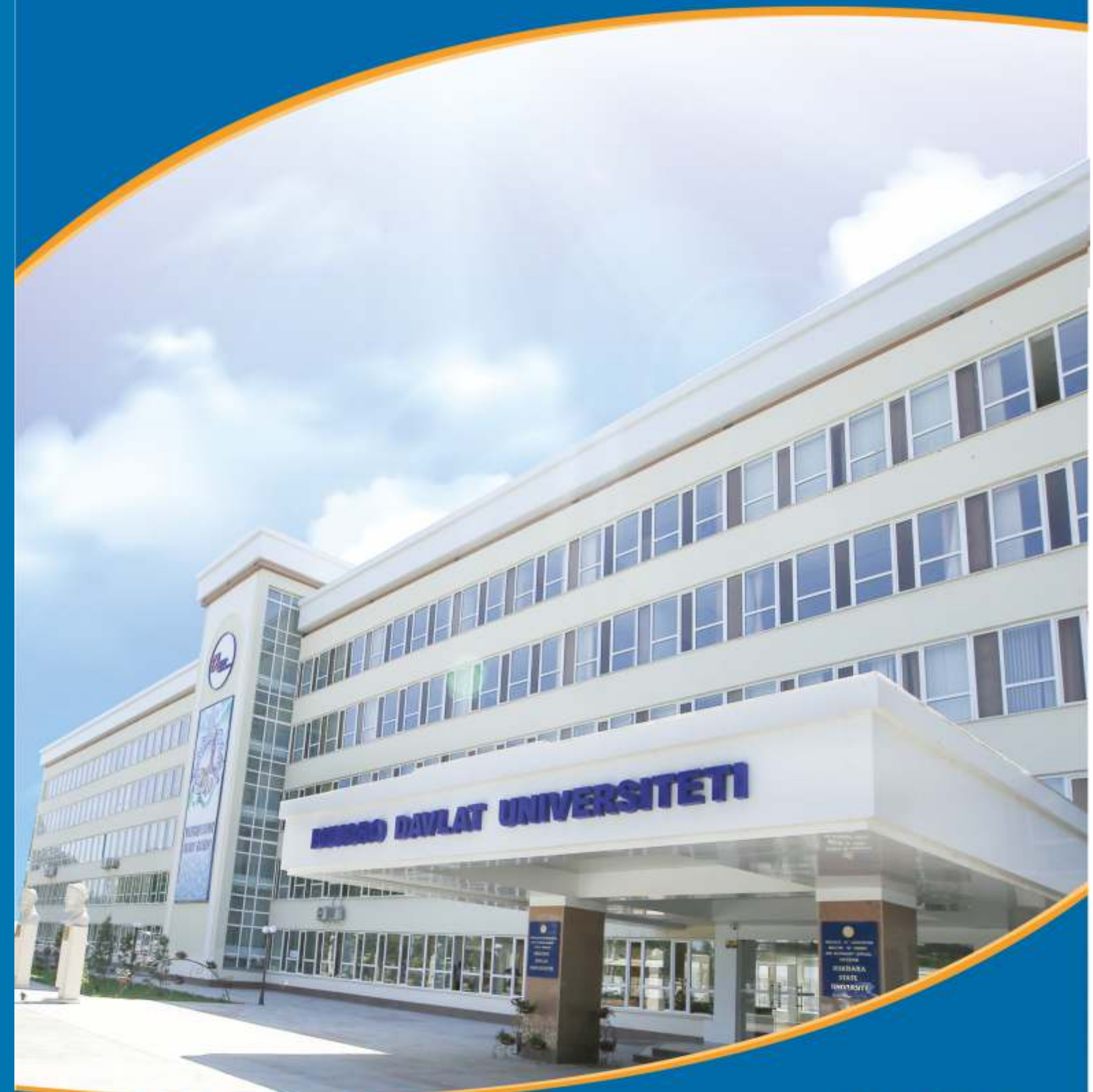


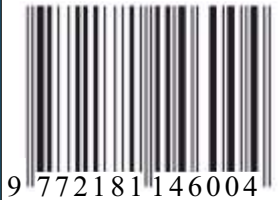
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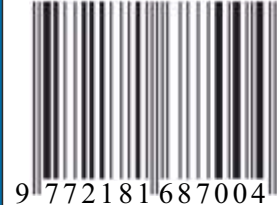
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DIDACTIC POSSIBILITIES OF USING MULTIMEDIA SOFTWARE ON ALTERNATIVE ENERGY IN THE EDUCATIONAL PROCESS

Jamilov Yusuf Yunus ogli
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Abstract:

Background. Today, with the rapid development of science and technology, the preservation of ecology and environmental cleanliness, the widespread use of alternative (renewable) energy sources in the economy, the effective organization of lessons on alternative energy in educational institutions is an urgent task.

