

Multimedia Tools and Virtual Laboratories for Teaching Natural Sciences

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ANNOTATIONS

The article mentioned the role of multimedia tools and virtual laboratories in teaching Natural Sciences in education, the peculiarities of the use of a multimedia system in the educational process. It is noted that the modern learning process is more effective when using interactive, multimedia resources that provide active learning styles. The best way is through educational resources and virtual laboratory systems. Virtual laboratories, interaction, interactivity, are modern technologies designed for the educational process and aimed at achieving the desired goal, contributing to the formation of the cognitive and creative activity of students.

Introduction

In the current period, there is a great interest in Computer Information Technology in the activities of Education, Science, Technology. The introduction of new technologies in education, as well as complex modernization, are the main issues that pay special attention not only in Uzbekistan, but also around the world.

In the strategy of action on the five priority areas of development of the Republic of Uzbekistan in 2017-2021, further improvement of the continuing education system, improvement of the capabilities of quality educational services, continuation of the policy of training highly qualified personnel in accordance with the modern needs of the labor market, construction, reconstruction and overhaul of educational institutions, their, by equipping them with computer equipment and educational and methodological manuals, the tasks of taking targeted measures to strengthen their material and technical base, developing national content, improving state-of-the-art education, scientific and educational, modern information resources suitable for the needs of

young people, mechanisms for creating and promoting multimedia products are outlined. This will expand the high-speed internet connection of the population of the Republic, access to multimedia and IP-TV services [1].

The programs established on the way to the development of Uzbekistan tomorrow and the material basis and opportunities created for their implementation, the powerful factor that carries out all the mobilized investments, realizing the high-skilled labor force, and the next day of our country, are mature specialist youth who are able to take responsibility for their development.

LITERATURE ANALYSIS

New pedagogical technology based on modern Information Technologies has entered the educational system of the Republic of Uzbekistan. Each of the modern information technologies depends on certain technical, software and other supplies.

N. from scientists from foreign countries, for example, Russia, on the use of Multimedia technology and its main tool, computers, in the educational process of preschool educational institutions. Z.Frolova, S.V.Gurev, V.P.Kustova, N.I.Klifsova, L.A.Savina, N.M.Klimeshova, M.V.Osmakovas, D. in the United States on the use of multimedia technology in the educational process. Jonassen, S.Carver, R.Grabindger, D.Davidson, R.Lehrer, A.Mullon et al have done scientific research work. In Uzbekistan, the use of multimedia technology and computers, which are considered its main technical support, began in 1985-1990. Among the first was In his scientific work, A.A. Abdukodirov carried out research work on the problem of the formation of computer literacy in higher educational institutions in the preparation of teachers on the subjects of physics and mathematics, and created a school in this direction, among the members of the school Atabayev A., Bilolov I.O', Mizrapov O'.H., Isakov I., and others can be included. T. on the use of multimedia technology and computer in the educational and educational process of educational institutions of our republic. F.Bekmurodov, M.Aripov, H.Z.Ikromova, U. Yuldashev, F.Zokirova, U.Begimqulov, R.R.Boqiyev, N.Toylakov, and others have also done scientific research and contribute significantly to their popularization [3]

Virtual laboratories model real-life object behavior in an e-learning environment, allowing students to acquire new knowledge, skills and qualifications, mainly from scientific and natural sciences such as physics, chemistry, biology, mathematics, geometry, computer science. (Abildinova G.M., Duysenova M. Virtual laboratory as a means of improving the quality of knowledge of students). Under the term Virtual laboratory, in the process of teaching Exact Sciences, a set of computer information necessary for the implementation of laboratory regulations is understood in laboratory exercises [5]. Scientists from the Max Planck Institute Berlin Sven Dierig, Jörg Cantel, Henning Schmidgen A.F. Yegorov, V.P. Belkov, T.V. Savitskaya believes that the virtual laboratory" is an integrated information environment and includes educational, educational-methodological, practical, reference, control-teaching and control-testing materials". N.V.Krivolutskaya believes that" a virtual laboratory is an apparatus for researching various natural (physical) phenomena, which has a wide range of possibilities in the construction of mathematical models and is practically the only software –computing complex. "Noting the advantages of a Virtual laboratory, K.I. Bogatirenko writes that it is a tool that" allows you to drastically reduce the time spent on the development of methodological materials and focus on the methods of the theory under study and the analysis of the results obtained".

