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Research Article

PEDAGOGICAL AND PSYCHOLOGICAL FOUNDATIONS OF DEVELOPING SYSTEMATIC THINKING OF FUTURE BIOLOGY TEACHERS IN HIGHER EDUCATIONAL INSTITUTIONS

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ABSTRACT

In this article, the pedagogical and psychological foundations of the development of systematic thinking of future biology teachers in higher educational institutions are covered. the problems of applying thinking to practice, their solutions on pedagogical and psychological bases are covered in detail.

KEYWORDS

Systems thinking, thinking, education, approach, nature and society, teaching, reading, modern approach, pedagogy, psychology, system, planning.

INTRODUCTION

Issues of quality education in all institutions of higher education are becoming a priority. In particular, in the development of socio-economic relations in the world, it is becoming increasingly clear that human intelligence and spirituality are an important factor and tool for developing society. This, in turn, makes the problem of training pedagogical personnel related to the need to train socially active citizens, high-level specialists, individuals capable of cooperative

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activity in a competitive and innovative educational environment necessary for the establishment of a free civil society even more urgent.

Currently, it is considered important to modernize the educational process in our country, to continue the policy of training highly qualified personnel in line with the modern needs of the national labor market, to improve the quality and efficiency of higher education institutions based on the introduction of international standards of teaching and evaluation of the quality of education. specified. In the implementation of these tasks, among other things, meaningful descriptions of the training of future specialists, further development of students' creative thinking and increasing its capabilities, and improvement of the process of preparing future teachers of professional education for professional activities are considered one of the important tasks.

Reforming the pedagogical and psychological foundations of the development of the systematic thinking of future biology teachers in higher educational institutions is gaining priority at the level of the education policy of our state. To develop human capital in our republic based on the requirements of the labor market, to introduce digital technologies and modern methods into the educational process, to train highly qualified, creative and systematic thinkers, who are able to make independent decisions based on international standards, to demonstrate their intellectual abilities and to form them as spiritually mature individuals. creation of necessary conditions is defined as the main strategic tasks. Decree No. PF-5847 dated October 8, 2019 "On approval of the concept of development of the higher education system of the Republic of Uzbekistan until 2030", Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated October 31, 2019 "On approval of the concept of continuous spiritual education and measures for its implementation" Resolution No. 1059 of December.

The promotion of the pedagogical and psychological foundations of the development of the systematic thinking of future biology teachers in higher educational institutions is of great interest in scientific and pedagogical experiments.

Commenting on the pedagogical and psychological foundations of the development of the systematic thinking of future biology teachers in higher educational institutions, let us first pay attention to the concept of systematic thinking. In modern epistemology, systematic thinking is being researched as an adequate way of thinking in studying the complexity of existence. What is systems thinking? In a number of studies, it is described as: "the most advanced form of thinking". Systemic thinking requires seeing the contradictions between things and events not as negations of each other, but as elements that build a whole. Since the universe is a whole system, our worldview about it must be systematic. Then our knowledge about the world will be adequate.

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We can cite the following main approaches to the development of the systematic thinking of future biology teachers in higher educational institutions.

1. The integrity of the given subject, i.e., the general necessity and problematic situations of the subjects, the general application of knowledge, skills and qualifications.
2. Interrelationship of the whole and part of the given topic - the sequence of concepts in the topics, the cases of their relationship to each other, different aspects and concepts of practical application, creating the skills of distinguishing primary, secondary and tertiary concepts in the topic.
3. The priority of the whole in relation to the part of the given topic - the interrelationship of the terms and explanations of the emerging topic in the in-depth description of the topic, filling the place.
4. Hierarchy of the system structure in the topic - cooperation in the use of additional information related to the topic and closer to the topic..

Based on the above concepts, we will analyze the pedagogical and psychological foundations of the development of the systematic thinking of future biology teachers in the higher educational institutions in question as follows.

B. Adizov, R. Safarova's research work focuses on the formation of a new way of thinking in students, personal and professional socialization of students, development of independent, national, spiritual-ethical, creative thinking. Pedagogical and psychological foundations of the development of systematic thinking of future biology teachers in higher educational institutions include the following issues:

1. Formation of skills of a new approach to solving educational problems.

2. To have the ability to use modern educational technologies in the teaching of natural sciences.

3. Creates an opportunity to form a mechanism for rationally establishing relations between nature and society.

The following qualities should be given importance by the teacher in the presentation of topics by students during the lesson. Description requires compliance with certain rules. They are as follows.

The definition must be of equal volume, that is, the sum of the volumes of the defined concept and the defining concepts must be equal. If this rule is violated, the definition becomes either too broad or too narrow. For example, "Logic is a science that studies thinking" is too broad, "Logic is a science that studies the structure of proof" is too narrow a definition.

The description should be clear. For this, you should not use figurative expressions and words with unclear content.

