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Technical and Software Capabilities of a Computer for Working with Multimedia Resources

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Abstract: The article discusses the definition of requirements for computers for the design and development of multimedia resources, ways of technical and software modernization of a computer to work with multimedia resources.

Keywords: Multimedia technologies, multimedia teaching aids, organization of the educational process, computer, software, electronic educational resources. Classification of hardware and software computer facilities related to multimedia. Telecommunication means as means of multimedia.

INTRODUCTION

One of the priority tasks in training is the introduction of information and communication technologies, the creation of electronic educational resources, the design of telecommunication lessons. The use of a computer and presentation - the main multimedia tools in the educational process is considered commonplace today. A set of teaching aids and technical devices, with the help of which the management of the educational process is carried out, facilitates the process and makes them more efficient. This leads to the conclusion that multimedia tools have great potential [1].

Multimedia tools used in educational institutions can be practically any means that can bring different types of information into training and other types of educational activities. Under the concept of multimedia tools, the obsolete analogue teaching aids that have become traditional can also fall. Computers and their associated peripherals are most commonly referred to as multimedia. At the same time, in this section of this online publication, it makes sense to list the main tools, the use of which in educational institutions allows students to deal not only with text or pictures, but also with audio, video or other information. Over the years, a variety of means penetrated into education, the appearance of which raised the information support of the education system to a qualitatively new level, which had a positive effect on the effectiveness of training specialists [2].

In educational institutions, you can find such tools that can be attributed to multimedia tools. We list some of them:

- means for recording and reproducing sound (electrophones, tape recorders, DVD players),
- systems and means of telephone, telegraph and radio communication (telephones, facsimile machines, teletypes, telephone exchanges, radio communication systems),
- systems and means of television, radio broadcasting (television and radio receivers, educational television and radio, DVD players),
- optical and projection film and photographic equipment (cameras, film cameras, overhead projectors, film projectors, epidiascopes),

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- printing, copying, duplicating and other equipment intended for documentation and reproduction of information (rotaprints, copiers, risographs, microfilm systems),
- computer facilities that provide the possibility of electronic representation, processing and storage of information (computers, printers, scanners, plotters),
- telecommunication systems that ensure the transmission of information via communication channels (modems, networks of wired, satellite, fiber optic, radio relay and other types of communication channels intended for information transmission). [1]

Modern multimedia applications use new technologies and are introduced into educational processes. Examples of such applications can be interactive training programs, simulation and animation applications that illustrate complex theories and concepts, web applications, etc. Such applications provide the ability to complete multimedia tasks using digital photos, blogs, videos, audio exercises. Multimedia applications also support distance learning. Successful multimedia applications spread very quickly among students.

We know that creating multimedia applications requires high-performance computers with software for editing photo, audio and video projects. Multimedia programming courses require separate laboratories with powerful computers for video and audio recordings and photography, color printing equipment.

The multimedia programming tutorials explore how to use these multimedia tools to create multimedia educational and web applications. In multimedia programming courses, students learn how to create multimedia presentations in various subjects.

The development of a multimedia application using programming is aimed at developing a more enriching technological learning environment. Considering the application of computers, tablet and smart phone and multimedia applications in teaching is very effective. In multimedia programming, the main task is to improve the educational process. For the effectiveness of training, it is necessary to equip with sufficient computer equipment and prepare a methodological and information base for the educational process [4].

RESULTS and DISCUSSIONS

Multimedia appeared in the 60s of the XX century and was actively used in events using different types and forms of information presentation (slides, movies, videos, audio fragments, lighting effects and music). Also, the term multimedia was understood as representations based on static or dynamic images from several projectors, accompanied by sound or music.

Technical means allow you to operate with information of various types, such as sound, text, photo and video images. These tools may well be considered as multimedia tools. Among them, the computer is a universal means of information processing, i. the same computer processes information of different types (multimedia information) and performs a whole range of operations with information. Therefore, a computer in conjunction with a set of peripheral devices is able to provide the performance of all the functions of technical multimedia tools [3].