Methods. The article analyzes the role and didactic possibilities of teaching alternative energy, alternative energy sources and devices, their use in the national economy, the concept of alternative energy in education through multimedia, multimedia products, multimedia technologies and multimedia tools based on analysis, observation, comparison and experimental methods, made.

Results. Practice shows that teaching students based on multimedia software learning tools is twice as effective and time-saving. Up to 30% of time can be saved in learning on the basis of multimedia software learning tools, and the acquired knowledge will be stored in memory for a long time. If students receive the given materials on a visual basis, the retention of information will increase by 25-30%. In addition, if the training materials are presented in the form of audio, video and graphics, the memorization of materials will increase by 75%.

Discussion. Software learning tools are didactic tools designed to partially or completely automate the learning process using computer technology. They are one of the promising forms of increasing the efficiency of the educational process and are used as a teaching tool of modern technologies. Pedagogical programmed tools are created using programs that implement effects such as dynamic illustrations, sound processes, animations.

Conclusions. The use of multimedia software tools in the process of alternative energy education, ie e-textbooks, e-problem sets, e-learning materials, virtual laboratory stands, 3D animations, e-learning simulators and computer control systems, significantly increase the motivation of students and the quality of education serves.

Keywords: multimedia, multimedia products, multimedia technologies, multimedia tools, alternative energy, multimedia electronic didactic tool, electronic textbook, training simulators, virtual laboratory stands, 3D animation, software training tools.

Introduction. Today, the use of modern forms and didactic tools of teaching in the world of education, the use of multimedia software teaching aids in the information education environment is considered a topical issue. It is important to create a global educational environment specific to Europe and other developed countries, to ensure the continuity and practical orientation of education, to improve the mechanisms to ensure the integration of science, education and industry.

In particular, the formation of competencies of students on alternative energy, alternative energy sources and devices, their use in the national economy, the importance of using alternative energy sources in maintaining ecology and environmental cleanliness is an urgent task.

The use of multimedia software in the educational process, ie e-textbooks, e-problem sets, e-learning materials, virtual laboratory stands, multimedia tools, 3D animations, e-learning simulators and computer control systems, significantly increase the motivation of students and the quality of education, serves to increase [3].

Methods. On the basis of the method of analysis, the scientific and methodological literature on the topic was systematically analyzed and advanced pedagogical experiences were studied and opinions were generalized.

On the basis of the method of observation in educational institutions in physics "Semiconductors. Mixed conductivity in semiconductors" was observed.

Electronic textbooks, virtual laboratory stands, multimedia, electronic didactic tools a multimedia software the methodological bases of the use of teaching aids and the didactic possibilities of teaching were compared.

On the basis of the experimental method, the normative-legal documents of the education system and the experience of leading teachers were studied, and the subject of physics "Semiconductors. Mixed conductivity in semiconductors" was organized and conducted on the basis of traditional lectures and software, animated videos.

Results. Information, communication and innovative technologies enrich the content of education and serve to update the forms, methods and tools of teaching. The introduction of innovations in the educational process is inextricably linked with the development of computer technology, the use of multimedia software in the educational process using information and communication technologies is the simplest and highest quality method of motivating students, shaping and evaluating science competencies.

Practical lessons show that teaching students based on multimedia software learning tools is doubly effective and time-saving. Up to 30 % of time can be saved in learning on the basis of multimedia software learning tools, and the acquired knowledge will be stored in memory for a long time. If students receive the given materials on a visual basis, the retention of information will increase by 25-30 %. In addition, if the training materials are presented in the form of audio, video and graphics, the memorization of materials will increase by 75 %.

Discussion. The effectiveness of the use of software training tools as a didactic tool in the education system is determined by the following circumstances:

1. Teaching based on software learning tools opens up opportunities for students to access non-traditional sources of information, increases the effectiveness of independent work and creates ample opportunities for creative activity.

