PEDAGOGICAL CONDITIONS OF IMPROVING THE METHODOLOGY OF TEACHING SUBJECTS OF MOLECULAR BIOLOGY

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Abstract. *The article is devoted to identifying the features of a teacher's professional activity in the context of the digital transformation of education. The problem of the need for changes in the teacher's implementation of traditional pedagogical activities in the training and education of schoolchildren has been updated. The goal is to specify and substantiate the updated set of professional functions of a teacher, formed under the influence and in the conditions of digitalization of education. As a result of the theoretical analysis, new functional features of the teacher's professional activity were identified, which consist in the need to master pedagogical technologies. There is a need to restructure curricula and academic disciplines so that students master the skills of incorporating digital technologies into the educational process for pedagogical purposes. A special place in the preparation of a future teacher should be given to the methodology of teaching school discipline based on digitalization. The author proposes the composition of new "digital" competencies of a teacher, based on the concept of human individuality.*

Keywords: *molecular biology, digital technology, protein, interactive board, digital transformation, case, multimedia.*

We all know the great scientists whose great inventions in the history of natural sciences raised their field to several levels. In particular, the mechanical laws discovered by I. Newton, the periodic system of chemical elements by D. I. Mendeleev, the binary nomenclature in the field of biology by K. Linnaeus caused revolutionary changes in these scientific fields. Such revolutionary changes took place in biology in the middle of the 20th century, and began with the study of life processes on an atomic-molecular basis. Traditional - classical biology identified the components and functions of complex, whole organisms and revealed the cell structure. It is known that the cell is actually composed of atoms and molecules. Most biological processes occur on the basis of a whole organism or cell. It is not always correct to analyze such biological phenomena on the basis of atoms or molecules. In the last 20-30 years, research on the structure and functions of proteins and nucleic acids from biopolymers has led to the fact that their functions in the body are performed on the basis of individual macromolecules, so it was recommended to consider them as a molecular process [1].

The development of the science of molecular biology in the Republic of Uzbekistan dates back to the 80s of the last century. During these periods, various researches began to be carried out in the institutes of chemistry and biology of the Academy of Sciences. The services of academicians Torakulov and Tashmukhamedov, who are the leaders in this field, are specially mentioned. Torakulov is the author of the textbook "Molecular Biology" for schools, lyceums and colleges that study biology and chemistry in depth. The scientific research of the scientist is devoted to the research of cyclic nucleotides, the molecular mechanisms of iodine deficiency in the body and the appearance of goiter, and the causes and molecular bases of glucose not passing

into cells in diabetes. Research led by Academician Tashmukhamedov is dedicated to determining the active transport of substances, ions, hormonal regulation of membrane functions, and the mechanism of action of membrane-active compounds [1].

By the 21st century, molecular biology has been actively involved in unprecedented innovations, in particular, in relieving people of heat diseases, solving food problems through transgenic and cloning methods. We can say with confidence that by today the science of molecular biology has become a vital field for humanity. Genetics, biochemistry, physiology and other biological processes form the foundation of molecular biology. The question of organic connection in natural sciences places great responsibility on the pedagogue. In addition, in the teaching of molecular biology, the pedagogue will definitely come face to face with chemistry in every subject. That is, the difference between molecular biology and other fields is 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 physic-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 physic-chemical ideas.

Therefore, in order to fully understand the science of molecular biology, having sufficient knowledge not only of general biology, but also of chemistry and physics will help to fully understand the studied science and facilitate the study of complex formula processes. [1].

