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The significance of multimedia didactic aids in the informative society

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ABSTRACT

Purpose: The article describes new kind of scientific aids, created with use of computer techniques and their significance in the informative society. Student equipped in such didactic aids has the simulation possibility of phenomena and processes from the nature, the technique or from specialistic investigative laboratories.

Design/methodology/approach: The teaching methodology with use of multimedia techniques makes possible the application of innovatory and effective didactic processes in several fields of education. Student will experience brand new computer culture. This will encourage them to raise their skills and abilities

Findings: Multimedia didactic aids are used not only on the computer science lessons. They are also effective applied in many different scientific disciplines not directly connected with computer science. They raise the efficiency of applied teaching methods and they promote the realization of collectivization postulates.

Research limitations/implications: In most cases authors of already published didactic aids are not professional teachers. They make accessible very large amount of data introduced in the original way, but unfortunately, burden with large number of factual errors.

Originality/value: Informations contained in this article can be useful for people whose wants to create new scientific aids, with use of modern informative techniques and simultaneously, which are the valuable and important matters with high didactic value. These aids should improve all didactic subjects by learning process adjustments exact to student's individual needs.

Keywords: Computer aided teaching; E-learning; Informative society; Virtual laboratory

EDUCATION AND RESEARCH TRENDS IN MATERIALS SCIENCE AND ENGINEERING

1. Introduction

Rapid development of internet and application of computers in more and more extensive areas of the life has caused that we become slowly the global informative society. The confirmation of this fact is observation of companies from the informatics technique branch. They become in last times the richest enterprises of the world (superb examples are here Intel®, AMD® or Microsoft®). The fact, that computers and the global communication net are indispensable in the present world, is undeniable. Now their applications in the field of the education became natural.

Undoubtedly the computer superbly realizes the programmed teaching. However, the teaching process, similarly as with the human, can not by programmed precisely. The usability of programming, in which the student is steered into the infinite stream of information and questions, is quite doubtful. It allows mechanical assimilation of information sequences, but it doesn't initiate any student for active and creative perception of gained knowledge [1-3].

For some time, the world compares the global communication net to the library, in which the entire book instead of being placed on shelves, are dropped disorderly on the crib in the middle of the room. Undertaking the challenge of the informative society marks the necessity of the arrangement of this library, and also to considerable enlargement of her repertories.

Recently appeared the need for working out new scientific aids, with are using modern informative techniques and simultaneously,

Fig. 1. The modern methods of knowledge passing with use of the multimedia a) the e-learning platform of the Institute of Engineering Materials and Biomaterials, b) the materials science virtual laboratory [6-7,11]

are the valuable and important items with high didactic value. They should improve all knowledge gain processes by adjustments of the learning processes exactly to the student's individual needs [3-5].

2. Computer as knowledge transfer medium

The support of computer techniques in the school lessons, which demands individualization of the work from students, makes parallel practices execution possible for a larger group of students. The use of the computer allows, that practices runs simultaneously and effective. It requires manual efficiency, and makes them more attractive for the student by the introduction of the simulation elements. (Fig. 1)

The possibilities of the computer are immense and they still grow. The computer facilitates the access for information, or their processing. The education at the school or at home with the use of the computer is very attractive and it considerably raises effects of the teaching process [6-7].

The creation of the global computer net has caused popularization of information processing techniques, which might appear at the school and are applied almost on all academic subjects. However, electronic multimedia materials, used by teachers, are not always didactic aids of full scientific value.

The computer with suitable software allows to simulate the nature phenomena and technological processes performed in investigative laboratories. The education supported by student's own discoveries takes the form of the problematic teaching. Educators perceive the important part of the computer at all stages of creative solving problems. The computer is present as the reliable source of information on the stage of formulating hypothesis, and then, in the stage of verification. Computer is the perfect tool for search and the verification of solution during the modeling, simulation and validation of the student's ideas [8].

The student with the asynchronous access to didactic materials is not attached to the school bench any more. He decides about time, place and the speed of all processes of the teaching, which depends exclusively from his individual predispositions and intentions [9].