A multimedia computer is a computer on which multimedia applications can fully realize their full potential. A multimedia computer displays graphic and video information, animation, plays various sound accompaniments, music and much more on the monitor screen. Usually, the term "multimedia computer" means the following composition: system unit (power supply, motherboard, processor, RAM), video adapter, monitor, HDD, keyboard, mouse, DVD / CD-ROM, sound card, modem, TV tuner.

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Multimedia hardware in the learning process is classified into the following categories:

- Tools for working with sound (sound cards);
- Laser discs (DVD, Blu-ray);
- Tools for working with video (video cards, TV-tuners, framegrabbers);
- VGA-TV converters, MPEG players [5].

The computer used in training has fundamental features, including working with a single user, simultaneous performance of several information processing operations, the ability to process, store, present and transmit information of various types, including text, numerical data, graphic images, sound and others (multimedia information), communication with the user in a language close to natural, joint work with various hardware multimedia devices that significantly expand the computer's capabilities for processing, storing, presenting and transmitting various types of information, performing information processing operations, solving applied tasks.

Multimedia technology allows you to integrate different types of information. This allows the computer to present information in various forms, such as: images (scanned photographs, drawings, maps and slides), voice, sound and music, video, animation. Computer multimedia tools and multimedia technologies are closely related to the rapidly developing computer telecommunications. All published information resources in computer networks are multimedia resources. The majority of multimedia resources and technologies created are focused on working in telecommunication modes. The widespread introduction of telecommunications networks in education became possible only after the emergence of the global computer network Internet. The work of the Internet is based on the ideas of standardization of the used information transfer protocols, open architecture and the possibility of free connection of new networks. All this led to the spread of the Internet in education. The Internet provides access to both educational resources containing information of various types (text, graphics, audio, video). Now multimedia and hypermedia technologies have become inseparable from telecommunication technologies, and the worldwide networks have turned into a large and well-structured repository of multimedia information [3].

The use of networks in teaching using multimedia technologies and resources opens up new opportunities, such as expanding access to educational multimedia information, the ability to search for multimedia information, organizing operational assistance, developing independent learning, conducting virtual classes in real time, organizing distance learning, organizing research projects, modeling of research activities, modeling of complex or dangerous objects, phenomena or processes, developing skills for searching and selecting reliable and necessary multimedia information. [3]

Services such as e-mail, teleconferencing, remote access to information resources, and others have appeared in the field of education. These services also allow you to work with multimedia information and are a powerful tool that expands the scope of multimedia use in education. Most users familiar with computer technology include speaker systems (speakers), a computer sound card (card), a microphone, and a computer video camera among hardware multimedia tools. These devices are common media components. Of great interest are multimedia tools designed to improve the effectiveness of learning. Among such modern means, first of all, it is possible to carry interactive multimedia boards.

The software and hardware set "Interactive whiteboard" is a modern multimedia tool that has all the qualities of a traditional whiteboard, has more opportunities for graphic commenting on screen

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images; allows you to control students at the same time, ensure ergonomic training, use methods using case methods, allows you to project an image from a computer monitor screen onto a projection board, control a computer using felt-tip pens, like using a keyboard or mouse. The interactive whiteboard software used (SMART Board Software) includes tools: a notebook (SMART Notebook), a video recorder (SMART Recorder), a video player (SMART Video Player), additional (marker) tools (Floating Tools), a virtual keyboard (SMART Keyboard) [2,3].

Using a notebook, you can create documents and include text, graphic objects. The video recording tool allows you to record all the manipulations currently performed on the board to a video file (AVI format), and then play it back using the video player (SMART Player). Additional tools are used to create various kinds of marks on the entire area of the monitor screen, regardless of the current application used. All notes can be saved. The virtual keyboard is used to control the computer, i.e. duplicates a standard computer keyboard.

The development of multimedia tools makes it possible to implement educational technologies at a new level, using technical innovations to provide and process various types of information. One of such multimedia tools in the field of education is virtual reality. Virtual objects include models of both real-life and imaginary objects or processes. Virtuality is used to emphasize the characteristics of electronic analogues of educational objects presented on paper. This characteristic means the presence of an interface based on multimedia technologies that simulates the properties of real space when working with electronic models.

