teaching process by N. Denic, B. Dasic, J. Maslovara [1]. Modern trends in the education system and, therefore, the teaching process are as flexible as possible. Teachers today need to be able to use modern methods and technologies in education. It is important that teachers are not only informatics but also information literate, and have the knowledge of what information literacy is and how much is its place of role and significance for today's contemporary education. Radical changes in the education system, embodied primarily in the curricular reform of primary and secondary Education has created the necessary prerequisites for the start of this process. Open and flexible curricula and provide support and new, modern methods, and teachers are encouraged to when as is necessary and justified, modernize education using ICT by ICT in Serbia [2]. Modern ICT introduces an access to the education process that places emphasis on an active learner means that a learner must find his way of thinking and learning, trying to build his own knowledge base where he needs to upgrade his knowledge. Teacher-educators in this case no longer have only and exclusively the role of transferors of knowledge and skills, but must direct their activities towards supporting and directing students in the educational process and creating such educational conditions that promote learning in couples, groups of themes.

Application of modern ICT in teaching can be, carried out in two directions. In the first, the role of modern technology to transfer information via the software that communicates with the student and give him instructions. Students in this way should know how to use devices that are progressing, and that as soon as possible master tasks. With the application of ICT in the process of teaching by teachers, his creativity and self-initiative comes to the fore. The following benefits are also evident: curricula and programs are more easily adapted to students' needs and needs. Better use of school time, space and mode of work is achieved, and educational content, methods and forms of work become more natural. An important role in education is the software that enables data capture, studious analysis and graphic representation of the interdependency of collected data, Internet access, word processing, and data management table. A characteristic of the application of modern technology in teaching, in another way, the notion of learning as the ability to solve problems using their own mind by N. Denic, N. Zivic, B. Dasic [3]. Information technology, in this case, it is only an aid, a tool to help students in research and problem-solving. It is clear that the use of modern ICT on the way is not the most proper solution because it most resembles the traditional classes where the student adopts more information. Another way of applying modern technology in teaching is far more acceptable, because a student comes up with a solution independently, observing, analyzing, inferring. Information technology in today's educational technology has changed all cases and is one aspect of an integrated

learning in which information technology (IT) is trying through all objects educational process and thus deepen the quality of earnings and acquisition of knowledge by D. Vukmirovic, K. Pavlovic, V. Sutic [4]. Using your computer Teaching during the learning of students affects the motivation to learn, the ability of logical thinking, success education, the ability of self-expression, metacognitive skills, attitudes developed to detect errors, developing cooperation, develop a sense of responsibility and gives the student immediate feedback.

Fig. 1. ICT in education D. Vukmirovic, K. Pavlovic, V. Sutic, [4]

II ICTs AND TEACHER EDUCATION

Active methods can be implemented without the use of ICT, but the moment ICT pervades all segments of society, it is logical to use new technology and in teaching by N. Denić, Z. Nešić, M. Radojičić, [5]. At a time when the IT revolution at its peak, it is only natural that the modern schools and modern teaching methods cannot be imagined without the active use of ICT. It is important, however, to analyze the ways in which ICT has used, and to recognize and support those who will bring the greatest benefit to study by I. Aux-Banfi, M. Koros-Mikis, [6].

Experience in practice indicates that contemporary education is a two-way course for teachers. In addition to changing its role in teaching, it is necessary for the teacher to access and personal professional training in the field of IK technology, so that he can get rid of and accept the introduction of innovations, and thus use ICT in improving the teaching process, as well as personal professional development.

These are three important fields of use of ICT in education.

a) *The first is the area of IT education, which includes all activities undertaken by students in connection with the operation and use of computers*
b) *The second area is the use of ICT in the education process, where we identified these activities are directly related to the learning process regardless of the subject area. Here the computer has seen as a tool that could be used in all or only certain stages of the educational process.*
c) *The third area deals with the use of computers in the work of such research, management or administration of the educational process*.

