

THE APPLICATION OF MODERN INFORMATION -
COMMUNICATION TECHNOLOGIES IN EDUCATION AT RAILWAY
COLLEGE IN BELGRADE

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Abstract: This paper shows basic concepts of modern education, which are in accordance with the Bologna process. Application of information-communication technology (ICT) in education of students at Railway College, as well as didactical resources, conduce to effective and high quality process of knowledge acquirement, and to overrun and reduction of technical-technology barriers while segregating Railway College in accordance with European educational system.

Key words: modern education, ICT, multimedia

1. INTRODUCTION

Humanistic approach to education deems best that organization of labour in which every student works, considers and solves problems. Advancement, respectively modernization of guidance-educational process is moving towards interactive pedagogics, pedagogics of dialogue, discussion, i.e. cooperative learning. [1]

2. BASIC CONCEPTS OF CONTEMPORARY EDUCATION

Teacher's role in traditional tuition mostly comes down to lecturing (giving information) and occasional control of student knowledge, although it should be continuous and much richer and more varied. The principal subject of such an educational process was the teacher, while student was given the function of an object.

New education paradigm is student oriented („learner – centered paradigm“) (Figure 1). Student is „placed“ in the center with learning resources around him, both timewise as well as regarding the place and way of learning. Besides, everything is student oriented and encompassed

in a single phrase „learning resources“ (people, knowledge, technology, media, organization...). The teacher should instruct students how to learn, make them self-sufficient, advise them and help them to advance quicker.

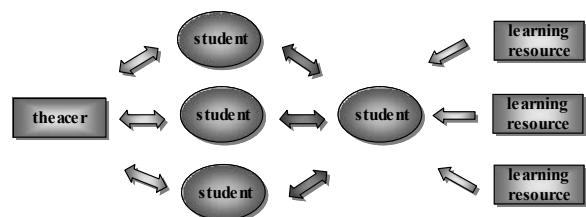


Figure 1. The transit of traditional education paradigm towards the new advanced one

The new vision of higher school system of education, with student being the central subject of the educational process, opens teaching and learning possibilities with everything adapted to student: methods of work and teaching, ways of communication, evaluation, obtaining return information and the whole of interaction, both between the teacher and student as well as between the students themselves.

3. EUROPEAN NETWORK OF INNOVATIVE SCHOOLS – ENIS

In the future, knowledge-based society will be the fundament of development and the survival itself. It will depend on ability to innovate quickly and generate new knowledge, ideas and technologies through education and research.

On that basis a program must be created that can prepare generations of individuals and students to, successfully and effectively, for themselves and the whole community, implement in the future on the global level the knowledge obtained in the present.

The application of ICT in education includes: introduction of digital technology in learning and learning space, high degree of connectedness within and between faculties and colleges, greater number of computer laboratories with longer usage times, creation of Web-based educational environment, acquirement and development of resources for teaching and the support of teaching staff in the use of technologies, as well as tying the technology with learning. [2]

Unavoidable is the question what is the correct, respectively purposive application of new ICTs? One must recognize that no material, not even the best software, can be efficiently used without teacher clearly leading the way. Purposive application of modern technology starts by clearly defining the aims and the strategies of search to be done by the students themselves or their teacher. Activity is purposive whenever something is learned, even if the aims envisioned at the beginning were not reached.[3] It is essential that students learn to fit together pieces of information, to apply what's learned in different circumstances.

In an effort to develop educational infrastructure of european countries „e-learning“ programs were initiated, as well as the European Network of Innovative Schools (ENIS)[4]. The aims and system of criteria set before some 500 schools connected in the network wholly reflect the philosophy of the European Union regarding the development of school, with key notions being [5]: diversity, high quality and inovation.

To become a member of ENIS, a school must fulfil requirements tied to six criteria focusing around the following terms [6]: a) pedagogics, b) educational technology, respectively ICT, c) school organization, d) strategy, e) organization, and f) content.

Strategic partnership exists between european schools in the network (located in Holland, Great Britain, Danemark, Germany, Norway, Hungary etc.) [7]. It should be pointed out that of all the former socialist countries, only Slovenia joined ENIS with some ten of its schools. ENIS' program points out that the activity of schools ready to experiment is of great importance for the implementation of the EU platform for the development of schools [8].