2. Software learning tools allow the teacher to use different forms of teaching and their combination, ie to create the necessary learning environment to achieve the set methodological goals. When using software-based teaching aids, the teacher will be able to make changes and additions to the computerized teaching and control programs depending on the circumstances.

3. As a result of the use of software-based teaching tools based on the use of automated teaching and information systems, teachers will not only increase their level of information, but also have access to information sets from almost all over the world [4].

Software learning tools are didactic tools designed to partially or completely automate the learning process using computer technology. They are one of the promising forms of increasing the efficiency of the educational process and are used as a teaching tool of modern technologies. Pedagogical programmed tools are created using programs that implement effects such as dynamic illustrations, sound processes, animations.

Software learning tools are divided into the following types: training programs, test programs, exercise machines, programs that create a virtual learning environment with the participation of the teacher.

Software teaching aids include: programmed (set of programs), technical and methodological support, additional aids aimed at achieving specific didactic goals in the subject.

There are two types of programmed tools in the education system: those that are related to the organization and management of education are called programmed tools, and those that are only related to the learning process are called programmed learning tools. Today, there are many programmed learning tools for use in the educational process, such as e-textbooks, e-learning manuals, e-journals, e-encyclopedias, e-libraries, virtual libraries, e-catalogs, e-learning methodological sets and other programmed tools. Software educational tools are publications of high scientific, methodological and technical level, located on magnetic optical media or computer networks (local, regional, global) and containing the electronic form of educational information. Software teaching aids are information about teaching and learning methods, provided in electronic

form, which serves to ensure the learning process. Programmed learning tools are a general concept, not just the intended e-learning tools, but the resources at various stages of creation, including the task-level, planned-level resources.

As noted in the "Concept of creating a new generation of educational literature for the system of continuing education", requires the creation of a new generation. Among the new generation of educational literature, e-learning literature has a special place in the software educational tools (e-learning manual, e-textbook, virtual laboratory, e-learning methodical complex). Software training tools are a very broad concept and can be divided into the following types depending on the formats of their preparation and storage on the computer [5].

The topical issue today is the development of ways to create software tools, pedagogical and psychological requirements, the necessary programmed tools, their functions, role and importance in the education system, as well as the basis of methodological support. Requirements for software training tools can be divided into several groups: technical, technological, didactic, psychological, content and structure, and others.

There are a number of challenges in the development and implementation of software training tools that need to be addressed based on world experience and the needs and requirements of today. The causes of such problems are being studied, and in order to eliminate them, a number of laws have been developed and implemented in the country. In solving problems, first of all, it is necessary to pay attention to the education system. Because only highly qualified personnel can guarantee the introduction of modern information technologies, the creation and use of software training tools. One of the most effective ways to develop software development and implementation is to teach the sciences that teach their creation in accordance with modern requirements [11].

Today, the information in higher education institutions is considered as an environment of interaction with the educational environment, aimed at meeting the needs and requirements of students, graduate students and researchers for information and software.

This information includes: means of interpersonal communication (e-mail, telephone, chats, forums, video conferencing, etc.), access to external and internal information resources, as well as the information resources provided to students. The main information resources of higher education institutions are electronic teaching aids for the study of various disciplines. Electronic educational-methodical complexes allow to combine almost all information materials in one information complex. In addition, it provides the necessary interactivity, visualization, mobility, compactness and low cost of reproduction, versatility, multi-stage and a large volume of tasks and tests for testing. The advantage of modern e-learning complexes is, first of all, the effective organization of the role of independence and activity of students in the learning process. The introduction of electronic teaching aids in the educational process will help students to show a full picture of information on the subject, ensure independent learning of educational materials, individualize teaching, improve control and self-control, increase the effectiveness of the educational process. The advantage of modern electronic teaching aids is the ability to make the learning process more interesting [12].

The use of these tools by students in the process of independent preparation changes the typical situation in which the usual teaching task in the education system belongs only to the teacher. The function of the teacher's teaching is transferred to the student in the free reception of educational information provided to the student by electronic educational-methodical complexes, their assimilation according to the nature of individuality. In doing so, the teacher not only supports the student, but also helps to effectively use the flow of educational information and solve problems that arise.

Electronic educational-methodical complexes have a working program on the course, logical classification of theoretical material on the subject, typical problems, assignments and tests, questions for exams or tests for students to acquire independent knowledge and self-control, the necessary normative and reference information. descriptive examples should be provided. In addition, it must clearly indicate the information about the author, the name of the subject, the code of specialization, as well as the approximate number of hours required for the entire course. The

software platform of the electronic educational-methodical complexes must work flawlessly and correctly under the management of the existing operating system and software products training center.

