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Research Article

A MODEL FOR DEVELOPING THE EFFICIENCY OF INDEPENDENT LEARNING IN THE SCIENCE OF GENERAL PHYSICS (ELECTROMAGNETISM) BASED ON PROJECT WORK

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ABSTRACT

Cooperation works are presented by integrating the effectiveness of independent education in general physics (electromagnetism) through the production of a model of development based on project work.

KEYWORDS

Assessment, experimental, electromagnetism, project work, production, integration, cooperation.

INTRODUCTION

As a result of the rapid development of the science of modern General Physics (electromagnetism), to develop the experimental skills of students, to regularly update the content and form of educational processes, to apply innovative processes to the field of education, to improve the criteria and methods of evaluating the quality of education, education, related to the search for innovative solutions to ensure the integration of science and production.

The following were taken into account when developing a methodical system for organizing independent education in teaching general physics (electromagnetism) to students of pedagogical higher educational institutions based on a collaborative approach:

1. Development of independent education in the subject of general physics (electromagnetism) focusing on students' acquisition of concepts related to project work (purpose, idea, ability to see the

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problem, empirical level of knowledge), development of levels of thinking skills and research activity.

2. to solve the problem of arousing students' interest in project work by introducing independent education, while ensuring the integration of science, education and production, and at the same time identifying their talent and preparing them for professional work.

3. taking into account the level of complexity of the project work, it is taken into account that the level of difficulty in the experimental work should be chosen step by step and students should be able to perform it. The increasing complexity of project work leads to the development of experimental skills in students. In doing so, they go through the stages of seeing the problem, putting forward a hypothesis - planning project work - conducting an experiment - processing the received data and analyzing the results of the work - presenting the results.

4. Mathematical literacy and widespread use of ICT programs ensure a high level of planning of project work. when processing the results of project work, time-consuming mathematical calculations are performed using interactive electronic programs.

5. Presentations of students on project work (in the form of scheme, project, model, written report, development, presentation) should be completed. The presentation work is evaluated by the leader (or members of the committee) based on aspects such as the student's ability to explain the project presentation, answer questions, think about it, and gain new information. Students listen to opinions, comments and suggestions about the results of their work, make a conclusion about the work they have done (self-evaluation).

When teaching General Physics (Electromagnetism) through the proposed model, it is possible to have the following opportunities:

1. In the field of education:

a) assessment and control of training quality;

b) identifying and solving educational methodological problems;

c) improvement of curriculum science programs;

d) analyzing, enriching, improving the level of educational literature;

e) effective use of ICT and pedagogical technologies;

2. In the field of education and science:

a) strengthening mutual integration of education and science;

b) directing students to scientific activities;

c) development of students' participation skills in scientific projects;

d) combining theory and practice;

e) development of mechanisms for applying the latest achievements of science to education;

f) To have a base of modern material and technical equipment in teaching the science of general physics (electromagnetism);

3. In the direction of education and production:

a) strengthening the integration between education and production;

b) direct observation of the application of theoretical knowledge in practice;

c) development of mechanisms for applying the latest achievements to production;

d) Availability of a base of modern material and technical equipment in teaching the science of general physics (electromagnetism);

4. Education and training workshop:

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a) direct observation of the application of theoretical knowledge in practice;

b) availability of conditions and modern material and technical equipment base for students to conduct educational project work;

c) students perform project work independently;

d) experimenting with various experimental tests under the guidance of a teacher;

5. In the management of education:

a) development of a regional management system, taking into account the capabilities of all components;

b) digitalization of the management system;

Based on the analysis of pedagogical researches and scientific-methodical literature, and taking into account the uniqueness of each subject and the principles of teaching, we have developed a model for the development of the effectiveness of independent education in the subject of General Physics (electromagnetism) based on project work (Fig. 2.1).

