

ADVANTAGES OF TEACHING PHYSICS ON THE CREDIT SYSTEM

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ABSTRACT

This article outlines certain aspects of the teaching of physics in higher educational institutions of Uzbekistan on the credit system.

Keywords: Technology, process, phenomenon, education, upbringing, credit, tool, modeling, ability, interest, system, knowledge, skill, ability, competence, logical thinking, technical tool, electronic education, software package.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

The credit education system (CS) began to be applied in foreign countries from the end of the 20th century, and in the last 10 years, the international higher education curriculum was adopted in European countries, and in 1987 - in the European Union. Later, in the experiment on this system, 145 higher educational institutions (HEUs) of European countries took part in the ERASMUS experiment. Currently, in most HEUs in developed countries, the COP is used to implement educational programs. In the systems widespread in recent years, it is possible to attribute the COPs of universities in the USA, Great Britain, and the European-Pacific region.

The use of CS in education, along with the choice of the most appropriate curriculum of disciplines for choice, the choice of a professor through the observation of open classes of subject teachers, the effective use of technical means and educational technologies in constant communication with teachers, provides opportunities for a constant independent search for students, development of the ability for independent creative search and logical thinking through phased consolidation, deepening of knowledge, Acquaintance and effective use with modern technical facilities and educational technologies.

The CS sets new tasks for teachers, since it is required to create a curriculum, curriculum, study guide, methodological and didactic recommendations that are appropriate for this system.

CS requires each teacher to create an environment that provides students with independent assimilation of academic discipline using the capabilities of modern information technologies (IT). This provides greater efficiency and quality of classes, increasing students' interest in the discipline, respectively, and the quality of education.

In a modern lesson in physics, students are taught the concepts and rules necessary for the assimilation of physical phenomena and processes, laws and laws, their scientific foundations, and the solution of theoretical and applied engineering problems. This process cannot be imagined without the use of computer technology (CT). Using a computer, a teacher can demonstrate the course of complex physical processes, students can change the initial (given) parameters of experiments when performing virtual laboratory work at their discretion, analyze the processes viewed, formulate the corresponding conclusions.

Physics is the foundation, the foundation of technical disciplines, therefore 4 credits are allotted to this discipline at the Jizzakh State Pedagogical Institute, which in our opinion is not enough.

Upon successful completion of studies in a particular discipline, a student studying in the CS is considered to have gained the number of hours-credits allocated to this discipline. These watch-credits open the way for him to master the disciplines of subsequent levels, i.e. disciplines interconnected with the finished and determines the order of study. But does not show the level of knowledge of the student. How much the student has learned the discipline can be judged by his grades. For example, if a first-year student has not learned the number of credits allocated to physics, he is not allowed to study disciplines related to physics.

The peculiarity of the organization of the educational process in the field of CS is that in it, widely using the capabilities of modern IT, an environment is created that provides independent study of physics by students. Here, attention should be paid to the inadequacy of educational literature and electronic manuals in the Uzbek language, which widely cover topics in each section of physical science. Let us not dwell on some software packages devoted to the study of physics.

Modeling of physical processes in the package Interactive Physics (Eng. Interactive Physics - living physics). This software package is the product of many years of work by physics teachers and programmers. Using the tools of the Interactive Physics package, students themselves can simulate physical processes as engineers or scientists. This package corresponds to the State educational standards, the educational literature, which is used for teaching in educational institutions, thereby is an important educational tool.

As is known, some processes, characteristics of a physical model cannot be fully reflected in circuits, plates. Moreover, it is impossible to trace changes in the process itself. In such cases, the computer model is indispensable. Yes, there are educational films in which all elements of physical processes are reflected, but the student watches similar films as a passive spectator. In a computer model of the process, the student can directly intervene in the process, changing its parameters, formulating how this affects the current pattern, i.e. he has the ability to gain and deepen knowledge. Today, using It removes many difficulties. They allow you to create animations that reflect invisible, slowly and rapidly occurring processes, the physical mechanisms of complex phenomena.

Interactive Physics software package allows you to create animations of various models using a multimedia projector, simulate them. Interactive Physics software package promotes a vivid and natural depiction of physical phenomena; demonstrations of processes that are difficult to observe; use as an object of study; repeated repetition of physical phenomena and processes; increasing students' interest in physics, their research activity, development of creative abilities.

Interactive Physics software package allows you to include in the physics teaching new cycles of classes, such as virtual laboratory work. Demonstration experiments; research experiments; task writing; task analysis, etc. It is important that the Interactive Physics program does not require the teacher to know special programming languages. This software package provides an opportunity for both the teacher and the student to pause, translate, change the initial parameters, in a word, intervene in the process. So the student feels himself in the role of a participant in the physical process.

The study of the physical process is carried out, naturally, on the basis of a certain physical model, i.e. abstract, simplified image of the process. In creating a simulation computer model of a real physical process, a specific physical model is taken as the basis. When creating a computer model of the process, it is important to maximize the reflection of the necessary elements of the model.

Modern ICTs in the educational system are used in four directions: as an object of study, as a technical means of training, in educational management, and scientific and pedagogical research.

In the teaching of exact disciplines, a positive factor for quick and high-quality mastering of topics is the widespread use of electronic textbooks, electronic versions of lectures, virtual laboratory work, presentations, video clips, 3D images of bodies and / or objects, bringing content to students using information technology. Also, in the teaching of physics it is advisable to use the capabilities of programs like MatCad, MatLab, Crocodile Physics, which allow you to simulate physical processes.

In the process of learning with the use of ICT, computer models, students will learn both in quantitative and in qualitative quantities that characterize the phenomena. A peculiar feature of modeling is that there is no need to create and prepare physical tools and tools.