Virtual reality is multimedia tools that provide sound, visual, tactile, as well as other types of information and create the illusion of entry and presence of the user in a stereoscopically presented virtual space, the user's movement relative to the objects of this space in real time. Virtual reality systems provide direct, immediate contact of a person with the environment, touching an object that exists only in the computer's memory. You can flip the images on the screen and view it from the other side[3].

There are many software tools for developing multimedia applications. Enumeration of all is impossible, we will focus only on the most common programs. They can be divided into several categories:

- Tools for creating and processing images;
- Tools for creating and processing animation, 2D, 3D graphics;
- Tools for creating and processing video images (video editing, 3D titles);
- Tools for creating and processing sound;
- Tools for creating a presentation.

HTML editors are widely used to create multimedia resources, and the HTML language is developing quite dynamically. The use of browsers for viewing imposes additional restrictions on the nature of the presentation of educational multimedia information. Programming systems used to create local components make it possible to include in the multimedia course and access to Internet resources, integrating network and local educational resources. When creating multimedia hypertext resources and multimedia pages for the Internet, the following languages and tools are most often used:

- Hypertext Markup Language (SGML, XML, HTML5) - the language used on the Internet to create, format and display web pages;

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- Object-oriented programming languages (similar to C++). For example, the Java language is designed specifically for the use of interactive graphics and animation in Internet resources. Many ready-made applications (Java applets) are available on the Internet and can be downloaded to the user's computer for further use when creating their own information network multimedia resources;
- VRML (Virtual Reality Modeling Language) for creating and placing on the network volumetric 3D- objects that create the illusion of a real object is much stronger than simple animations. These 3D objects are also called "virtual rooms", "virtual galleries" and "virtual worlds";
- CGI (Common Gateway Interface) - to describe the rules for collecting information and creating databases. PHP or some other language (Perl, JavaScript, etc.) is used to create a CGI program that allows you to host and run "dynamic documents" on the web. For example, filling in real-time forms of questionnaires and reviews on Internet pages, answering test questions, etc.[4].

You can use other tools to create multimedia resources. To do this, you need to select the editor program that will be used to create the pages of the multimedia tool. There are a variety of media development tools available to help you create rich media applications. Of course, there are many other development tools that can be used with equal success instead of those mentioned. To prepare multimedia resources, software is used, which can be classified into the following categories:

- Programs for creating graphics and photo images - Adobe Photoshop, Corel PhotoPaint, PhotoDraw, PhotoImpact, CorelDRAW, Macromedia FreeHand, Adobe Illustrator;
- Animation creation programs - GIF Animator, Animation Shop, Animo, Elastic Reality, 3D Studio MAX, TrueSpace, LightWave3D, SoftImage3D, Maya;
- Programs for creating and editing video - Quick Editor, Ulead VideoStudio, AVIedit, Digital Movie Studio;
- Programs for creating and editing sound - Cakewalk Pro Audio, Sound Forge, CoolEdit Pro, WaveLab [2,3];

After creating all multimedia components, you need to combine them into a single multimedia application. The existing means of combining various multimedia components into a single product can be conditionally divided into three groups:

- algorithmic languages for direct development of a control program;
- specialized programs for creating presentations and publishing them on the Internet (quick preparation of multimedia applications);
- multimedia authoring tools (Formula Graphics, HyperMethod, Authorware, IconAuthor, Multimedia Builder) [1].

