Use Of Interactive Educational Technologies in Teaching Subjects of Molecular Biology Department

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ABSTRACT

This article describes how to use interactive educational technologies in teaching the topic of proteins, carbohydrates, lipids and nucleic acids at the Department of Molecular Biology.

Keywords: learning effectiveness, interactive educational technologies, brainstorming, Cluster, charkhpalak, SWOT analysis protein, carbohydrate, lipid, nucleic acids

The reforms implemented in the world education system are carrying out systematic work to modernize the quality of education, therefore, in today's digital educational environment, interactive educational technologies for training competitive personnel are widely applied to the educational process. UNESCO's Incheon Declaration for 2030 states that "Education is an important driving factor of development and a guiding force for the goals of sustainable development" and systematic scientific research is being carried out to raise the quality of education to a new level, improve innovative activities, and change people's lives.

In world educational and research institutions, students who can think logically and creatively about the content of academic subjects, who have the ability to effectively apply the acquired knowledge, skills and competences in their future social, personal and professional activities, who have perfected the fundamentals of science Scientific researches are being carried out on the training of specialists, as well as on the modernization of the content of education based on the competence approach. In addition to improving the quality of education on the basis of reforms in the economic and social sphere, revising and analyzing the content of DTS and qualification requirements and sample science programs, the stages of professional competence formation of future teachers, their criteria, the content of education scientific research is being conducted to improve it by combining it with the latest achievements of science.

In the education system of our country, in recent years, in the educational process based on the competency approach, the use of information and communication technologies, independent education of future teachers, and the continuous improvement of knowledge are being strengthened. Effective use of interactive educational technologies that ensure the formation of professional competence of students based on the modernization of the educational process, application of innovative methods of developing the level of natural-scientific literacy to one's pedagogical practice,

cognitive, communicative skills of future teachers and development of personal activity, as well as creation of necessary didactic and methodical support for teachers' pedagogical activity, introduction of new teaching methods into the educational process, effective use of educational resources in pedagogical practice. As a result of the implementation of these tasks in the educational practice, the possibilities of determining the stages and criteria of formation of professional (methodical) competences of students in the teaching of molecular biology, like all other subjects, and improving the didactic and methodical support for the systematic application of educational tasks from molecular biology to the teaching process will expand.Also, the main goal of the reforms carried out on the basis of the new version of the Law "On Education" adopted in our country is to educate such spiritually mature, well-rounded, deeply and solidly educated young people as society demands, as well as education. A unique new approach in the process of radically reforming the education system and improving its quality, activating students' cognitive activity is considered one of the urgent tasks assigned to the pedagogue today.

An important part of the study of molecular biology is that heredity, self-creation, protein biosynthesis, motility, growth and development, information storage and transmission, energy exchange, movement, etc. are the basis of life processes. based on the activity of proteins and nucleic acids from biopolymers.

Molecular biology differs from other fields in that it studies the biological function of macromolecules based on their structure and spatial configuration. Therefore, the manifestation of a biological function is based on the dependence of molecules on physical-chemical changes. Although life processes are superior to physico-chemical laws, the main methodology of molecular biology in the study of biological phenomena is based on physico-chemical ideas.

Nowadays, molecular biology is one of the rapidly developing fields, and the cell nucleus, mitochondrion, ribosome, chromosome, and cell membrane, which are part of the simplest and most complex organisms, are studied separately and their activity is studied from an atomic and molecular point of view. Also, nucleic acids and proteins that determine the life processes of viruses and bacteriophages, which are cell-free forms of life, are being comprehensively studied at the molecular level. Genetics, biochemistry, physiology and other biological processes form the foundation of molecular biology.Currently, on the basis of the achievements of the science of molecular biology, medicinal substances, a new generation of vaccines, and effective diagnostic methods are being developed for mankind. Molecular biology is also entering the fields of social and humanitarian sciences: history, ethnography, archeology and criminology.

