

DEVELOPMENT OF BASICS OF LEARNING COMPETENCE OF FUTURE PHYSICS TEACHERS

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Abstract. *This article presents information about important pedagogical and didactic conditions that contribute to the professional development of future physics teachers, the composition of educational and cognitive competence and that the experiment is the basis of educational and cognitive competencies.*

Keywords: *future teacher, competence, experiment, professional competence, educational and cognitive competence.*

INTRODUCTION. Currently, in the classification of pedagogic sciences, the issue of competence of specialist personnel shows its relevance, great interest, importance and necessity for organizing the educational process and ensuring its effectiveness. Forming and ensuring the competence of a teacher who is active and dynamic, shows initiative, clearly understands his professional goals, has an innovative mindset and is ready to implement innovations in education, this issue is one of the most important elements of the education and training process. It is required to promote that. The social content of this concept is very broad, and it is used in almost all areas of production [1].

Competence as a scientific problem currently does not have a clear and unified definition, and interest in it has not been fully analyzed despite the significant history of its development.

RESEARCH MATERIALS. Competence as a concept appeared in the scientific discourse at the end of the 50s of the 20th century [2]. At first, his interpretation in domestic and foreign studies had a different essence. It should be noted that the appearance of the concept of "competence" in the scientific field, together with its definition in linguistics, becoming an economic and management term and becoming one of the important goals of the total pedagogical processes today, reflects the evolutionary development of the concept. makes

There are different definitions and approaches to the word competence. In particular, The word competence in the "National Encyclopedia of Uzbekistan" is as follows explained: competence (lat. *competo* – I am achieving, I am worthy, I deserve) - 1) a specific state body (local self-government body) or of an official as defined by law, charter or other document scope of powers, rights and duties; 2) knowledge in one or another field, experience [3].

"Competence" (incl. "competence" - "ability") is the effective use of theoretical knowledge in life activities, the ability to demonstrate high-level professional qualifications, skills and talent.

The concept of "competence" entered the field of education as a result of psychological scientific research. From a psychological point of view, competence is "how a specialist behaves in unconventional situations, unexpected situations, engages in communication, takes a new way in relations with opponents, performs ambiguous tasks, uses conflicting information, consistently develops and possessing a plan of action in complex processes.

Professional competence means acquisition of knowledge, skills and qualifications necessary for professional activity by a specialist and their practical application at a high level. Professional competence does not mean the acquisition of separate knowledge and skills by a specialist, but the acquisition of integrative knowledge and actions in each independent direction. Also, competence requires constant enrichment of professional knowledge, learning new information, understanding important social requirements, finding new information, processing it and being able to use it in one's work.

Professional competence is evident in the following cases: in complex processes; performing unclear tasks; using conflicting information; being able to have an action plan in an unexpected situation. A specialist with professional competence: consistently enriches his knowledge; learns new information; deeply understands the requirements of the era; seeks new knowledge; processes them and effectively uses them in his practical work [4].

In her research work, O. Sultanova approached the relationship between competence and competence as follows: competence consists of the sum of knowledge, skills, qualifications and personal characteristics, personal results; according to its systematic activity; is evaluated by academic subjects. This requires conducting the education system based on a competency-based approach [5].

J.Usarov emphasizes that the concept of competence is considered not only as a category of knowledge, but also as a category of personality. Accordingly: acquisition of necessary knowledge, skills and qualifications; personality characteristics that determine the ability to perform some activity; suggests that it should consist of components such as a set of professional characteristics and a person's acquisition of relevant competencies [6].

G.E.Karlibaeva touched on the concept of competence as follows: Competence is a new quality of professional training, competence means that a person's knowledge is quick and flexible, it is regularly updated. Competence consists of meaningful (knowledge) and professional (skills) components, and implies the ability to choose the most optimal solution, justify the choice, critical thinking [7].

In the research works of K.J.Riskulova, the following opinions were expressed about the concepts of competence and competence: "Competence" is the professional laws, principles, requirements, rules, duties, tasks and obligations, as well as personal deontological information necessary for the holder of this or that profession. means sum of edges. Competence is related to a person's practical activity, and it is the ability to demonstrate competence norms in work experience on the basis of creativity based on the requirements of society" [8].

In the educational manual "Basics of pedagogical competence and creativity" by N. Muslimov and others, professional competence is divided into the following types: social competence, personal competence, special competence, technological competence, extreme competence [9].

According to A.K.Markova, competence is "... a combination of mental qualities such as mental states that allow to act independently and responsibly, it means that a person has the ability and skills to perform certain labor functions." A.K. Markova believes that the competence of a particular person is narrower in relation to his professional skills, "A person may be a master of his profession in general, but may not be competent in solving all professional issues" [10].

According to N.A.Muslimov and K.Abdullaeva, competence is the level of ability to independently and creatively apply acquired theoretical knowledge, skills and competences to

practice, which is formed during the student's practice and activities after higher education. The concept of competence is defined as the ability to apply knowledge, skills, personal qualities and practical experience for successful activity in a certain field.