When creating e-learning complexes, it is necessary to pay special attention to some of its important aspects. Today, the content of e-learning complexes must meet the requirements of the new generation, as well as meet the level of modern scientific and technological progress in the field of knowledge. The structure of e-learning complexes must consist of two logically interconnected elements or modules. While developing or reviewing a separate module, they should be open to the content of a separate general-purpose e-learning material, even if they are feature-oriented. The interface of e-learning complexes is organized in such a way that it has a strictly expressive appearance, the visual toolbar is simple for the user to master the technology of operation [14].

Multimedia products have a special place in the structure of electronic educational and methodical complexes. Multimedia is the ability to work with different forms of information on a computer: color graphics, dynamic effects in text and graphics, sound output and synthesized music, animation, as well as full-length video clips, and even videos. A multimedia product is an interactive, computer-generated product that can play music, include video clips, animations, photo and slide galleries, various databases, and more [1].

Multimedia technology can transmit information in a combination of many forms (including speech, pictures, drawings, images, music, numbers, and letters) that can be understood by a person at the same time. This technology can search, copy and copy information to any other computer in the specified format, and create any combination of them. In addition, multimedia technology allows the user to design himself, as well as create static (still) and dynamic (moving) images, and distribute the results of his creative work to the external environment through communication channels.



Picture-1. Multimedia elements

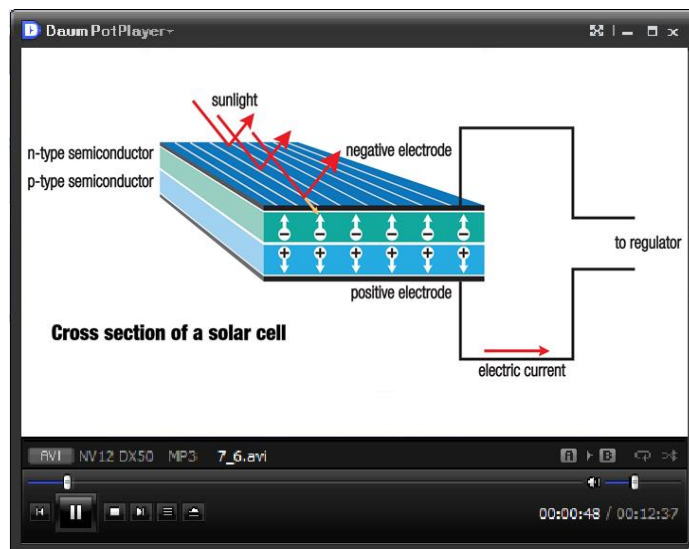
The rapid development of multimedia systems was due to the expansion of the capabilities of personal computers and the development of hardware and software. In recent years, the speed of the computer and the capacity of memory devices have increased dramatically, as well as the expansion of graphics capabilities and improved technical performance of external storage devices. The development of multimedia technologies has been greatly contributed by the development of video technology, laser discs, as well as the development of recording techniques and technologies for the production of sound and images. It is also important to create ways to quickly and efficiently change information in order to store and store information compactly (densely) in memory.

Multimedia tools are a set of hardware and software that allows a person to communicate with a computer using a variety of environments that are natural to him: sound, video, graphics, text, animation, and more [2].

Globally, computer graphics and design are much more advanced. They have been used in practice for a long time. But all these programs, videos, the main part of the designs are created for movies, cartoons, websites. The lack of multimedia textbooks on science on special sites, as well as the inability to fully cover the topics of a particular subject, requires the creation and use of modern multimedia software in education. The use of multimedia software provides a number of benefits

for teachers. This is because science-themed audio programs, illustrations, animations (presentations), films made in the form of animations, animations will be interesting news for the reader, attract the reader's attention and increase the effectiveness of education.

For example, in physics “Semiconductors. Mixed conductivity in semiconductors ”along with theoretical information, virtual laboratory stands for determining the“ Volt-Ampere ”characteristics of semiconductor devices, photo batteries on the practical application of semiconductors, animations reflecting their structure and principle of operation provide students with in-depth knowledge of the subject.