RESEARCH METHODOLOGY

The ability of a teacher to master and popularize the advanced experiences of the practice of creative education depends on the level of its preparation for innovative pedagogical activity. There are several different methods of education in educational institutions, in which theoretical and practical training occupy one of the most important places. These forms of knowledge

transfer serve to strengthen and deepen the information acquired during the lecture sessions, to improve their skills by implementing theoretical knowledge in practice. Practical classes occupy a special place in the preparation of students for professional activities, in the careful assimilation of educational material, forming a certain part of the hours of the audience's training.

Today, the teacher should come to each session, in particular, with special preparation for practical classes, that is, think deeply about the methods that he uses in reading the topic, including the issue, examples, and bring to mind how to use them. Since there is an opportunity for an individual approach to students in practical classes, it is also advisable that if problems of one type or another, complexity are encountered, the teacher gives an explanation, instructs, if necessary, mentions theoretical rules.

It is in the process of organizing and conducting these activities that the electronic resources created in the sciences in recent years (electronic teaching aids, electronic methodological manuals, practical and laboratory, electronic developments for virtual laboratory classes, encyclopedias, etc.) the need for further growth. Alternatively, there are also opportunities for the use of Information Technology in the teaching of Natural Sciences in the classroom. In the Natural Sciences, virtual laboratory training, 3D technologies, applications that provide the possibility of online and offline use of artificial intellect are also an example of Information Technology. The main goal of all reforms in the field of education in this regard is to educate spiritually perfectly developed people, improve the educational system, implement lesson processes on the basis of information and digital technologies in accordance with the demand of all times.

It is known that in the traditional teaching system, teaching materials are usually presented in the form of texts and formulas, and keeping them in mind would have been a challenge for some time. It allows classes to be organized on the basis of innovative software-didactic complexes with special software developed using information technology tools, to present not only in the form of text and formula, but also in the form of images.

The course tools used in the educational process (electronic resources, online virtual programs, handouts, technical tools, etc.) make the course process interesting and provide many opportunities for the teacher and the learners. It allows multimedia and virtual implementation with the help of programs, in order to ensure the safety of processes that are impossible for educators to imagine and perform in practice, as well as their safety.

Through the use of multimedia and virtual system in the educational process of its students, the process of transforming and developing the educational process in order to achieve higher results, gaining new knowledge, pedagogical experience of another quality is understood.

In the educational process, within the framework of the application of the multimedia and virtual system, new philosophical-pedagogical, psychological-pedagogical approaches to the development of understanding, education and upbringing of educators; new conceptual pedagogical ideas for the application of educational content and methods; new forms of Organization of the activities and life of the student and the activities of educators in

The Virtual laboratory is a platform and is only a practical work on the topic at the appointed time, so at the same time our established actions in the scientific environment to acquire new knowledge.

The main stages of cognitive activity include:

1. Dating, adoption: methodological recommendations, printed manuals.
2. Comprehension, reinforcement and knowledge verification: electronic tutorials, test Systems, virtual study rooms.

3. Formation of professionally oriented skills and competencies, development of intuition: mathematical or simulation modeling, trainers and other training systems.
4. Project-research training activities: training or production includes additional program packages.

It is difficult to imagine the training of a mature specialist in the field of Applied Sciences without personal acquaintance with physics, chemistry, biology, mathematics, geometry, computer science tools and devices and the formation of working skills in them. In the conditions of organizing distance education, the traditional forms of laboratory practicum use hardware-software (technical) tools, computer graphics and animation on the way to achieving effective interactive interactions of the user (student experimenter) with the modeling environment, imitating physical experience and using mathematical modeling technology, filling it with virtual laboratories. An important aspect of the Virtual laboratory is that, along with the usual images of its instruments, it is possible to visualize the experiment by using it in previous experimental data files stored in the necessary data files, and not in real signal imitation models. The basis of the guarantee of the results of training is the operational response link, which is organized in a holistic learning process. Evaluates the Daily results aimed at the goals set in the study of educational material and enriches the content of Education.

