

METHODS OF IMPROVING STUDENTS INDEPENDENT LEARNING WITH THE HELP OF ELECTRONIC LEARNING RESOURCES AS AN EXAMPLE OF BIOTECHNOLOGY (FORMS AND TOOLS)

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Abstract. The article describes the forms and means of improving the methodology of organizing independent education of students in Biotechnology with the help of electronic educational resources. The content of education according to the established standards for the training of highly qualified specialists is the approved science programs, syllabi and educational materials prepared on their basis, i.e., lecture notes, practical developments, independent educational assignments. The advantages of teaching methods in teaching differ depending on the results they provide. The main goal of pedagogical education in the traditional teaching method is the acquisition of certain knowledge, skills and qualifications, that is, externally determined standards. Traditional education is not focused on designing and building the student's self-development process. At the same time, the cognitive activity of students is ignored by teachers. The motivation field of the student is not taken into account, and they are not given the right to choose the cognitive method of searching for the necessary information, the personal experience of the students is not taken into account. Therefore, the materials presented in this article represent an innovative approach to independent education of students.

Keywords. Independent learning, e-learning resources (ELR), biotechnology, method, form, tool.

Introduction. Modern socio-economic processes and requirements of the rapidly changing information environment create new requirements for the development and modernization of higher education [1]. Nowadays, the increasing role of knowledge and the need to process new forms of information in a large volume, the social order of society is to train a specialist with competitive, information search, processing, change, organization of independent work, transfer, use and storage of received information. The introduction of new educational standards reflecting this trend requires not only changing the content of training future specialists, but also creating and implementing innovative ways of organizing the educational process [2, 5, 7].

Today, electronic education, electronic resources, distance learning technologies are playing an increasingly important role in the higher education system. In this regard, the selection, scientific justification and successful implementation of technological e-learning platforms are urgent, on the one hand, they provide an opportunity to effectively change the traditional didactic procedures of the educational process, and on the other hand, they develop mobile, creatively active individuals with a high level of professional skills, independent and critical thinking. Today, such tools include educational management systems ("HEMIS", "WebCT", "Virtual University", etc.), among which the modular object-oriented dynamic learning environment Moodle is of particular importance.

Independent education is especially relevant in the study of special subjects, because it directs students to work with scientific literature and develop decision-making skills. Student education remains dominant, including systematic, independent activities indirectly controlled by the teacher, especially in the conditions of modern education, special attention should be paid to the transition to multi-level training of specialists in the higher education system.

Approaches to the process of training specialists in higher education institutions, as well as changes in teaching technology, especially in the context of electronic education, create the need to change the content, form, methods and tools of planning, organizing and implementing the independent activities of students, as well as their assessment system. In this context, the problem of organizing independent education of students in the conditions of electronic education is particularly relevant. At the same time, the analysis of psychological-pedagogical literature showed that the issues of developing pedagogical conditions for organizing independent activities of students have not been sufficiently studied [3, 4, 6].

Based on the above, in our research, we aimed to improve the methodology of organizing independent education of students in Biotechnology with the help of electronic educational resources.

Methods. Tadqiqotimizda soha va mavzuga oid zamonaviy ilmiy hamda o'quv-metodik manbalarni tahlil qilish, qiyosiy tahlil, umumlashtirish, pedagogik prognostika metodlaridan foydalanildi.

Results and its discussion.Independent education of students means activation of factors under the symbiosis of external and internal (mainly life experience and internal activation) process of personal formation through self-development of an individual.

When we developed the methodology of improving the independent education of students, we took into account that the change in the level of self-development of the student's personality occurs due to the need or as a goal orientation. Accordingly, the first is carried out under external influence, and the second - under the influence of internal motivation. It should be noted that the main task of the teacher is to motivate the student to professional and personal growth.

Today, informational and educational environment has been created in all higher education institutions. Students and faculty can access open learning resources and e-textbooks in this environment.

Created e-learning courses allow students to independently study the necessary stages of the subject to be mastered.

They are as follows:

- assimilation of theoretical material;
- provision of practical assignments with direct access to the necessary software for the implementation of tasks related to mastering and strengthening the educational material;
- development of necessary skills in performing creative tasks for continuing education and professional activity;
- the possibility to get acquainted with the tasks of test control in advance and later to check their assimilation with the help of a computer, as well as to carry out self-control of one's own knowledge based on the test program;
- communication with the teacher through electronic systems (syndication of completed tasks, exchange of information, consultation).

However, at the time of the globalization of the world and society, the implementation of digital transformation in the Republic of Uzbekistan, it is necessary to introduce special courses on the development of electronic educational resources and to develop skills and apply them to students in the educational process.



Fig. 1. Logical structure of e-learning resources

The use of e-learning resources provides an opportunity to focus on the development of each student, to move from general to developmental education and, as a result, to the main skill of the student - self-learning and lifelong learning.