Educational software is an integral part of the teaching process from the lower grades of elementary school in developed educational systems, and with the help of them and the corresponding hardware environment a new model of teaching is created, which is more efficient than the traditional model and motivates students more. "Software in the field of education is an intellectual technology and is called educational software (ES), which includes programming languages and tools, a specific organization of teaching and learning based on logic and pedagogy

Ways of ICT use in teaching:

a) *Computer Assisted Learning – CAL student uses the computer in the learning process, which*

involves the use of educational software, computer simulation, virtual reality, artificial intelligence, etc.

b) *Computer Assisted Research has used for the theoretical survey of the literature in various fields of research and empirical assisted by proper statistical software.*

c) *Distance Learning – DL has achieved, using the computer, telecommunications and cable television.*

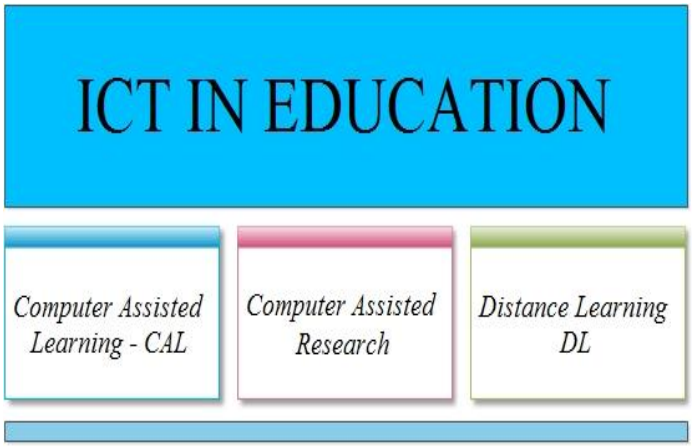

Fig. 2. ICT in education process by R. Barton, [7]

The use of ICT in education aims to change the way of acquiring knowledge which is now based on storing large amounts of data. Guidelines relating to favoring problem-solving, develop creative thinking and self-initiative by C. A Baste, [8]. Training for the future information society should enable the transition from the traditional concept of the educational process dominant at present teaching practice, to the post-industrial society that prefers knowledge as a foundation by V. Blahova, [9]. The student is no longer a passive recipient of knowledge and information that from teachers but became an active participant in the process of education to their needs, preferences, and desires for knowledge by E. Boldrini, A. Cattaneo, [10]. Teaching should be carried out in small groups, not by full classes of thirty or more students, where the individualization of educational methods nearly impossible by T. Plomp, R.E. Anderson, N. Law and A. Quale, [11]. Activities should not primarily be initiated by the teacher/lecturer, but it is necessary to enable students to actively participate in creating and presenting the topics that are of interest to them and which have inclinations by A. Kington, S. Harris, [12].

III THE DEVELOPMENT CONCEPT OF INFORMATION TECHNOLOGY

By using the information technology, the main didactic concept gets the extensive form in which the reversible routes, apart from students, professors and teaching content equally participate in information technology methods, forms, and principles that change the educational paradigm by I. Kramplova, [13]. The new educational paradigm has oriented towards the students, which are located in the center, while is surrounded with learning resources both in terms of time and place and ways of learning. Digitization of existing scripts or textbook students come easily to the learning materials by J. Parkinson, [14]. The opportunity for faster searching throughout the textbook increases the importance in exploiting the teaching material. Materials in electronic form will facilitate the students the process of routine operations copying and formatting because for these purposes they use software tools.

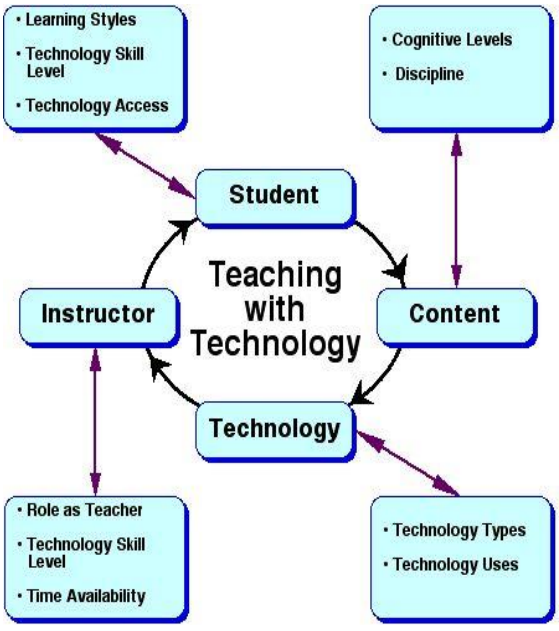

Fig. 3. Pedagogical paradigm of teaching by R. Shultz-Zander, [15]

IV ICT IN SERBIAN EDUCATION

Independent, competent and confident and the use of ICT is a prerequisite for a proper methodological approach to teachers. ICT competence of teachers directly affect the methods and techniques that will be used in teaching using ICT.

