THE IMPORTANCE OF IT TECHNOLOGY IN ORGANIZING SELF-EDUCATION OF STUDENTS THROUGH PROJECT ACTIVITIES

Muhitdinova Shahlo Kodirjon kizi
Teacher of Namangan State University
https://doi.org/10.5281/zenodo.11090214

Abstract. *This article mainly presents effectivemethods of using the wide capabilities of IT technologies and numerical modeling in preparing physics students of higher educational institutions for project activities when organizing self-education. In addition, completing hours of self-education in practical classes lists the methods and functions of developing skills in using computer programs in preparing students for project activities.*

Keywords*: IT technologies, numerical modeling, student, project activity, self-education, physics, task, variable force, speed, accelerating motion.*

Specialists who meet the requirements of today need to effectively use IT technologies and numerical modeling methods in their field. Taking this into account, when developing an educational trajectory for a bachelor's degree in physics using the project method, students need to use the above types of activities during their project activities and further improve the project. In addition, in the process of modern scientific research it is impossible to achieve high efficiency without the use of IT technologies. IT technologies are used in project activities for the following purposes:

- Formation of a database with the effective use of Internet resources.

-Creation of presentations, animation, two- or three-dimensional graphics using multimedia technologies.

-Use of various practical tools (MatLab, Maple, C++) to perform specific educational practice.

Currently, thanks to the development of Internet networks, it is much easier to achieve the first goal; students are provided with information about the list of necessary platforms and methods of working with them for the effective use of Internet resources. For example, they teach how to work with search engine data from Google, Scopus, and Web of Science.

The problem and its solution

When preparing students for project activities, they need to focus on preparing a presentation using multimedia technologies, since in order to win the declared projects and submit a project report, the prepared presentations must quickly evoke a positive opinion among the jury members. Therefore, in the presentation, thoughts and ideas should be structured in a popular scientific, logical sequence, without using a large number of words, using tables and graphs, with a design corresponding to the topic of the project. If the product of project activity is a scientific and theoretical result, then in physics conclusions and proposals are necessarily drawn up using graphs or diagrams.

Therefore, it is necessary to form and develop students' skills in working with web design programs, Power-Point or two- and three-dimensional graphics. As in all areas, in the bachelor's degree in physics, students from the first year study the course "Information Technologies", and,

based on the requirements of the time, students need to master the use of the wide possibilities of IT technology in self-education. The tasks performed in this course must be adapted to the direction of the project activity.

With a more effective implementation of project activities in physics, a physical model is developed that shows the reality of any physical process under study based on the capabilities of IT technologies, and a mathematical model is created on its basis. The content of physical research fully demonstrates the capabilities of numerical modeling and fully realizes its potential in the knowledge of mathematical modeling, which is the main organizer of the modern approach to the study of real phenomena in nature. From this point of view, it can be understood that developing students' ability to use IT technologies, mainly various programs, when implementing modern projects in physics is one of the main directions of preparing students for project activities [1ASU]. Based on this requirement, it is necessary to develop a plan, inextricably linked with the course "Computer modeling of physical processes", for the problems used in the practical classes of the general physics course of the bachelor's degree in physics "Solving selected problems".

But the main responsibility for preparing students for project activities lies with professors and teachers conducting practice in general and theoretical physics. Because the main problems in the "Collection of Problems in Physics" manuals used in practical classes [2,3 Devil's Sparrow] belong to the group of quantitative problems, or because the main focus of the problems used in the course of theoretical physics is to find an analytical expression to determine a physical quantity, the use of numerical methods or various programs will no longer be necessary. Based on this situation, teachers conducting practical classes should give students such tasks, students should feel the need to use the numerical method and create motivation for them.

