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Review Article

The use of multimedia and interactive technology in teaching computer science to students of primary school

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Abstract: The classic symbols of school life — blackboard and chalk — are hopelessly obsolete. They are replaced by high-tech interactive whiteboards. Using an interactive whiteboard in a classroom is not only an opportunity to captivate schoolchildren with interesting material, but also the teacher himself to take a fresh look at his subject**.**
Keywords: computer science, information technology, computer, students, information culture, computer science training.

In the modern world, for any organization, including schools, it is no longer enough just to buy a projector or a screen. We live in the era of information. One of the directions of which is the process of informatization of education. Assuming the use of opportunities for the use of multimedia and interactive techniques, methods and means of computer science to enhance the development of visual-effective, visual-figurative, theoretical types of thinking; for the development of the creative, intellectual potential of the student.

Ability to communicate; to intensify all levels of the educational process, to increase its efficiency and quality. Therefore, the computer is a central figure in this process. As well as additional equipment that helps to transfer training to a new level. All this is facilitated by the introduction of not only computers into the educational process, but also multimedia and interactive technology, such as multimedia projectors and interactive boards.

Interactive whiteboards, multimedia projectors, etc. began to appear in accordance with the priority project for the development of education in schools. Thus, their use in the classroom of informatics and ICT is not exotic today, and probably for the first time the technical equipment of schools in general and the informatics classroom in particular is carried out faster than didactic support of this process.

The formation of information culture is laid in the school as a result of the study of new directions of informatics. These areas include telecommunications, local and global networks, distributed computing and databases, multimedia and hypermedia technologies. The introduction of new technologies requires constant updating of the ideas and content of school education, as well as the training of new teaching staff who are able to study and implement these technologies in detail.

The statement of the problem and the initial stages of its implementation were carried out in the eighties of the twentieth century. Ershov, B.S. Gershunsky, E.I. Mashbits, N.F. Talyzina and other scientists. Nevertheless, the issues of using multimedia technologies in the learning process remain open. The use of multimedia technologies in teaching implies that graduates of general education schools must possess mechanisms for searching, analyzing and collecting information, must be able to visually perceive the expression of ideas, concepts, processes and be able to express their ideas through the use of various types of information.

Multimedia technologies that combine the ability to simultaneously obtain an image of an object, a process in various informational representations: graphics, sound, video, and the realization of dynamism of movement, transformation of objects in the form of animation, which increases the efficiency of learning.

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At the same time, difficulties arise in introducing interactive multimedia technologies into the learning process: teachers have to work with software created by engineers for general use. As a rule, it does not take into account neither psychological-pedagogical, nor methodological, nor organizational features of the educational process, does not support school standards, and is not associated with curricula and work plans. Teachers in order to use multimedia technologies themselves have to adapt them for integration into the learning process.

Working with an interactive whiteboard provides for a simple but creative use of materials. Files or pages can be prepared in advance and linked to other resources that will be available during the lesson; this can be achieved in computer science and ICT lessons. Teachers say that preparing for a lesson based on one main file helps plan and promotes the flow of the lesson.

When using an interactive whiteboard, the lesson efficiency is significantly increased due to the innovative visibility of the material being studied; the ability to show complex processes and objects in the dynamics of their virtual change; increasing interest and learning motivation of students to study the school subject in particular computer science and ICT.

Features of Computer Science Training

Speaking about the teaching of computer science, you should initially examine the regulatory documentation, namely education standards.

This document deals not only with the list of required students' ZUNs, but also with the possible technical equipment of computer science lessons. For example, the use in teaching the course "Informatics and ICT" special technical means and the latest equipment, such as interactive whiteboards and multimedia projectors.

