

MODERN EDUCATIONAL TECHNOLOGY: SOME ASPECTS OF MULTIMEDIA APPLICATION IN TEACHING

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***Summary:** Information and communication technologies have changed the world. The educational system must adapt to these changes, unless a gap between the educational process in schools and ways of acquiring knowledge in everyday life will be formed. The differences could lead to alienation between education and its main hinge – student. Multimedia learning organizations in schools certainly reduce these differences. Saving time, higher interest, higher activity of students and easier to remember are some features of multimedia teaching. Society of knowledge, that we seek for, implies such modern methods of training competencies, which enables more effective lifelong learning and adjusting to the dynamic business environments. This paper explores some aspects of the application of multimedia in educational process, and addresses with special attention the issue of criteria for the selection of models and didactic teaching strategies embedded in multimedia.*

***Key words:** modern education, multimedia, educational technology, multimedia application*

1. INTRODUCTION

In his famous speech, "Let's start an educational revolution," Sir Ken Robinson raises two key questions. The first question is how to educate our children to take their place in the economy of the 21st century, when we do not know how the economy will look like in the coming weeks? Another question is how to educate the children to have a sense of cultural identity and belonging in this world of globalization. Elaborating on these two issues, Robinson concludes that "what we are doing is meeting the future by repeating the past." [1] And what we need is an educational revolution. A revolution in education is partly determined by the ICT revolution. It has to go in the direction of significant changes in the educational paradigm. Only this kind of education is education for the 21st century. Only this kind of education corresponds to the knowledge society to which we aspire.

This attitude is much more intense than the paragraph in the Strategy for Development of Information Society by 2020 of The Government of the Republic of Serbia for application in education. The strategy states, inter alia, that ICT should be an integral part of the educational program, that the educational curricula and processes should be adapted to the needs of information society, and the teaching staff should be trained in modern teaching methods and that the teachers should have the obligation to develop digital content.[2]

In our conservative cultural environment, educational institutions and teachers themselves should be ready to encourage and present educational revolution. Only then there will be no gap between today's young man, born in a modern society and the education system that is mostly traditional. Young people today are doing many things at the same time, they rely on the "digital juggling" of daily activities and commitments. [3] "Young people are not content to be passive consumers, but increasingly satisfy their desire for choice, convenience, customization and control, through the design, manufacture and distribution of their own products." [4] These young people's aspirations should be used as a direction in which to go in modernization of the educational system. The student should be the creator of his knowledge, not the expert for knowledge consumption. Organization for Economic Cooperation and Development (OECD) also indicates that, if creativity is the basic principle of "knowledge economy", it is the most important task for all involved in education to enable students to participate in the creation of creative innovation. [5] This is how the process of the role changes in the educational process should be continued. The focus of the teaching process has already been moved from teaching content to the learner. If we accept the fact that today's student is different, that he is constantly in the virtual space, where he creates different modes of interaction, then we realize that his needs exceed the level of traditional teaching. Changes in education will be big when the teacher becomes its leader through a virtual space of digital educational content. The teacher then becomes the manager of the teaching process.

In this changed educational environment multimedia, interactive multimedia especially has an important place among the resources that students and teachers use to create knowledge. By using multimedia, educational

technology has increased its role and importance in the teaching process, because it got new possibilities for usage, with better quality of showing the current reality and acting on those who learn.

2. A REVIEW OF THE CURRENT SITUATION IN THE WORLD AND IN OUR COUNTRY

Analyzing various reports, conclusions and recommendations of international organizations dealing with advancement of educational process in the world, especially UNESCO, I came to the important informations.

❖ Technology, when integrated with interactive digital content, teacher training and community involvement, has a positive impact on student learning and performance, according to the results of the "Interactive Class" project evaluated and released by UNESCO.

UNESCO evaluation from July 2011. shows that student achievement increases by combining professional learning, compelling interactive digital content and technology in the classroom. Dell corporation announced that it will extend research on technology's impact on teaching and learning in emerging and developed countries.

