

COGNITIVE RESEARCH FOR THE APPLICATION OF VIRTUAL SOFTWARE IN THE EDUCATION SYSTEM

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The summary. Virtual means is a software package that allows physical experiments to be carried out on a computer without direct contact with a real laboratory setup or stand. The article discusses the main cognitive research of the application and effectiveness of virtual tools in the education system.

Key word: dynamic model, multimedia laboratory, virtual software, effective use of virtual tools
In virtual programs, the dynamics of processes is realized through computer animation - a set of methods for displaying any objects in time. The processes of forming concepts by means of analysis, comparison, highlighting essential features and other logical operations are reproduced by a specialist developing animation in a figurative form, and interactively displayed on a computer display in strictly defined sequences.

The development of multimedia educational and scientific laboratories and their use in engineering education are a promising direction in teaching modern high technologies, training highly qualified scientific personnel and industry specialists, as well as improving the qualifications of engineering and technical workers.

A multimedia educational and scientific laboratory, as a rule, combines a simulation dynamic model of equipment and a software shell that includes methodological support for laboratory work. The dynamic model is formed from a set of control elements that allow you to adjust specific input parameters and read the output parameters of the experiment, thereby simulating the course of physical processes [2].

Figure 1 shows a schematic diagram of the learning process using a virtual software tool. As shown in the diagram, computer tools include a set of software and hardware tools that allow the learning process to be carried out without direct human interaction and a real laboratory installation.

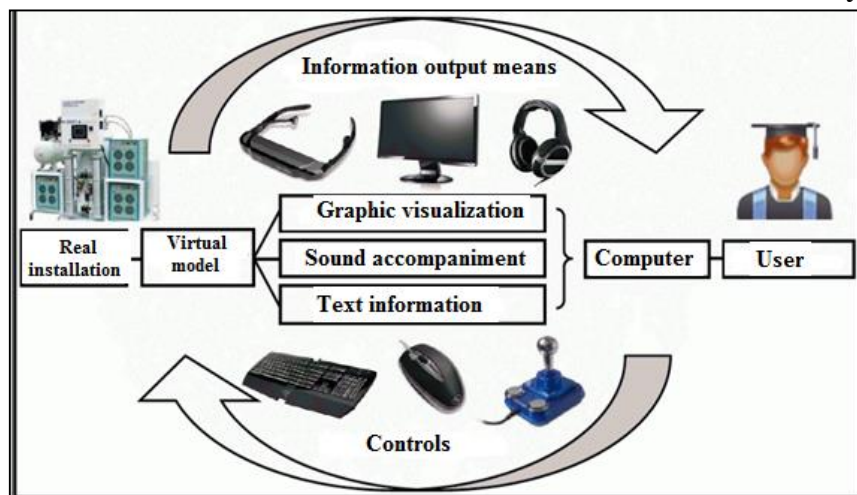


Fig. 1.



The hardware capabilities of the programs are a modern personal computer equipped with high-quality input / output devices. Software is a mathematically grounded virtual model that includes a graphical visualization system, soundtrack and text information [1].

Input and output of information is carried out according to the developed algorithm - the program code of the virtual model.

Electronic educational resources based on modern computer three-dimensional simulation of physical processes and phenomena are implemented in the form of multimedia educational and scientific laboratories or virtual tools. The novelty of the technology of virtual tools is substantiated by the use of modern means of computer modeling and the active introduction of information technologies in the field of education as a new transdisciplinary direction [5].

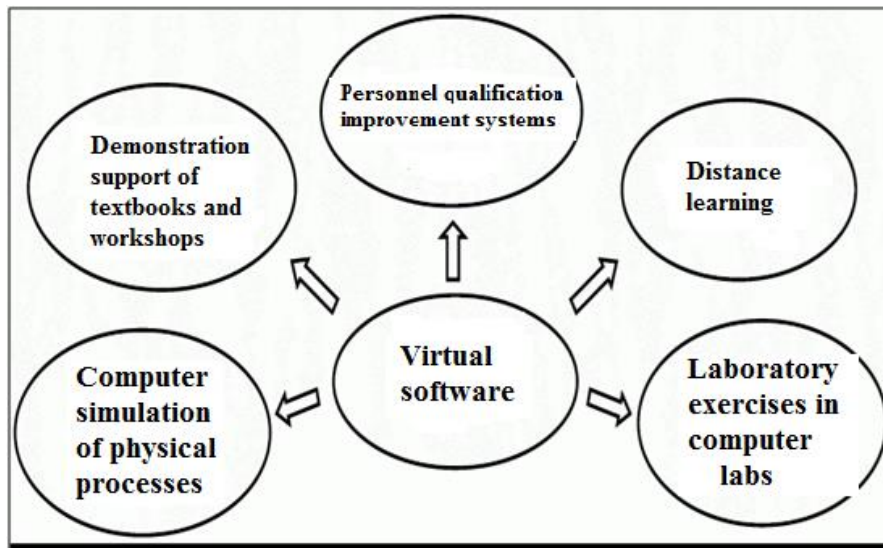


Fig. 2.

In the learning process, the user goes through the main stages of cognitive activity:

- perception, initial acquaintance;
- comprehension, consolidation, control of knowledge;
- the formation of professionally oriented skills and abilities;
- development of intuition.

Figure 2 shows the scope for virtual tools, which includes several large areas.

A virtual laboratory is a software and hardware complex that allows experiments to be carried out without direct contact with a real installation or in the complete absence of it. In the first case, we are dealing with a so-called laboratory installation with remote access, which includes a real laboratory, software and hardware for managing the installation and digitizing the data obtained, as well as communication tools. In the second case, all processes are simulated using a computer [3].

Virtual laboratory work takes place in several stages - just like the real one. In a separate window there is a description of the order of work execution - it coincides with the description for a real laboratory work [6]. Another tab of the window contains a description of the installation and its diagram. The last tab contains control questions that the student is encouraged to answer in order to successfully complete the work.

Virtual laboratory tools allow you to eliminate another disadvantage of the traditional way of teaching - it is a separate conduct of lectures and laboratory works, both in time and on the topic.

In most cases, laboratory work is assigned not from the position of maintaining the sequence of presentation of topics in lectures, but from the point of view of the availability (operability or unoccupancy) of the laboratory stand [4].

Virtual labs can also be demonstrated during a lecture, i.e. in addition to the lecture material. At the same time, not only the sequence of topics studied in the discipline is achieved, but the time barrier between lectures and laboratory classes is eliminated, which contributes to an increase in the efficiency and quality of education [5].

The effective use of virtual funds in the education system contributes not only to improving the quality of education, but also to saving significant financial resources, creating a safe, environmentally friendly environment.

The introduction of virtual laboratories requires an integrated approach, both on the part of educational structures and industrial and other state structures.

Thus, we can conclude that virtual labs are a modern and effective solution to a number of pressing problems today.

The support of the laboratory complex for the automation of the work execution process brings distance education closer to real, formalizes the process of assessing the level of knowledge, increases the objectivity of the assessment, and reduces the load on the teacher when work with large flows of students.

It should also be noted that the possibility of self-preparation of students before doing real work, using a virtual laboratory workshop, allows not only to improve the quality of training, but also to reduce operating time of real laboratory installations, which increases their exploitation.

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Muallif(lar) haqida ma'lumotlar.

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Sho'ba nomi	Ta'lim jarayonida raqamli texnolo-giyalarni qo'llashda kognitiv tadqiqot-lardan foydalanish samaradorligi.
Maqolaning mavzusi	Cognitive research for the application of virtual software in the education system
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