Modern teaching technologies, which have been known to science for several years, are used in the teaching of molecular biology topics. If we look at the development of the education system of any country, we will see that the pedagogues there have strong knowledge in their field and the educational process is carried out with new technologies. Therefore, every pedagogue is required to be very responsible and enthusiastic. In addition to having more than enough knowledge about his subject, each pedagogue should be constantly aware of new innovative and information technologies, be able to use them during the lesson and, most importantly, use this knowledge. I believe that it is necessary to teach the young generation. In addition, digital ("advanced", "smart", "SMART") technologies are the core of the current stage of technological development and will retain their dominant role in the near future. Currently, the process of digitization - the deep convergence of digital technologies with material and socio-humanitarian technologies and practices, including educational technologies, is being accelerated. It is important to understand the place and role of digital technologies in any modern field of professional activity. Therefore, it is important for a modern higher education institution and a pedagogue to know how to improve their digital competence, how to manage the process of wide introduction of digital technologies into the educational process, and what these technologies will bring to higher education. More than ever, the modern teacher needs systematic knowledge and skills, new professional competencies that define his digital culture and enable reliable use of new technologies in his classroom [2].

Development and dissemination of Internet technologies in the field of molecular biology, modernization of the infrastructure and improvement of the technological efficiency of the educational process, improvement of the quality of the implementation of educational programs, as well as the necessary knowledge, skills and new digital technology necessary for this discipline from digital technologies. provides skill development. At the same time, teachers who do not know how to work with new digital technologies, do not know the new content of education, teaching

methods, and modern approaches to assessment cannot ensure the introduction of the proposed innovations.

It is necessary to qualitatively update and digitalize higher education with the following mandatory conditions:

creating a digital educational environment by spreading new digital technologies in education, including ensuring the use of mobile technologies;

development of modern digital educational content, new educational and methodological complexes;

to ensure high-quality professional development of teachers by changing the continuous pedagogical education system, to acquire new digital skills, and to increase the motivation to use digital educational content [3].

In modern society, there is a trend of rapid development of science and technology, the volume of information and the speed of its acquisition and processing are increasing. Dramatic changes are taking place in all aspects of society's life, and modern education is no exception. Currently, education is aimed at forming a strong and competitive person, ready to solve life issues independently. Great attention is being paid to increasing the creative ability and social activity of the young generation. For this, the student must acquire basic competencies such as research, self-awareness, criticism and thinking of his own product, and effective communication. It is known that the activation of these abilities and their formation takes place directly in the school with the active participation of the teacher. Here, the problem of how to interest the child in the educational process, how to teach him the necessary knowledge, skills and abilities, how to open his potential arises. Learning is the main activity of the student [4]. But teaching also requires creativity from us pedagogues. Especially, in the teaching of molecular biology, the teacher explains each topic taught in connection with the student's daily routine, diet, etc., which makes it easier for them to remember. For example, proteins are substances that perform the most functions and have a colorful structure compared to other organic compounds. "Wherever we find life, we associate it with some proteinaceous body, and wherever we find a proteinaceous body that is not in the process of decay, we invariably encounter the phenomenon of life." (K. Marx, F. Engels. Collections. T.20).

Proteins make up 10-18% of the total cell mass. Each cell contains more than 3000 protein molecules. There are more than 10 million proteins in the human body. Proteins play an important role in cells. Proteins are carriers of substances, ions, protons, and electrons. Proteins protect the body from infection. Communication between the cell and the external environment is carried out by various proteins that can distinguish the shape of molecules, register temperature changes, insignificant mixtures of substances and distinguish one color from another.

Proteins are often called proteins - this name emphasizes the main role of these substances (from the Greek "proteo" - I take the first place). Proteins are disordered polymers whose monomers are amino acids. There are about 100 amino acids in nature, 25 of which are found in the body. But each protein has 20, from which 2,432,902,008,176,640,000 compounds can be formed, that is, different proteins with exactly the same composition but different structures. The knowledge presented above is certainly interesting for every person, because psychology also confirms that a person is most interested in his body.

At the same time, the issue of using the didactic component, the integrated use of information and communication technologies (ICT) with pedagogical technologies, is one of the

priorities of creating an informational educational environment. In this new educational environment, multimedia technologies and technical interactive teaching tools serve as means of communication between the teacher, students and the subject being studied. Traditionally, ready-made electronic products are used for work (for example, educational CDs and DVDs), which will help you quickly and accurately present the educational material. When learning new material, visual material with video fragments works well [4].

