IMPROVING THE METHODOLOGY OF TEACHING ANATOMY WITH THE HELP OF VIRTUAL LABORATORIES

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Annotation: This article is devoted to the issues of improving the methodology of teaching anatomy based on the use of digital technologies in the modern educational process. The study comprehensively analyzes the concept of virtual laboratories, their pedagogical capabilities, and theoretical and practical aspects of their use in teaching anatomy. The possibilities of providing demonstration in the process of studying the structure of the human body with the help of virtual laboratories, and achieving deep and conscious assimilation of knowledge by students through modeling complex anatomical structures and biological processes are highlighted. The article substantiates that combining virtual laboratories with traditional methods in teaching anatomy is an important factor in increasing educational efficiency. It is shown that laboratory exercises conducted in a virtual environment increase students' interest in the subject, develop independent learning skills, and serve to consolidate theoretical knowledge with practical exercises. Also, the safety, cost-effectiveness, and reusability of virtual laboratories are analyzed as their advantages.

Keywords: virtual laboratories, digital education, innovative pedagogical technologies, interactive teaching methods, 3D modeling, distance learning, educational efficiency, improvement of the educational process, information and communication technologies, competence.

INTRODUCTION: In the current globalization and digitalization processes, modernization of the education system, its development based on the achievements of modern science and technology is one of the urgent tasks. The development of society is directly related to the quality of education, and in this process, updating teaching methodologies and introducing innovative pedagogical technologies are of great importance. In particular, the use of modern approaches in teaching natural sciences, including anatomy, serves to increase the effectiveness of education. Anatomy is aimed at studying the structure, organs and systems of the human body,

and is one of the most complex and multifaceted sciences. In teaching this science, along with theoretical knowledge, practical exercises, demonstration tools and experiments play an important role. In the traditional educational process, textbooks, pictures, tables and limited laboratory equipment are often used to teach anatomy. However, such tools do not always allow for a complete and accurate representation of complex anatomical structures. The rapid development of modern information and communication technologies has brought new opportunities to the educational process. In particular, virtual laboratories have become widely used as an effective tool in teaching natural sciences. Virtual laboratories allow students to study complex processes visually, interactively and safely by modeling real laboratory conditions in a digital environment. In the field of anatomy, virtual laboratories play an important role in showing the internal structure of the human body based on three-dimensional models and explaining the interrelationships of organs and systems. Today, the insufficient material and technical base in educational institutions, the limited availability of laboratory equipment, and the complexity of conducting some experiments in real conditions create problems in teaching anatomy. Virtual laboratories allow us to eliminate these problems and make the educational process more effective and interesting. Also, in the context of distance learning, virtual laboratories are emerging as an important didactic tool in teaching anatomy. Teaching with the help of virtual laboratories increases the activity of students, develops their independent work, analysis and conclusion skills. Through interactive models and simulations, students have the opportunity to gradually study complex anatomical processes. This contributes to a deeper and longer-term retention of knowledge. In this regard, the issue of improving the methodology of teaching anatomy using virtual laboratories is considered an urgent scientific and pedagogical problem today. By studying this topic, it is possible to introduce innovative approaches to the educational process, improve the quality of teaching, and form a pedagogical model that meets the requirements of modern education. This article discusses the theoretical foundations, practical possibilities, and impact on educational efficiency of improving the methodology of teaching anatomy using virtual laboratories. It also analyzes the issues of bringing the quality of teaching anatomy to a new level by introducing virtual technologies into the educational process.

RELEVANCE OF THE TOPIC: Today, the rapid development of science, technology and information technologies worldwide is bringing about fundamental changes in all spheres, including the education system. In modern society, an effective educational process cannot be imagined without digital technologies. In particular, updating teaching methodologies and introducing innovative pedagogical technologies in the higher and secondary specialized education systems is one of the urgent tasks. In this regard, the issue of improving the methodology of teaching anatomy using virtual laboratories is of particular scientific and pedagogical