Picture-2. Solar battery operation process

Here are the advantages and disadvantages of multimedia technologies:

- it is possible to store large amounts of information in different formats on a single disk (several chapters of text, thousands of high-quality images, several hours of movies and videos, as well as audio information);
- it is possible to divide the images on the screen or enlarge the most interesting and necessary parts, while maintaining the quality;
- possibility of comparative analysis of graphs, images and pictures, calculation of their indicators, processing with the help of software for scientific or research purposes;
- it is possible to extract keywords or the necessary part of the image from the text and other displayed information used to illuminate the image or image, and to extract the information necessary for explanation;
- continuous music and other audio supply similar to static or dynamic image;
- possibility to use a video recording using the "stop-frame" mode;
- access to the global Internet and access to its resources;
- can work with graphics and sound editors, personal applications that can process cartographic information and text.

In addition to the advantages and features listed above, multimedia software training tools have many other options, including automatic viewing of the whole or part of the image, saving and marking the selected location.

The emergence of multimedia systems has led to the development of information technology and its widespread application in science, education, trade (business) and medicine.

Multimedia software learning tools are of particular importance in the learning process with the following most important aspects:

- organization of differential and individual learning process;
- assessment of the learning process, feedback;
- self-monitoring and self-correction;
- demonstrate the studied disciplines and their dynamic process;

- use of computer and information technologies in science, such as animation, graphics, animation, sound;
- student - to develop strategic skills for students to master the subject.

It also paves the way for the practical side of multimedia tools, their use in the educational process and the creation of a database and animated presentations for the future educational process in the education system.

Distinctive features of multimedia include:

- integrates different types of information: traditional (text, tables, decorations, etc.), non-traditional (speech, music, video clips, TV footage, animation, etc.), in one software product;
- work at a certain time, unlike text and graphics, which by their nature are static, audio and video signals are considered only at certain intervals of time. To process and display video and audio information on a computer, the CPU's fast mobility, data bus bandwidth, RAM and video memory, large capacity external memory, volume, and the rate of exchange on computer input and output channels are approximately doubled;
- "Human-computer" is a new level of interactive communication, in which the user receives a wide range of information, which allows to improve the conditions of education, work or leisure.

Teaching students on the basis of multimedia software learning tools has the following advantages:

- possibility of deeper and more complete mastering of the given materials;
- the desire to communicate more closely with new areas of education;
- achieving time savings as a result of reduced study time;
- the acquired knowledge is stored in the memory for a long time and can be used in practice when needed.

There are a variety of different technological approaches aimed at developing quality multimedia applications. Multimedia applications:

Presentations - a form of presentation of information in visual form using audiovisual means. The presentation includes computer animation, graphics, video, music and sound integrated into a single source. Typically, a presentation will have a plot, script, and structure for easy access to information.

Animated videos - a series of images to express the movement of the image on the basis of multimedia technology. The effect of imaging motion is created by the exchange of video frames of more than 16 frames per second.

Games - are multimedia applications aimed at relaxing, entertaining, relieving stress and developing certain skills and abilities.

Video attachments - technology and presentation of moving images. Video image readers are software that controls movies.

Multimedia galleries - are a collection of moving pictures accompanied by sound.

Audio attachments - devices that read audio files - programs that work with digital sounds. Digital sound is the expression of the amplitude of an electrical signal in discrete numbers.

Applications for the Web - are individual web pages, its components (menus, navigation, etc.), applications for data transfer, multi-channel applications, chats, etc. [2].

Conclusion. In the process of teaching on the basis of multimedia software will be able to teach specific and natural sciences, edit lectures, improve the method of presentation of lectures based on the analysis of control results, students will be able to see, hear and reflect on animation elements based on multimedia.

In particular, the multimedia software educational tool plays an important role in improving the quality and efficiency of education, providing students with in-depth knowledge of alternative energy sources and devices, their use in the national economy, the importance of using alternative energy sources in maintaining ecology and environmental cleanliness.

It should be noted that there are non-renewable and renewable (alternative) energy sources in nature. Non-renewable energy sources include oil, coal, natural gas and radioactive fuels from

nuclear power plants. Examples of renewable (alternative) energy sources are solar energy, wind energy, running water, biogas, geothermal energy and other alternative energy sources.

The use of multimedia software tools in the process of alternative energy education, ie e-textbooks, e-problem sets, e-learning materials, virtual laboratory stands, 3D animations, e-learning simulators and computer control systems, significantly increase the motivation of students and the quality of education serves.

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