There is a difference between competence and skill, a skill is a characteristic that can be learned from the observation of action, competence - behavior, skills in a specific situation.

The main components of competence:

firstly, knowledge, not only information, but rapidly changing, dynamic, changing information that you need to find based on your own experience;

secondly, the ability to use this knowledge in a certain situation; understand how to acquire this knowledge;

thirdly, adequate (relevant) evaluation - themselves, their world, their place in the world, their unique knowledge, their necessity or uselessness for their activities, as well as the way to get them or use them. This formula can be logically expressed as follows: competence = mobility (movement) of knowledge + flexibility of method + critical thinking [11].

In accordance with the program of introducing a competently oriented approach to the educational process, the following basic competencies are distinguished:

- to achieve a goal and organize one's achievement, to explain one's goal;
- planning, analysis, reflection, self-assessment of educational activities;
- asking questions about the verified evidence, searching for the causes of events, showing understanding or misunderstandings in solving the studied problem;
- defining tasks aimed at knowledge and introducing hypotheses; selection of observation or experimental conditions; choosing the necessary tools and equipment, acquiring measurement skills, working with instructions;
- applying knowledge of analytical and statistical methods;
- describe the results, form conclusions;
- speaking orally and in writing about research results using computer tools and technologies (text and graphic editors, presentations);
- to have the experience of perceiving the image of the world. Thus, skills appear as competence in practice.

RESEARCH RESULTS. Helper in the professional formation of the future physics teacher the following can be noted as important pedagogical and didactic conditions:

1) material and technical conditions (educational buildings and auditoriums, educational laboratory rooms, physical tools and equipment);

2) information technologies (availability of television, computer, projector, copiers, interactive whiteboard and other technical means, etc.);

3) educational and methodological regulations (state educational standards and qualification requirements, model and working curricula, model and working curricula, textbooks and training manuals, methodological recommendations, etc.) ;

4) capacity of scientific and pedagogical staff (professor, associate professor, teacher, tutors and technical staff);

5) social and educational-technological environment (teachers, students, leaders and students, as well as the content, direction, unity of goals, etc.)

6) consistent, continuous and systematic implementation of organizational and educational-practical activities.

Educational competence is a set of competencies of students in the field of independent learning activities, including elements of logical, methodical, general educational activities that are interconnected with real well-known things. This includes methods for setting goals, planning, analyzing, reflecting, and organizing self-assessment. The student acquires the skills of a creative approach to the studied objects: learning directly from the surrounding objects and realities, learning and learning such as moving in non-standard situations they master the technique of cognitive problems related to. Within the scope of these competencies, functional literacy requirements such as the ability to distinguish facts from assumptions, the ability to perform measurement tasks, the ability to use probabilistic, statistical, and other methods of knowledge are identified in students [12].

The educational activity of future teachers is not only to master the results of knowledge, but also to live with the way of knowledge itself. To solve the problems of real knowledge, to implement the methods of creative inquiry activity, to get acquainted independently with the objective contradictions of scientific knowledge and ways to solve them, to be aware of scientific achievements, to make new inventions, to apply knowledge in practical and life situations. It consists of mastering the methods of application and others.

According to V.A. Slavenin, "cognitive activity is a unity of emotional perception, theoretical thinking and practical activity. Cognitive activity is present at every stage of human life, in all types of activity and social relations (production and socially useful work, artistic and aesthetic activity, communication) , as well as in the educational process, which is carried out by performing practical actions on various topics (conducting experiments, designing, solving research problems, etc.)" is reflected [13].

The cognitive activity of future physics teachers is developed with the help of such activities as studying physical phenomena and laws, conducting experiments, and solving physical problems. In our research, we set the task of developing students' academic competence with the help of experimental activities. Development of students' academic competence is a long-term process. Therefore, it is necessary to implement this process gradually, step by step, through activities that allow to achieve the intended goal and help to develop creative cognitive competencies in students.

The time factor plays a central role in the process of acquiring competence, because it determines how long it takes for one or another competence to be formed at a certain level. The student spends time on the proposed situational (real, life or educational) task and its further development, choosing ways and means or actions to achieve the goal. Here it is important to determine the number of situational problems and how much time will be spent on mastering and solving them, and ultimately on developing the student's competence.

Thus, the need to withstand strong competition in the labor market in the conditions of market relations encourages each specialist to develop professional competence and qualities specific to him. We should look at the educational experimental competences of the future physics teacher as a purposeful organizer of learning competence.

In the research works of M.S. Pavlova, the formation of the experimental competence of the future physics teacher was carried out on the basis of the following principles: 1) theoretical knowledge plays a leading role; 2) training is conducted in conditions close to real conditions; 3) education is conducted on the basis of the principle of general to specific [14].