Educational teachers, teachers of teachers need constant training and seminars that would primarily be aimed at breaking prejudices and fears of modern media in teaching, and only after that explain the purpose of their use and the effects that they achieve. If teachers were aware of the extent to which the benefit of learning efficiency and the student's thoughtful activity were likely to make efforts to supplement the teaching process with these resources.

The teacher usually passes through several characteristic stages of development:

The first phase - teachers use ICT to print teaching materials. The teacher spends a lot of time and energy on elementary control computers and related equipment. The teacher has no control over the activities of students, but they often do not allow it.

Acceptance - use a word processing program, intensive use slide presentations and educational software on CD with elements of interaction. Students work in a highly controlled environment.

Active usage - teacher organizes activities so that students use word processing, graphics, spreadsheet ... Students use the Internet to search for and retrieve information.

Customizing - the teacher is confident and competent benefits of ICT in their work. The pupils use ICT in the learning process, with an emphasis on cooperation and interaction.

Innovation - The teacher acts as a facilitator, and the benefits of ICT to strengthen the interaction between the students and encouraged them to work together, share knowledge and skills. Teacher fully integrate ICT into your program. Teacher creates new approaches and strategies in the use of ICT, which will enable students to use higher-order thinking and develop key competences.

Teachers, aware of the possibilities of contemporary media in teaching, must accept the fact that their direct, active, verbal participation in the teaching process is reduced. Teachers who do not accept this continue to use the monologue and with the presence of modern media, so at the same time the impression of the struggle of contemporary media and teachers is gained. Instead of making contemporary media a facilitation in the work of a teacher, the acceptance of this factor is hampered by the very process of transferring and acquiring knowledge. The goal of professional development of teachers is a continuous development of teachers' resources, to improve the work and improve teaching. To be a professional teacher perfected the need to consider all aspects of their profession during their studies and to continuously increase awareness of the work. The vocational training to the work conceived as upgrade formal education, innovation knowledge acquired during their studies for work of teachers, development of skills and abilities, knowledge application and practice using information technology.

With the development of information and communication technologies and the needs of content teachers, they have changed. Instead of a frontal type of teaching, a gradual transition to collaborative learning is needed that supports the active role of students. There was a need for a teaching tool that would allow the display of various multimedia content while providing dynamism, flexibility and interactivity in teaching.

In Serbia, ICT education is held at 40 High Education institutions distributed in 21 cities, which helps recruiting a wide base of ICT students. ICT education has taught at 35 Higher Education institutions, 16 of which state-owned, 6 private faculties and 13 state-owned vocational colleges

	Serbian notation	Type	Level	Studying programs-translation	Title
OSS	Osnovne strukovne studije	B	I	Basic Vocational studies	B.Sc
SSS	Specijalističke strukovne studije	B	II	Specialist Vocational studies	S.Sc
OAS	Osnovne akademske studije	A	I	Bachelor Academic studies	B.Sc
MAS	Diplomske akademske studije	A	II	Graduate Academic studies-Masters	M.Sc
SAS	Specijalsitičke akademske studije	A	II	Specialist Academic studies	S.Sc
DS	Doktorske studije	A	III	PhD studies	Ph.D

Fig. 4. Tertiary-type A and type B Education Programmes in Serbia by S. Džigurski, S. Simić, S. Marković, D. Šćepanović, [16]