3. Primary aims of the multimedia education

The informative society means society well educated, and prepared to practically use of many information, and outright their congestion. Two basic problems of the multimedia education are mentioned below:

- preparation to the specific receipt of the varied media
- preparation for effective usage of media as tools of the intellectual, professional and social development.

Described media education deserves to be treated as the unit of general education .The aim of such education is the preparation of active, creative, and also critical receipt of medial recourses and also use this media as the tools of the communication, learning, winning, accumulating and processing of the information [10].

4. Advantages and disadvantages of multimedia didactic aids

Electronic didactic materials are used not only at computer science lessons; they are also effectively applied in many different scientific disciplines not connected with computer science. They

raise the pictorial range of the applied by the teacher teaching methods and they favour the realization of the collectivization postulates. The students are using substantial collection of information (the WWW pages, multimedia encyclopedias and dictionaries, virtual laboratories etc.), that requires information processing for their full understanding. In this way students are assimilating the knowledge through creating meanings, defining notions, creating logical structures, hierarchizing and valuing information [12-14].

Unfortunately, except valuable information, threats also lurk on the student while using the Internet. Authors of published content and not often professional teachers. They make accessible the richest class of the data introduced in the original way, but unfortunately, burdened with large number of factual errors. This results first of all from the fact that internet publications are written often by amateurs and, moreover, are not reviewed. .

The next problem is the dependence from the informative technology. The computer user recreate prepared for him exercises and processing methodology. All facilities implemented in applications and computer systems makes definite and impassable boundaries, a form, that unify the students work, and impose the standard way of thinking simultaneously.

Enriching the didactic process about multimedia materials should follow very in the balanced way. With the introduction of the new material, the method of the virtual simulation certainty is more interesting as traditional methods. However the teacher not always has the possibility to assure the constancy of knowledge passed on in this way [15].

5. Can interactive multimedia aids be a useful help in the education of young engineers?

To answer this question unambiguously we have to convict that we live in the more and more computerized world which force on us the skills of the using new tools.

Many creative teachers build they own didactic materials in presentation makers (like Microsoft PowerPoint or OpenOfficce.org Impress). Everything is fine, when the presentative character of the didactic material relates to the teaching programme. However, when the teacher tries to create the true interactive educational didactic help, he focus on difficulties, because the presentation applications are not prepared to creating advanced educational contents using didactic paths, practices, dictionaries and different elements raising the efficiency of the educational programme.

That is why universities and engineering colleges should play the main part in the delivery of multimedia educational contents. Only in such places didactic materials are created, and knowledge is passed on. Experts from the given branch will see, so that the educational material contains exclusively useful contents transferred objectively devoid of the mediumistic hum.

The scientific multimedia aids, constructed in this way will certainty improve the process of prospective engineers education. The education methodology with use of multimedia techniques provide delivering such knowledge and computer culture for students, which will allow them methodical usage of any gained information and, at the same time, increasing of their qualifications. Skills acquired by the use of multimedia applications will influence their relation to the computer as the attractive form of gaining and presenting the information. The computer is a powerful medium in the process of teaching and learning. It is a tool, which allows the preparation of varied materials and projects about several, not only academical, character (Figs. 2, 3) [16-20].

6. Conclusions

Dynamic changes, which constantly are proceeding in the computer and telecommunication industry in sudden and irreversible way, have changed not only the economy, but first of all our own life. The development processes of the engineering technology and, particularly, the informative technology cannot be restrained.