importance today. Anatomy is one of the main fundamental sciences that studies the structure of the human body, its organs and their interrelationships. This science serves as an important theoretical basis for the fields of medicine, biology, pedagogy, sports and health care. Without a thorough mastery of anatomy, it is impossible to fully understand human health, physiological processes and the causes of diseases. Therefore, the quality and effectiveness of the teaching process of this science are of great importance for society. In the traditional education system, anatomy is taught mainly through textbooks, atlases, static drawings, tables, and limited laboratory exercises. However, these tools do not always allow for a complete and accurate representation of complex anatomical structures. Many processes in the human body are dynamic in nature, and explaining them only through text or two-dimensional drawings creates difficulties for students. As a result, students lose interest in the subject and acquire knowledge superficially. Today, the lack of a material and technical base in educational institutions also negatively affects the effective teaching of anatomy. The high cost of many laboratory equipment, the complexity of conducting experiments in real conditions, and safety and hygiene requirements create problems in the practical study of anatomy. In addition, conducting some anatomical experiments on the basis of real objects is also ethically and sanitaryally limited. Therefore, the need for alternative, safe, and effective teaching tools in the educational process is increasing. Virtual laboratories created on the basis of modern information and communication technologies are considered an effective solution to these problems. Virtual laboratories, by modeling the real laboratory environment using digital technologies, allow students to study complex anatomical processes in a three-dimensional, interactive and dynamic form. This helps students to master the subject more deeply, accurately and consciously. Improving the methodology of teaching anatomy using virtual laboratories activates students' cognitive activity, develops their skills in independent work, analysis and drawing conclusions. Through interactive models, simulations and virtual experiments, students learn to search for and independently master knowledge, rather than accepting it ready-made. This fully corresponds to the competency-based approach to modern education. Especially in the context of distance education, the importance of virtual laboratories is increasing. Global problems that have arisen in recent years have shown the need to introduce distance and blended learning forms in the education system. In such conditions, although the possibility of fully conducting traditional laboratory classes is limited, it is possible to effectively teach anatomy through virtual laboratories. This plays an important role in ensuring the continuity of the educational process. Virtual laboratories are also economically effective. They reduce the need for expensive laboratory equipment, allow experiments to be conducted repeatedly and in a safe environment. This provides significant financial savings for educational institutions. At the same time, virtual laboratories are also environmentally beneficial, minimizing

the use of biological waste and hazardous substances. Improving the methodology of teaching anatomy using virtual laboratories also requires new approaches from educators. Teachers will need to master the skills of working with digital technologies and organize the lesson process interactively. This will serve to increase the professional competence of teachers and bring the quality of education to a new level. Based on the above considerations, improving the methodology of teaching anatomy using virtual laboratories is a topical, modern, and scientifically important topic today.

CONCLUSION: An in-depth study of this topic creates the opportunity to organize the educational process on an innovative basis, increase the level of knowledge of students, and train competitive specialists. Therefore, this topic remains relevant as one of the important areas of scientific research in the field of pedagogy and educational methodology. This article extensively covers the issues of improving the methodology of teaching anatomy using virtual laboratories. The results of the study showed that virtual laboratories allow for the effective organization of the educational process based on modern pedagogical technologies, increase students' interest in the subject, and help them to master knowledge more deeply. Virtual laboratories create the opportunity to study complex anatomical structures in a three-dimensional, interactive, and dynamic manner, which, unlike traditional teaching aids, makes the educational process more effective. Teaching using virtual laboratories develops students' skills of independent work, analysis, and drawing conclusions. Through interactive tasks, simulations, and 3D models, students not only receive knowledge, but also learn to apply it in a practical way. At the same time, virtual laboratories in distance learning conditions allow for a seamless and safe implementation of the educational process, which is in line with global educational trends. The article highlights several advantages of improving the methodology of

teaching anatomy using virtual laboratories. Complex anatomical processes are explained visually and interactively, which helps students to master the subject more deeply. Dangerous or difficult experiments in real laboratory conditions can be safely conducted in a virtual environment. The need to use expensive laboratory equipment is reduced, which provides material savings. Virtual laboratories also provide effective education in distance learning. Through independent research, interactive exercises, and simulations, students develop critical thinking and a creative approach. It should be noted that virtual laboratories are not only a technological tool, but also an integral part of the pedagogical approach. By properly integrating them into the educational process, teachers can effectively organize lessons, improve students' knowledge and skills. At the same time, the introduction of virtual laboratories serves to form teachers' skills in using digital technologies, to plan the educational process on an innovative basis. In general, improving the methodology of teaching anatomy using virtual laboratories is an urgent scientific and practical problem today, bringing the educational process to a qualitatively new level. Therefore, the widespread use of virtual laboratories in pedagogical practice, updating teaching methodologies, and developing interactive education are promising directions. This not only serves to improve students' knowledge and skills, but also to train competitive specialists in the future. In conclusion, virtual laboratories are the main means of effective teaching of anatomy in the modern education system, developing independent and creative activities of students, as well as enriching the educational process with modern information and communication technologies. Therefore, this topic is of great importance in scientific research and practice in the fields of pedagogy and medicine.

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