Also according to UNESCO report eight million jobs will go unfilled in Brazil in the next three years due to shortage of qualified workers. Dell invests in research and development with local universities to prepare students better for 21st century competitive workforce. [6]

❖ Robert Kozma in his *Comparativ Analysis of Policies for ICT in Education* gave five strategic educational ICT policy rationales [7] :

- Support economic growth. A particularly common rationale for investment in educational ICT is the role it can play in preparing a future workforce and supporting economic development .
- Promote social development. Other countries have focused more on the potential social impact of ICT and governments have justified ICT investments with policies that promote their use to share knowledge, foster cultural creativity, increase democratic participation, make government services more widely available, and enhance social cohesion and the integration of different cultural groups and individuals with different abilities.
- Advance education reform. Any major change in an education system can be, and often is, called reform. But here the term is used to refer to major curriculum revisions, shifts in pedagogy, or assessment changes. ICT can play a particularly important role in supporting education reform and transformation
- Support education management. Some countries advocate the use of ICT to improve the management efficiencies or accountability of schools or the education system, more generally. Consequently, these policies emphasize computer-based testing and the use of digital data and management systems.
- Multiple rationales. These four policy rationales are not mutually exclusive. Indeed, a number of countries have used two or more of these rationales together in mutually reinforcing ways.

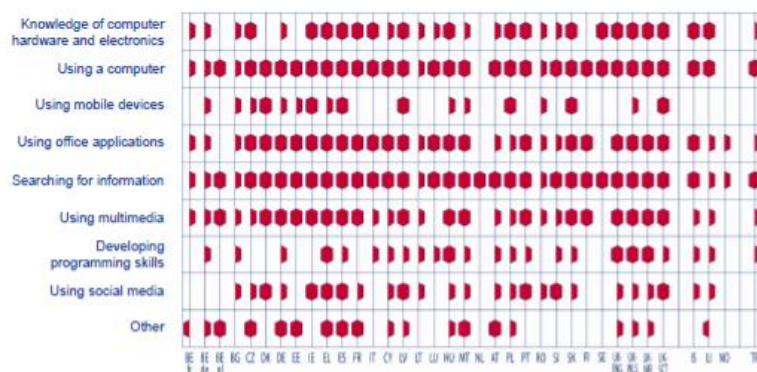


Figure 1: ICT learning objectives in central steering documents

❖ According to European Commission report almost all European countries include the EU key competences in their central steering documents for compulsory education. The notion of competences or skills is now widely used in education frameworks. An increasing number of curricula defines educational aims and objectives in these terms. A competence ‘involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context’ (OECD 2005, p. 4). They are generally defined as *outcomes* of the education process and therefore form part of the conceptual shift ‘from a content- based input approach to a competence-based output approach’. Almost all countries applying this competence framework suggest using information and communication technology (ICT) as a means to help pupils acquire at least some of these competences.

Figure B6 looks at specific learning objectives related to ICT use in their steering documents for compulsory education.[8]

We can shortly conclude that role of multimedia in achieving core competences is very important.

- ❖ Situation in our country is not so optimistic. There is no statistical information about the presence of multimedia in teaching and learning. There is no clear instructions nor trainings for teachers how to make multimedia for teaching. There is some multimedia educational material enabled for pupils, but first of all for primary education. Teachers are on their own in the application of multimedia in teaching and learning.

3. DIDACTICAL AND METHODOLOGICAL ASPECTS OF THE APPLICATION OF MULTIMEDIA IN EDUCATION

Power of interactive multimedia as an instrument of knowledge construction lies in encouraging social interaction and student interaction with the content. [9] The student makes decisions about the content and desired outcomes of the learning process, and he can adapt the teaching style to his learning style. In this way he takes responsibility for his own learning. Many learning theories emphasize human interaction as an important element in the learning process. Interaction is not limited to cognitive processes, but use of interactive multimedia enables cooperative learning. Ability of students to learn on their own and to educate themselves is increasing during the process of education. By acquisition of educational experiences, students gain the intellectual skills needed for lifelong learning. [11].

Scientific theory confirmed that a student of average ability, can store 10% of the content that he read, 20% of the content that he heard, 30% of what he saw, 50% of what he both heard and saw, 70% of what he can dramatize and write, and even 90% of what he organizes theoretically, says, does and realizes.

