

# The Use of Innovative Distance Learning Technologies in the Training of Biology Students

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## Abstract

The main purpose of the study is to identify the key aspects of the use of innovative distance learning technologies in the training of biology students. Currently, there is a modernization, the evolution of the education system from a classical university to a virtual one, from lecture material teaching to computer educational programs, from a book library to a computer one, from multi-volume paper encyclopedias to modern search databases. During studies in higher education, distance learning ensures the delivery of information in an interactive mode through the use of information and communication technologies. The main disadvantage of distance learning is the emotional interaction of the teacher with students. It is necessary to increase the level of methodological developments for independent studies of students. The methodology includes a number of theoretical methods. Based on the results of the study, the main elements of the use of innovative distance learning technologies in the training of biology students were identified.

## Keywords:

*pedagogy, innovative education, distance learning, students, information and communication technologies.*

## 1. Introduction

Today, in all developed countries of the world, the emphasis in the process of reforming education systems is shifting to teaching the ability to independently obtain the necessary information, identify problems and find ways to rationally solve them, be able to critically analyze the acquired knowledge and apply it to solve new problems.

Most of the developed countries of the world have realized the need for student-centered education, in which the student is truly the central figure in the educational process. What does the concept of "learning-centered learning" mean?

Student-centered learning is difficult to provide in a traditional school or university environment, which is called "closed", because the student's behavior is controlled both in space and in time. The planning of

the educational process is carried out entirely by teachers. The closed form of education is aimed mainly at the formation of knowledge, skills and abilities. Therefore, the traditional "closed" learning systems are being replaced by new "open" systems, which include distance education.

It is important to note that distance learning is a fairly common phenomenon in world practice. In many countries of the world, its popularity is growing every year, because this form of education, the main principle of which is interactive interaction between the subjects of educational services, is the most flexible and accessible. World universities demonstrate a high level of acceptance of distance learning (93%) and its enhanced use in the education process (87%). In addition, higher education institutions tend to incorporate distance learning into their institutional strategies (85%) [1].

The new information environment has become the basis for the development of modern distance education. Although some elements of distance education have been used in other forms of education (primarily distance learning), in the full sense, distance education is the brainchild of our time. It is possible only with the use of the latest interactive technologies (computer educational systems in conventional and multimedia versions, electronic libraries and databases with remote access, computer networks, satellite television antennas, etc.) [2].

Note that the concept of distance education and distance learning should be differentiated. Obviously, distance education is a new form of organization of learning, which occupies an intermediate position between stationary and correspondence forms, and distance learning is a new method of didactics. According to many scientists, distance education is an educational process organized on certain topics,

disciplines, which provides for an active exchange of information between students and teachers, as well as between students themselves, and makes the most of modern means of new information technologies[4]. Distance education is a multifaceted phenomenon. Therefore, in the distance education mode, students can receive training in any field of scientific knowledge. Biological education is no exception. Higher education, retraining of personnel and advanced training of biologists can be provided remotely.

## 2. Methodology

The main purpose of the article is to identify the key aspects of the use of innovative distance learning technologies in the training of biology students. For this, a number of methods were applied, which form the research methodology.

The study was carried out using the following theoretical methods: systems analysis and synthesis, induction and deduction, comparison, classification, generalization and systematization, idealization and abstraction.

## 3. Research Results and Discussions

Distance learning is open and accessible to everyone, regardless of where a person lives. This is learning, not self-education. It uses modern means of new information technologies and mass media as a technological basis - both familiar (radio, television, fax) and new (audio, television and video conferences, computer telecommunications, etc.).

Distance learning using computer and information and communication technologies usually manifests itself in the form of teleconferences, chat classes, web classes, audio and video conferences[5].

Teleconferences - e-mail correspondence, which is based on mailing lists, as an alternative to regular correspondence. This form of education is characterized by the achievement of only the basic tasks of education.

Chat sessions are learning sessions using chat technologies: real-time exchange of small text messages. These sessions are held at the same time so that all participants can share the chat. Chat as a means of communication can be used both separately

and together with other forms of learning, complementing them.

Web-classes are a collective concept for distance lessons held in the form of conferences, seminars, business games, forums, laboratory and test works, workshops, online tests, surveys and other forms of training sessions implemented using Internet tools and technologies. namely, with the help of new generation WWW technologies that provide interactivity of communication. It is on this form of education that the greatest hopes are placed as very convenient, unpretentious in terms of technical equipment, flexible in management and intuitive in use by people of all ages and education. The main means of interactive communication between students and the teacher and among themselves when using web technologies are forums - text messaging technology. Unlike chat - a simpler form of communication, forums allow you to exchange messages asynchronously, and therefore, are quite long in time; forums and messages in it can be both private and public; are organized on specific topics on which it is convenient to ask questions and look for answers to previously posed ones; give the opportunity to comment on someone's question or answer to it, while expressing, for example, their own opinion on a particular problem. Forums are, first of all, a source of practical knowledge, unlike regular web-based classes, because forums are created on the basis of the "history" of live communication on the most pressing issues, which, as a rule, are of a practical nature.