Pedagogical software tools - computer technologies - these are didactic tools designed for partial or full automation of the educational process, opening up prospects for increasing the effectiveness of education. To pedagogical software include software products (software packages), technical and methodological support, additional and auxiliary tools aimed at achieving specific didactic goals of the discipline.

Pedagogical software is divided into:

- educational programs that orient students to learn new knowledge based on their interests and level of knowledge;
- test programs used to test and / or evaluate acquired knowledge, skills and abilities;
- simulators, primarily serving to repeat and consolidate the learned training material;
- programs that create, with the participation of the teacher, a virtual learning environment.

Computer modeling is widely used in research and teaching physics. Of particular importance here are experiments, experiments simulating physical phenomena, which cannot be observed under real conditions for various reasons:

- smaller or larger scale ongoing processes;
- mismatch of the time scale of the physical process with the time of observation;
- not possible to observe the conditions of the experiment;
- the technical complexity of the experiment;
- for security reasons.

Programs that allow you to create a virtual learning environment include simulators. Simulators can be used practically in all aspects of the educational process from primary education to higher education. One of the main advantages of simulators is that they can be an alternative to real objects, while they are much cheaper. They allow you to simulate a particular physical process without real tools and equipment, to conduct virtual laboratory work, which leads to cost savings.

As you know, the implementation of certain studies, for example, related to nuclear physics, represents a certain danger to people's lives. In addition, such studies require huge material

costs. EE simulators do not require almost financial costs, which allows students to repeatedly perform certain research works. Another, perhaps the main advantage of simulators is their safety.

In the process of using the simulators, students, even if they virtually implement the knowledge learned at the lecture lessons. This contributes to further consolidation of knowledge, the development of theoretical and practical research. In addition, students from passive observers move into participants in research work, which in turn leads to an increase in their interest in study and research.

The classes use Crocodile Clips software and Interactive Physics programs that have led to major changes in education.

Crocodile Physics is a software environment that allows you to simulate physical processes, create, conduct and observe experiments in the fields of physics, such as mechanics, electricity, optics and the phenomenon of waves. The program allows you to simulate processes of various levels of complexity, conduct experiments that are impossible in real conditions, calculate with greater accuracy the values of physical quantities, form a graphic relationship between the physical quantities of a phenomenon or process, save and print created models.

This program, which allows solving problems, performing demonstration and laboratory work, has been improved by Crocodile Clips Ltd since 1994. Currently, the program is widely used in educational institutions in more than 35 developed countries of the world.

Crocodile Technology is a program that allows teachers and students to use IT capabilities in-depth study of the "Electricity" section of a physics course in secondary, specialized secondary, and professional education. The program can be used in the study of electrical engineering, the theory of electrical circuits. The program is an electronic designer, provides an opportunity to simulate the process of collecting electrical circuits on a monitor as if in a natural experiment, to measure electrical quantities in a multimeter, ammeter and voltmeter. The program also allows the student to see their mistakes, determine the causes of unsuccessful experimentation, analyze electrical circuits before executing them in real installations.

Currently, in prestigious scientific institutions in Europe, the Crocodile technology program is used to model physical processes, which allows you to simulate and model complex electrical circuits.

The Phunphysics program was created by Emil Ernerfield at the Department of Computational Sciences at Umeå University (Sweden), and allows you to "revive" physics in two dimensions (2D), simulate and observe various physical processes.

The Beginnings of Electronics program is an electronic designer with which you can simulate the process of collecting electrical circuits on a monitor screen. One of its main features is the ability to simulate real physical processes with great accuracy. It can be used both in practical classes, and when performing laboratory work, solving problems.

The electronic designer allows you to:

- check the resistance of the conductor, its comparative resistance, length, dependence on the surface of its cross section;
- study Ohm's law for the entire chain or part thereof;
- study the laws of serial, parallel and combined connection of capacitors, coils;

- to study the principles of operation of electric storage devices in an electric circuit, etc.

The application of the capabilities of ICT, the Internet helps to increase the effectiveness of the educational process.

The introduction of a credit system simplifies the monitoring of students' competencies and brings together national educational programs.

An analysis of the introduction of a credit training system shows that in different countries it has its own characteristics. However, the effectiveness and appropriateness of the credit system of education is confirmed by the increasing spread in the educational system of the countries of the world, since the orientation of educational programs on the development of independent work among students will increase the level of creative activity and self-stimulation, respectively, and improve the quality of education.

The HEU of our country has taken the first steps to introduce a credit education system. The goal is to include HEU among the leading HEUs in the world through a radical improvement in the training system, and the introduction of educational systems in the educational process.

REFERENCES

1. Rakhmatullaeva MF, Tohirov UH, Methods of teaching physics in the credit system / The role of talented youth in the development of physics. RIAK-XII-2019 Materials of Republican scientific-practical conference. Tashkent, 2019. - B .. 407 - 409.

2. Kholmedov H.M. Problems of teaching physics in higher education institutions with the introduction of credit system of education / The role of talented youth in the development of physics. Proceedings of the Republican scientific-practical conference RIAK-XII-2019. — Tashkent, 2019. —B. 414 - 416.

3. Kurbanov M.H. Methods of using information technology in laboratory studies of physics / The role of talented youth in the development of physics. RAK-XII-2019 Republican Scientific and Practical Materials. —Tashkent, 2019. —B. 434-437.

4. Khamidov VS About 4 programs that caused a drastic turn in the education system. <http://uz.infocom.uz/2009/12/21/talim-tizimida-keskin-burilishga-sabab-bolgan-4-dastur-haqida>.

5. Abdurakhmanov KF etc., Physics course, Tashkent 2012.

6. Frish S. E, Timoreva AV, General Physics Course, Tashkent-Teacher.