



Improving the Quality of Teaching Physics Laboratory Lessons Through Modern Software Tools

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Annotation

This article provides information on improving the quality of teaching physics laboratory classes using modern software tools. The main focus is on factors necessary for students to have a broader outlook and deep knowledge.

Key words: Software, physical experiments, hardware, event, virtual laboratory, model, modeling, applications.

Zamonaviy Dasturiy Vositalar Orqali Fizika Laboratoriya Darslarini O'qitish Sifatini Oshirish

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Annotatsiya

Ushbu maqolada zamonaviy dasturiy vositalardan foydalanib fizika laboratoriya darslarini o'qitish sifatini oshirish haqida ma'lumot berilgan. Asosiy e'tibor o'quvchilarning kengroq dunyoqarash va chuqur bilimli bo'lishi uchun zarur omillarga qaratilgan.

Kalit so'zlar: Dasturiy taminot, fizik tajriba, texnik vositalar, hodisa, virtual laboratoriya, model, modellashirish, dasturlar.

ПОВЫШЕНИЕ КАЧЕСТВА ПРЕПОДАВАНИЯ ЛАБОРАТОРНЫХ ЗАНЯТИЙ ПО ФИЗИКЕ С ПОМОЩЬЮ СОВРЕМЕННЫХ ПРОГРАММНЫХ СРЕДСТВ

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Аннотация: В данной статье представлена информация по повышению качества



преподавания лабораторных занятий по физике с использованием современных программных средств. Основное внимание уделяется факторам, необходимым для того, чтобы студенты имели более широкий кругозор и глубокие знания.

Ключевые слова: Программного обеспечения, физические эксперименты, технические средства, событие, виртуальная лаборатория, модель, моделирование, приложения.

Introduction

The problem of computerization of education is a modern direction in the science of pedagogy that appeared about half a century ago. The process of computerization is progressing in such a way that in a few years every listener will be provided with a computer. Therefore, it is necessary to develop methodological and educational guides for the use of computers in educational processes. Teachers should use programs compatible with the physics program to students and listeners, show the convenient and understandable side of electronic textbooks and tasks. All science pedagogues are tasked with using the electronic textbook in their classes and giving lectures using it.

Literature Analysis And Methodology

The direct development of science is one of the important factors for economic development and increasing the power of Uzbekistan. When creating new samples of technology, it is necessary to study the problem and a new approach to the solution of the existing problem. Currently, computer and information technology tools are widely used in the classes of general and specialized subjects. Computer and information technology tools make it possible to master and master educational materials, to retain their content for a long time, to strengthen knowledge, and to increase students' interest in the subject.

Every day, modern software tools are introduced in every sphere of our life, increasing the efficiency of our professional activities. Today, we cannot live without modern devices such as television, radio, but also mobile phones, computers, and tablets. Using them, we enrich the content of our lives and ease our work and education tasks. At present, the implementation of the capabilities of modern software tools in the teaching of various subjects in the education system, among all other fields, is an urgent issue. Modern software tools serve not only to form students' knowledge and skills, but also to develop their personal characteristics and increase their interest in knowledge. In recent years, in many psychological and advanced pedagogical fields, we are witnessing the fact that modern software tools promote the development of students' knowledge and creative thinking. The use of modern software tools helps to enrich the range of information provided in the educational process and to be absorbed by students with interest. With the introduction of modern software tools into the educational process, a new approach to education, characteristic of the modern information environment, began to take shape.

Discussion And Results

Today, modern software tools with extensive use of digital educational resources are an



integral part of modern methods of teaching physics. The quality of the modern educational process is directly related to the improvement of technology and teaching methods, which in turn depends on the use of modern software tools by teachers.

It is known that physics in general schools includes "Mechanics", "Molecular physics", "Fundamentals of thermodynamics", "Electrodynamics and magnetism", "Optics", "Atomic and nuclear physics", Quantum physics. includes files. To study and understand them, the ability to analyze and compare imaginative thinking is required.