Audio and video conferences (audiocasts, webcasts, webinars) are a form of education using modern sound and image transmission technologies. They allow to hold practical "meetings" of teachers and students at a great distance, they also allow to gather a significant audience, but require the presence of the listener at the technical means of reproducing such communication at a certain, predetermined time. They can be organized both unilaterally and using feedback, that is, they can be interactive.

The use of modern effective communication technologies, which allow for constant interaction between participants in training, largely distinguishes distance learning from distance learning [6].

At the heart of the distance learning course there are a number of important pedagogical provisions.

At the center of the learning process is the independent cognitive activity of the student. Education, self-mastery of knowledge has become a human need today. Therefore, a flexible system of education is needed, which allows one to acquire knowledge where and when it is convenient for each individual. At the same time, it is important not only to acquire a certain amount of knowledge, but also to learn how to independently obtain new ones, work with information, and master the methods of cognitive activity [7].

Independent acquisition of knowledge should not be passive, on the contrary, from the very beginning, the individual is involved in active cognitive activity, which involves the practical application of this knowledge.

The organization of independent activity provides for the use of the latest pedagogical technologies that stimulate the disclosure of the internal reserves of each student (problem methods, modular training, etc.).

Distance learning, which is inherently individualized, does not exclude the possibility of broad communication among students. This is a complex of educational services provided to the general population in the country and abroad with the help of a specialized information environment based on the means of exchanging educational information at a distance.

Distance learning is one of the forms of continuous education designed to realize the human right to education and information. This is a new form of organization of the educational process, based on the principle of self-study of the student. The learning environment is characterized by the fact that students are often remote from the teacher in space, at the same time they have the opportunity to communicate at any time using telecommunications. Studying even on a full-time basis, a person who has the appropriate technical means can continue to carry out his studies, control his progress, conduct a cut of his own knowledge during periods when he is actually not able to directly study permanently (illness, holidays, academic leave). Therefore, distance learning is understood by us as an opportunity to receive education by attending lectures, seminars, practical and laboratory classes, self-training, starting, current, boundary and final control (testing, trainings, virtual simulators, compiling knowledge ratings, final analysis, tests,

exams), use virtual classrooms, laboratories, libraries, educational and informational audio and video materials, databases with remote access, etc., indirectly, through the use of electronic and telecommunication technologies, at a convenient time for the student, at a convenient place and pace of learning.

Lesson in distance learning has certain features. First of all, this is a virtual meeting, not a real one. Although it can be difficult to transition to distance learning, the latest methods allow the teacher to continue the educational process in an unobtrusive and creative way. In pedagogy, the term "innovation" means innovation, updating the learning process.

Pedagogical innovation is the process of creating, distributing and using new tools to solve those pedagogical problems, the methods of solving which are outdated. Today, the lack of opportunities for traditional education at school has become a pedagogical problem. Although such restrictions are temporary, the educational process cannot stop even for a while[8].

Innovative methods are methods that involve the growth of the role of the student in the educational process, the shift of the center (focus) of the educational process from the teacher to the student; strengthening the function of supporting the student, helping him in organizing an individual educational process; the possibility of teacher feedback with each student in the process of using teaching technologies and ICT.

Innovation means transformation, novelty, transformation; innovation involves bringing in something really new. This involves the involvement of the new in the purpose and content of the lesson, the use of modern methods and forms of education and upbringing, the creation of a collective work of the teacher and the student, the dissemination of new views on learning and the entire educational process as a whole [9]. Innovations are not born on their own, they arise as a result of scientific research, attempts, research, advanced pedagogical experience and experiments.

The use of innovative methods in the teaching process began in the twentieth century. and gained popularity in the last decade due to the rapid development of ICT. In addition, innovative technologies make it possible to move from studying an abstract subject to perceiving it as a means of communication and thinking, and transfer

educational and cognitive activity to a modern, creative level. The introduction of innovative methods significantly improves the quality of the presentation of educational material and the effectiveness of its assimilation by students, enriches the content of the educational process, increases motivation for learning, and creates conditions for a closer partnership between teachers and students. Such a partnership is a guarantee that the teacher becomes a mentor not only in the study of the subject, but also in everyday life. Therefore, the use of innovative methods is extremely important in the learning process [10].

