



**PROBLEMS OF USING WEB TECHNOLOGIES
IN DEVELOPING STUDENTS'
COMPETENCIES IN BIOLOGY**

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***Abstract.** This article analyzes the works of scholars on the implementation of digital technologies in the educational and upbringing process of general secondary education schools. Furthermore, it highlights the problems related to the use of web technologies to enhance the effectiveness of teaching biology and to develop students' biological competencies in general secondary schools.*

***Keywords:** digital technology, web technology, electronic educational resource, motivation, competency.*

Nowadays, the integration of digital technologies into all areas and the expansion of the global Internet network's opportunities in education have created the need to use web technologies to improve the effectiveness of teaching subjects in general secondary schools and to develop students' subject-related competencies.

Regarding these issues, research on the use of digital educational technologies to improve the effectiveness of teaching subjects in general secondary schools has been conducted by scholars such as U.M. Mirsanov [1], A.B. Janzakov [2], U.N. Taylakov [3], A.I. Gazeykina [4], and L.F. Adriana [5].

In the works of these researchers, studies have been carried out on the use of digital technologies to enhance the effectiveness of teaching

mathematics, geography, and informatics and to develop students' competencies.

However, their studies did not pay sufficient attention to the use of digital technologies to improve the effectiveness of teaching biology and to develop students' biological competencies. Similarly, the research conducted by M.M. Isabayeva [6], N.A. Karimova [7], D.S. Maria [8], M.T. Umaraliyeva [9], A.A. Bogomolova [10], and N.P. Stepanova [11] presents methodologies for teaching biology. In their studies, various approaches have been used to increase the effectiveness of teaching biology. However, these studies did not focus on the use of digital technologies.

In addition, the studies by L.M. Qaraxonova [12], Sh.B. Xasanova [13], and M.N. Ibodova [14] have explored the issues of using digital learning technologies to improve the effectiveness of teaching biology in general secondary schools.

In particular, L.M. Qaraxonova developed a methodology for using multimedia learning tools to develop students' subject-specific competencies in biology at general secondary schools. Furthermore, she devised a mechanism for using digital technologies to enable students' self-monitoring and assessment in biology [18].

Sh.B. Xasanova improved the stages of developing students' basic and subject-specific competencies in biology through the use of multimedia learning tools. In addition, she designed the didactic possibilities of integrated approaches within an electronic information learning environment aimed at ensuring computer-mediated feedback and interaction. Furthermore, she enhanced the processes of developing biology teachers' information culture by incorporating integrated tests

and correction elements into the structure of educational and software tools [19].

M.N. Ibodova developed information resource tools aimed at the comparative study of the structure and characteristics of biological organisms. In addition, she created didactic materials designed to support students' independent study of laboratory work in biology and provided a methodology for their effective use [20].

YE.S. Gladkaya presented a methodology for teaching biology in general secondary schools using computer technologies. In addition, her research provides recommendations for the development and use of electronic educational resources designed for students' extracurricular learning activities in biology [15].

In the studies of the aforementioned scholars, research has been conducted on the use of information technology tools in teaching biology in general secondary schools and in students' extracurricular learning activities. However, insufficient attention has been paid to the application of web technologies in the biology education process and to the use of web technologies for developing students' competencies in biology. Therefore, the proposed research — namely, improving the methodology for using web technologies to develop students' competencies in biology — is considered one of the pressing issues today. This is because web technologies are an integral part of modern education, providing a wide range of tools and resources that significantly enrich the learning process.

Nowadays, a new type of information perception is emerging among learners through the use of the global network, television, and computer programs. For students studying in general secondary schools,

traditional sources of information — such as textbooks or the teacher's lecture — are losing their impact, which leads to a decline in interest in the learning process. However, if web technologies are integrated into the organization of educational and upbringing processes in various subjects, including biology, students' abilities to work with information will increase, and their skills for independent inquiry and creativity will develop. Furthermore, the relationship between teachers and students will transform, creating a collaborative environment that fosters problem-based heuristic learning, differentiated instruction, and learner-centered educational settings. In addition, it enables overcoming geographical barriers, providing opportunities to acquire knowledge from anywhere in the world at a convenient time.

Therefore, it is necessary to develop modern approaches for the integration of web technologies into the educational and upbringing process of biology in general secondary schools. To achieve this, it is first required to study the current state of the organization of biology education and upbringing in these schools.

Therefore, an observational study was conducted as part of this research. The observation focused on the process of teaching biology in general secondary schools located in the Navoi region. In this process, various interesting lesson plans and teaching methods were developed in collaboration with biology teachers. To determine students' level of knowledge in the subject, more than ten lessons were observed. During the observation period (2024–2025 academic years), the state of biology teaching in the aforementioned general secondary schools was examined.

It was revealed that biology teachers approached each lesson creatively and conducted classes using innovative technologies. It was

observed that in the general secondary schools studied, biology lessons were conducted with the use of computer presentation software and electronic educational resources. However, it was found that in organizing laboratory activities, due to a lack of equipment and reagents, some students did not develop a complete understanding of the subject. The main reason for this was that teachers organized lessons limited only to textbooks. Furthermore, it was confirmed that in the use of computer technologies, electronic educational resources were employed that had not been prepared in accordance with scientific-pedagogical, methodological, psychological, and psychophysiological requirements. In the classes where observations were conducted, it was noted that some students became bored during lessons and that teachers could not fully achieve the intended goals, resulting in students not acquiring sufficient skills related to the topics covered. In our opinion, despite the availability of web-based learning tools in today's globalized environment, their insufficient use in the biology teaching and educational process is one of the factors contributing to the decline of students' interest in the subject.

▪ Thus, based on the analysis of normative-legal documents, scientific-methodological sources, and the current state of teaching in general secondary schools related to our research, it has been determined that solving the pedagogical problem of increasing the effectiveness of teaching biology and developing students' biological competencies depends on the implementation of the following key tasks:

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- *Insufficient attention is paid to developing students' culture and skills*

In conclusion, it is necessary to further improve the forms and methods of teaching biology in general secondary schools by using web technologies to develop students' biological competencies. In this way, students will have the opportunity to study biology-related learning materials in a visual format, conduct laboratory tasks multiple times through virtual laboratories, and observe biological phenomena and processes virtually. As a result, students' interest and motivation towards the subject will increase significantly. Furthermore, this approach will help students use their free time more productively, broaden their thinking, develop their cognitive skills, and enhance their biological competencies.

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