This division is rather arbitrary, because many tools have the ability to create program modules in a scripting language. As a rule, the choice of tool is based on the requirements for the efficiency of the multimedia application and the speed of its development. Also an essential requirement is the degree of interaction with the user. Specialized presentation programs are focused primarily on the transfer of information from a computer to a user. Authoring tools enable a high degree of interaction and create a truly interactive application. Developing a multimedia application in any algorithmic language requires knowledge of programming, although modern visual programming environments are supplemented by various wizards for creating individual interface elements that

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allow you to automatically receive the program code. The time spent on development will be significant in this case, but the resulting application is optimal in terms of the use of computer resources and the speed of operation. Author's tools can significantly reduce the development process, but give a loss in the efficiency of the application being created. In addition, the development requires a good knowledge of the capabilities of this tool and effective methods of working with it. The simplest and fastest is the use of presentation programs, the capabilities of which in some cases are enough to create a simple multimedia application.

On the other hand, software tools for creating electronic textbooks can also be attributed to the creation of multimedia resources. Electronic editors have a fairly large capacity for editing text and other objects. These editors include CourseLab, NeoBook Professional Multimedia, DeskTop Author, eBooks Writer, SunRav BookOffice and others. HTML compilers allow pre-prepared HTML files to be combined into common content. This group includes LCDS (Learning Content Development System), eBook Maestro, eBookGold, HTML Help Workshop. Applications for creating e-books are designed for developing e-books in highly specialized formats. This group includes Microsoft Reader, Mobipocket, Hiebook and others. To create electronic textbooks, it is better to use programs that support many other formats, which allows you to open e-books on a large number of devices [2].

When creating multimedia resources, interesting effects are created using an animation program. Popular ones include Adobe Animate, Blender, Pencil2D Animation, Cartoon Animator, Synfig Studio, Easy GIF Animator, Pivot Animator. Programs for creating animation are capable of automating the work of the artist, speeding up the process of creativity, while not limiting the creator, but on the contrary, allowing you to expand the standard features and give the artist pleasure from doing what he loves.

Multimedia information, especially video information posted on the Internet, are often quite large files. The reason may be interactivity, connected audio and video, high-resolution graphics, etc. This makes it difficult to use multimedia resources. The problem is solved by organizing work with resources in local mode. A large amount of multimedia information You can use laser compact discs (DVD), flash memory or portable hard drives to transfer and store it for high-quality presentation of a large amount of multimedia information.

The development of multimedia resources for education is multifaceted and not simple. The main issues of content content and ergonomic problems related to the creation of multimedia resources will be considered in the following articles. [1].

CONCLUSIONS

The emergence of multimedia systems produces dramatic changes in education. To date, multimedia technologies have firmly established themselves in many areas of activity. Many programmers, screenwriters, designers are working on new projects. We note the possibilities and areas of application of multimedia products and technologies. The main purposes of using products created using multimedia tools are:

- Popularizing and entertaining.
- Scientific and educational or educational.
- Research - in museums and archives, etc.

The undoubted advantage and feature of multimedia technology, as well as its means, are the following features:

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- the ability to store a large amount of very different information on one medium;
- the ability to increase (detail) the image or its most interesting fragments on the screen while maintaining image quality;
- the ability to compare the image and process it with various software tools;
- the possibility of audio accompaniment;
- the possibility of using video clips;
- the ability to work with animation;
- the ability to work with the Internet;
- the ability to work with various applications;
- the ability to automatically view the entire content of the product;
- the ability to navigate through information using the menu.

The use of networks in educational institutions, combined with the use of multimedia technologies and resources, opens up new opportunities, the main of which are:

- expansion of access to multimedia information;
- formation of multimedia information search;
- organization of operational assistance;
- development of independent learning;
- conducting virtual training sessions in real time;
- organization of distance learning;
- organization and modeling of research activities;
- modeling of complex or dangerous objects, phenomena or processes, etc.;

Multimedia technologies can facilitate the work of the educational process and diversify it. Software is an important part of a computer system. Application software for special (professional) purposes includes text and sound editors, multimedia players, presentation development programs, graphic and office editors, video processing applications that make it possible to create material and work in various programs depending on the learning objectives. Thus, the inclusion of various types of multimedia technologies in the educational process makes it interesting and productive in the process of learning new material or consolidating it in practice. Having become interested, even the most disinterested in learning a language, students do not notice that they are learning, they are actively involved in the process of searching for knowledge.

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