E-learning resources can be used as a tool at any stage of education, but when using it, every action must be calculated.

According to the analysis in the research process, various ELRs can be used in the educational process. There are following types of ELRs:

- information objects: photos, video clips, voice recordings, text documents, animations, interactive models, tasks in the form of tests;

- combinations of information objects related to a specific subject, textbook, field of science
- internet links, resources, digital resources rich in theoretical and practical materials, etc.;
- interactive tasks that activate individual and group learning and cognitive activities of students;
- multimedia interactive tools that display the contents of the topics on modern electronic devices

According to the results of the analysis in the first chapter, the issue of determining the functions of e-learning resources has not been fully studied. Some researchers ignore the most important functions of ELRs. Some, while studying the essence of the concept of ELR, define certain actions performed by ELR as functions of ELR.

Functions, by definition, must represent action, but not every action or possibility, but rather the intended action that achieves an effective result. The purpose of the functions is to ensure the integrity of the system.

In order to determine the functions of the ELR, it is necessary to answer the question of what is the purpose of the ELR to ensure its integrity and achieve a quality result. To create models describing biotechnological processes, an electronic educational resource will be developed, including multimedia presentations, interactive practical tasks and exercises, and automated processing of test results.

This ETR shows the use of digital video recordings of information, how to construct a mathematical model, and how to solve this problem using MS Excel. Test control can be used to determine the mastery and consistency of knowledge.

It would be appropriate to include the following types of ELR that students can use in the course of independent study of biotechnology:

Electronic textbook is a publication containing electronic color, multimedia information. It can be used for videos, audio, excerpts from the lectures of the best teachers and more. The electronic textbook has a hypertext structure, which allows the student to study the material along the chosen trajectory and at the chosen pace. Often, an e-textbook allows a student to test their knowledge.

E-learning courses are individual interactive learning materials that match one or more learning objectives, providing annotations, interactivity, questions and feedback, glossaries, etc. so that students can learn new concepts and skills independently. These may contain several types of media, including text, images, animation, audio and video, and courses should be limited to a maximum of approximately 30 minutes of instructional time.

An e-learning course follows a linear sequence in which content is presented in a predetermined order; or it may take a fragmented approach, with students following different paths according to their own choices.

A number of teaching methodologies can be used to create an e-learning course.

An electronic manual is an electronic publication containing information and data. Usually, the electronic manual contains information that repeats the textbook and additional information, a list of terms or words of the language being studied (vocabulary), a glossary, and the names of cited authors.

Simulators and games are highly interactive forms of e-learning. The term "imitation" basically means creating a learning environment that mimics the real world while allowing the student to learn through experience. Imitation is a unique form of Internet-based learning that brings the student to a specific situation and provides an immediate response to his behavior. An educational game includes a competitive component, a complex set of goals and rules, and constraints. Virtual reality and augmented reality are new and effective ways to implement simulations and games. Virtual reality is a powerful tool for modeling human interaction and hands-on training in realistic physical scenarios.

The book of electronic tasks is an electronic publication created for practicing the technique of finding solutions to problems, tasks, tasks. The student develops the skills to connect theoretical knowledge with practical knowledge and solve problems in the process of independent education.

Online Workshop – participants learn key concepts and fundamentals through e-learning sessions and assess their knowledge through online quizzes. They then begin to apply this knowledge to their own contexts through content mapping exercises and online discussions.

Electronic practicum and simulators - training sessions are aimed at practical application and strengthening of knowledge, development and improvement of students' skills and abilities. Electronic practicums and simulators are intended for: modeling of certain phenomena, for use as models, for demonstration of phenomena and demonstration of practical skills, for control of simulated processes. The electronic practicum gives the student the opportunity to analyze and observe the processes occurring in the real objects being studied, and the students can use it to simulate experiments that cannot be carried out in real conditions. The electronic simulator simultaneously simulates not only the actual installation, but also the facility - allowing for research methods and experimental conditions that can take months or years to observe real-time accelerated mode events.

The computer test system is a system that determines the level of students' knowledge acquisition and self-control. Currently, many software solutions have been developed for creating computer tests. Given their convenience, any teacher can create and widely use them in the process of learning various subjects, in the classroom and outside the

classroom, especially in the assessment of independent learning. This type of control eases the teacher's work, and the student has the opportunity to control his own learning.

Conclusion. Thus, ELR can be considered as a tool that allows for independent education of students in the field of biotechnology, because with their help, the roles of the teacher (s) and students are changed (active independent acquisition of information); control is carried out independently; the level of knowledge acquisition is determined independently; theoretical and practical skills are developed independently; the development of practical skills and their use in practice will affect the professionalism of students. The interactivity of ELRs helps to improve the quality in the organization of the educational process.

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