While molecular biology is an interesting science, it should be considered as one of the most complex branches of theoretical biology. The reason for this is that only the power of biology is not enough to understand the mechanisms of implementation of laws at the molecular level in the organism. From this point of view, in the minds of future biology teachers, they should fully understand the content of molecular biology science, in the process of forming objective knowledge, skills and competences, based on the integration of chemistry and physics and other sciences, carbohydrates, classification, structure, monosaccharides, aldoses, their isomerism, configuration, genetic sequence, closed-chain forms of mono-di-oligo-polysaccharides, tautomerism, properties, structure determination, amino acid classification, synthesis, physical and chemical properties, structure determination, protein, protein composition, structural structure , protein biosynthesis, its mechanisms, nucleic acids, chemical composition of nucleic acids, structure of nucleic acids and determination of nucleotide sequence, replication, DNA repair and transcription, reverse transcription, etc.

The future teacher of biology in the process of forming his professional competence and the knowledge, skills, and abilities acquired

from the science of molecular biology in the process of thorough mastering of the basics of biology by students studying in general education schools is effective from interactive educational technologies. It is considered appropriate to apply general methodical, private and local level pedagogical technologies in practice in a coordinated manner. This means that the future teacher of biology, during his future pedagogical activity, will not only master the content of related sciences such as molecular biology, chemistry, physics, but also master the content of biology teaching methodology at a high scientific methodological level. and forming the competence to directly apply them to the process of pedagogical practice, as a result of provard, is considered one of the primary factors in activating students' cognitive activity and improving the quality of education.In the process of methodical preparation of future biology teachers to work in general education schools, in order to activate the cognitive activity of students, the lesson should be used to determine the knowledge, skills and competences acquired by students on the previous topic, systematize them, introduce new control and assessment of acquired knowledge, skills and competencies on the topic, as well as in the process of learning a new topic, interactive educational technologies gain practical importance.

The types of interactive actions can include "student + teacher" and "student + student" or "student + student" targeted actions. In interactive teaching, the teacher is an active organizer of the educational activity, and the student or students appear as the subject of this activity.

Interactive teaching is a special organizational form of developing the cognitive activity of learners, and in this process, the learner turns from the object of learning into the subject of mutual cooperation, and is characterized by his active participation in the learning process. Interactive teaching methods are evident in the modeling of life situations, the use of role-playing games, and collaborative problem solving. Interactive teaching not only forms activity, creativity, independence from students or pupils in the process of assimilation of information, but also helps the full realization of educational goals.

With "Case study", "Brainstorming", "Chain of terms", "SWOT analysis", Assessment, "Venn diagram", Cluster, "Charkhpalak" and other interactive educational technologies during the teaching of molecular biology In addition, the use of "PISA" international context assignments is of great practical importance. Therefore, below we will focus on the methodology of applying some interactive educational technologies to the teaching process of molecular biology.

In the process of teaching molecular biology, the use of the Cluster method is important in order to systematize and ensure the stability of the acquired knowledge of future biology teachers. The cluster method creates a basis for systematic thinking of students or students. The main idea or concept is based on the cluster method.

The cluster method can be used not only in the process of learning a new subject, but also in evaluating the acquired knowledge of students or students by applying it to unexpected new situations. Based on the theoretical knowledge obtained from the textbook during the lesson, the teacher should complete the "Cluster" given below.

