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## Increasing The Efficiency Of Learning Electrodynamics Section Of The Physics Course

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### ABSTRACT

The article discusses the issues of increasing the effectiveness of teaching with the help of innovative pedagogical technologies. Currently, the issue of using software-pedagogical and telecommunication means in the educational process of the school and, in particular, in teaching physics is urgent.

### KEYWORDS

Education, pedagogy, efficiency, process, computer technology, student activation, teaching material.

### INTRODUCTION

In the 21st century, any educated person should be able to use modern information technologies in their work. Thus, there is a need to create a different educational environment. Currently, the issue of using software-pedagogical and telecommunication

means in the educational process of the school and, in particular, in teaching physics, is relevant.

In order to increase the effectiveness of the development of cognitive and research

activities and provide new opportunities for the creative growth of students, it is necessary to use modern physical electronic laboratories, multimedia computer programs and telecommunication technologies that provide students with access to non-traditional sources of information - electronic hypertext textbooks, educational sites, systems distance learning.

When used correctly, they provide a number of advantages over conventional teaching methods:

- Individualization of the educational process in terms of content, volume and rate of assimilation of educational material;
- Activation of students in the assimilation of educational information;
- Increasing the efficiency of using study time;
- Positive motivation for learning due to comfortable psychological conditions of the student's work, objectivity of assessment;
- Changing the nature of the teacher's work (reducing routine work and strengthening the creative component of his activities);

## MATERIALS AND METHODS

The use of computer technologies in teaching physics in secondary school plays a special role. As the pedagogical experience shows, the greatest number of difficulties arises when studying those sections of the physics course that are associated with electricity and magnetism. Meanwhile, the methodology for studying various topics in these sections has not been adequately developed.

The use of computer technologies, and in particular some applied packages, increases

the efficiency of the educational process and allows students to achieve a deeper understanding of this topic. Based on the goal and the formulated hypothesis, the following tasks follow:

- Consider the use of new information technologies in the educational process;
- Consider general issues of teaching methods of the topic "Electricity and Magnetism";
- Find out what difficulties students face in the process of studying this topic and, therefore, what issues and concepts should be given special attention;
- To develop an electronic lecture on the topic "Electromagnetic oscillations" for the school physics course of the profile classes.
- Consider the use of new information technologies in the educational process;
- Consider general issues of teaching methods of the topic "Electricity and Magnetism";
- Find out what difficulties students face in the process of studying this topic and, therefore, what issues and concepts should be given special attention;
- To develop an electronic lecture on the topic "Electromagnetic vibrations" for the school physics course of the profile classes;

To solve the set tasks, you can use the following methods:

- Study of methodological, psychological and reference literature on this topic;

- Acquaintance with the existing developments in the field of this topic.

One of the main aspects of the upbringing and development of the younger generation in the learning process is the intellectual development of schoolchildren. At present, the volume and level of complexity of information is constantly increasing, therefore, the process of intellectual development of students requires intensification. One of the ways to increase the intensity of training is the use of computer learning technologies (ITO). When used correctly, they provide a number of advantages over conventional teaching methods:

1. Individualization of the educational process in terms of the content, volume and pace of mastering the educational material;
2. Activation of students in the assimilation of educational information;
3. Increasing the efficiency of the use of study time;
4. Positive motivation for learning due to comfortable psychological conditions of the student's work, objectivity of assessment;
5. Changing the nature of the teacher's work (reducing routine work and strengthening the creative component of his activities).

A special role is played by the use of computer technologies in teaching physics in secondary and higher schools.

As the pedagogical experience shows, the greatest number of difficulties arises when studying those sections of the physics course that are associated with electricity and magnetism.

Meanwhile, the methodology for studying various topics in these sections has not been adequately developed. In this regard, we made an attempt to substantiate the expediency of using ITO when studying, in particular, the topic "Electromagnetic oscillations" and developed some methodological points, which, depending on the adopted technology of the educational process, its goals and objectives, as well as on the computer equipment of the school, can be used by physics teachers both to study the entire topic as a whole, and to study its individual issues.