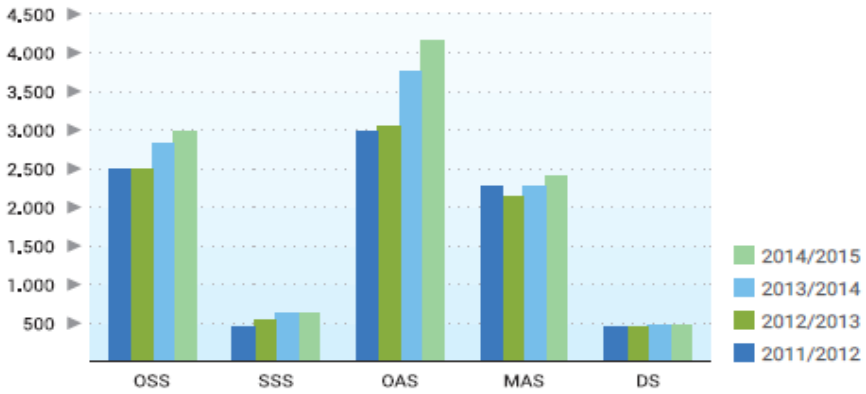

Fig. 5. Number of ICT Student according to Studying Programs in Serbia 2011-2014 by S. Džigurski, S. Simić, S. Marković, D. Šćepanović, [16]

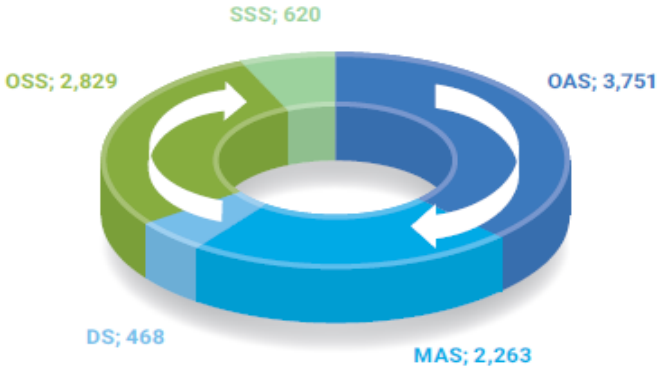

Fig. 6. Capacity of New Enrolees according to ICT Studding Programs, in 2013/2014 by S. Džigurski, S. Simić, S. Marković, D. Šćepanović, [16]

The total number of new ICT enrollees in the school year 2013/2014 was 6,580, its 3,751 students begin their ICT education with tertiary-type. A studying program (OAS) and remaining 2,829 are with tertiary-type B (OSS). For several years the annual growth of around 500 new enrolled ICT students has continued, indicating that rising interest for ICT studies corresponds to the ICT sector growing needs [16].

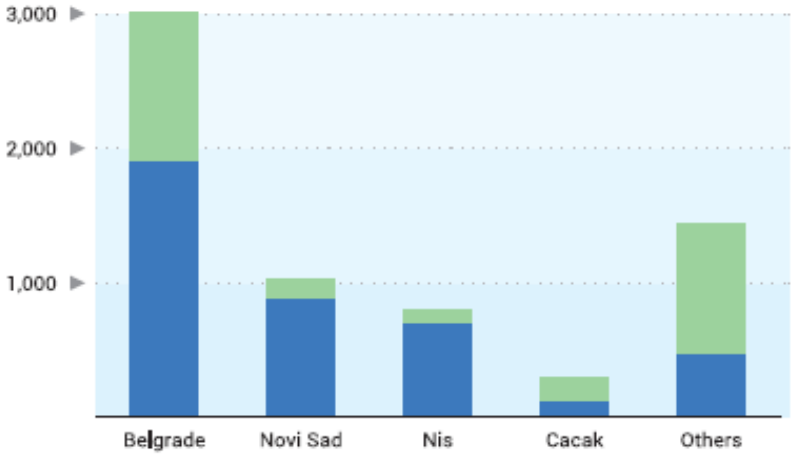

Fig. 7. Number of ICT Student according to Studying Programs in Serbia 2011-2014 by S. Džigurski, S. Simić, S. Marković, D. Šćepanović, [16]

V CONCLUSION

In this studious research work on the basis of relevant scientific literature and conducted research in practice, possible aspects of the application of information communication technologies in the teaching process are presented. The computer, with the support of ICT,

is becoming increasingly indispensable help of the educational process which is essentially an information process. Most of the research speaks about the positive impact of computers on the teaching process and the quality of knowledge. In the information society, which is slowly but surely changing, it is necessary to computerization of schools and the educational process. Computer-mediated learning enables students to take responsibility, control content selection in a multimedia environment, evaluate their learning and activity. Everyone involved in this process has to be able to build their computer literacy to the extent that they can respond to the challenges set by the transition to a knowledge-based society.

