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MULTIMEDIJALNI ELEMENTI U OBRAZOVANJU IZ BIOLOGIJE I KEMIJE

MULTIMEDIA ELEMENTS IN BIOLOGY AND CHEMISTRY EDUCATION

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Sažetak

Multimedijalni obrazovni sustavi stvaraju nove mogućnosti za pristup određenim informacijama. Za komunikaciju s korisnicima ti sustavi koriste tekst, video za projekcije pravih eksperimenata, animacije za prikaz nekih procesa ili zvuk. Osim toga, ovi atributi su povezani interaktivnim linijama, što znači da je ovaj tip multimedijalnog obrazovnog sustava prilagođen individualnim zahtjevima. Računalo može biti prisutno u svim predmetima obrazovnog procesa, kao i u svim fazama nastavnog procesa (npr. motivacija, objašnjavanje, ponavljanje pronalazaka i zaključci). Rad s računalom će tijekom školskih lekcija učenicima biti zanimljiv, privlačan i atraktivan, a osobito će se istaknuti oni koji u klasičnom obrazovanju nikada ne bi pokazali svoj talent.

In the process of learning the teacher has to monitor and transmit the true spirit of ethical and moral principles of new scientific knowledge about science education and paying particular attention to access to the didactic with students in mind and the educational and psychological aspects /1/, /2/.

It is essential that the teacher using the resources that build on the curiosity of children and use their imagination and spontaneity, and also to create space for meaningful activities in which students have the opportunity to explore and evaluate the events of the immediate environment /3/.

Information can be obtained in several ways. About 83% of information obtained visually, 11% hearing, smelling of 3.5% and 1.5% by touch. Effects of remembering can be divided according to how information is perceived and administered as follows 10% to remember reading the text, 20% using phonetic devices, 30% percent with a visual aid, 50% with a visual aid and discussion, 70% of the audiovisual device, 90% s audio / visual devices and active involvement. For faster and more complete adoption of the curriculum is the best use of textbooks and curriculum, which allows the feedback and verification of knowledge. Tutorial should be formed according to the principle of proportionality, that is neither too simple nor too

Abstract

Multimedia educational systems create new possibilities in the access to some information. They communicate with users using text, video for real experiments projection, animations for viewing some processes or sound. Moreover these attributes are connected by interactive links, and that is why this type of multimedia education system allows individual requirements. Computer can be used in any school subject and in any phase of teaching process (e. g. motivation, explanation, or in repetition of findings and conclusions). Work during the school lessons will be more interesting and attractive for students and using this kind of education, students who would probably never show their talent can excel.

difficult. Not to be ahead of new curriculum. Must proceed by steps and must be pre-tested percentage ownership of the curriculum. User (student) may follow his pace, he can choose the option of gradual transition. Dissolving of interest issue or subject itself can give rise to work with (multimedia), encyclopedias and the Internet. Teacher's consultations are important precisely when the pupils among themselves analyzes the information obtained from the program. "No tutorial, developed to the maximum level of logic can answer any curious question of the pupil. Therefore, the teacher's role is irreplaceable. "The main objective of ICT technology is facilitating the work of teacher and pupil to provide a realistic picture, which is as difficult to achieve in chemistry. The program Mercury2.2 teacher can work with a crystal systems or molecules and their construction. Market as well as other Chem3D, Diamond 3.2, Jmol and others. Some are able to determine the angles between the bonds, show internal hydrogen bonds, which contribute to readability. The teacher can properly choose which program will work, which is best for students /4/.

European education authority on the base of observations of individual teachers developed the theory that teaching and learning should be directed to: - education in the field of scientific concepts and

theories,

- learning in the field of scientific research,
- learning in teaching methods,
- manage information technology /5/.

In the field of science education highlighted the lack of information and communications technology (ICT), which often facilitate the work of teachers to students has introduced information in the form of the brightest. ICT is an appropriate complement to a variety of teaching methods and the result is interest and efficiency of work by pupils. This has led to a multimedia project Tempus Phare. AC Tempus Phare project JEP 14327 - 1999 "Model-service training of science teachers' innovation is the beginning of didactics of science in multimedia form. The project is devoted to teacher training through the Internet and other multimedia devices. Since the evidence presented to students are often already outdated, because the science and technology are in constant evolution. Took place in several stages:

- Stage 1: Analysis of the original science didactics and teacher education. The result was a proposal for innovative curriculum didactics and teacher education model.
- Stage 2: Develop information systems for school subjects. The result was the SIS (School Information Services) running on the server Kekule at <http://kekule.science.upjs.sk>
- 3rd stage: creation of courses for teacher education. Result: Teachers attend courses such as: Teleproject, Environmental Education in Biology, Introduction to Computing and others /6/.

Tempus projects, Infovek, Pisa emphasize that in the 21 Century many things must pass any change in the direction of multimedia, which are open to the world of new skills and knowledge. Teaching is the element applicable in every respect. ICT is a means of

teaching, which supports the effectiveness of acquiring knowledge, which combines cognitive and manual work in the classroom. Activation method supports pupils' autonomy and creativity in particular. Rapid communication helps to decipher the problem with the use of other knowledge and skills. Some chemical tasks are difficult or nearly impossible to realize in laboratory conditions, there is just a way to show them something that will never experience the real. Educational games (computer simulations) help students understand the playful patterns and theory and in particular reduce teacher preparation time /7/.

ICT can be used during any phase of the lesson. During the hours we can use in their motivational stage - fancy colored or otherwise attempt (simulation) models or spatial arrangement of elements in the compounds. Or in the fusing stage - conceptual maps, tables, where students can easily connect the dots knowledge tests - entry tests are easier, less time consuming, and the teacher has the opportunity to immediately realize the feedback /8/, /9/.

Statistical research, which reflects the use of ICT in the curriculum (for the ISCED 1 and 2) within the European countries, shows that the presentation of experimental results and data, finding information on the Internet and the ability to use ICT is more than wealthier simulation and communication with other pupils. During the work with ICT is easier to monitor individuals, because they are part of direct interaction. The biggest find justification for challenging issues, teacher raises problematic tasks to students, and in addition work with simulation issues (interactive blackboard). ICT has proved particularly as an incentive /10/(Kubiatko, Nagyová, Ušáková, 2006).

The gradual introduction of multimedia elements in the learning process takes place to facilitate the teacher's work, but does not mean that replacing its role.

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