Experienced teachers without a deep analysis of the current state of education understand that there are a number of contradictions in our educational system:

- Between the increased requirements of the state, on the one hand, and the established system of teaching physics in educational institutions, on the other;
- Between the need for students to form systemic subject and metasubject knowledge, generalized skills based on the most important types of educational and cognitive activities in teaching physics, on the one hand, and insufficient development of technologies for organizing these types of activities, means, methods and techniques of teaching, on the other hand.

Everyone understands that the goal of teaching is not memorization by the student of facts and formulations, but an understanding of basic physical phenomena and their connections with the world around them. Understanding is a multi-step process with no

end. For understanding, the integrity of perception is extremely important, the disclosure of an object in motion, in development, from paragraph to paragraph, from topic to topic.

A modern student, immersed in the modern information "field" at school and at home, receives a huge amount of separate information, i.e. information. But information and knowledge are far from the same thing. For information to become knowledge, purposeful mental activity is necessary, which then becomes the basis for practical actions, a person's readiness to use the acquired knowledge and skills and methods of activity in real life. How to build this thinking activity in the lesson? How to acquaint students with new information step by step, logically and holistically?

A person constantly, in the process of his practical activity, is faced with the need to refer to different sources of information. Basic school students in the classroom meet with oral and written speech, a diagram, a drawing, a structural-logical diagram, a table, an analytical way of presenting information (formula, equation), learn to work independently with different sources of information, learn to extract, broadcast and assimilate information presented different ways. It is clear that each of these ways of presenting information is mastered by each child "in due time" and according to the curriculum.

And in order to master this or that way of presenting information, the student must have formed or developed certain intellectual skills.

Intellectual skills (operations):

- The ability to describe what was detected by the senses (oral speech);
- The ability to compare and contrast;
- The ability to dismember the whole into its component parts - analysis and reverse operation – synthesis;
- The ability to carry out reasoning from the particular to the general, generalization;
- The ability to carry out abstraction, modeling, etc. Students can forget over time this or that fact, the definition, the name of the quantity, the formulation of the law and its mathematical formula, but they will not "unlearn" the difference between fact and fiction, cause from effect, model from real object. It is important to teach them to understand that knowledge is of an approximate nature, a more or less accurate description and explanation of phenomena is possible only within specific boundaries, that phenomena cannot be harmful or useful, that is how a person makes them.

In modern physics education, students should receive clear examples of the development of a system of concepts, new knowledge based on the analysis of the situation and prediction of its further development, and master the methods of scientific knowledge.

And the activity in which every child is immersed should be varied (from reading the text of a textbook and conducting laboratory experiments to solving high-quality and calculation problems), regular, emphatically systemic and instrumental. One of the largest and most significant sections in the physics program is "Electrodynamics".

How to prepare students for the section "Electrodynamics": to give them basic

knowledge, teach them universal methods of mental activity, develop individual abilities and prepare them for a large volume of independent work on solving problems?

Fundamental concepts of electrodynamics: electric charge, electromagnetic interaction and electromagnetic field.

There was an opinion: the concept of an electromagnetic field must go through 3 main stages of formation. First, on a qualitative level (mainly through demonstration experiments), initial information about the electromagnetic field is given, the relationship of its components - electric and magnetic fields is revealed, the existence of a single electromagnetic field is emphasized. Further, in accordance with the program, particular manifestations of the electromagnetic field - electric and magnetic fields, their properties and the main qualitative and quantitative characteristics - are consistently and in sufficient detail.

## CONCLUSION

Finally, an alternating electromagnetic field is considered, the field is characterized as a special type of matter, the full spectrum of electromagnetic radiation is shown, and information about the electromagnetic field is generalized.

1. Electromagnetic interaction underlies all electrical, magnetic, optical and electromagnetic phenomena in general.
2. Electromagnetic interaction is characterized by short-range, and the speed of its propagation is the highest in nature -  $3 \cdot 10^8$  m / s.

3. Electromagnetic interaction is universal, which is due to the electrical structure of matter.
4. Electromagnetic interaction, like other types of interaction, is material. Its material carrier is the electromagnetic field.

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