

The Role and Tasks of Information and Communication Technologies and Pedagogical Technologies in Teaching Biology

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Annotation: This article presents the role and tasks of multimedia presentations, didactic materials, video and audio materials, and problem-based approaches to teaching biology. In biology, the use of information and communication technologies and problem-based learning approaches has been shown to ensure the effectiveness of the teaching process.

Keywords: biology, multimedia, video, audio, problem-based learning approaches, didactic materials.

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At a time when our country is rapidly developing on the path of innovative development, to fully support the creative ideas and creativity of young people who are the successors of our future, to form their knowledge, skills and competencies and to improve the system of evaluation based on best international practices, international standards and requirements. , a comprehensive comparative analysis of the existing system, close cooperation with relevant international and foreign organizations, research institutions.

Today, in order to assess the quality of education, the public education system PISA aims to participate in international research. The PISA International Survey aims to assess students' creative and critical thinking skills, their ability to apply their knowledge in practice through a variety of tasks, and to encourage the development of these skills in the future. It is planned to participate in the PISA international program in 2022 in accordance with the agreements signed between the State Inspectorate for Quality Control in Education and the Organization for Economic Cooperation and Development and the International Association for the Evaluation of Achievements in Education. As the literacy levels of students in the Republic of Uzbekistan are being tested for the first time in the PISA international program, preparations are being made with great responsibility.

In order to identify talented young people in our country, attention is paid to teaching in schools on the basis of the STEAM program. STEAM is an alternative approach to traditional teaching. At the same time, children learn Science, Technology, Engineering, Art and Mathematics based on interdisciplinary connections and practical approaches. STEAM allows students to carry out project and research activities in school and out of school. The basic idea of the STEAM approach is that practice is as important as theoretical knowledge. At the same time, students have to use not only their minds but also their hands in the learning process. The main feature of the STEAM approach is that students use their minds and hands to effectively learn all subjects and "acquire" knowledge independently. This will help to achieve positive results in participation in the international program PISA.

In order to improve students' knowledge and skills in biology, teachers need to teach modern lessons. What requirements must a modern lesson meet? The teacher's skill is assessed in terms of the students' activity in the lesson, the students' attitude towards the topic, the teacher, each other, the educational and developing mobility of the person who emerges during the lesson. To do this, the teacher must organize lessons on the basis of modern information and communication technologies and advanced pedagogical technologies.

Information technology means the use of special methods, software and hardware, and pedagogical technology in working with information. For example: audio and video, computers, use of telecommunications networks. The use of ICT in biology lessons reflects the important aspects of the various objects that are visually reflected, highlights the most important features of the objects being studied and natural phenomena, which improves the quality of teaching biology.

The teaching of biology in school should be accompanied not only theoretically but also by demonstration. However, demonstration classes in science in a modern school are often hampered by a lack of time and a lack of modern logistics. At this time, the use of information technology is important. Students have difficulty mastering a topic without an exhibition, are unable to understand biological objects without a picture, and are unable to study a phenomenon. Their thinking skills occur through images. Multimedia animated models allow students to form

an integral picture of the biological process in the mind and work independently. One of the advantages of using multimedia technologies in education is the novelty of the activity, improving the quality of learning due to interest in working with computers. The use of computers in the classroom is becoming a new way of organizing active and meaningful work of students, making lessons more useful and interesting.

Application of information and communication technologies at different stages of biology lessons:

- When explaining a new topic, the teacher can show color pictures and photos, slides, videos, 3D images, animations, models, drawings using a multimedia projector.
- Students conduct computer experiments in the independent study of teaching materials during the lesson, as well as draw conclusions on the topic in accordance with the tasks set by the teacher.
- When using a computer, the student has more opportunities to plan experiments, implement them and compare the results with real laboratory work and participate as a researcher.
- When conducting virtual laboratory work and experiments, students learn how the knowledge gained during the lesson will help in everyday life.

Problem-based learning approaches in the organization of biology lessons: person-centered learning technologies, heuristic learning technologies can be used.

Problem-based learning is a process of logical thinking, that is, analysis, generalization, analysis of problem situations on a particular topic. This situation directs students to research activities and provides new information on the topic. This is a new system of teaching method. The problem-solving “brainstorming” lessons used in the educational process, the scientific discussion and free thinking lessons are based on the problem-based learning technology. The most alternative option of pedagogical influence on the student by the teacher is a problem-based education aimed at developing students' thinking skills and satisfying the need for knowledge in the process of acquiring knowledge, preparing the ground for general and specific development of the individual. It is said. The teacher's activity in the application of problem-based learning includes: problem-solving learning material on the topic, activating students' cognitive activity by creating problem situations, combining the learning process with play, work activities, problem-solving constructs a chain of problematic questions on how to solve a situation and explains it to students in a logical sequence.

Methods of creating problem situations include the method of analogy, the method of analysis and synthesis, the method of advancing the problem question.

Analogy method. In this way, the teacher can generate problem questions based on the knowledge of the learning material previously studied or based on the students' life experiences. For example: “The vital activity of mammals depends on the size of their heart, and so do insects?”

Through the method of analysis and synthesis, students study biological objects based on experiments conducted by scientists and draw conclusions. For example, “Lichens were originally considered by scientists to be a single organism and belonged to the algae department. In 1867, Russian biologists A.S. Faminsin and O.V. Baronesky found that lichens have green algae in their bodies, which reproduce by simple division and spread through spores. So, since

xanoria is an algae that lives independently, what kind of organisms are lichens, and in which category can they be included? ” through which students identify the similarities and differences of objects, divide the studied objects into components, identify the beginnings and causes between the objects.

The problem-solving approach allows students to creatively apply what they have learned in previous lessons to new and unexpected situations.

Heuristic education is a system of teaching by asking guiding questions. The word heuristics is a Greek word derived from the word "heurist" which means "seek", "find", "discovered". Heuristic education has been around for a long time. In the process of answering a series of questions when used for the first time in the learning process, heuristic dialogues were formed, and problems were solved.

In conclusion, in the process of teaching biology, the teacher organizes modern lessons based on STEAM approaches through the use of information technology and pedagogical technology. and then stimulate the development of these skills.

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