In the teaching of Informatics, it is necessary to give an idea of the multimedia and virtual laboratory system, to mention the importance of obtaining knowledge using multimedia and virtual laboratory tools, its good aspects, and to increase students' interest in science and to formulate the effectiveness and importance of independent mastering of the topic [6];

Education based on Multimedia technologies relies on a significant level of technical and software infrastructure. Multimedia (as the placement and presentation of educational information) and computer devices (as a means of its organization and non-compliance) serve. Therefore, one of the principles that must be taken into account when creating multimedia electronic resources is the principle of distribution of educational material. The second important principle that must be taken into account when developing a Multimedia electronic resource is the interactivity of educational material. Interactive tools make it possible to combine various means of presenting information - textual, static and dynamic graphs, video and audio record into one whole complex, which allows the learner to be an active participant in the learning process, as long as the presentation of information occurs in response in accordance with the actions of the learner [4].

The main problem in the way of optimizing the educational process is to assess and improve the state of a person in the process of acquiring new knowledge. In this case, multimedia e-learning is the fourth principle that must be taken into account when creating resources-the principle of adaptation to the personal peculiarities of the educator. Despite the great importance of independent work in education (multimedia e-learning using resources), the main subjects of the educational process are the student and the teacher. In educational activities, the participation of a student with a teacher is one of the conditions of quality education.

Multimedia e-learning the above-expressed principles of resource creation make it possible to improve the quality and efficiency of e-learning tools. A Virtual education system is a web system created by teachers to structure, manage online courses. The use of virtual laboratory educational multimedia complexes has a good effect on education.

A Virtual laboratory is a software and hardware complex that allows us to experiment without real installation or direct contact without it. Virtual laboratories understand two types of software and hardware complexes: 1) Remote laboratories - laboratory installation with Remote Access; 2) Virtual laboratories - software that allows you to simulate laboratory experiments. The use of virtual laboratory work in the teaching of Natural Sciences allows to improve the quality of

Education, making laboratory work more alive and interesting [3].

The use of Crocodile Physics, Crocodile Chemistry, Phet, Yenka, vbb and other applications in virtual laboratories in digital teaching of Natural Sciences is of great effect on these programs. In the Phet program, we also carry out information technology-based virtual classes prepared virtual laboratory work <https://ictschool.uz/fizika/>, <https://ictschool.uz/kimyo/> / there is also the possibility of using education sites online or offline.

ANALYSIS AND RESULTS

With Multimedia tools, teachers can swallow time and spend the time they spend preparing a didactic tool working with the student or on themselves. The use of multimedia in practice as well as a virtual laboratory in teaching Exact Sciences makes it possible to master twice as productive and Exact Sciences perfectly. Studies confirm that the study of multimedia tools and Exact Sciences on the basis of a virtual laboratory saves 40% of time and gives the opportunity to preserve the knowledge gained in memory for a long time. At the same time, through the visualization and hearing of the materials described in multimedia and virtual laboratories, the study of the Exact Sciences increases the possibility of forming the skills of correct and accurate execution of tasks [6].

These programs provide the opportunity to improve the quality and efficiency of education in physics, chemistry, biology, mathematics, geometry, computer science, increase the imagination of students, ensure independent education. In the context of information of education, the role of multimedial tools and virtual laboratories is significant, creative thinking develops through the assimilation of knowledge in electronic tools, the child learns to find the only real solution in non-standard cases. Thought processes are conscious and rely on developed memory. The creative ability of children comes to the fore.

Conclusion

Using multimedia applications, videos, various animated virtual laboratory materials specially prepared in the course of the lesson, when the educational process is organized, it acquires students' interests in the subject in the formation of practical thinking and imagination and provides an opportunity for their quick understanding. It is known that the usual – traditional passage of the lesson has been proven by pedagogical scientists that about 25% of students can master it. Experiments show that both hearing a lecture at the same time and seeing the material on the computer screen and active control of its release on the screen increase the quality of mastering.

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