POSSIBILITIES OF USING SOFTWARE TOOLS IN THE PROCESS OF EDUCATION ON ALTERNATIVE ENERGY

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ABSTRACT

The article explores the legal basis for the use of alternative energy sources and devices in the economy, the relevance and importance of the topic, the role and pedagogical basis of teaching the concept of alternative energy in education and provides methodological recommendations. The analysis of the didactic possibilities of using software – based teaching aids, electronic textbooks, virtual laboratory stands, multimedia tools, 3D animations and training simulators in the content of the pedagogical basis. For the formation of competencies in alternative energy in students.

Keyword: Alternative energy, electronic didactic tool, electronic textbook, training simulators, virtual laboratory stands, multimedia, 3D animation, software training tools.

INTRODUCTION

Today, in the world of education, the introduction of modern forms and didactic tools of teaching, the design of the educational process on the basis of modern teaching aids, the use of software teaching aids in the information learning environment is considered a topical issue. It is becoming increasingly important to create a global learning environment specific to Europe and other developed countries, to ensure continuity and practical orientation of education, to integrate science, education and industry, to develop students' creative abilities, to improve the use of modern software teaching aids in teaching development. .

One of the priorities in the education system of the country is the training of specialists in accordance with international standards, the training of highly qualified, competitive, highly professional and intellectual personnel who can apply innovative technologies in the chosen field of education. Increasing the share of intellectual resources of the country through the use of innovative techniques and technologies in the organization of the educational process, the introduction and improvement of organizational and pedagogical mechanisms based on existing approaches to the educational process in the national and world educational experience is of particular importance.

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

Decree of the President of the Republic of Uzbekistan dated March 1, 2013 ПФ-4512 "On measures to further develop alternative energy sources", President of the Republic of Uzbekistan dated May 26, 2017 "On further development of renewable energy in 2017-2021, energy efficiency in economic and social spheres Resolution of the Government of the Republic of Uzbekistan No. ПҚ-3012 "On the program of measures to increase energy

efficiency" and the Law of the Republic of Uzbekistan No. ЎРҚ-539 of May 21, 2019 "On the use of renewable energy sources" Legal basis for research, use and development of alternative energy sources serves as ПФ-4947 of the President of the Republic of Uzbekistan dated February 7, 2017 "On the Strategy for further development of the Republic of Uzbekistan", the President of the Republic of Uzbekistan dated January 25, 2018 "On measures to radically improve the system of general secondary, secondary special and vocational education" Decree No. ПФ-5313 of April 20, 2017 "On measures to further develop the system of higher education" No. ПҚ-5099 play an important role in the further development of the system of continuing education, training of qualified personnel, radical improvement of the quality of education and the integration of science, education and industry, the creation of e-learning environment, the use of software training tools [5].

The use of software-based educational tools 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 [1].

LITERATURE REVIEW

The Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 provides for further improvement of the system of continuing education based on the development of education and science, increasing the capacity of quality education services, training qualified personnel, radically improving the quality of higher and general secondary education. the development of high-demand subjects is reflected in [4].

It emphasizes the importance of creating an e-learning environment, along with ensuring the integration of science, education and industry, in radically improving the quality of education.

The monograph "Heliotechnology in Physics Education" contains information on the role and importance of alternative energy sources, devices of alternative energy sources in physics education, their use in the national economy. The monograph can be used by students of professional colleges, students and masters of higher education, as well as teachers [10].

METHODOLOGY

On the basis of the method of analysis, the scientific and methodological literature on the research 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 , the methodological basis for the use of electronic didactic tools, ie software learning tools, and the didactic possibilities of teaching were compared.

On the basis of the experimental (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 vidio.

STATEMENT OF THE PROBLEM

For example, in physics “Semiconductors. Mixed conductivity in semiconductors ”along with theoretical data, 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 topic.(1-picture).

Figure-1. An animated demonstration of the structure and working principle of a solar cell.

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 energy, biogas, geothermal energy and other alternative energy sources [2, 3].

Here are a few alternative energy source devices (Figure 2-3).

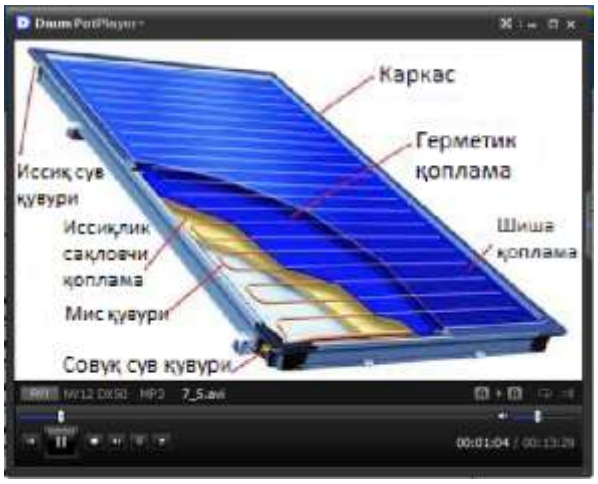

Figure-2. Animation of the structure and working principle of a solar water heater.

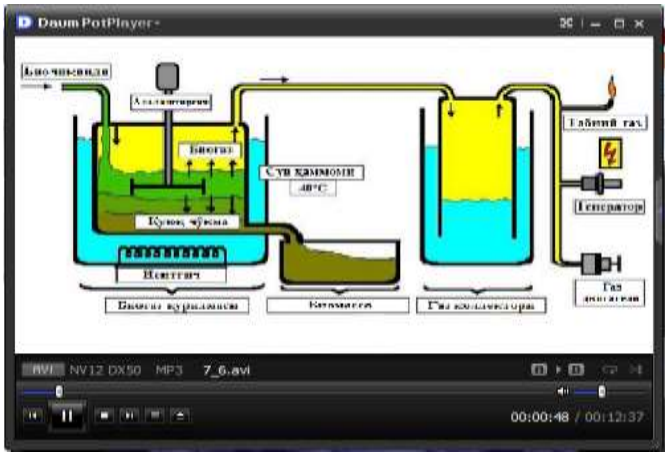

Figure-3. Animated demonstration of the structure and working principle of a biogas plant.

From the above considerations, it can be said that although a lot of research has been done to organize and improve the training process, the pedagogical-psychological and didactic possibilities, methods, scientific basis for the creation and application of software tools in the formation of alternative energy competencies are not fully disclosed. The problem of improving them has not been specifically studied. This requires research into the technology of creating and applying software learning tools to improve the methodology for the formation of competencies in alternative energy in learners.

It is important to form competencies on renewable (alternative) energy, alternative energy sources, alternative energy sources devices, the role of their use in the national economy and the importance of the use of alternative energy sources in maintaining environmental cleanliness. In this regard, the use of electronic textbooks, virtual laboratory stands, animations, multimedia, electronic didactic tools, ie software training tools give good results.

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