4. MULTIMEDIA IN TUITION

Dale's pyramid of experience (Figure 2.) warns us that children and adults memorize [9]:

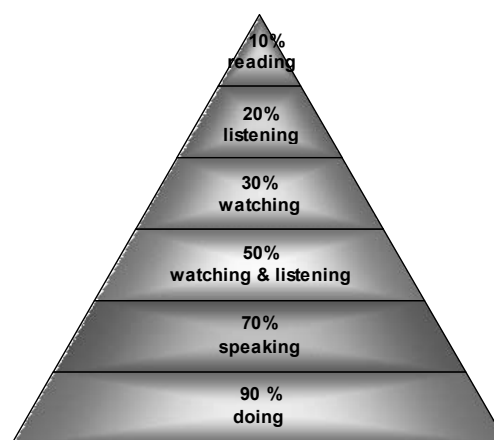


Figure 2. Dale's pyramid of experience

- only 10 % of what they read,
- 20 % of what they listen to – listening to words,
- 30 % of what they watch being done,
- 50 % of what they both watch and listen to while it is being done – watching pictures, actions or demonstrations,
- 70 % of what they themselves voice – playwriting, acting the roles, writing/reading on the subject at hand,
- 90 % of what they themselves do – doing something real, implementing realistic targets, looking for solution.

Multimedia is a method of presenting data by different kinds of digital media: audio material, video material, text, picture and animation.

The term multimedia is very often misused. Many teachers believe that it denotes the usage of an electronic media in the educational process. To use the term correctly is to use it when talking of information having more than one meaning??.

For the perception of such information one simultaneously uses several senses, because it propagates and exists in different media.

Positive effects of multimedia are:

- attracting students' attention by presenting the teaching material with greater diversity, clearness of layout and contemporariness, and in a more interesting way;
- more thorough understanding of content and more effective attaining of new concepts;
- better memorizing of content and greater capacity to apply the knowledge in new circumstances;
- greater degree of communicativeness between participants in educational process;
- higher level of students' interest, motivation and satisfaction.

Creation of content with multimedia elements should mean more than a handful of colorful pictures and various audio and video effects. One should avoid the so-called *muddymedia* applications, respectively the applications with too much multimedia elements, too much buttons, screaming colors, inconsistent look of pages, unmarked or badly marked links, links leading nowhere...

In a research done by Research Institute of America it was established that 33 minutes after the end of a unit in a course with instructor, students memorized app. 58% of the material taught. By the next day they memorized some 33%, and three weeks after the course they memorized app. 15% of the knowledge acquired. Dividing the material in smaller units resulted in longer and better memorizing of the material. While with instructor students memorized some 58% of material, here they memorized from 25 - 60% of the material in the longer run.[10]

In Zrenjanin Technical College an experiment was conducted, where one group of students heard a traditional sort of lecture, while another group attended a multimedia course, with students not knowing the principles of evaluation. The results were as follows [11]:

- Out of 54 members following the traditional lecture in a classroom, all of 31 could not reproduce 20% of the material lectured, 15 managed to reproduce 35%, and only 8 of them

managed to reproduce more than 35% of the material lectured.

- In the other group, from 54 members learning the material given in multimedia courses only 11 could not reproduce 20% of the material, 6 managed to reproduce 35%, while (it is hard to believe) 37 members managed to reproduce more than 35% of material.
- In a test after the lecture, out of 46 key terms, the first group memorized only 10%, while the other memorized 70-80%. After 48 hours, in a repeated test, the first group memorized app. one percent of terms, while with the other group, the number of terms memorized remained practically the same.

5. ICT IN BELGRADE RAILWAY COLLEGE OF VOCATIONAL STUDIES

5.1 School mission and vision

The School mission is:

- continuous innovation of the educational content in the greatest scope possible
- application of modern methods and techniques of education
- hands-in process of education for young and high quality specialists in the field of applied scientific disciplines pertaining to railway sciences
- application of modern technologies and innovations in the field of railway traffic, compatible with european trends

The School vision is:

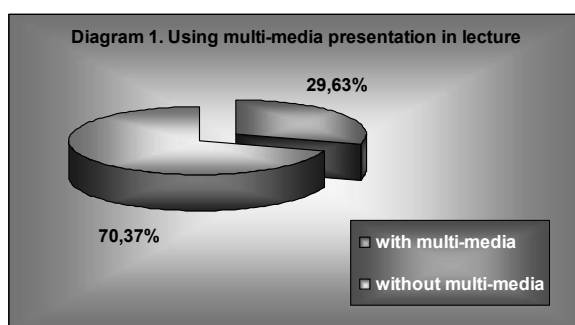
- modern european vocational higher school institution, recognized for its achievements and achievements of its graduates in the field of railway technics and technology
- increase of interest for studies and raise of the quality level of vocational studies
- betterment of teaching plans and programs
- quicker development of the city, the region and the whole country

5.2 The application of multimedia

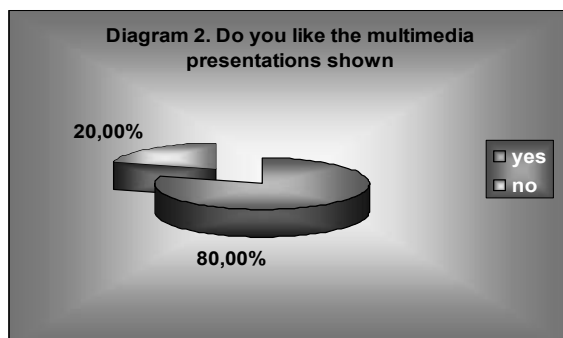
To find out the degree of application of multimedia technologies during the training at

School, an experiment was conducted. Students of year II of Belgrade Railway College, specialty informatics, anonymously filled a survey in order for us to become acquainted with their thoughts and suggestions in relation to the use of multimedia presentations in training.

Asked how many subjects were taught with professors using multimedia presentations for the purpose of training, students named 8 subjects only, i.e. 29.63% of the total number of subjects* instructed (Diagram 1). In 85.00% cases those presentations were produced with MS PowerPoint, containing text and corresponding animations and graphics (in relation to the total number of lectures with multimedia presentations).



Asked whether they liked the multimedia presentations shown, 80.00% of surveyed students (diagram 2) answered in affirmative, and gave the following explanations:



- they attract bigger and longer lasting attention
- they are dynamical, not monotone
- they are concise and directed at the most important elements of lecture
- they occupy several senses so that one gains a clearer picture of the material instructed

- they are easier to memorize, especially so when pictures affiliated to the text presented are shown
- they contain the material necessary for the passing of exam

Students answering the previous question in the negative gave the following explanations of their answers:

- the students were not enough involved
- professor reads the text shown and often speedily, so it becomes monotone, students' focus wanders and the information is poorly memorized

Asked to write down some of their suggestions as to how the lectures and exercises could be improved, students gave the following:

- more multimedia presentations with corresponding animations
- engaging students on common projects in order to train them for team work
- more exercises and practice for students
- oftener testing of students' knowledge

6. CONCLUSION

The aim of our School is to innovate the content of education continuously and in the greatest scope possible, as well as to apply modern methods and techniques of education. The School endeavours to provide a practical process of education for young, high quality specialists in the field of applied scientific disciplines in railway sciences.

School ICT has become a part of the training system, either as a teacher support in the implementation of traditional tuition or as its substitute by one of the many new methods and ways of implementing tuition process, as well as learning and teaching process.

The application of ICT as a didactical means in the education of students enhances efficient and high quality process of knowledge acquirement, bridging and lowering technical-technological barriers for connecting the Belgrade Railway College for Vocational Studies in the common european educational system.

* The surveyed students had 27 subjects in total

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ПРИЛОЖЕНИЕ НА МОДЕРНИ ИНФОРМАЦИОННО-КОМУНИКАЦИОННИ ТЕХНОЛОГИИ В ЖЕЛЕЗОПЪТНИЯ КОЛЕЖ В БЕЛГРАД

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СЪРБИЈА

Резюме: Докладът представя концепции за модерно образование, които са в съответствие с Болонския процес. Приложението на информационно-комуникационните технологии (ICT) в обучението на студентите от железопътния колеж, както и дидактическите източници, допринасят за ефективен и висококачествен процес за придобиване на знания и за преодоляване и намаляване на технико-технологичните бариери, които отделят Железопътния колеж от европейската образователна система.

Ключови думи: модерно образование, ICT, мултимедия.