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ICT IN PHYSICS CLASSES

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Abstract:
In this article, the relevance of the use of information technologies and the possibilities of networks are confirmed by the strategic directions of the development of education in our country. An overview of the continuous use of ICT in physics classes, the need to regularly update several interrelated elements to ensure a high-quality level of education, and new educational technologies is held.

Keywords: Physics, ICT, computerization, interactivity, multimedia, modeling, communication, illustrative, visual.

INTRODUCTION

Today, in the conditions of informatization of education, new modern innovative technologies are emerging that open up new opportunities for effective cooperation between subjects of the educational process.

- new educational stand art, new basic curriculum, new educational materials (educational kits);
- new mechanisms for financing the educational process, updating the mechanisms for selecting and attracting personnel to the school (staffing);
- formation of concepts of social direction in school development programs - health school, day school, specialized school, external study, family school, UVK, etc.;
- new forms of teaching on the basis of technical equipment of schools (computerization and internetization of schools) and new competencies of teachers and managers based on these changes;
- development and dissemination of distance education among school teachers and students;
- new school rules that develop the classroom system and offer alternative approaches to the organization of the educational process, especially on the basis of the policy of actively forming an information-rich environment of the educational institution and forming a single informational educational space.

The introduction of information technologies into the educational process fundamentally creates new pedagogical tools, thereby creating new opportunities for the teacher. At the same time, not only the functions of the teacher will change, but also the sector of independent educational work of his students will expand significantly. It is known that independent study work is effective only in the form of active activity. Therefore, it is necessary to consider the introduction of methods and approaches that develop these forms of education and increase students' enthusiasm as an integral part of the educational process. Another consequence of the expansion of the field of independent education is the need for constant control of the educational process. All this, of course, requires a change in teaching methods.

The real goal of informatization of local education is to change the content, methods and organizational forms of educational work in the context of the formation of a "new" school, which is aimed at solving the problem of preparing young people for life in the information field. society. The analysis of the current situation shows that life not only puts new demands on the school, but also provides it with some tools to solve new problems. Among them are new pedagogical technologies and ICT tools that support them.

Analysis of the available opportunities of information technologies from the point of view of educational problems allows us to identify five new pedagogical tools:

- interactivity,
- multimedia,
- modeling,
- communication,
- work

Currently, the teacher is faced with the problem of teaching the child such technologies of cognitive activity, teaching the ability to acquire new knowledge of any form and type, so that he can process the received information quickly and, most importantly, qualitatively, applies in life. Practice solving different types of tasks (and tasks), feel personal responsibility and participation in the learning process, prepare yourself for further practical work and continuous education.

We can see several reasons that lead to the loss of interest in learning new knowledge, mastering the technology of cognitive activity (and as a result, the interest in science is lost): use of traditional education aimed at increasing the flow of information with limited time that does not allow students to fully reveal their creative potential.

- in teaching physics, the elements of learning as an important component in laboratory and practical work are not fully used: due to the lack of equipment or the simplification of the experimental model itself, students spend a lot of time on calculations. Required values and measurement errors, the impossibility of repeating the experiment with different parameters, etc.;
- a formal approach to solving physical problems (the impossibility of solving them only on paper and verifying the obtained result in practice);
- insufficient supply of exhibition equipment due to insufficient funding;
- the impossibility of showing some physical experiences in school conditions, their cost or high risk, etc.;

Consider two main problems in teaching physics:

1) Many phenomena cannot be demonstrated in a school physics class. For example, these are microcosm phenomena or experiments with fast processes or non-office devices. As a result, students experience several difficulties in reading because they cannot visualize them mentally. The computer can not only create a model of such phenomena, but also allows to change the conditions of the process, to "rotate" with an optimal presentation of the educational material for assimilation.