The new society comes into being - the informative society - the world where human life is permanently enriched through usage of the achievements of technological and informative services

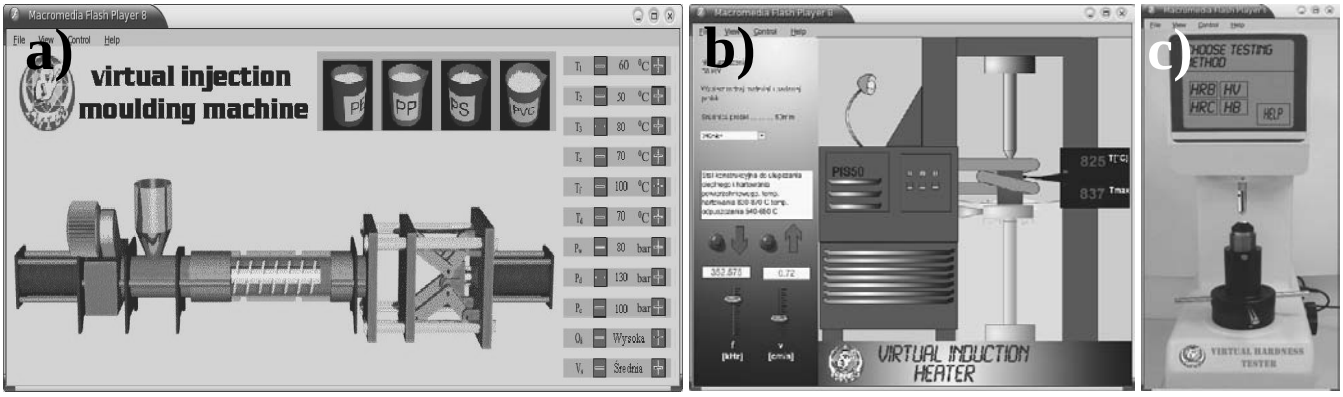

Fig. 2. Examples of virtual devices, which are simulating real scientific equipment a) simulation of injection moulding machine, presented is the the panel for polymer and process parameters selection, b) surface hardening heater PIS50, presented is the heating stage, c) simulation of hardness tester, presented is the panel serving for the choice of the testing method, [6-7,11].

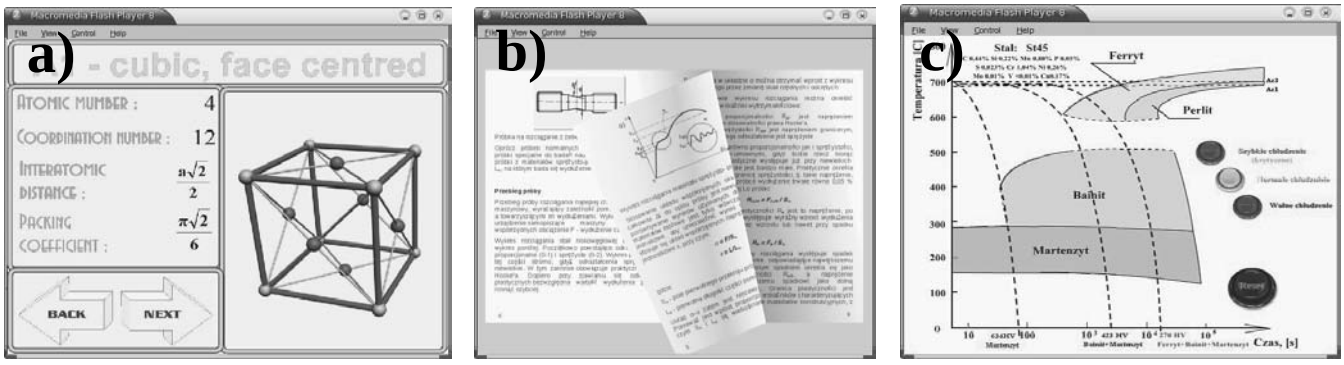

Fig. 3. Examples of different multimedia aids a) three-dimensional presentation of metals crystallographic structure, b) electronic book on the subject of materials durability investigations, c) interactive TTT/CCT diagrams.[6-7,11].

The new media has caused many chances, but also many threats for the education, which is why they should be used skillfully. Most often in discussions the attention is directed on the system used to passing on educational materials, and not on methodical principles and the aims of the education. Meanwhile, in most cases, they decide in the main part about efficiencies of educational processes.

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