Analysis of the content of physics teaching methodology showed that absolutely all components of scientific knowledge are related to experiments. We can also interpret physical experiments as one of the main methods of teaching, as a real object of learning and as a means of demonstration. Its importance is so great that the formation of future physics teachers' competence in learning physics is a necessary condition for preparing them for professional activity. Experimental competence means the competence of a physics teacher in the field of educational experiments. Competence, in turn, is a skill requirement for the content of training sessions. This represents the readiness and ability of the future teacher to establish a connection between knowledge and the situation, to formulate a procedure for solving the problem that has arisen.

DISCUSSION. The specific characteristics of learning-cognitive competencies based on physical experiments are shown in the following (Fig. 1):

1) competence in the field of providing the physics room with basic equipment: knowledge of devices and skills in using them; the ability to obtain information about devices and new developments, to carry out physical educational experiments using existing basic devices, to introduce new devices to the process of teaching physics, to create radically new experimental devices when replacing devices, to do it yourself at home using the capabilities of the devices;

2) competence of students in the field of physical educational experiment (frontal laboratory work, physical practicum work, experiments performed at home, experimental problems, computer-assisted experiments): knowledge of the methodology of the educational experiment, mastering the technique of its implementation, understanding the importance of the experiment, experiment design and implementation;

3) competence in the field of demonstration experiment: knowing the methodology of demonstration experiment, mastering the technique of its implementation, understanding the importance of demonstration experiment, mastering the technique of its implementation, revealing its connection with theoretical material; skills in designing experimental devices;

4) competence in managing the cognitive activity of students in the process of observing and researching physical phenomena: knowing the system of educational experiments in physics and realizing its importance for cognitive activity; depending on the didactic tasks, choosing the type and method of conducting the experiment, organizing cognitive activities (more independent), conducting physical experiments in the laboratory and at home, monitoring and evaluating;

5) competence in the field of technical safety rules: knowledge of the rules; follow these rules while performing experiments; to be able to rationally organize an educational experiment in physics during the educational process in order to protect the health of students and teachers (anticipate and prevent dangerous situations).

We describe the specific features of learning-cognitive competencies based on physical experiments in the form of the following scheme:

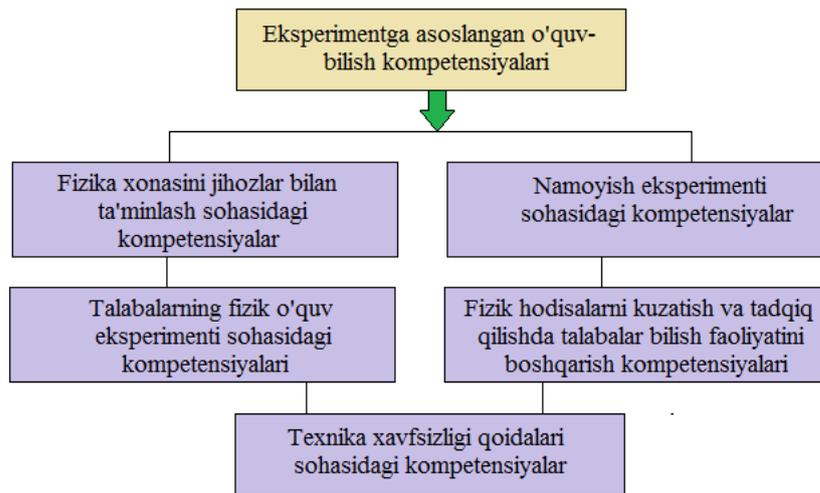


Figure 1. Learning competencies based on physical experiments its own characteristics

We can cite the following components that are part of the educational competence of future physics teachers:

- 1) setting a goal and finding ways to achieve it, being able to explain one's goal to others;
- 2) asking questions about observed facts, studying the causes of events, expressing understanding or not understanding the essence of the problem being studied;
- 3) setting cognitive tasks and putting forward hypotheses;
- 4) make oral and written presentations about the results of their research using computer tools and technologies;
- 5) continuing intellectual training and education;
- 6) conscious interest in knowledge and striving to realize it;
- 7) use of theoretical knowledge in practice;
- 8) rational organization of work, independent education;
- 9) knowledge of rational work methods, self-education;
- 10) applying knowledge to solve problems arising in non-standard situations;
- 11) familiarity and knowledge of physical devices, conducting experiments using them and analyzing the results;
- 12) development of creative abilities;
- 13) to achieve the level of competence in the field of knowledge.

CONCLUSION. The above-mentioned principles determine the main approaches that provide learning activities in the formation of the learning-cognitive competence of future physics teachers from the perspective of developing education, help students easily adapt to real conditions and understand the educational process.

The problem of developing the educational competence of future physics teachers is of particular importance in the system of training highly qualified, competitive specialists in the continuous education system. The development of methodological and pedagogical foundations of this problem, their theoretical and practical justification, as well as the introduction of modern educational methods based on the approach to improving the learning and knowledge competences of future physics teachers will allow the effective organization of the mentioned process.

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