

PEDAGOGICAL METHODS OF FORMING THE PROFESSIONAL COMPETENCE OF FUTURE PHYSICS TEACHERS

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The use of modern information technologies supports the general integrative traditions of the process of knowledge of general professional disciplines, provides the possibility of individualizing the educational process, ensuring the effectiveness of the educational process for the development of professional competencies. One of the components of the information competencies of students in the electrical engineering field, in our opinion, is the ability to program. The following tasks can be solved through programming:

- creation of programming tools for educational purposes in the form of educational tools (problem-oriented, object-oriented, topic-oriented), learning objects, control tools, communication tools, information processing tools through the design activities of students;
- ensuring the integration of the capabilities of sensing, recording and measuring devices of several physical quantities, devices that provide input and output of analog and discrete signals, etc., when creating hardware and software based on the development of a linear synthetic module for the development of professional competence.

According to the analysis of the literature on the pedagogical conditions for the formation of professional competence of physics teachers, it can be seen that the problems of physics teaching methodology were studied by pedagogical scientists of our republic B. Mirzamedov, K. Nasriddinov, and the theoretical and methodological foundations of the use of innovative pedagogical and information and communication technologies by U. Sh. Begimkulov, M. Ochilov and others [6,7, 2, 8]. The model of a complex methodological system used in the formation of professional competence of physics teachers includes M. I. Makhmutov's binary system of scientific methods of cognitive activity, which develops cognitive independence to the level of research [5]. Involving students in independent cognitive activity in the formation of knowledge, skills and competencies based on the complex communication technology "task - dialogue - game" allows not only to improve the quality of scientific, philosophical-methodological and professional achievements, but also to change the educational methodology presented as a heuristic methodology, since dialogue is a specific means of implementing heuristic activity. A mandatory requirement for the purposeful and effective use of communication technologies is the mastery of scientific methods and techniques of independent cognitive activity by future physics teachers. This must be taught in advance. For this, in the methodology of teaching general physics, we use two approaches. In the first case, scientific methods in the educational process are considered as a means of teaching physics, and in the second case, as elements of the educational content. This allows for the conscious formation of complex physical concepts based on consciously formed scientific methods and techniques of cognitive activity, which allows for an increase in the level of independence of students and their scientific, philosophical-methodological and professional competence. The acquisition of independence of knowledge as a basic competence leads future teachers of physics to understand its importance. Its main feature is that it ensures the continuity of education and

self-education, increases the quality of professional training of teachers in higher educational institutions, contributes to the self-realization of the individual and the formation of his individual style of activity. In general, all types of independence of knowledge determine the content of the proposed model of a complex methodological system of teaching students in higher educational institutions of pedagogy and include three main stages:

- 1) development of students through internal, self-transformation;
- 2) motivational and purposeful education and professional activity;
- 3) education leads to development and forms critical and creative thinking of students.

The first stage. This corresponds to the executive and reproductive activities of future physics teachers. Such a learning process involves the conscious assimilation of educational material at the level of repetition and application of knowledge in practice. This type of training is distinguished by its time-saving, fundamental, systematic and scientific nature. However, training in which reproductive and executive activity predominates is carried out as a result of the internal development of the student, self-transformation, on which teaching has a very weak effect. At the same time, memory, not thinking, develops. At this stage, the necessary skills and qualifications are developed as a result of repeated repetition. Student independence is at its lowest level.

The second stage. This corresponds to the effective activity of future physics teachers. This is a motivated and purposeful educational and professional activity of students. This stage is based on the needs for cognition and the need for self-development, the formation of professional skills and competence. Independent activity of students is associated with the repetition, generalization, systematization of educational material and is carried out in the zone of proximal development.

The third stage. It is characterized by the full implementation of the laws and principles of developmental education, which corresponds to the expression of L.S. Vygotsky, which leads to the development and formation of critical and creative thinking of students [3]. The main types of cognitive activity of students are communication, planning, teaching, various forms of play. At this stage, partially search and research forms of education prevail, therefore, such elements as logical and intuitive anticipation; putting forward and checking hypotheses; using scientific methods and techniques of cognitive activity begin to play an important role. At the same time, the law of development of higher mental functions of students in an expanded form for higher educational institutions is fully operational. The pedagogical conditions for the formation of professional competence of physics teachers are provided within the framework of a complex pedagogical system of education through the use of complex communication technology “task - dialogue - game” which leads to the formation of effective professional skills and competence, the pursuit of continuous education and self-education. Professional skills and competence are personal characteristics of a graduate of a higher educational institution, on which success in life and work depends. For a competitive specialist, the main thing is not the amount of information received, but the ability to creatively find, master and use it” [1]. In order to form professional competence of physics teachers, the following questionnaires can be conducted to determine the level of creative search activity using the example of the formation of the concept of “Inertia”:

1. What is the measure of inertia of bodies?
2. Plan an experiment with an Oberbeck pendulum to check the measure of inertia in rotational motion.
3. Conduct a planned experiment to check the measure of inertia during the rotational motion of a rigid body.
4. Substantiate and write down the expression of the physical characteristic for the measure of inertia during the rotational motion of a rigid body (thereby showing the method of obtaining new knowledge).
5. Using the method of scientific analogy, derive Newton's law for the rotational motion of a rigid body.

These questionnaires provide an opportunity to assess the level of development of physical concepts of future physics teachers, their ability to analyze and plan their cognitive activities, assess the level of research activity, and their ability to independently find ways to obtain new knowledge. At the same time, physics teachers do not sufficiently understand the important foundations of such universal concepts as “energy” and “attributive properties of matter”, they encounter difficulties in distinguishing the differences and common aspects of the categories “matter”, “body”, “field”, and in substantiating the universality of the concept of “energy”, relying on the formulation of the law of conservation and transformation of energy, which serves to form the skills to practically perform logical proof of the eternity of matter, as well as the material world. All this indicates that the pedagogical conditions for the formation of professional competence of physics teachers should begin with teaching self-education, self-study, independent work on oneself, reflection, self-control and self-esteem. Therefore, it is important for physics teachers to create a comprehensive methodological system for teaching science, explain the content of science through real-life concepts, and be able to analyze and draw conclusions from research experiences, scientific methodological literature and documents on improving the education system based on a modern approach at all stages of education.

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