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The Essence of Forming Professional Qualifications of Future Teachers of Physics and Astronomy

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A B S T R A C T
In modern society, university graduates, especially pedagogical ones, are required to have various abilities: creative, communicative, project-based, and the ability to self-learn throughout their lives. In our article we will present methods for improving the professional competence of future teachers in physics and astronomy at pedagogical universities.

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The relevance of the topic lies in the fact that professional competence is the main component of the formation of a teacher's personality. Therefore, we discussed methods for improving the professional competence of future teachers in physics and astronomy in this article.

Competence is the ability of a teacher to act in a situation of uncertainty - the higher the uncertainty, the greater the professional competence of the teacher.

By professional competence we mean the totality of professional and personal qualities necessary for a teacher to successful teaching activities.

Professionalism is the personal and professional qualities that a teacher uses in the process of educational activities. A competent teacher should ideally have perfect knowledge of his subjects and know the methods of teaching and educating future specialists [1].

The highest component of a teacher's personality is his professional competence.

The main components of professional competence are:

1. Social and legal competence - knowledge and skills in the field of interaction with people, and mastery of techniques of professional communication and behavior;
2. Personal competence is the ability of an individual for constant professional growth, advanced training, and the opportunity to realize oneself in professional work;
3. Special competence - preparedness to perform specific types of activities in education, the ability to solve professional problems and evaluate the result of one's work, the ability to acquire knowledge and skills in the specialty: "Physics and Astronomy";
4. Autocompetence - an idea of one's professional characteristics and mastery of technologies for overcoming professional pedagogical difficult situations;
5. Extreme competence - the ability of a teacher to act in unexpected situations, for example: natural disasters, etc. [2].

Competence is a personal characteristic that constitutes a personal quality and minimal experience in relation to teaching activities in a given field.

Competence is a consequence of personal training and is formed in the process of performing a pedagogical set of actions.

The competency-based approach involves the development of other key competencies: recognition of various problems; wording; translation of the problem into the form of a task; relationship with the context of the acquired knowledge system; analysis and evaluation of the result [Z].

The content of professional competence consists of a set of various components, blocks:

- Scientific - theoretical block (information) - the range of knowledge that is necessary for the implementation of this competence;
- The operational-activity block, which describes the subject's level of proficiency in algorithms, methods and experience in implementing the activity components of competence;
- Personal - psychological block, reflects the intellectual, motivational, emotional - volitional structures of the psyche of the subject of professional activity.

Pedagogical activities, first of all, should be aimed at creating conditions for the realization of students' creative abilities in order to develop their cognitive activity. The teacher must set himself the following tasks: creating conditions for improving the quality of students' knowledge; the use of traditional methods and techniques when teaching students - in physics and astronomy, as well as modern innovative technologies and methods.

A creative teacher is capable of experimental, demonstration activities, and is able to develop creative thinking and research skills in students. In school lessons, a future bachelor in physics and astronomy must develop in students the ability to think independently and creatively, independently apply knowledge, as well as motivation for the subject. To achieve these goals, you can use various technologies: games, problem-based learning, group learning, case method, etc. It is recommended to use ICT technologies to effectively train students in physics and astronomy. This allows students to work with information, develop communication skills and other competencies.

We studied various pedagogical literature and identified a group of professional competencies that, in our opinion, a future teacher of physics and astronomy should possess.

1. Cognitive competencies are a body of knowledge in the taught discipline, as well as pedagogy, psychology (related sciences: mathematics, chemistry, etc.); the level of competence of the teacher in matters of subject content, teaching and educational methods; knowledge of methods of scientific and pedagogical research;
2. Professional - technological competencies - include knowledge of physics and astronomy, the main types of planning, forecasting the educational process, modern teaching technologies, the ability to design various types of educational activities; mastery of modern innovative teaching methods and technologies [4].
3. Psychological competencies are the extent to which a teacher can build relationships with students, knowledge of developmental physiology, developmental psychology. A teacher who is able to identify the personal characteristics of the student, the orientation of the student, and also take into account the emotional state of the student during the lesson.
4. Communicative competencies are an organization of pedagogical interaction in which a community of teacher and students is created, the individuality of each of them is preserved, and the formation of psychological readiness for cooperation between them is created.
5. Professional - information competencies are the level of knowledge, skills and abilities that allow one to navigate in the information space.
6. Value and semantic competencies: (innovation, creativity) knowledge of the forms of creative pedagogical activity, the ability to apply innovative methods and technologies, measure their results,

participate in events to exchange experience.