The study of computer science and information and communication technologies at the stage of basic general education is aimed at achieving the following goals:

• mastering the knowledge that forms the basis of scientific ideas about information, information processes, systems, technologies and models;

• mastering the skills to work with various types of information using computer and other means of information and communication technologies (ICT), to organize their own information activities and plan its results;

• Development of cognitive interests, intellectual and creative abilities by means of ICT; fostering a responsible attitude to information, taking into account the legal and ethical aspects of its dissemination; selective attitude to the information received;

• Development of skills for the use of ICT tools in everyday life, in the performance of individual and collective projects, in educational activities, in the further development of occupations in demand in the labor market.

Presentation of information. Information, information objects of various kinds. Language as a way of presenting information: natural and formal languages. Formalization of descriptions of real objects and processes, examples of modeling objects and processes, including computer modeling. Information processes: storage, transmission and processing of information. Discrete form of information. Units of measurement information. Management, feedback. The main stages of the development of information technology tools.

Transfer of information. Information transmission process, information source and receiver, signal, encoding and decoding, information distortion during transmission, information transfer rate.

Data processing. Algorithm, properties of algorithms. Ways to write algorithms; flowcharts. Algorithmic constructions. Boolean values, operations, expressions. Dividing the task into subtasks, auxiliary algorithm. Objects to be processed: chains of characters, numbers, lists, trees, graphs. Perception, memorization and transformation of signals by living organisms.

Computer as a universal device for information processing. The main components of the computer and their functions. The program principle of the computer. Team user interaction with the computer, graphical user interface. Software, its structure. General purpose software. The idea of programming.

Information processes in society. Information resources of a society, educational information resources. Personal information, information security, information ethics and law.

Basic ICT devices. Connection of blocks and devices of a computer, other ICT tools, simple control operations (on and off, understanding of signals of readiness and malfunction, etc.), the use of various storage media, consumables. Hygienic, ergonomic and technical conditions for the safe operation of ICT tools.

Operating computer information objects in a visual-graphic form (graphical user interface). Creating, naming, saving, deleting objects, organizing their families. Archiving and unzipping. Protection of information from computer viruses.

Evaluation of the quantitative parameters of information objects and processes: the amount of memory required for storing objects, the speed of transmission and processing of objects, the cost of information products, communication services.

Educational areas of priority development: computer science and information technology, material technology, social studies (economics).

ICT recording of information about objects and processes of the surrounding world (natural, cultural, historical, school life, individual and family history):

- recording of images and sound using various devices (digital cameras and microscopes, video cameras, scanners, tape recorders);

- texts, (including using a scanner and programs for recognition, interpretation of oral speech);
- music (including using the music keyboard);

- tables of measurement results (including the use of sensors attached to a computer) and surveys.

Creation and processing of information objects. Texts. Creating text through a qualified keyboard letter using the basic means of text editors. Work with text fragments. Page. Paragraphs, links, headings, table of contents. Highlight changes. Spell check, dictionaries. Inclusion in the text lists, tables, images, diagrams, formulas. Print text. Planning work on the text. Examples of business correspondence, educational publication (report, abstract).

Educational areas of priority development: informatics and information technology, social science, natural sciences, philology, art.

Database. Search data in the finished database. Creating records in the database.
Educational areas of priority development: computer science and information technology, social studies (economics and law).

Drawings and photos. Input images using graphics editor tools, a scanner, a graphics tablet, the use of ready-made graphic objects. Geometric and style transformations. Use of primitives and templates.

Sounds and video images. Composition and installation. Use simple animated graphic objects.

Educational areas of priority development: languages, art; project activities in various subject areas.
Search for information. Computer encyclopedias and reference books; information in computer networks, non-computer information sources. Computer and non-computer directories; search engines; formulation of requests.

Educational areas of priority development: social science, natural sciences, languages.
Design and modeling. Blueprints. Two-dimensional and three-dimensional graphics. The use of standard graphic objects and the construction of graphic objects: selection, union, geometric transformations of fragments and components. Charts, plans, maps.

The simplest controlled computer models. Educational areas of priority development: drawing, material technologies, art, geography, natural sciences.