Some students may not have the necessary thinking skills to deeply understand the events and processes described in these sections. In such situations, modern technical educational tools and, first of all, a personal computer will help. With the help of modern software tools, it is possible to create a model of experiences and events that are difficult to imagine, as well as to change the conditions of the process, to "rotate" with optimal speed for assimilation.

The use of software products in the lesson allows students to study the processes and events occurring in the real world as accurately as possible. In addition, it activates cognitive activity and increases students' interest in new knowledge.

The use of information and communication technologies in science education creates the following opportunities:

- pictorial, visual explanation of the material;
- independent work with the help of a teacher-consultant;
- use of diagnostic and control materials;
- accurate calculation;
- use of simulation programs in experiments and laboratory works;
- use of information search systems;
- organization of students' project creation activities;

When explaining topics in physics, they can use special software tools to learn about the level of understanding of the topic using PowerPoint presentations. It is necessary to use computer technology to solve problems and conduct experiments, quickly calculate and graphically express the results. This can be done by humans, but there is no guarantee that the error will be within the specified limits. It is possible to safely and easily show that the amount of error increases and the value is kept the same only in the model used on the computer. On the other hand, when conducting the experiment, we may not take into account the influence of additional factors such as the Earth's electromagnetic field, the direction of rotation, and temperature. In the correct calculation and analysis of the obtained result, taking into account the above-mentioned factors (measurement error, electromagnetic field effect, external temperature, additional forces) complicates the calculation process. Therefore, it is convenient to use modern software tools, especially software and computers in the course of the lesson, to facilitate such complications.

Especially, connecting subjects with each other in the course of the lesson leads to easier understanding and mastering of the subject. Any innovation, project and production network in the field of science cannot be implemented without complex mathematical calculations. In order to facilitate such calculations, many modern and universal integrated systems, i.e. a package of practical programs, are being created. The application package includes a wide



range of software developments aimed at increasing the practical level of computers by using them together with application and system programs.

Modern software tools have a special place in the formation of students' scope of knowledge, outlook, and imagination in laboratory classes of general education schools. Because the lessons of physics and astronomy are aimed at learning many theories and subjects, mastering new techniques and technologies, information media.

The role of models in the study of complex processes is great. A computer-aided simplified model is run. First the initial conditions, then the calculation with different steps is performed. The obtained results are stored in the computer memory in the form of a file. If the program stops working for some reason, you can start it here. In most cases, the analysis of the results is carried out in the second step. For this, another program is launched, and its final result is displayed on the monitor screen in the form of a graphic. Currently, such steps are no longer necessary. The results are obtained and their analysis is reflected on the additional screen.

The following results can be achieved by using modern software tools in physics classes:

- formation of the main competencies of students during the educational process and extracurricular activities;
- increasing students' interest in learning;
- mastering computer literacy by students and increasing the level of computer literacy;
- organization of students' independent and research activities;
- development of students' spatial thinking and cognitive abilities;
- increasing the aesthetic appeal of classes.

The application of computer technologies to the educational process and the use of modern software based on them is of great importance from the pedagogical and psychological point of view, and leads to the following important results:

- activates, speeds up the educational process, increases educational efficiency;
- transmission of educational materials in various forms (using voice, text, video, graphics, animation) attracts the attention of students;
- a high level of visibility arouses great interest in the studied subject in students;
- ensures long-term retention of the studied educational material;
- students have more opportunities for independent learning and develop independent learning skills;

Conclusion

In general, it can be said that the use of ICT tools and software is of great importance in increasing the effectiveness of the teaching process of physics. This does not reduce the essence of physics, but provides an opportunity to understand it easily. This situation, in turn, is the basis for the formation of a complex concept in education.

The environment of modern software tools used in various departments of physics, informational educational environment, intelligent teaching systems, multimedia lessons, virtual laboratories, students' scientific research work in the field of creating a computer model of a physical phenomenon and creating software. It is of great practical importance.



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