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DISTINCTIVE CHARACTERISTICS OF COMPETENCY-BASED TEACHING OF NATURAL SCIENCES

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Abstract
In the era of rapidly developing advanced technologies, the development of the social sphere in order to meet the demand of today's world for qualified and highly experienced personnel is becoming a global problem. The article considers improving the teaching of natural sciences based on a competency-based approach, global problems facing the field of education, the connection of natural sciences with practice, the development of theoretical and fundamental knowledge, and the improvement of acquired knowledge and skills.

Keywords: Education sector, natural sciences, artificial intelligence, competencies, key competencies, subject-specific competencies, communicative competence, formation of skills, approach, educational process.

Introduction

One of the main tasks of modernizing general education is to develop students' competence of independent learning within the system of continuous education, expand their scientific worldview, and train qualified specialists in accordance with labor market and customer requirements. The result of teaching in general education is the formation of qualification requirements предусмотред in the state educational standard of graduates, general cultural and professional competencies.

The basis of this idea is the development of logical thinking in students in analyzing problems, finding solutions, and engaging in creative activity as a result of abstract thinking. Activities related to selecting, grouping, and classifying natural objects, deductive reasoning, and mixed and probabilistic thinking contribute to this development.

At a time when environmental protection problems are gaining universal significance and the negative consequences of human impact on the natural environment are being reconsidered, it has become clear that the problem of forming ecological culture among all segments of the population and improving biological knowledge is directly related to changes in human consciousness. Therefore, teaching biology in general education based on a competency-based approach and forming biological knowledge and concepts in

students is of great importance. Today, due to the rapid development of science and technology and the disruption of the natural balance between humans and nature, significant damage is being caused to the environment. Treating nature with a forward-looking perspective and preserving it in its beauty and natural state for future generations is an important task of today.

The more ruthlessly humans treat nature, the more nature responds in the same way. The level of ecological culture formed in the consciousness of each individual determines the level of development of society. Therefore, developing effective forms and methods of forming ecological culture in students and shaping the ecological culture of general education school students—future specialists in various sectors of the national economy—is an extremely urgent problem.

Also, in teaching biology in general education based on a competency-based approach, extracurricular activities are of great importance. Extracurricular activities mainly provide opportunities to expand, deepen, and concretize theoretical knowledge acquired in the educational process, to stimulate interest in studying nature, and to develop students' independence.

It should be noted that it allows determining the level of mastery of knowledge, abilities, and acquired competencies in each subject. It also предусматривает ensuring the possibility of checking the mastery of certain competencies and their components.

Thus, competence is a personal characteristic of an individual, readiness to perform various tasks, which is formed during activity, and the value attached to this activity enriches its essence. In the educational process, the following types of competencies are distinguished: key and subject-specific general competencies, communicative competence, information handling competence, self-development competence, social and civic competence, national and general cultural competence, general cultural, general professional, and professional-practical competencies.

Analysis and Results

Key and subject-specific general competence—based on the continuity and coherence of education in the Republic of Uzbekistan, the priority of the learner's personality and interests, competencies are formed in accordance with their age characteristics.

Communicative competence—implies the ability to engage in communication in the native language and in a foreign language in social situations, to observe communication culture, social adaptability, and the ability to work effectively in a team.

Information handling competence—implies the ability to search for necessary information from media sources, select, process, store, and use it effectively, ensure its security, and possess media culture.

Self-development competence—implies continuous self-development physically, spiritually, mentally, intellectually, and creatively, striving for self-improvement, independent learning throughout life, regular enhancement of cognitive skills and life

experience, and acquiring the ability to make independent decisions in managing one's behavior.

National and general cultural competence—implies forming loyalty to the homeland, kindness toward people, adherence to universal and national values, understanding works of art, dressing neatly, and following cultural norms and a healthy lifestyle.

General cultural competence—the ability to successfully perform tasks common to many types of professional activity. The level of its formation is determined by the results of mastering the entire educational program.

General professional competence—implies readiness to carry out psychological-pedagogical activities in the educational process, to perform professional activities in accordance with regulatory legal documents in the field of education, and knowledge of professional ethics and speech culture.

Professional-practical competence—the ability to successfully perform tasks and solve problems in a specific professional activity. It also includes the ability to educate and morally develop learners during lessons and extracurricular activities, the ability to design curricula, and to manage students' research activities.

Also, competence reflects a dynamic unity of knowledge, understanding, skills, and abilities. The development of competencies is the main goal of educational programs. Competencies are formed in different course units and assessed at different stages.

According to researchers D.S. Deryabo, V.A. Yasvin, and L.M. Makarova, who approached this issue from a scientific perspective, an important characteristic of ecological consciousness and ecological culture is the subjective perception of natural, that is, biological objects. "The formation of subjective attitudes toward nature in adolescents is associated with certain difficulties, and some authors believe that under current conditions it is practically impossible to form it within a limited time. Therefore, strategic work in this area should begin from a young age, because in the minds of young people, unlike adults, anthropocentric and technocratic attitudes toward nature have not yet been formed."

Based on the above approaches, it should be noted that organizing education in accordance with the principle of conformity to nature and taking into account students' age and individual characteristics in the process of human natural development is one of the important issues. Also, studying students' attention, memory, individual typological characteristics, and the specifics of their thinking process comprehensively, and organizing education based on biological knowledge in accordance with the principle of unity and integrity of the natural and social environment, is a globally relevant issue.