It is known from pedagogical experience that in the kinematics section of the "Mechanics" course, it is mainly required to find such quantities as speed and the distance traveled for uniform, uniformly accelerated, rectilinear motion, if you want to construct a graph of the dependence v(t) or S(t), mathematical calculations are performed The calculations are not complicated, do not take much time and do not create problems for students. Therefore, as we approach the end of the tasks in the kinematics section, students are given several tasks to draw up graphs depicting various dependencies by performing complex calculations related to the unevenly accelerated motion of bodies under the influence of a variable force. Here are some examples of such tasks:

Acceleration of a body as it moves in a certain medium

changes according to the law If draw graphs of the relationship a(t), v(t), S(t), a(S) and v(S)$a = a_0 exp(-At)(\ m/s^2)$

A body moves with uneven acceleration in a medium with variable force. If the acceleration changes according to the law ,construct a graph of a(t), v(t), S(t) and find the distance traveled until the moment of stopping.$a = a_0 - a_0 exp(At)(m/s^2)$

If the acceleration of a body moving in a medium changes according to the law,

$a = a_0 exp\left(\frac{B}{At+C}\right)$(m/s^2) construct graphs of a(t), v(t), S(t), a(S) and v(S).

If the acceleration of a non-uniformly accelerating body changes according to the law, draw up graphs of the dependence a(t), v(t), S(t), a(S), v(S).= $a = a_0 - Av$(m/s^2),

There are several other tasks similar to those described in the example above. All problems given as examples are united by the fact that formulas representing the connection v(t), S(t),v(S), or a(S) can be found analytically, i.e., by simple integration, but Since the formulas involve an

exponential function, the calculation is complex. To eliminate this inconvenience, you need to use various programs designed for your computer.

Suchproblems can be compiled for all sections of the “General Physics” and “Theoretical Physics” courses.

The use of such tasks in preparing students for project activities not only develops students’ skills in using information technology and computer programs, but also performs a number of functions. That is:

It performs the function of developing individualized learning, since the coefficients a0, B, C given in the problems are presented to the student separately, and different graphs are obtained.

Provides educational visualization function, i.e.*a(t), v(t), S(t),* builds dependency graphs, and the ongoing physical process is almost clearly manifested, which makes it possible to determine and visualize the limiting values of such quantities as acceleration and speed.

Performs the function of developing independent research and creative activities of students. In this case, the student can make changes to the graph by entering different values in addition to the coefficient values provided by the teacher and think about the values that affect the change in the graph.

In addition to the functions listed above, according to an analysis of the literature, with the effective use of various programs and numerical modeling in physics education, the following principles of didactics are implemented:

compensatory - spends less time understanding a new topic, assimilation of knowledge, formation of epistemic knowledge, use of computer capabilities and compensates for the time spent creating a program.

integrative - describing or obtaining information about the physical object or process being studied, first in parts and then as a whole.

virtuality - the ability to create graphs that are unimaginable in real life, the relationship of quantities impossible to obtain under normal conditions

reliability – the ability to prepare individual, high-quality educational material for a large number of students in the classroom and compare the results obtained.

It is known that after the production of 3D printers, the capabilities of computers and their scope of application have increased even more. As a result, different devices could be made using a 3D printer, especially for different demonstrations or physics labs. With this in mind, it is necessary to develop skills in using a 3D printer and working with related software when implementing practical and experimental projects.

Conclusion

Thus, by working on physical problems using IT technologies and various software, they develop various related skills to prepare students for effective project activities. Consequently, project activity or the implementation of projects is not a means of teaching physics, and considering project activity as an integral part of self-education is one of the concepts of the modern education system.

REFERENCES

1. Chertov. A. G , A.A. Vorobiev. Collection of problems in physics. Toolkit. Tashkent. "Uzbekistan". 1997

2. Radionov V.E. Non-traditional pedagogical design / V.E. Radionov. - St. Petersburg: St. Petersburg State Technical University 1996. - 140 p.
3. Serikov G.N. Pedagogical learning systems: textbook. allowance / G.N. Serikov / Ed. ON THE. Tomina. - Chelyabinsk: ChPI, 1980.
4. Slastenin V.A. On modeling educational technologies / V.A. Slastenin // Science and school. - 2000. - No. 4. - P. 50-56.
5. E.S. Polat. New pedagogical and information technologies in the education system: Textbook. – M.: Publishing house. Center "Academy", 2000. – P. 22.
6. Ismanova O.T. It is practical in increasing the efficiency of designing activities of physics bachelors the importance of training. // Zahiruddin Muhammad Babur Andijan State University Scientific Bulletin. Series: Pedagogical studies. 73-78 p. ISSN 2091-5780. E-ISSN 2181-306x