Educational software is most often designed by team of experts must be appropriate to the age of students, obvious in presentation of content and written in a simple and understandable language so that users can reach the required knowledge in a simple way.

In order to adapt the teaching needs, interests and each ability of students, it is necessary to reach the significant reform of education in Serbia. In the Republic of Serbia, according to official data, the number of Internet users exceeds three million, but a relatively small number of educational institutions use and apply distance learning accredited by the Commission for Accreditation and Quality Control. Serbia. The reform would relate to the curriculum, and to strengthen of accomplishment teachers regard the use of educational technology in the teaching process. Integrated, design and personalized teaching, supported by engaging teams of teachers and other interested associates (psychologists, educators, parents, students) using information - communication technologies, it would certainly result in raising the overall quality of learning in school education. The results of conducted theoretical and practical research indicate that information communication technologies are still very poorly used in the teaching process and that all factors in the teaching process are not sufficiently educated for the application of modern tools.

Our global society has transformed in line with the trend that more and more heavily on creative thinking, innovation, and new technologies. Employers XXI century, need experts armed with knowledge and skills, which guarantee the success of the company. In this regard, it is necessary to devise a national strategy in education, offering the best solutions and who prefers the idea that education is a continuous group that should last throughout their lifetime. The results of the research indicate that for the more efficient and effective use of information and communication technologies in the teaching process, the inevitable professional and methodical education of educators for the use of these sophisticated tools.

REFERENCES

[1] N. Denic, B. Dasic, J. Maslovara, Profitability of the investment project of introducing modern business information systems, TTEM - Technics Technologies Education Management, Impact Factor: 0.414 (ISI Journal Citation Reports 2012), Vol. 8, No. 1, (2013) pp. 367–372.

[2] ICT in Serbia - At a Glance 2015. https://vojvodinaictcluster.org/wpcontent/uploads/2014/08/ICT-in-Serbia-At-a-Glance-2015.pdf

[3] N. Denic, N. Zivic, B. Dasic, Analysis of factors of implementing ERP solutions in the enterprise, Annals of the Oradea University, Fascicle of Management and Technological Engineering, Vol. XXII (XII), Issue #2, September (2013) 27–31.

[4] D. Vukmirovic, K. Pavlovic, V. Sutic, Use of Information and Communication Technologies in the Republic of Serbia, 2014

[5] N. Denić, Z. Nešić, M. Radojičić, Software Projects Quality Management in the Function of ERP System Implementation. 22. Telecommunication Forum TELFOR 2014 November 2014 ETF. Belgrade

[6] I. Aux-Banfi, M. Koros-Mikis: *Nacional Policies and Practies on ICT in Education: Hungary*. Tjeerd P. et.al., ed., Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003, pp. 267-282

[7] R. Barton: *Teaching Secondary Science with ICT*, Berkshire:Open University Press, 2004

[8] C. A Baste: *Nacional Policies and Practies on ICT in Education: Catalonia (Spain)*. Tjeerd P. et.al., ed., Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003, pp. 79-98

[9] V. Blahova: *Nacional Policies and Practies on ICT in Education: Slovak Republic*. Tjeerd P. et.al., ed., Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003, pp. 509-524

[10] E. Boldrini, A. Cattaneo: *ICT... Innovazione, Competenze, Tecnologie*, Roma: Carocci, 2007

[11] T. Plomp, R.E. Anderson, N. Law and A. Quale, Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003,pp. 465-478.

[12] A. Kington, S. Harris: *Nacional Policies and Practies on ICT in Education: England* Tjeerd P. et.al., ed., Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003, pp. 197-212.

[13] I. Kramplova: *Nacional Policies and Practies on ICT in Education: Czek Republic*.Tjeerd P. et.al., ed., Cross-national Information and Communication Technology Policies and Practices in Education. Information Age Publishing, Connecticut 2003,pp. 163-178.

[14] J. Parkinson: *Improving Secondary Science Teaching*, London: Routledge Falmer,2004, 274 pp.

[15] R. Shultz-Zander: *Nacional Policies and Practies on ICT in Education: Germany*.Tjeerd.

[16] S. Džigurski, S. Simić, S. Marković, D. Šćepanović, Investigation of applicability of information and communication technology in Serbia, Government of Republic of Serbia