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Research Article

METHODOLOGY OF STUDENTS PLANNING OF PROJECT WORKS

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ABSTRACT

The methodology of students' project work planning skills formation, using the "Multisim" program installed along with information and communication technologies, systematization, generalization and deepening of the students' knowledge of electrical engineering, electronics, radio engineering, physics, mathematics, and informatics are presented.

KEYWORDS

Electrical engineering, electronics, radio engineering, physics, mathematics, informatics, "Multisim", scientific-methodical, educational-methodical, scientific-technical, professional experimental skills.

INTRODUCTION

Today's physics teacher has the responsibility to increase the student's interest in natural and technical sciences, to increase the quality and efficiency of education.

As a solution to the above problems, we, the goals, tasks, tools, and pedagogical methods of forming the skills of planning (making a scheme) of the students are as follows.

During classes, the teacher will have the following opportunities for self-education of General Physics using the "Multisim" program based on information and communication tools:

serves as a universal and necessary tool in the fields of data collection, processing, automatic management, and changing the values of the categories;

with the help of the "Multisim" program, which is installed together with information and communication technologies, the creation of chains is carried out in a few seconds;

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"Multisim" allows to combine the processes of development and testing of electronic devices based on the technology of virtual devices for the purpose of educational production;

the possibility of independent creation of various chains (schemes);

very broad electronic material technical base;

the possibility of attractive assembly of schemes;

accuracy of laboratory equipment and extinguishing results;

the possibility of comparison and analysis of graphs of obtained techniques;

the width of the opportunity to get acquainted with the designation of its elements in the scheme, properties and brands;

it is possible to observe laws (processes) with the eye;

students have opportunities to check their ideas and innovations;

When working with the Multisim program, the student feels free, he is not afraid of making mistakes, because there is an opportunity to quickly and efficiently correct mistakes.

Tasks of designing projects in general physics:

systematization, generalization and deepening of students' knowledge of electrical engineering, electronics, radio engineering, physics, mathematics, computer science;

justifying the place of innovative technologies in the multi-level education system and giving necessary recommendations to students;

justification of the need to improve the purpose, content, methods and tools of science education, as well as the obtained results based on the requirements of the time;

introducing students to the planning of scientific-methodical, educational-methodical, scientific-technical work of a modern teacher;

study of modern approaches to design, modeling and organization;

justifying the need for planning and arming with ways and methods of improving the process of teaching General Physics based on an individual approach;

using and relying on students' prospective teaching tools

designing the teaching process of general physics, implementing the project

- composition of skills and qualifications to be introduced to memory;

To teach forms and methods of analysis and evaluation of the project and its results;

The activity and independent work of learners will have a significant effect only when their creative approach and research to the problem set in the educational process is highly demanded.

Designing means determining the necessary conditions for conducting an experiment (testing a hypothesis); determine the follow-up to be conducted;

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determination of measurable quantities; selection of tools and equipment for project work; choosing the sequence of execution of project work; means choosing the form of writing project work results.

In designing, in order to implement project work in practical and independent educational activities of General Physics, we analyzed traditional activities theoretically and practically. As a result, we have developed a set of actions that take into account all the parameters in the electrical circuit, which are aimed at building skills and are necessary for students to perform independently.

For this purpose, classes in general physics are carried out on the subject of project work in the following stages:

1) the goal is determined, that is, the compatibility of the educational content with the goals is determined;

2) theoretical information is introduced, the essence of the given values and their place in the educational content are determined;

3) equipment necessary for project work is selected;

4) project work equipment is assembled, measuring instruments and other equipment are placed on the laboratory (work) table, paying attention to the logical sequence and appearance;

5) the stages of execution of project tasks are determined;

6) works on finding answers to goal-directing questions (these questions are based on the knowledge acquired by the student in general secondary schools and secondary special vocational education, higher education institutions);

7) project work is carried out on the basis of the clauses specified in the order of execution;

8) project work results;

9) project work errors are identified;

10) project work requires the completion of a task appropriate to the subject of independent education: theoretical, (inquisitiveness, aspiration, work on literature, formation of self-control evaluation skills, instills feelings of self-confidence) and experimental knowledge and skills;

11) methodical instructions for completing tasks are offered;

12) necessary literature is recommended for each study assignment.

The didactic aspects of practical tasks that form the skills to perform project work are as follows:

providing targeted training;

choosing the common general methods of project work, the given educational material;

design (modeling) of a real process based on organization and recommendation;

formation of elements of methodological culture, which assumes the understanding of the scientific basis and expediency of this or that method. Based on these requirements, we tried to plan and systematize project work in our research.

when planning project work:

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a) to realize the integral connection of theoretical and practical education, to form the skills of students to perform project work, to develop research activities;

b) rational use of reproductive and productive methods of teaching, introduction of innovative methods of teaching;

c) coordination of individual, group and team forms of training;

g) to evaluate the form of the report and the resulting activity;

d) Attention was paid to the extent to which the teaching of general physics relies on the modern state.

Independent education relies on the ability of students to form creative and practical activities based on the content of the lessons, the compatibility with the General Physics curriculum, and the requirements of the educational content. The recommended tasks are experimental in nature and consist of a sequence of practical and theoretical processes performed independently by students under the guidance of the teacher.

It is required that the subject of the independent study sessions correspond to the subject of the completed project work. Its main purpose is to develop basic concepts, laws, theories of general physics, to develop independent thinking, skills and abilities, including the ability to observe physical phenomena, perform simple experiments, measurements, use tools and materials, analyze the results of project work, is to help generalize and draw conclusions.

It is compiled on the basis of existing project works in general physics, and their content is studied in independent educational sessions and is inextricably linked with the educational material. This allows you to regularly complete assignments throughout the semester, and at the same time, to conduct the teaching of the subject on the basis of project work.

In the preparation of tasks for each independent educational topic, attention is paid to the importance of students' skills and abilities to perform project work, along with theoretical knowledge to study a physical phenomenon or law. Taking into account the students' ability to know, understand, understand, and master, the project gradually becomes more complicated to the extent that it helps to gradually form a system of work execution. In addition, project works also contribute to the development of students' thinking, because they encourage students to show mental activity (analysis, synthesis, comparison, generalization, etc.) and create the possibility of self-control. Development of students' thinking abilities and activation of self-control is carried out by setting appropriate problems in the process of project work. Problems draw students' attention to the important aspects of the studied phenomena, direct them to understand their work and the obtained results.

Attention was paid to the fact that independent education in general physics meets the following requirements and criteria in pedagogical higher education institutions:

1. Deepening of theoretical knowledge;

2. Formation of skills and qualifications for general project work;

3. Implementation of intersubject connections;

4. Demonstrating students' creative abilities;

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5. Formation of students' independent work skills;

6. To help master the fundamental laws of science;

7. Using the results of the obtained project work in further training;

8. Development of students' scientific outlook;

9. Know the applicability of existing statistical methods (calculation of errors) in processing the results of project work;

10. Focused on acquiring professional experimental skills;

11. Application of mathematical methods to theoretical foundations;

12. Development of ideas about areas of application and sectors of project work.

Below we present the development of a practical exercise that will help students to create a scheme of general physics projects in the Multisim program.

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