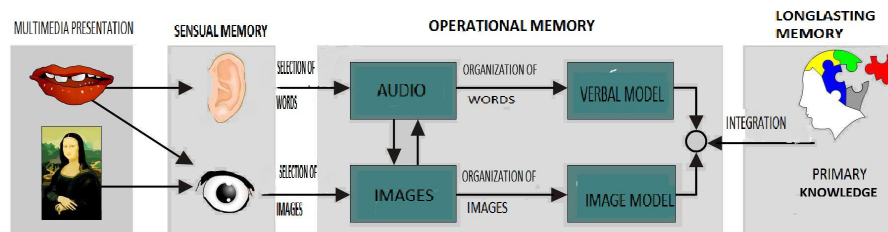


Figure 2: Mayer's cognitive model of multimedia learning

Students express their opinions electronically every day, whether they're tweeting about a favorite band or commenting on an online video. In the classroom, however, they usually aren't as eager to speak up — especially in response to the teachers' questions. Engaging these digital learners to provide feedback requires meeting them on their own turf — through technology. In this way we keep student's attention in class and get them excited about learning. Therefore performances of learning are certainly higher.

Multimedia content also provides a better concept of the representation of the task to check the students' knowledge which can not be seen in conventional tests where student chooses one or more offered answers or fills in the gaps. It is a framework in which the main component of education as learning, teaching and testing is intergrated, as well as adaptive testing and implementation of a system that provides students with learning instructions.[9]Based on the basic types of interactive tasks more complex, more efficient multimedia architecture can be developed .

According to the type of interaction [10] there are the following educational multimedia applications:

- assistance (learning through suggestions)
- passive tutor - guide (learning through self-study)
- training (learning through practice)
- active tutor (driven learning)
- simulation (learning by finding, discovery)
- game (fun learning),
- problem solving (learning by doing - "learning bydoing") and
- intelligent dialogue (Socratic learning).

Implemented interactive tasks vary according to:

- The method of giving the answer,
- Visual leading while performing the task,
- The level of complexity.

Better we pack the multimedia in learning material better will be the performance of learning.

Teachers can use a response system to poll students before, during or after lessons. Students respond using either a "clicker" device or software on their computers.

With a student response system:

- Students are empowered to take control of their own progress — they can gain insight into areas where they need help and seek it out.

- Students who are reluctant to speak in class can respond to teachers' questions in anonymity.
- Teachers can do real-time assessments of students' collective and individual comprehension of a lesson and use that information to adjust the lesson plan or provide personalized instruction.

Many corporations, like Dell offers different classroom technologies.



Figure 4: Students response device

All interactive tasks do not allow students to move to the next level of solving the problem if the student has not previously filled in or selected correctly the interactive fields on the previous level. From the pedagogical point of view, the application leads students to make conclusions about the accuracy of achieved steps in solving the complete task. In this interesting way the students acquire the required amount of knowledge without the intervention of a guardian or prior knowledge by random guessing, self-discovery, and thus they perform the learning process. The effects of learning significantly affect distribution of content, content type and design of users' interface. Content should be designed to promote awareness of their own progress and knowledge and allow independent selection of content according to their abilities - individualization through the nonlinear content organization. This will facilitate learning with customized programs, for average and gifted students. However it should be noted that if a school is equipped with the latest multimedia applications, it does not guarantee their functional use in the classroom. In order to achieve this, personal and professional competence of teachers is very important when we use the multimedia in traditional or developmental terms. Modern high school requires teachers with pedagogical, technical and technological culture, who is able to organize, manage and provide teaching communication supported by multimedia.

Information that media broadcasts should not be repeated without a plan. We should take maximum advantage from each media so that when broadcasting educational content we intensify the media that can fulfill the assigned task best.