Interactive whiteboard is the best and one of the technical training tools for teacher group interaction. It is a device that combines projection technology with a sensor, and such a board does not just show what is happening, but also provides opportunities to manage the presentation process and make corrections, leave color notes and comments, and save the material for further editing [5]. Especially in the topics of molecular biology, it is very useful to show students various formulas and structures.

In the conditions of digital transformation of education, the development of professional competences of teachers of natural sciences is one of the real tasks. It is also important to search for and implement new effective means of social and economic assessment of the professional qualifications of educational specialists, taking into account the quality of the teacher's pedagogical training. We consider case technology as a multidimensional diagnostic and didactic tool that allows solving relevant problems [6].

The concept of "case" (from the Latin casus - convenient situation, opportunity, opportunity and capsa - box, warehouse) is a collection of materials, the use of which allows to increase some possibilities. It should be noted that case technology allows you to take into account many factors. The peculiarity of using a case in the educational process is that it is based on a problem situation. In the teaching of molecular biology topics, presenting problematic situations to the student encourages a deeper understanding of the topic. Case technology shows its effectiveness in organizing the educational process when used both in individual, micro-group work, in frontal work (discussion, roundtable) and remotely (using zoom, padlet, google-forms).

The main goal of all the reforms implemented in the field of education is to educate and train intellectually and morally developed people, improved educational systems, and the introduction of educational processes based on new pedagogical and information technologies in accordance with the needs of the times. That is why special attention is paid to the effective use of modern information technologies in the educational system. Increasing the level of knowledge and skills in this regard, providing technical support to the educational system, as well as the ability of pedagogical personnel to use the Internet will allow them to use modern digital tools in the educational process [7].

A vivid example of this is the development of multimedia. Multimedia creates opportunities for presenting information, creating dynamic images in various forms, helping students to effectively perceive the material through the organs of sight and hearing. In multimedia technologies, information is expressed not only in the form of text, but also in the form of images, sound, movement, and animation, and this encourages students to be active, attentive and inquisitive in class. In addition, the use of multimedia tools in the educational environment allows creating and placing high-quality video recordings, virtual laboratory and animated models of various processes of practical work on digital platforms of multimedia courses [7].

REFERENCES

1. M.N. Valikhanov, S.N. Dolimova, G. Umarova, P. Mirkhamidova "Biological chemistry and molecular biology" Tashkent-2015;
2. V.I. Kolykhmatov Professional razvitie pedagoga v usloviyakh tsifrovizatsii obrazovaniya Educational and methodological manual Saint Petersburg 2020;
3. Arystanova S.A. Rol iry v razvitii poznavatelnoy deyatelnosti uchashchikhsya na urokax biologii / S.A. Arystanova, K.K. Khamitova, A.S. Ayatov. ed. T.S. Mamontova. - My work: Izd-vo IPI im. P.P. Ershova (branch) TyumGU, 2019. - S. 202–207;
4. Gnezdilova E.V. Imitatsionno-modeliruyushchie igry kak sredstvo formirovaniya neproizvolnogo zapominaniya v protesse obucheniya inostrannomu zyzyku // Vestnik Barnaulskogo juridicheskogo instituta MVD Rossii. - Izd-vo "Barnaulsky legal institute Ministerstva vnutrennix del Rossiyskoy Federatsii", 2019. - No. 1(36). - S. 6–7;
5. O. M. Avlasko "Uspolzovanie elektronnykh sredstv obucheni v obrazovatelnom protsesje pri izuchenii biologii". Minsk city pedagogical college, g. Minsk, Republic of Belarus;
6. E. N. Artemyonok "Case-technology as means of diagnosis and development of professional competence of teachers". Republican Institute of Higher Education, G. Minsk, Republic of Belarus;
7. L. K. Bagbekova, s. A. Ayupova "Effectiveness of the use of multimedia educational courses in the educational system". Tashkent State Pedagogical University Nizami, g. Tashkent, Republic of Uzbekistan.