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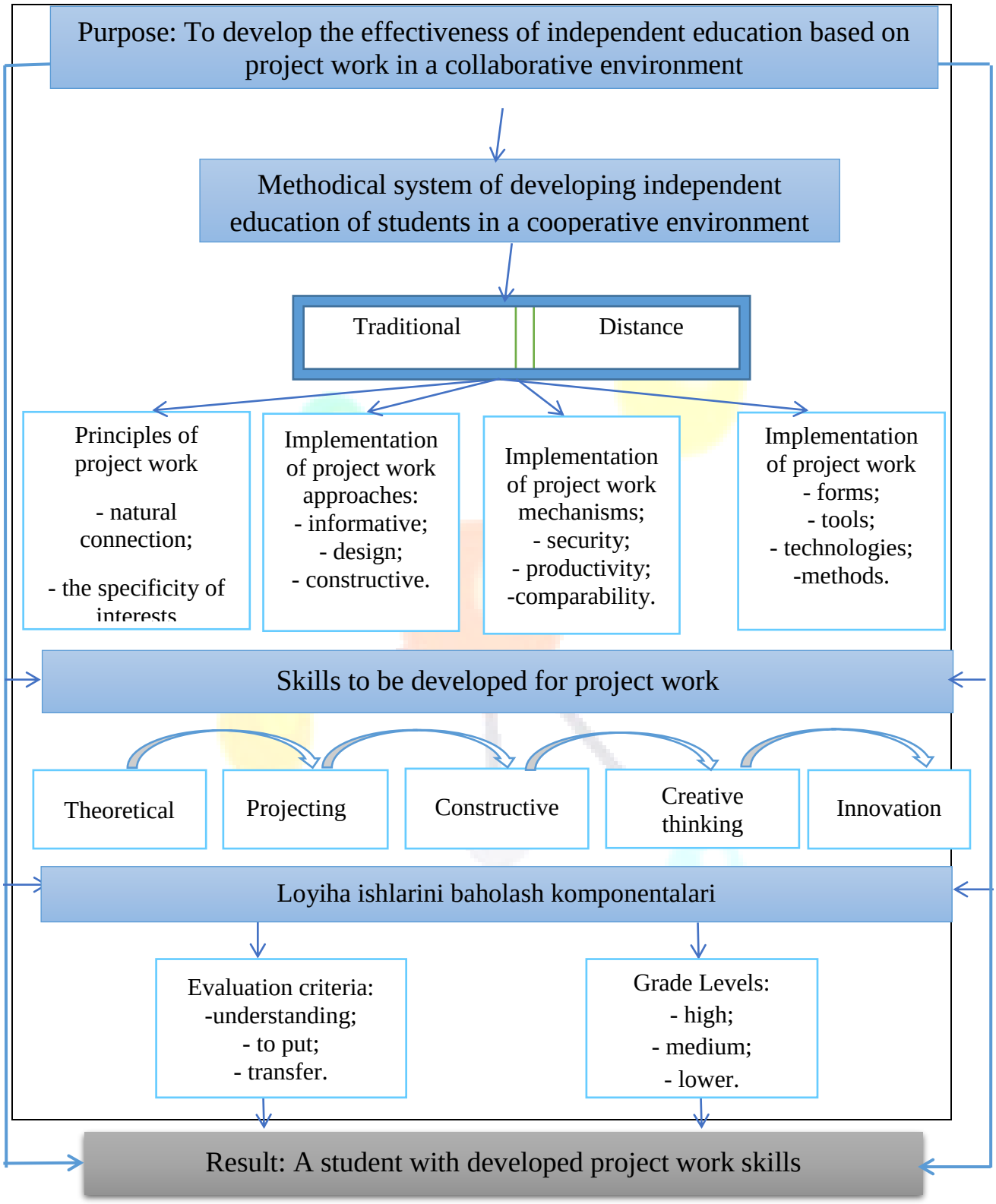

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Figure 2.1. A model for developing the effectiveness of independent education in general physics (electromagnetism) based on project work

The model that we offer "The model of the development of the effectiveness of independent education in the subject of general physics (electromagnetism) based on project work" consists of the following components.

The results of the project work show that, regarding the development levels of students' ability to perform project work during the teaching process, the understanding, knowledge, skills and qualifications of the first level of verification are sufficiently complete, but the above-mentioned factors of the second and third stages show that most of them have not been fully mastered. The fact is that after the first level of knowledge, it is very difficult to transfer everyone to the knowledge and skills of the second and third level, and it is achieved mainly through the systematic execution of project tasks during the educational process.

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