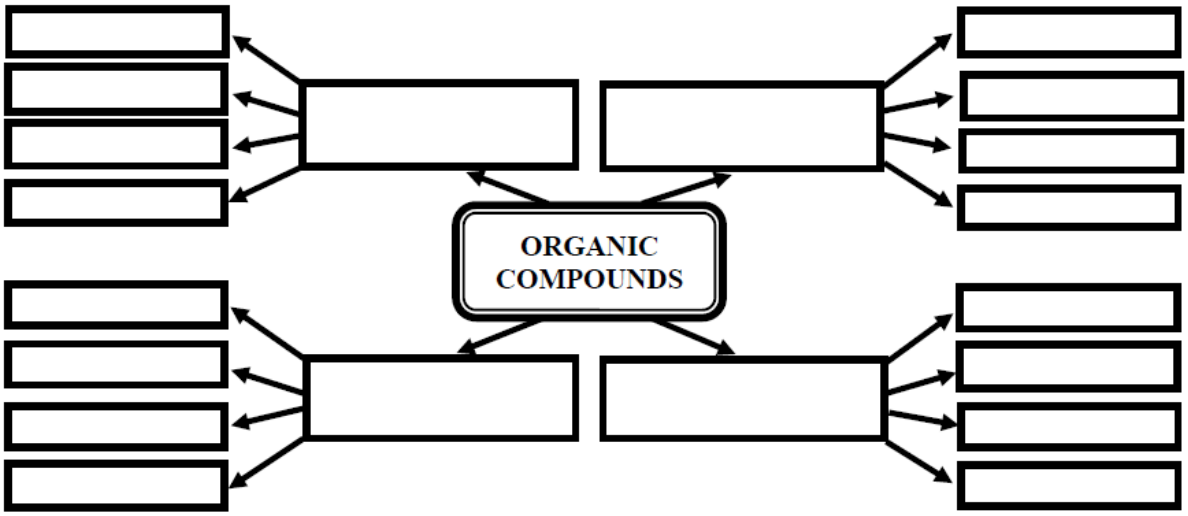
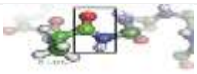
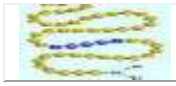


Figure 1. Cluster overview

The use of the "Brainstorming" method in the process of teaching molecular biology is highly effective. This method is a method of forming a unanimous solution by summing up the opinions given by the student group regarding the studied problem. There are two ways of implementing this method. The first of them is the oral form in which students answer questions prepared by the teacher. The second form is the written form. In this process, students will give their answers in writing. If future teachers can design the correct and proper use of this method in the process of teaching science, it will create the opportunity for students to express their free opinions about the problem.

In the process of teaching the topic of nucleic acids, it is suggested to ask students or students with the following brainstorming questions. Tell me, do you think it's a gene or a protein? As a result of using such brainstorming questions in the educational process, it prepares the ground for a meaningful understanding of the mechanisms of molecular processes in a living organism. It is considered appropriate for the future teachers of biology to prepare a chain of problematic questions in advance in order to implement the method of brainstorming from the topics included in the content of molecular biology. This is the basis for them to understand complex topics quickly and easily.

In the teaching of molecular biology topics, it is useful to use the "Charkhipalak" technology at the reflection stage of the lesson. This technology serves to strengthen, analyze, synthesize, repeat, evaluate and independent creative work skills of future teachers on a specific subject. It is appropriate to use this technology in the repetition of homework, assessment and control work in accordance with the subject. In this process, pupils or students are divided into small groups and handouts prepared on a specific topic are presented to them, and the assignment of special symbols (+, -, X, Y) to the boxes in the presented task is explained. Each member of the group individually selects their answers to the indicated boxes, and the teacher changes the answer sheets of the groups in clockwise order at the next stage. This process is repeated until each group returns to its original work. After the handouts reach their owners, the teacher reads out the correct answers. Participants check the correct answers and rate each correct answer with a score of 1. At the end of the training, the teacher reads out the correct answers and each participant evaluates himself based on the correct answers collected. The trainer clarifies the grades and summarizes and concludes the necessary aspects of the training. It is advisable to use this technology in the following way.

№	The name of organic compounds	The structure of proteins			
		Primary	Secondary	Tertiary	Quaternary
1.			+		
2.				+	
3.					+
4.		+			
5.				+	
6.			+		
7.					+
8.					+
9.		+			
10.				+	

By using the Carxpalak method in this order, students will be able to understand the fundamental essence of biological processes, laws, and theories at the molecular level.

In short, effective use of the above-mentioned interactive educational technologies in the process of organizing molecular biology classes is considered appropriate. Therefore, every future biology teacher should have developed the competencies to use interactive educational technologies in his future pedagogical activities..

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