As a result of research conducted worldwide on the development of students' biological knowledge, skills, and abilities, a number of aspects have been clarified, including the fundamental aspects of increasing students' logical and creative thinking levels (AICHI University of Education, Japan), as well as the development of educational resources, creation of innovative technologies, manipulation of realities affecting consciousness, development of students' creative thinking potential (Princeton University, USA),

development based on STEAM education technologies (National University of Singapore, Singapore), development of an autodidactic system for improving reading competencies (Belfield Pedagogical University, Germany), development of structures for practical research within international assessment programs such as PISA and PIRLS (National Advice on Pedagogical Technology, England), and the inclusion of knowledge related to applying knowledge and skills and analyzing problems in school curricula.

Research is being conducted in the following priority areas for improving the technology of teaching natural sciences in general education based on a competency-based approach: increasing teachers' methodological preparedness based on international assessment programs, and improving mechanisms for the continuous development of students' creative potential based on the integration of theory and practice within the framework of competency-based approaches.

The analysis shows that successful participation in international assessment programs such as PISA and PIRLS requires two main objectives: first, the preparation of materials used by teachers, which requires the creation of new educational materials; second, targeted training of teachers and changes in the priority principles of teaching methodology in the educational process to improve results in international studies. For this purpose, it is necessary to train teachers, implement a more active system of developmental education, and provide them with materials that can be used more effectively in the educational process.

Teaching natural sciences in general education based on a competency-based approach is expressed through students' application of acquired knowledge in various real-life situations. In this process, existing curricula, teaching methods, and approaches are strengthened to ensure better performance of students in our country. These projects serve to develop students' creative and critical thinking skills and their ability to apply acquired knowledge in life.

Also, teaching natural knowledge, that is, biological knowledge, in general education based on a competency-based approach is of great importance. In developing intellectual abilities, a foundation is created for the formation of an individual's interests and inclinations. Educating young students who can think independently is one of the urgent issues of today.

In the educational process, teaching natural sciences based on a competency-based approach in interdisciplinary connection, especially developing natural sciences in an integrated content, is important. In this, the knowledge, concepts, skills, abilities, and competencies provided to students acquire a generalized content. Implementing interdisciplinary connections in the educational process plays an important role in forming interconnected knowledge and skills in students.

Thus, improving students' biological competence in the context of interdisciplinary integration, ensuring interdisciplinary connections in the educational process, studying the

content of lesson topics, and mastering the important rules within them make it possible to activate the following processes:

to attract students' attention to the main aspects of academic subjects that are of primary importance in revealing the key ideas of the discipline;

to continuously complicate perception, expand the scope of students' creative initiative and independence in learning activities, effectively organize the development of biological competence in the context of interdisciplinary integration, and gradually implement organizational activities aimed at developing biological competence in the educational process through the use of various types of didactic tools;

to achieve the integrated mastery of academic subjects through various didactic tools;

to establish creative cooperation between teachers and students [7].

At present, the development of natural sciences in modern schools in the context of interdisciplinary integration is considered a factor that helps solve pedagogical problems, improve school activities, enhance teachers' potential, and identify optimal ways of influencing them.

Also, teaching natural sciences in the educational process based on a competency-based approach within the framework of interdisciplinary integration creates opportunities for implementing large-scale measures aimed at educating a harmoniously developed generation capable of taking responsibility for the future of our country.

The organizational and methodological aspect of teaching natural knowledge in general education based on a competency-based approach consists of designing a curriculum that connects ideas from various fields. Such teaching encourages students to think deeply. The cognitive aspect of competency-based teaching means that it is aimed at increasing students' thinking abilities. This helps them solve problems, analyze information, and understand complex concepts.

In studying and researching the problem of teaching natural sciences in general education based on a competency-based approach, it has been found that the basis of the interdisciplinary integration of science and scientific knowledge lies in the unity of the material world, that is, the interconnection of nature, society, and its cognition, as well as the development of interrelations between sciences and the increasing importance of information tools. As a result, the achievements in the educational process are also reflected in the fields of nature, society, and technology—the material world.

Accordingly, improving biological competence among students in an interdisciplinary context involves attention to environmental protection, preservation of nature and humans, rational use of natural resources, and issues of cleanliness. These issues require the organization of practical training according to the curriculum.

Currently, due to significant changes in science and production, new demands are being placed on school education. The problem of teaching biology based on a competency-based approach is becoming increasingly relevant both theoretically and practically from the perspective of modern social demands.

Conclusion

In this process, the education system is aimed at establishing a high level of scientific foundations, developing thinking, understanding and perceiving the world holistically, correctly interpreting events occurring in the surrounding environment, and educating young people who can comprehend their essence.

The pedagogical conditions for developing natural competence in students in an interdisciplinary context are considered important for purposefully designing students' competence (goal orientation), implementing the process, and ensuring the effective step-by-step development of future specialists in modern socio-ecological conditions.

The cognitive, motivational-reflexive, and behavioral characteristics of teaching natural sciences in general education based on a competency-based approach are developed step by step by forming internal motivation and self-development. Pedagogical conditions for developing biological competence help improve the independence and effectiveness of learning activities, as well as the level of knowledge and skills.

Based on the above, in developing natural sciences among school students based on a competency-based approach, mnemonic activity methods, vitagenic and reflexive technologies, and methods of working with mental maps and their emotional impact are considered effective. These include:

understanding and memorizing information systems, classifying and describing information, discussing personal views structured in the form of dialogue, understanding the axiological content of the information world, directing value systems toward social and professional tasks, forming an emotional attitude toward information, and using students' life experience, the Internet, and additional sources [8].

A competency-based approach in the educational process effectively influences students' understanding and implementation of social and professional tasks. Developing natural sciences based on a competency-based approach begins with considering students' thinking and activity. Thinking mainly manifests as intellectual consciousness or the ability to think.

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