New means of providing information play an important role in the learning process. In addition to multimedia (the use of animation, three-dimensional images, etc.), the training module can also have sound design. Using all the possibilities of the latest computer technologies will make it possible to activate all channels of students' perception of information, to make the learning process in higher educational institutions interesting and fruitful.

The positive aspects of distance education, in our opinion, include such opportunities as [11]:

- obtaining education by persons who, under certain circumstances, are not able to receive it in another way;
- receiving education on the job, place of residence, as well as obtaining several educations at the same time in different educational institutions;
- obtaining education at a convenient time for the student, in a convenient place and at a convenient pace of learning;
- formation of an optimal individual or group training plan from a set of independent training courses (modules);
- simultaneous communication of students with teachers and among themselves, regardless of their place of residence and time of entry into the information and telecommunications network;
- reducing the cost of training (there are no costs for renting premises, for the road to the place of training for both teachers and students);
- teaching a large number of people at the same time;
- improving the quality of education through the use of modern tools, large electronic libraries;
- creation of a single educational space;
- the use of the most modern achievements of information and telecommunication technologies in the educational process.

In turn, we consider the negative aspects of distance education to be [12]:

- the actual absence of domestic developments of qualified means of educational and methodological support (electronic textbooks and books, tests and virtual simulators) in the specialty "biology";
- low level of computerization of educational institutions;
- the lack of a perfect regulatory framework for the existence and development of distance education and state-recognized conceptual developments, which levels its national significance and reduces it to the corporate interests of certain groups of people, sometimes they may not be entirely competent in this area, etc. [13].

The latest information technologies can also be successfully applied in teaching biologists according to conventional curricula, but with the introduction of "distance learning" tools. First of all, we are talking about students who study in any (daytime, evening or part-time) form. It is clear that the independent work of students is provided by a system of educational and methodological tools provided for the study of a particular discipline. However, traditional tools (textbooks, educational and methodical manuals, lecture notes of the teacher, etc.) can be supplemented with special computer programs for any biological disciplines. These programs must be built using the latest computer technology.

So, the basis of the educational process in distance learning is the purposeful and controlled intensive independent work of a student who can study in a place convenient for himself, according to an individual schedule, having a set of special teaching aids and an agreed opportunity to contact the teacher by phone, e-mail and regular mail. as well as eye to eye [14].

Distance learning is a purposeful interactive, asynchronous process of interaction between subjects and objects of learning among themselves and with learning tools, while the learning process is indifferent to their spatial location. Undoubtedly, mastering the profession of a surgeon or a pilot in the process of distance learning is quite problematic, but for the profession of a biologist this, in our opinion, is quite realistic.

The training of young biological personnel is impossible without the use of high-quality, intelligent educational and scientific information, which is a reliable resource base for the informatization of the

educational process, the creation of modern scientific and educational computer networks and the improvement of the system of training specialists as a whole [15].

It should be noted that the problem of introducing modern types of information systems, especially automated ones, into the process of training biological personnel is an extremely urgent matter. Therefore, in order to train highly qualified specialists in the field of law, it is imperative to improve the information support systems of the educational process, taking into account modern achievements in science and technology, the development of scientific approaches, specific methods and techniques.

#### 4. Conclusions

Thus, new innovative educational technologies provide ample opportunities for differentiation and individualization of educational activities. The result of the application of educational technologies depends not so much on the skill of the teacher, but on the motivation and ability of the student to self-study, analysis of the literature used. Educational technologies are associated with increasing the effectiveness of training and education and are aimed at the end result of the educational process - this is the training of highly qualified specialists who are able to successfully master new, professional and managerial areas, respond flexibly and dynamically to changing socio-economic conditions; have high moral and civic qualities in an innovative educational space.

Innovative learning is a process that updates the learning system and eliminates the possibility of student passivity during the lesson. The latest methods help to establish partnerships between the teacher and students, which has a positive impact on the process of assimilation of information and the formation of socio-cultural competence. During quarantine, it is possible and necessary to continue learning with innovative methods. The use of interactive methods in the context of a global pandemic is a necessary element of the educational process, which contributes to the formation of deep theoretical knowledge and practical skills in students, stimulates constructive-critical thinking, arouses interest and motivation.

The innovative component of distance learning is the use in this form of education of the most competitive educational developments, modern technical equipment, the introduction of the most effective information and communication technologies (virtual reality, augmented reality, 3D modeling, etc.). This state of affairs allows us to talk about the impact of distance learning and its subspecies, in particular, e-learning, on the development of high technology and a positive impact on the economy of the state and the process of training modern specialists with a high level of professional skill.

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