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IMPROVEMENT OF BIOTECHNOLOGY TEACHING METHODOLOGY ON THE BASIS OF A CREATIVE APPROACH

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Annotation: The article covers the theoretical and practical foundations of a creative approach in teaching biotechnology. The importance of using creative methods, the role of interactive methods in forming independent thinking in students, and the possibilities of using innovative technologies in teaching biology are considered.
Keywords: biotechnology teaching methodology, creative approach, interactive methods, innovative technologies, methodology, independent thinking, digital educational technologies.

Studies on the theory and practice of organizing independent learning activities in the system of continuous education were conducted by such scientists as I.V. Rebro, S.N. Kostromina. However, today there are a number of problems in organizing independent learning activities of specialists being trained in higher educational institutions, including future biology teachers, which have not been fully resolved in pedagogical research.

Today, it is necessary to identify and eliminate existing problems in organizing independent learning activities of future specialists in higher educational institutions. To do this, it is first necessary to clarify the range of problems in organizing independent learning activities and their solutions.

According to T.V. Rudina, Yu.E. Kalugin, currently in the process of training qualified specialists, there are problems in improving the forms, methods and means of organizing their independent learning activities: insufficient attention is paid to checking and controlling the independent assignments given in the subject; lack of systematized necessary educational tools for students' independent learning activities; lack of scientific and methodological resources for organizing independent learning activities; lack of systematization of independent work assignments in science; lack of attention of professors and teachers to students' independent educational activities, etc., are among them.

Information on these problems and their solutions is presented in the scientific research of U.B. Bakhodirova, G.S. Ergasheva. The works of these scientists emphasize the need to introduce information technology tools in order to train future specialists in higher educational institutions and improve the system of organizing their independent educational activities.

Based on the above, the proposed research is also aimed at solving these issues, namely, improving the independent educational activities of future biology teachers in biotechnology based on information technology tools.

It is advisable to use information technology tools in improving the system of organizing independent educational activities of future biology teachers in professional disciplines, in particular in biotechnology. Because biotechnology studies methods of processing raw materials to extract biologically active substances and purification of biologically active substances, improvement of bioobjects used in the production of medicines using cell engineering methods, the role of proteins in the body, synthesis methods, the role of enzymes in the metabolic process, the creation of medicines based on genomics and proteomics[3].

It is impossible to fully convey these topics to the minds of future biology teachers during classroom sessions. In this regard, the use of information technologies and tools in independent learning activities plays a complementary and developing role. In addition to technical features, important aspects related to the availability of knowledge have emerged in the use of information

technology tools. The computerization of the teaching process of subjects included in the biology category is also being improved under the influence of interactive technologies. Due to the creation of unified databases, previously existing differences in the systematization of knowledge in academic subjects are changing. Due to the introduction of computers and interactive technologies into the educational process, including biology education, new approaches to teaching are emerging. This, in turn, serves as methodological support for professors and teachers, and actively serves as an interactive means of delivering educational information to students.

On the one hand, information technology tools improve the organization of various training sessions by professors and teachers in biology, related to aspects such as repetition of the passed educational material, intermediate control of knowledge. On the other hand, they provide the specificity of computer technologies associated with the interactive controlled construction of subjective new knowledge in the learning process, as well as the possibility of obtaining information through electronic educational tools, local networks, information and educational environments and search engines of the global network. In this sense, the use of information technology tools is not a goal, but a means of achieving the general goals of biology education and solving practical problems of educational practice related to the subject[6].

Taking this into account, the formation and development of creative abilities, creative thinking, and competencies of future biology teachers based on the development of new approaches to teaching biotechnology, namely, the methodology for introducing information technology tools in independent learning activities, remains one of the urgent problems for today's biology education[4].

To overcome these problems, the following tasks should be implemented: creating didactic electronic educational resources intended for independent learning; creating virtual laboratories on science and introducing them into the independent learning process on the basis of testing; creating an information and educational environment and providing it with the necessary educational tools for independent learning activities; forming a culture of using the global network among future biology teachers; developing the skills of future biology teachers in using modern computer applications and mobile applications; improving the system of tasks given to future biology teachers for independent performance; integration of independent tasks assigned to future biology teachers with modern pedagogical computer software.

In the training of future biology teachers in higher educational institutions, it is necessary to pay special attention to their independent learning of professional disciplines, including biotechnology, that is, to introduce the use of didactic electronic educational resources designed for the global network and mobile phones. As a result, future biology teachers will have the opportunity to use electronic educational resources on science wherever and whenever they want. This will help them increase their interest in science and spend their free time productively[5].

The main types of classroom training in higher educational institutions are lectures, practical classes, seminars, laboratory classes, and control types are carried out in written, oral and test forms. One of the tasks of higher education institutions is to develop future specialists, educate them, and form a creative personality of a specialist capable of innovative thinking[1]. The fulfillment of these tasks should not be achieved only by transferring knowledge in a finished form from a professor to a student. There is a need to transform a student from a passive consumer of knowledge into an active creator of knowledge who can formulate a problem, analyze ways to solve it, find the optimal result, and prove its correctness.

In conclusion, it can be said that independent learning activities of students should become not only an important form of the educational process, but also its basis. This implies a focus on active methods of mastering knowledge, the development of creative abilities of future

specialists, individualization of education taking into account the needs and capabilities of the individual.

The idea being put forward is not to increase the share of hours spent on independent work, but to fundamentally reconsider the methods of organizing independent learning and independent work of future specialists, including future biology teachers. This, in turn, will help to form the ability to self-develop and increase professional competence of future biology teachers.

An analysis of the literature on this issue and empirical research show that the system of independent education of future biology teachers (independent work, its planning, organizational forms and methods, monitoring of results) is one of the weak points in the practice of higher education and has not been sufficiently studied. In independent education, each future specialist independently acquires knowledge based on his or her own understanding and needs in a particular discipline, including biotechnology. The main goal of independent education in biotechnology is to acquire theoretical and practical knowledge, determine patterns, determine the interactions and connections between the components of nature, and form skills in acquiring knowledge.

Information and educational environments, educational portals, virtual educational environments, and search engines of the global network serve as important pedagogical software tools for future biology teachers to repeat the knowledge acquired in classroom classes on biotechnology and to study the necessary information in their independent educational activities.

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