"And with the latest hypermedia educational technology there is a possibility for logical, epistemological and didactic failures that are comparable to the criticisms of the traditional teaching (frontal lecturing-representation classes in which the teachers are active while the students sit, listen and watch). Thus, a particularly important issue with the use of multimedia and the Internet for teaching and learning is the criteria for the selection of the didactic models and didactic strategies that are embedded in multimedia." [11]

Computer will never replace the teacher, but the teacher can not replace the computer (used appropriately). Everyone knows to do something better than someone else but "united" they can contribute to the improvement of the education and learning process. [12]

Mayer generated a series of experiments yielding five major principles of how to use multimedia to help students understand a scientific explanation. [13]

- Multiple Representation Principle: It is better to present an explanation in words and pictures than solely in words.
- Contiguity Principle: When giving a multimedia explanation, present corresponding words and pictures contiguously rather than separately.
- Split-Attention Principle: When giving a multimedia explanation, present words as auditory narration rather than as visual on-screen text.
- Individual Differences Principle: The foregoing principles are more important for low knowledge than high-knowledge learners, and for high-spatial rather than low-spatial learners.
- Coherence Principle: When giving a multimedia explanation, use few rather than many extraneous words and pictures

4. STUDENTS' OPINION

The aim of this research was to form statistical image on students' opinion about the application of multimedia and interactive multimedia in teaching and learning. I wanted to know is there a need for digital teaching material, what are the students' habits and motivation. Students of final class high vocational school filled in the questionnaire. Students of these educational profiles in high percentage opting for further education.

Standard questionnaire is used as appropriate methodologically correct method for data collecting. The form of questionnaire is standard. The questionnaire consists of 12 questions relevant to the research topic. The quality of research material was ensured by two main principles of conducting the poll, voluntary and objectivity.

4.1 Results

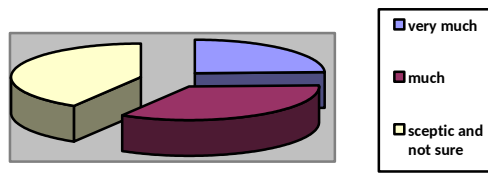


Figure 5: Students' opinion on the ICT contribution to the advancement of learning process
Students believe that ICT can contribute to the advancement of learning process: very much 24,39%, much 34,15%, and the percentage of students who are sceptic or not sure is 41,47%.

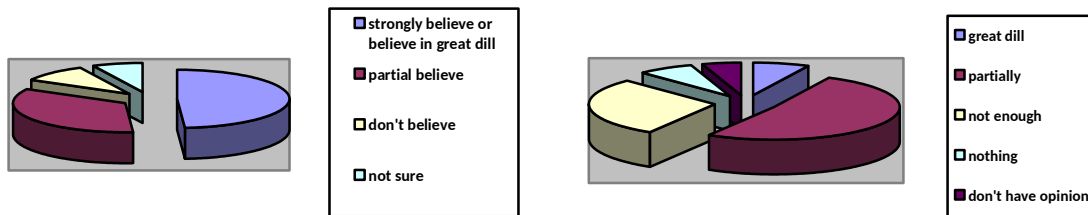


Figure 6: ICT is future of the educational process and presence of multimedia in current curriculum
On question: „Are the information and communication technology future of the educational system and learning process?“ students answered: 48,78% of students strongly believe or believe in a great dill, 34,15% is partial confided, 9,76% do not believe and 7,32% of students are not sure.
Students' answers on question: „How you can describe the presence of multimedia in current curriculum?“ are 7,32% of students think that they are present in a great dill, 51,22% think that they are partially present, 29,27% of students think that multimedia is not present enough and 7,32% think that multimedia is not present in current curriculum and the 4,88% of students don't have opinion.

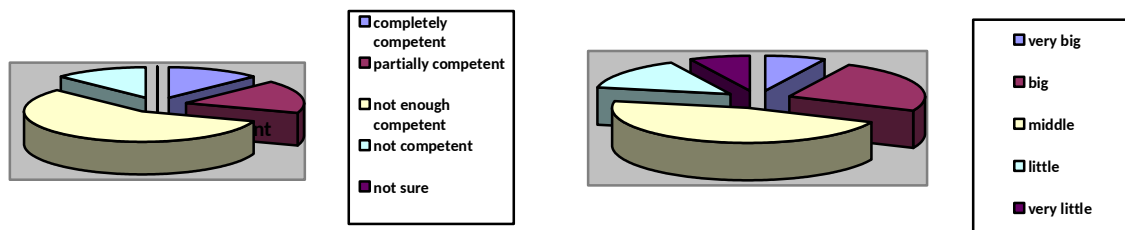


Figure 7: Students' competences and students' interest for the application of multimedia in teaching
I was interested in students' opinion about their own competences for modern multimedia learning environment. 56,1% of students think that they are completely competent for modern multimedia learning environment, 24,39% of students think that they are partially competent, not enough competent are 2,44% of students, not competent are 12,2% of students and 4,88% students is not sure about this..
The students' showed interest for the application of multimedia in teaching: little and very little interest showed only 21,95% students, till very big, big and middle interest showed even 78,05%.

