THEORETICAL FOUNDATIONS OF TRAINING STUDENTS FOR SCIENTIFIC RESEARCH ACTIVITIES

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Abstract*. In this article the organization of classes based on digital technologies in the higher education system, the problems of increasing the scientific potential of future specialists in education, the study of the organizational and methodological foundations of teaching natural sciences, including at the Department of Atomic Physics physics, through the capabilities of information technology (IT)), devoted to the description of scientific research aimed at the introduction of electronic educational resources for distance and self-paced learning, technologization of the educational process are described. Electronic textbooks on physical processes, remote open online courses are recommended, as well as optimal solutions for the use of educational tools in the training of future physicists.*

Keywords*: figital technologies, innovative methods, physical processes, education, electronic textbooks, distance open online courses, training, atom, information technology, module.*

It is known to everyone that the problem of preparing university students for professional activities is multifaceted. Given socio-economic and scientific-technical changes, there is a constant need for updating and new scientific views in approaches to solving it.

The person’s readiness for professional activity is understood as a personality characteristic based on the interaction of components necessary for him to perform basic professional tasks. This is a complex mental formation that is built in relation to features that perform certain functions in its formation. In the process of education, one should first of all consider the development of the future specialist’s commitment to his professional activity, the goal of the development process as the final result.

Any educational process is considered as a complex integrated system, that is, as an ordered set, as a set of interconnected elements of integrated education arranged in a certain order.

It is true that developing students' professional readiness through the teaching of atomic physics is a dynamic system.

Definitely, a system is an ordered collection of individual components, expressed in the properties of an integrated system. These include the order of connection of components (elements) in the structure of the system, the contribution of elements to the overall activity of the system, its structure, the state of the system, the level and sequence of states.

From a holistic, personal-activity approach (non-methodological), readiness for a certain type of activity is not clearly determined.

The personal approach to the study of professional readiness perceives it as a unit of important professional characteristics that differ in their role in the regulation of professional activity. In this case, the leading integrative role is played by personal qualities that express attention to the relevant activity.

Within the framework of the personal-activity approach, professional readiness is considered as a manifestation of the integrity of individual, personal and subjective characteristics

and qualities of a person, providing a person with the opportunity to effectively perform his functions.

While teaching atomic physics in higher educational institutions, the most important competencies of future physicists are psychological, methodological, informational, creative, communicative, personal, technological, and when constructing a methodological model for improving the preparation of students for professional activities, we based on the research of N.F. Talzina "...not a single known skill can be mastered or implemented without relying on knowledge. Consequently, a rational division of the qualification system means at the same time a rational distribution of the knowledge necessary for a specialist.

In a general sense, "model" (French modele - sample, prototype) means an image of a system. The term model, widely used in pedagogy, has many definitions. Here are some of them: 1) a mentally expressed or materially realized system that can replace the object being studied, showing or repeating it, and its study gives us new information about this object; 2) a system of elements that repeats some aspects, connections, functions of the object being studied.

There are different classifications of scientific models built on different foundations. However, V.A. Shtoff emphasizes that, despite the variety of models, they one way or another reflect reality [1].

The process of creating a model in the narrowest sense is called modeling. Modeling is one of the leading methods of modern scientific and pedagogical research. By pedagogical modeling, according to E. V. Yakovleva and N. O. Yakovleva, we understand the reflection of the features of the existing pedagogical system in a specially created educational system, which is object called the pedagogical model [1].

Vocational training is widely studied as a necessary human characteristic for various types of activities. G.A. Bokareva separately highlighted the following components of preparing future specialists for professional activities: procedural, ethical, motivational and goal-oriented, professionally oriented [2].

There was studied the preparation for professional activity (N.Yu. Bugakova); ICT training (A.P. Semenov, I.B. Koshleva); preparation for the use of interactive resources (N.F. Chekunova, S.S. Sorokin); willingness to apply acquired knowledge in practice (S. N. Mukhina); social and professional training (V. Grela), etc.

M.Yu. Bokarev defined interdisciplinary integration as a means of the professional educational process, determined the invariant foundations of the content of natural science and professional knowledge, their influence on professional development and formation [3].

The content component: 1) ensures that students acquire knowledge and develop skills in mental activity as a means of solving practical problems in their practical activities; 2) develops the ability to apply knowledge in education; 3) modeling of physical processes forms the creative abilities of the student.

Motivational-target component 1) improvement of motives and learning goals under the influence of acquiring physical knowledge; 2) development of goals and skills of practical activity under the influence of acquiring knowledge; 3) creative self-improvement, expansion of motives and goals, carrying out educational and mental activities.

Professional orientation 1) changing skills under the influence of knowledge acquired in physics; 2) the influence of mastering physical knowledge on the development of professional

thinking; 3) the use of physical knowledge and skills in solving creative problems of professional activity.

While considering each of the components, the readiness of future physiotherapists for professional activities can be considered as a complex structure reflecting personal qualities that ensure professional success and social adaptation, according to G.A. Bokareva [4].

Some aspects of the professional training of future specialists were further developed in the works of students and disciples of G.A. Bokareva [5]. For example, I.L. Kulikova conducted a study on the formation of a quality system of practical knowledge when teaching students; E.A. Mukhina formed the professional skills of her students; S.N. Mukhina studied the professional training of students as an element of future activity; T.A. Medvedeva emphasizes the need to develop the professional training of students to conduct competitive professional activities.

The scientific analysis of the above studies showed that students' readiness for professional activity is considered as an integral characteristic of the individual and as the goal of the educational process of atomic physics. It is known that integrity characterizes the development of a phenomenon at a high level, its perfection. A perfect person is a person who is highly formed in accordance with the requirements of society and successfully fulfills his duties in the world around him. It is understood as such a feature that determines the direction of a person's entire life and leaves an imprint on many other qualities, subordinates them to its nature, unites them and combines them into a single whole, in any whole there are always components.

Studying the state of scientific knowledge about readiness for training, profession and other types of human activity, we consider the target phenomenon of "readiness" of students (future physicists) as a model and study of their functional significance in cognition and consider it as a system of professional competencies of a specialist.

By summerising it should be suggested that professional readiness is projected as an integral dynamic characteristic of a future physicist, structured as a means of cognition of the material world with methodological, epistemological, explanatory, integrative, transformational and imitative functions of models.

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