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THE IMPORTANCE OF AN INTEGRATIVE APPROACH IN THE EDUCATION OF FUTURE PHYSICS TEACHERS

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Abstract:
This article provides methodological recommendations on the" importance of the integrative approach of future physics teachers" in pedagogical higher educational institutions. These recommendations serve to expand the knowledge of schoolchildren and students in physics and STEAM. The importance of an integrated approach in the study of physics is also expressed.

Keywords: Stem, integration, s – Science, M-mathematics, E-engineering, T-technology, competence.

Today in our country, special importance is attached to the implementation of the requirements of state educational standards to increase the opportunities of future teachers to receive modern education and apply the acquired knowledge in practice. An important role is played by the pedagogical competence of future teachers, the effective use of modern information technologies and the ability to conduct pedagogical research. In our country, based on advanced foreign experience, research work is being carried out to create the necessary conditions for the realization of internal opportunities, based on the requirements of the modern education system for training young teachers for the continuous education system. In the strategy of action for the further development of the Republic of Uzbekistan "Further improvement of the system of continuous education, increasing the opportunities for providing quality educational services, continuing the policy of training highly qualified personnel in accordance with the modern needs of the labor market", priority tasks of the type '[1] are identified.

Today, competition in all spheres of society is increasing, and future teachers are required to have professional competence. Along with this, each teacher must have professional competence and the ability to conduct scientific research in his field. To do this, first of all, it is important to develop future higher education teachers, along with professional knowledge, as well as research competencies [2].

STEM education has as its main purpose "teaching science", "teaching technology", "engineering", "learning art" and "teaching mathematics", while virtual physics laboratory work is STEM.

STEM education chain (Science + Technology + Engineering + Mathematics). Assessment of the level of students' thinking and its changes is carried out using diagnostic tasks and empirical observation of learning.

Cases that combine knowledge in STEM subjects can be called STEM cases. These tools are similar to the PISA problems that test scientific literacy, but their solutions are not engineering proposals.

Let us briefly describe the stages of solving a STEM case, identifying the dominant components of logical thinking in each of them:

1). S-Science: analysis of existing scientific knowledge and filling it to the level necessary to understand and comprehend all aspects of the problem under consideration, including through experimentation (metacognitive thinking);

2). M – mathematics: create a mathematical model of a problem that allows you to study its important aspects and abandon heavy (logical thinking); the complexity of the simulation should correspond to the level of the most prepared students, so that during teamwork, some students determine the learning strategy of others;

3). E – engineering: promotion of an engineering idea based on a mathematical model and evaluation of its implementation (creative and rational thinking);
4). T – Technology: find a technological solution to a given problem based on an engineering idea and evaluate its optimality (reflexive thinking).
The STEM education approach to science teaching shows that practical knowledge is linked to theoretical knowledge. If future physics teachers and students try out the theoretical knowledge acquired during the lesson in practice, then this situation will increase the imagination of future physics teachers and students. For future physics teachers and students to learn well, the brain and hand need to work together. As a result, the acquired knowledge is directed to use.

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