2) Physics is an experimental science. It is difficult to imagine the study of physics without laboratory work. Unfortunately, the equipment of the physics office does not always allow to

perform complex laboratory work, it does not allow to introduce scientific research work that requires more sophisticated modern equipment. ICT comes to the rescue, which makes it possible to perform very complex laboratory work. In them, the student can change the initial parameters of the experiments at will, observe how the phenomenon itself changes, analyze what they see and draw appropriate conclusions.

New information technologies make the educational process an interesting process, contribute to the development of students' research skills, and encourage teachers to master the methods of scientific projects. Information technologies allow to individualize the educational process, to activate the activity of difficult students in preparing and conducting lessons. The use of ICT in the lesson increases students' enthusiasm for the educational process, creates conditions for students to acquire knowledge and learn about the world. The use of ICT in physics classes allows to increase the interest in learning science, to expand the possibilities of showing experiments through the use of virtual images. Today, a teacher who uses ICT in the educational process has a unique opportunity to make the lesson more interesting, demonstrative and dynamic.

Purpose: to introduce E H M into the educational process in physics classes.

Duties: In order to qualitatively teach students the main subjects of the school curriculum using new information technologies, it is necessary to:

- to know the didactic capabilities of the computer;
- own methods of computer use in organizing training sessions;
- to be able to use a computer to control the mastering of the material passed by schoolchildren and to organize self-control;
- ability to optimally combine computer and traditional educational technologies;
- use of new information technologies in organizing students' creative activities, etc.

ICT - the process of teacher competence formation is carried out in three stages:

- acquisition of the basic level, that is, knowledge, skills and experience in the use of general purpose ICT tools;
- mastering a science-oriented level: formation of readiness to introduce special technologies and resources developed in accordance with the requirements for the content and methodology of a particular academic subject into educational activities.
- realizing the need to create their own electronic educational resources (EER) - experience is accumulated, i.e. the teacher acquires the skills of analyzing the didactic possibilities of educational software, evaluating their effectiveness, predicting the result of their use, and developing methodological recommendations for their use.

actively use information and communication technologies in classes that allow students to develop self-education skills and abilities at a high level - data analysis and systematization. accepted. At the same time, it should be noted that the new training manuals allow to connect information-communicative, person-oriented technologies with methods of creative and research activities.

The use of ICT in the lesson allows the teacher to reduce the time of studying the material due to the visibility and speed of work, to check the knowledge of students in an interactive mode, which increases the effectiveness of learning, helps to realize all possibilities.

personality - cognitive, moral, creative, communicative and aesthetic, helps to develop students' intelligence, information culture.

I use information and communication technologies for different purposes and at different stages of the lesson:

- illustrative, visual explanation of the material;
- independent education by denying the activities of the teacher;
- independent education with the help of a teacher-consultant;
- partial replacement (piecemeal, selective use of additional material);
- use of educational (teaching) programs;
- use of diagnostic and control materials;
- performing independent and creative tasks at home;
- using a computer for calculations, drawing graphs;
- use of programs that simulate experiments and laboratory work;
- use of game and entertainment programs;
- use of information and information systems;
- organization of students' project activities;
- Distance education.

Use of computer models in the implementation of different teaching methods in physics classes

Computer models (CM) are one of the new types of educational objects that enrich the system of educational tools in a modern school. Since its inception, CM has very quickly become a part of almost all digital educational resources in physics. As a rule, based on high-quality physical-mathematical models of real objects and processes, educational computer models cannot be compared with any other digital object as a new tool for visualization.

The use of material or materialized models of real objects has always been considered a very suitable method of learning, because it provides a deeper assimilation of the main (important) in the phenomenon. CMs are no exception in this sense. The advantages of computer models are very clear. Computer models allow:

- study of physical phenomena and technical objects at an understandable level, in addition to the often awkward description of many details and the analysis of complex mathematical calculations; focusing on the main (important) thing in its content due to the simplified form of presentation of the event and multimedia effects;
- studying the phenomenon in its "pure" form, accurately repeating the necessary conditions for its occurrence;
- observing the phenomenon in dynamics (that is, determining its development in space and time);
- to accompany the model work with a visual interpretation of regular relationships between the parameters of the studied system in the form of dynamic graphs, charts, diagrams, etc.;

- performing impossible operations in reality, in particular: changing the spatial-temporal scale of the event; setting and changing the parameters of the studied object system without fear of its condition, as well as the safety and security of the environment.

