

Organizing Independent Education of Physics Based on Software Educational Tools

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Abstract

Organization of the educational process in the world through independent education (Simulations), wide application of forms of distance education (Moodle, Ilias, Dokeos, etc.), continuity and practical orientation of education in the conditions of information-educational environment (e-learning), education It is important to improve the methodology of using software training tools [1] in the development of the creative abilities of the recipients, in the development of the process of innovative preparation for professional activity. Alignment with International Standard Classification of Education (ISCE) levels adopted by UNESCO; full implementation of the National qualification system in the educational process; innovative design of educational content so that trained personnel can take a decent place in the labor market; division of professional competences into components; special attention is paid to creating new methodological models of education and their application in specific educational practices. Legal and ethical concepts are also a key factor in organizing activities with software tools.

Implementation of concepts in this regard at the lower levels of education, that is, joining various target groups in social networks, serves to prevent vices such as network criminals [5; 27 p]. In order to avoid the formation of the above negative problems, digital educational materials should be up to date and the most important aspect should satisfy the student's interest in science.

The development stages of modern education are characterized by new theories and practices that are fully covered by software. This process is related to the development and implementation of innovative innovations based on traditional methods in the educational system in the context of socio-economic development in all aspects of the national economy.

Improving the effectiveness of the knowledge acquired by students in academic lyceums is one of the signs of encouraging the development of the state [2]. Efforts to explore the content of education lead to creative approaches and independent learning. Society has always had a high need for progressive thinking pedagogues who meet the demands of the times. The content of the teacher's activity is modernized through scientific achievements and advanced pedagogical experiences, with the introduction of creative development.

Keywords: independent education, software tools, physics, electrodynamics, independent education, educational material.

I. Introduction

Currently, due to a number of factors such as healthy competition in the field and economic efficiency, the digital education system is developing much faster than

expected. These include self-paced training, freedom and flexibility of class schedule, accessibility, mobility, productivity, social equity, creativity, individual approach,

intensity, comfortable environment, etc. [8; 22 p].

There is a lot of work to be done in this regard, which can also be explained by the development of the level of intelligence of learning management systems based on artificial intelligence in digital education. This means that digital education has a huge task in programming full virtuality in accordance with the maximum level of knowledge that can be given to the student in the teaching of the physics course in the educational system.

II. Literature review

The implementation of information and communication technologies in the study of the electrodynamics section of the physics course strictly requires knowledge [7; 35 p]. This includes basic computer programs such as electronic document processing, spreadsheets, image storage, database and management, as well as electronic tools for saving work time, free time and large data (e-mail, such issues as understanding the use of the Internet and communication opportunities through network tools) are included. In addition to understanding how ICT supports creativity and innovation, students will also need to be aware of the reliability of available information and the electrical and magnetic phenomena associated with the interactive use of ICT.

III. Analysis

In the concept of adapting the higher education system to the digital generation adopted with the support of the European Union Erasmus Plus program, the term "Digital pedagogy" does not mean and does not require the use of the traditional classroom in the usual sense.

In turn, the term "digital" is used to develop electronic textbooks and training manuals that provide basic opportunities for the Digital Generation, interactive tests for checking mastered materials, interactive tools for existing and previously identified gaps in knowledge and gradually adapting them to the "Digital Generation" will have to go [9; 7 p].

It is important to use software tools in the process of independent creative work to form and strengthen the skills of independent thinking, which are necessary to come to a certain solution to the problems and tasks set in mastering the Electrodynamics section of the physics course, and to choose its optimal option.

Academic lyceum students' ability to adapt their independent knowledge of physics courses to the needs of the times, to extract what is needed from the flow of information, and to form the ability to process and analyze data, is of great importance in the implementation of their activities at the next stage.

The use of software tools in the study of each topic included in the physics curriculum of the academic lyceum, the student's independent thinking is manifested in any activity: using a unique method in solving problems, writing creative essays, drawing pictures with different creative approaches in art classes, performing experimental work, demanding making various items in cases where [3; 252 p], a constructive approach to the creation of laboratory equipment and all similar processes require the student's independent thinking and clearly show that this ability is well developed.