Mathematical tools, dynamic (electronic) tables.
Table as a means of modeling. Entering data into a finished table, changing data, moving to a graphical representation. Input of mathematical formulas and calculation by them, representation of the formula dependence on the graph.

Educational areas of priority development: computer science and information technology, natural sciences, social science (economics).

Organization of the Information Environment.
Creation and processing of complex information objects in the form of printed text, web pages, presentations using templates.

Organization of Information in an Information Resource Sharing Environment.
Email as a means of communication. Rules of correspondence, attachments to letters, sending and receiving messages. Saving for individual use of information objects from computer networks (including the Internet) and links to them. Examples of the organization of collective interaction: forum, newsgroup, chat.

Educational areas of priority development: computer science and information technology, languages, social science, natural sciences.

Requirements for the Level of Training Graduates
As a result of studying informatics and information and communication technologies, a student should know / understand:

- types of information processes; examples of sources and receivers of information;

- units of measurement of the quantity and speed of information transfer; principle of discrete (digital) presentation of information;

- the main properties of the algorithm, the types of algorithmic constructions: following, branching, cycle; concept of auxiliary algorithm;

- software operating principle of the computer;
- the purpose and functions of the used information and communication technologies;
- perform basic operations on objects: strings of characters, numbers, lists, trees; check the properties of these objects; perform and build simple algorithms;
- operate information objects using a graphical interface: open, name, save objects, archive and unzip information, use menus and windows, help system; take anti-virus security measures;
- evaluate the numerical parameters of information objects and processes: the amount of memory required to store information; information transfer rate;
- create information objects, including:
- structure the text using pagination, lists, links, table of contents; conduct spell checking; use in the text of the table, images;
- create and use various forms of information presentation: formulas, graphs, charts, tables (including dynamic, electronic, in particular - in practical tasks), move from one data presentation to another;
- create drawings, drawings, graphical representations of a real object, in particular, in the design process using the basic operations of graphic editors, educational computer-aided design systems; perform simple digital image processing;
- create records in the database;
- create presentations based on templates;
- search for information using search rules (building queries) in databases, computer networks, non-computer information sources (reference books and dictionaries, catalogs, libraries) when performing tasks and projects in various academic disciplines;
- use a personal computer and its peripheral equipment (printer, scanner, modem, multimedia projector, digital camera, digital sensor); follow the requirements of safety, hygiene, ergonomics and resource conservation when working with information and communication technology tools;
- use acquired knowledge and skills in practice and everyday life for:
- creation of the simplest models of objects and processes in the form of images and drawings, dynamic (electronic) tables, programs (including in the form of flowcharts);
- conducting computer experiments using ready-made models of objects and processes;
- creation of information objects, including for registration of the results of educational work;
- organizing an individual information space, creating personal collections of information objects;transmission of information through telecommunication channels in educational and personal correspondence, use of information resources of the company in compliance with the relevant legal and ethical standards.

The school educational subject of informatics cannot include all that variety of data which make up the content of actively developing science of computer science. At the same time, a school subject, performing general educational functions, should reflect the most universally significant, fundamental concepts and information, revealing the essence of science, equip students with the knowledge, skills, and skills necessary to learn the basics of other sciences in school, as well as preparing young people for the future. practical activities and life in the modern information society.

CONCLUSION

From the analysis of the scientific literature read on the topic of the thesis, conclusions were made: on the structure and operation of multimedia and interactive technology, the possible use of special software in conjunction with this technology, as well as the possibility of using multimedia and interactive technology in teachers at school, on improving the effectiveness of teaching in the school.

It was selected, analyzed the content of training in the section “ICT hardware and software” of the informatics course, made up thematic planning for this section, determined the possibilities of training in the topics of the section.

Educational materials were created for conducting informatics lessons using multimedia and interactive techniques, presented in a separate paragraph, and in electronic form, such as a textbook on the external and internal structure of a computer system, a series of presentations on the topics of the section, carrying not only informative, but also popular character.

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