It is of fundamental importance to direct students to generalized plans in the organization of their work with computer training models, because. allows students to get the most complete educational information installed by the author-developer. Working with such instructions in a very short time leads to the formation of general approaches to learning (research) of computer models and the formation of generalized skills in students. It is important to purposefully form students' ability to respond to the text independently, including creating computer models based on appropriate generalized plans and repeating the most important stages of model work in the form of drawings. response rate.

The use of ICT in the organization of the educational process has a number of advantages, but at the same time it comes with disadvantages and problems.

Advantages	**Disadvantages, problems of use**
Ko view, pictorial	Long-term preparation for the lesson is related to choosing a ready-made EER, creating one's own resources
The ability to simultaneously play on the computer screen and in sound a certain set of objects presented in different ways	Visual (listening) overloading of the lesson, turning the lesson into a visual-sound, literary-musical composition, incorrectly defining the didactic role of ICT, their place in the lessons.
Variety of educational material presentation	Inadequate methodological training of the teacher in terms of using ICT in a specific lesson
Interactivity (in some cases)	Lack of network versions and interactivity of some ready-made DERs
Wise use of class time (with correct identification of the didactic role of ICT, their place in classes)	The danger of suppressing interpersonal communication when overloading the ICT lesson and neglecting other forms of organizing educational activities
Simulation of processes that are difficult to demonstrate in a school laboratory	Refusal to conduct a "live" experiment in electronic form, which allows material and technical equipment of the cabinet; resulting in a lack of direct learning of reality
to change the conditions of the process, slow down or speed up the process	Educational institutions are not equipped with modern equipment
Studying the object in motion, change, development	
Objectivity and speed of assessment in computer tests	
Mathematical processing of results	
Organize self-control at a convenient time	

Organization of independent research, research activity	Increasing social inequality in the organization of students' homework using ICT (if the student is not provided with the opportunity to prepare for the lesson in the computer school room)
Using a large database of objects to prepare speeches, lectures, theses, presentations	
The possibility of a virtual tour	
Quick access to encyclopedic information	The risk of receiving incorrect information from the Internet if the source is not verified

Designing a lesson using ICT requires a lot of time, patience and perseverance from the teacher. Naturally, the simulation of various phenomena in no way replaces real, "live" experiences and experiences, but together with them, it allows to explain the meaning of what is happening at a higher level. Based on my work experience, I can say with confidence that the use of information and communication technologies, if their didactic role and place in the lesson is correctly determined, if the acceptability and expediency of their use is assessed, students will be really interested. ; motivates schoolchildren, involves everyone in the work, allows effective use of class time, enables quick exchange of ideas with students, overcomes the subjectivity of grading. Information technologies increase the information content of the lesson, the effectiveness of teaching, give the lesson dynamism and expressiveness.

The result of the work is the ability of students to gain a deeper understanding of the nature of physical phenomena, independently pose a problem and find ways to solve it, put forward hypotheses and test them in experiments. The use of modern ICT in physics lessons opens up new opportunities for learning, allows students to develop their creative abilities, increase cognitive activity and motivation to learn, thereby helping to form the child's "self-concept" and prospects for the development of his personality. , strategies for future adult life.

Summary

The prospects for the use of ICT in physics classes, in my opinion, are as follows:

- forming the main competencies of students during the educational process and extracurricular activities;
- increase students' motivation to study;
- mastering the computer literacy of students, increasing the level of computer literacy of the teacher;
- organization of independent and research activities of students;
- creating a bank of ready-made teaching and methodical materials for use in the educational process;
- development of students' spatial thinking, cognitive abilities;
- aesthetic appeal of classes.

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