High-level knowledge cannot be fully imparted to students by classroom training. In doing this, independent

educational activity performs the task of supplementary development.

Independent education is a form of education for the purpose of strengthening acquired knowledge, skills and abilities, additional information or independent study of material.

Independent activity serves to implement the formation of knowledge, skills and abilities defined in the curriculum of a particular subject and must be mastered by the student, based on the advice and recommendations of the teacher, it is performed in the auditorium or outside the auditorium with the help of electronic textbooks.

Based on the characteristics of the topics of the Electrodynamics Department, software tools are developed for assignments on independent types of work [10; 125 p].

Conditionally based on the research of pedagogic scientists, independent work is divided into the following types, the use of software tools during the execution of each type of independent work increases the efficiency of independent work:

1. Independent completion of written assignments in the electrodynamics department

performing calculations in the process of solving problems related to electrical phenomena, creating a working formula using the formulas learned during the lesson, filling in summarizing and repeating tables, developing technological maps of the lesson, drawing up reports on laboratory, practical work, students based on various organizers organization of activities, etc. [4; 156 p].

2. The following can be included in the graphic independent assignments in the department of electrodynamics:

drawing graphs showing the relationship between quantities in formulas, preparing various projects, sketching drawing works, drawing electrical circuit diagrams, depicting sections and intersections (drawing some details and nodes, etc.), creating schemes, graphs, diagrams, observing laboratory work includes describing the results and similar tasks.

3. The following tasks can be included in the independent tasks of a practical nature in the department of electrodynamics:

based on the teacher's assignment, students in the process of independent work make, repair, model, and process physical devices for laboratory work and physical experiments and demonstrations, prepare models of molecules and crystal lattices, repair equipment and tools, product processing, calculation, new fit They perform work such as design of models, layouts and models, preparation of samples.

Independent work is divided into 4 groups from the point of view of the implementation of individual didactic goals:

- Tasks that encourage the initial formation of knowledge and perception. In this, students should know what is required to achieve the goal. Tasks are aimed at acquiring information and data;

- tasks aimed at mastering information, storing and reviving information in memory, and processing. In this case, tasks are given that are performed on the basis of the correct involvement and activation of previously acquired knowledge and are required to be applied in specific conditions;

- assignments that require a new approach to knowledge, skills, and skills that have been previously mastered, become stereotyped, and are the result of

accumulated experience. They are given tasks that require searching for the essence of the problem, finding new solutions, and expressing new ideas and thoughts;

- assignments encouraging creative activity. It involves researching new or previously known ideas and thoughts from a different point of view, that is, gathering information, working on them, and giving assignments and tasks that encourage you to express your opinion.

Under the independent work of academic lyceum students, we understand cognitive mental activity aimed at acquiring knowledge, skills and abilities of students, in this process, students learn to observe physical phenomena, including electric and magnetic processes. Events, their observation and comparison, analysis, generalization, distinguishing the main situation, drawing conclusions from the whole process - in short, it is assumed to acquire logical operations with an independent approach to answering the questions.

IV. Discussion

N.G. Dairi's definition of independent activity is considered the most perfect among the definitions so far: "Independence is an activity that is carried out without the constant help of a teacher, relying on one's own knowledge, thinking, skills, life experience, faith, and enriches the student with knowledge, develops and educates him, and forms the qualities of independence. Necessary for the person;

independent activity represents the quality of the cognitive process, the personal characteristics of the student and the form of educational organization". The advantage of this definition is that the definition takes into account the nature of the student's cognitive activity.

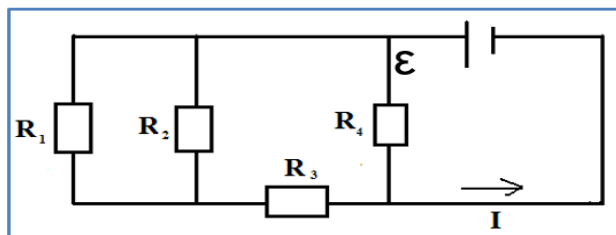
The study of electrical phenomena is related to the development of thinking. In this, to set intellectual tasks that require the manifestation of strong willed actions in front of the students; step-by-step formation of didactic difficulties; diversifying various exercises; relying on the experience of the student's knowledge acquired so far; taking into account the individual characteristics of the learner; use independent work in all learning processes; connecting acquired knowledge and skills with life and putting them into practice.