7. Reflective pedagogical competencies show how much a teacher knows how to critically evaluate the process and result of his teaching activities [4].

The teaching profession is a managerial one. To manage students' personality development, one must be competent. The concept of professional competence of a teacher is understood as the ability of a specialist to successfully solve the problems of professional activity. One of the main conditions for ensuring the competitiveness of an educational institution is the level of professional competence of teachers, which determines the level of training of future specialists. The ability and willingness of teachers to work in new conditions is a factor influencing the successful implementation of tasks in education. The teacher must be able to combine professional basic knowledge and innovative thinking, and also apply a research approach to solving specific pedagogical problems. The formation of professional competencies will be successful if the teacher works on himself, knows the essence of the content and tasks of professional competence [5].

The professional competence of a teacher can be considered as a phenomenon consisting of many facts, which includes a system of theoretical knowledge of the teacher and the possibility of using it in specific pedagogical situations, indicators of his pedagogical culture (oratory, style of communication with students, attitude to his activities). It is in the learning process that the qualities of a future specialist - a competitive graduate - can be laid down and developed. When teaching students the basics of professional competence in the classroom, it is important to establish interpersonal contact with them and create appropriate motivation. In the process of organizing educational activities, a teacher may encounter a contradiction that arises between the requirement for a future specialist in physics and astronomy and the level of students' general preparation and their motivation for cognitive activity [5].

With the abundance of new knowledge on subjects that students receive in the Astronomy Course, students cannot independently select the information they need. The reason is the inability to apply existing knowledge in physics and astronomy in practice, a passive position, weak communication skills that interfere with communication with students in their group. This may reduce the professional competence of future teachers in physics and astronomy.

The main directions of improving the methods of professional competence of a teacher are: presentation, study pedagogical experience, which ensures continuous professional growth of teachers. This may be the use of modern pedagogical methods and teaching technologies, psychological and pedagogical aspects of the educational process, modern technologies - the organization of independent work of students during extracurricular time (for example, evening observations through a telescope), organizational and pedagogical support of the educational process.

Planning and organization of work to improve the professional competence of future teachers in physics and astronomy at pedagogical universities is carried out by the methodological department of the educational institution, as well as by teachers conducting classes with these students.

The task of the teacher in the field of improving methods of professional competence of future teachers of physics and astronomy is to adapt novice teachers to working conditions in secondary schools, support their innovative and research activities.

Professional competence of a teacher - as a complex characteristic of a particular teacher, makes it possible for future specialists to carry out pedagogical activities in comprehensive schools and vocational colleges with academic lyceums, with the implementation at a high level of labor functions defined in educational standards. Important for pedagogical activity, as a creative process, is an understanding of the diversity of pedagogical tasks and the possibility of solving them, an understanding of the level of one's pedagogical skills and its development, and the desire to improve [6].

There are many factors influencing the formation and development of key competencies among future specialists in physics and astronomy, for example, active methods of acquiring knowledge aimed at developing skills and abilities, applying them in their future professional activities.

In the traditional education system, students cannot choose activities, the process is one-sided, deprives

students of initiative, and thus the teacher may lose the ability to critically analyze their activities. Traditional teaching methods are: story, lecture, explanation, which implies the passivity of students - they only listen and watch. New requirements - students are tasked with increasing activity in class and using interactive and innovative teaching methods. Interactive learning is a way of learning, with the joint activity of students, all participants in the educational process interact with each other, information is exchanged, a situation is simulated, immersion in a real atmosphere of cooperation to solve a problem. With interactive learning, almost all students are involved in the educational process. These technologies are considered as an effective teaching method and are a promising approach to modern learning [7].

Innovation is a means and a process that involves introducing something new into the educational environment. Each teacher can create the conditions for the successful introduction of innovative technologies into the educational process.

The priority principles of the quality of education are the personality-oriented and developmental nature of educational training programs; problematic content of education.

Lecture classes, for example in the Astronomy Course, are a common form of training and a one-sided presentation of large amounts of information. The concept of an active educational lecture, when the teacher, during the presentation of the material, shares knowledge and activates the learning process in the following way: interrupts the lecture with questions on the topic, analysis of cases from life and practice, there are fragments of discussion, demonstration of computer slides and videos on the screen using a projector.

Conclusions: We can conclude that increasing professional competence and various methods in achieving it are of great importance in the development of a teacher's personality. In this article, we presented factors that may affect the decline in the professional competencies of future teachers in physics and astronomy. Methods that increase the pedagogical professional competence of future specialists are also fully disclosed.

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