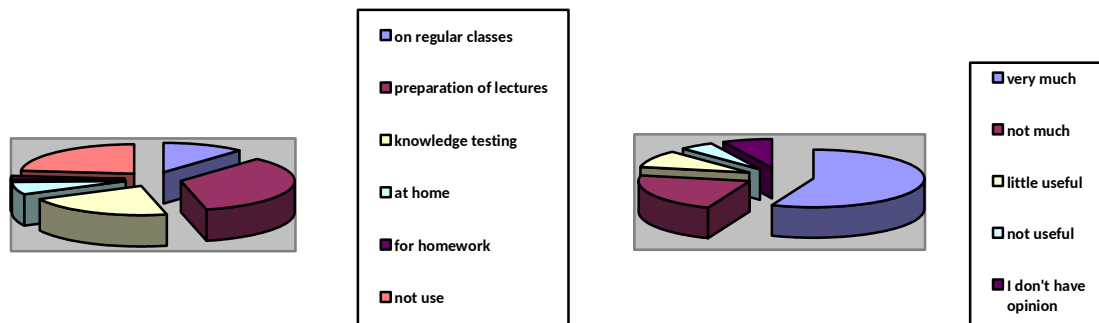


Figure 8: When do the students use multimedia? Students' opinion about the benefits of interactive multimedia
Students already use multimedia for learning in school, especially on regular classes 12,2%, for preparation of lectures 36,59%, for knowledge testing 21,95%, at home 7,32%, for homework 2,44%. 24,39% of students do not use multimedia.
Students' opinion about the benefits of interactive multimedia are: 7,32% of students think that interactive multimedia is very useful, 48,78% think that is useful, 21,95% of students think that interactive multimedia is

not very useful, 9,76% of students think that is little useful , 4,88% think that interactive multimedia is not useful i 7,32% of students don't have opinion.

Here is how the students marked benefit on the scale from 1 to 5 of some multimedia applications and elements of multimedia for teaching and learning.

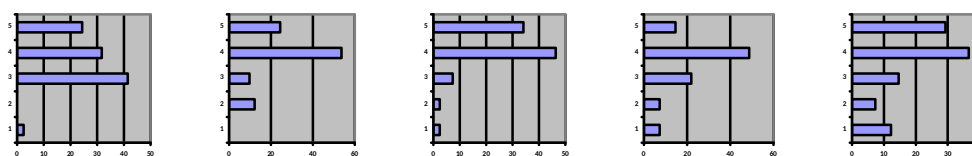


Figure 9: Students' mark of some multimedia applications and elements of multimedia: presentation, video, simulation, interactive educational material, interactive tests

The research confirmed hypothesis, set in this paper, that ICT are the future of the learning process according to opinion of those who learn. The research results even on this small sample of young people, future faculty students clearly show students' designation for application of multimedia for learning. Although multimedia is only partially present in teaching according to their opinion, they still use multimedia for their own preparation of lessons. Significant percentage of students understands benefit of interactive multimedia. Students marked simulations as the most useful tool for learning and teaching, then video on the second place. Third place share interactive knowledge tests and interactive educational material and the last place according to students' marks belongs to presentation.

5. CONCLUSION

For the quality establishment of the faculty education curriculum, according to many authors, key roles have development and confirmation of research capacity, which will bring the rise of national economy and global competitiveness. Multimedia have wide spectrum of possibilities and because of that is important for articulating motivation energy of young people for education. All of multimedia possibilities can be embedded in innovatory educational system. The curriculum with embedded multimedia has numerous learning roads to move to, but each student must have feedback about his learning outcomes no matter which road and scenario he chose.

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