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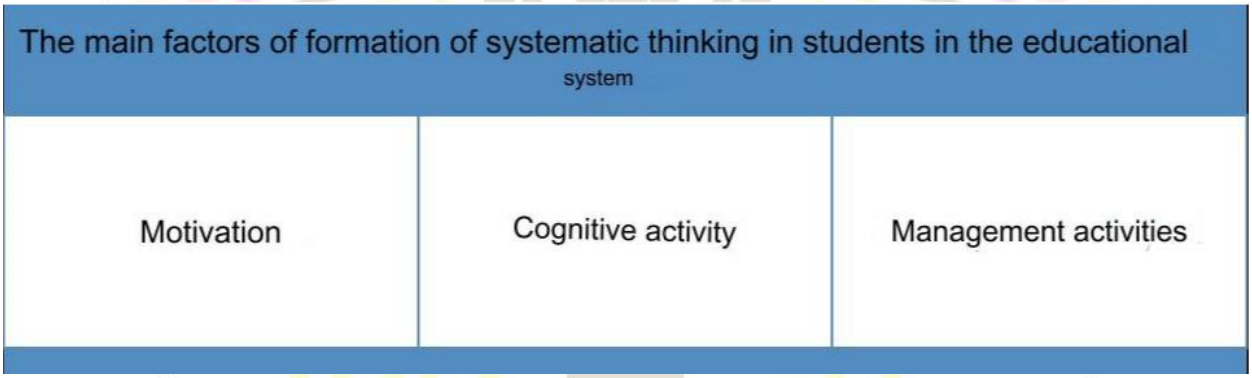
The definition should not be circular. When giving a definition, in order to determine the content of the defining concept, reference is made to the defined concept itself, a circle is formed in the definition. For example, when it is said that "Logic is the science of correct thinking", a circle appears in the definition. Because, to the question "What is correct thinking?", it is necessary to answer "It is thinking in accordance with the laws of logic", that is, the concept of "logic" is referred to.

The definition should be as non-negative as possible. Otherwise, instead of the character specific to the object, the character that is not there is displayed. For example, the definition "Consciousness is not material" cannot fully reveal the meaning of the concept of "consciousness".

The concept of systematic thinking is being researched as an adequate way of thinking in studying the complexity of existence among students. Systemic thinking requires seeing the contradictions between things and events not as negations of each other, but as elements that build a whole. As for the issues of developing the systematic thinking of future biology teachers in higher educational institutions, ensuring the following qualities in students during the teaching process is the main factor.



The motivating factor for the development of the systematic thinking of future biology teachers in higher educational institutions is the emergence of interest in learning and solving in students, and the formation of the skills to feel as the main leader of the society, in particular, the educational system.

The level of the factor of cognitive activity in the development of the systematic thinking of future biology teachers in higher educational institutions means the extent to which the potential of professional competence has been formed and its competitiveness.

The management factor of the development of the systematic thinking of future biology teachers in higher educational institutions is the concept of self-assessment, control and the ability to make a rational choice in students.

Pedagogical process of developing the systematic thinking of future biology teachers in higher

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educational institutions usually consists of students' desire for new knowledge, the ability to correctly assess the problem and eliminate it in time, and the psychological process involves the development of society and nature. It forms the concept of mental connection between people, that is, that people are a part of nature, and rational use of nature.

In the course of higher education, future biology teachers will be provided with general interdisciplinary communication, along with the effective development of students' acquired knowledge, as well as their ability to perceive, activities, interests, and the ability to analyze systematic thinking will be achieved. In the educational process, the relationship between nature and society should be understood as a didactic opportunity that ensures the proportionality of educational programs, textbooks on various educational subjects. Including

If we pay attention to the following concepts in creating the concepts of systematic thinking in students within the scope of science and in the formation of interdisciplinary connections during the lesson, we would explain the pedagogical and psychological foundations of developing the systematic thinking of future biology teachers.

• Within the framework of topics of natural sciences, it is assumed to be used in the course of classes, extracurricular activities, classes outside the auditorium, which are forms of teaching according to the interdependence of connection and sequence.

• A unique feature of organizing the lesson based on integration is that the lessons give the teacher the opportunity to control the content of the lesson, to form the feeling that the world is a whole to the students.

• Forms the ability to constantly monitor the extent to which the students learn the knowledge given by the teachers.

• Creates an opportunity to create integrated lessons taking into account the psychological characteristics of students.

In conclusion, we should say that these characteristics of a systematic thinking person are formed only thanks to the democratic communication style. In this case, the teacher takes into account the individual characteristics of a person, his experience, the specifics of his needs and capabilities, and he must be objective in his assessment, versatile and proactive in his communication with students. After all, passion for creative research is not only a result of communicative activity, but also a result of attitude towards pedagogical activity in general. According to many teachers, the most important condition for the organization of artistic and creative activities of higher education students in the organization of natural sciences is not only the development of interest, a taste for non-standard solutions, the ability to think trivially, but also a new and to develop a willingness to perceive unusual things, to create a creative environment created by the desire to use and

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implement them. Systematic thinking serves as an effective tool in solving complex problems and finding the right solution in the teaching of biological sciences. The emergence of such thinking in future biology teachers and the recognition that every problem has a systemic nature in thinking, and solving it requires solving not only one, but many problems. Solving systemic problems also depends on systemic thinking. After all, the origin of many problems and crises in modern education and training is related to the lameness of systematic thinking.

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