Independent activity as a form of organization of educational process is considered from different positions: as a characteristic of a person and as a person's knowledge [6; 56 p]. Despite this, the idea of independent activity is fully manifested as a teaching method.

In the process of independent work on the "Electrodynamics" department, students can be given assignments to work on issues related to the topics. Below we give examples of solving such problems.

Question 1: Find the internal resistance of the source with EYK i 12 V in the circuit of Fig. 2.12. The resistance of all resistors is 4 Ω , and the current in the unbranched part of the circuit is 4 A.

Берилган:
 $I=4\text{A}$
 $\varepsilon=12\text{V}$
 $R=4\text{ om}$
 $r=?$



$$I = \frac{\varepsilon}{R_{um} + r}$$

$$r = \frac{\varepsilon}{I} - R_{um}$$

Picture 2.12. Source with EYK i 12 V.**Answer to question 1:**

$$\frac{1}{R_{1,2}} = \frac{1}{R_1} + \frac{1}{R_2} \Rightarrow R_{1,2} = 2\Omega$$

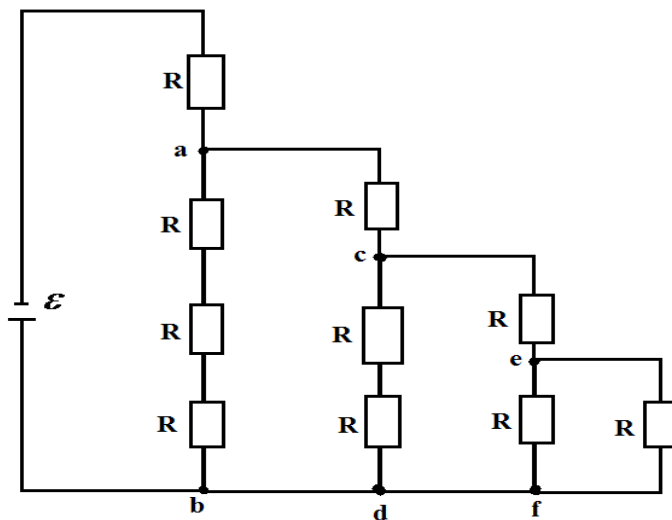
$$R_{1,2,3} = R_{1,2} + R_3 \Rightarrow R_{1,2,3} = 6\Omega$$

$$\frac{1}{R_{um}} = \frac{1}{R_{1,2,3}} + \frac{1}{R_4} \Rightarrow R_{um} = 2.4\Omega$$

$$r = \frac{12V}{4A} = 3\Omega$$

$$r = 0.6\Omega$$

Question 2: Determine the current I through the current source in the circuit shown in Picture 2.13. All resistances of the circuit are the same, do not consider the internal resistance of the source.

**Picture 2.13. Power source.****Answer to question 2:**

$$R_{um} = R_{fec dab} + R = \frac{39}{34}R + R = \frac{73}{34}R$$

$$R_{um} = \frac{73}{34}R = \frac{73}{34} \cdot 68 = 146\Omega$$

$$I = \frac{\varepsilon}{R + r} \Rightarrow I = \frac{\varepsilon}{R} = \frac{14}{146} \approx 0.1A$$

$r = 0$

In the growing education system, along with listing the additional tools - techniques and methods that develop student independence, it is necessary to draw up a clear map of the study of certain topics, only in this case, the independent activity of the student will literally have its place in the educational process and is becoming.

V. Conclusion

The content of the physics program in academic lyceums, the possibilities of explaining the content of educational materials using software tools in the context of interdisciplinary integration in its teaching were analyzed. The use of software tools in the organization of independent education in physics serves to develop students' skills in phenomena, their observation and comparison, analysis, and generalization.

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