eISSN: 2229-3213 pISSN: 2229-3205
The Journal of Applied Science and Social Science
Volume 16,Issue 02 February, 2026

THE USE OF DIGITAL TECHNOLOGIES IN THE ORGANIZATION OF MODERN EDUCATIONAL PROCESS IN ORTHODONTICS

Nigmatov R.N.
Yusupalieva K.B.
Tashkent State Medical University

Abstract. With the rapid digitalization of healthcare and the introduction of innovative technologies into dental practice, the demands on the training of future specialists are significantly increasing. Orthodontics, as one of the most technologically oriented dental disciplines, actively utilizes digital methods of diagnosis, planning, and treatment. This necessitates transforming the traditional teaching model to integrate digital technologies into the educational process.

The modern educational process in medical schools must ensure that students develop clinical thinking, practical skills, and the ability to independently analyze diagnostic data. Digital technologies offer new opportunities for improving learning efficiency, individualizing educational pathways, and aligning the educational process with real-world clinical practice.

Key words: digital technologies, orthodontics, medical education, digital dentistry, educational process.

Relevance of the study. The relevance of using digital technologies in orthodontic training is determined by a number of factors:

active implementation of digital diagnostic and treatment technologies in clinical orthodontic practice;

the need to improve the quality of practical training of students and residents;

limited capabilities of traditional training in terms of visualization of complex anatomical structures and clinical situations;

development of distance and blended learning formats.

The use of digital educational tools not only enhances the acquisition of theoretical material but also develops sustainable professional competencies that meet the requirements of modern digital dentistry.

The purpose and objectives of the study. The aim of the study is to analyze the role and potential of digital technologies in organizing the modern educational process in orthodontics and to assess their impact on the quality of student training.

Research objectives:

To examine the main types of digital technologies used in orthodontic teaching.

To analyze their pedagogical potential and didactic significance.

To assess the benefits and limitations of integrating digital technologies into the educational process and identify promising areas for the development of digital learning in orthodontics.

Materials and methods. The study utilized data from domestic and international scientific publications on the digitalization of medical education, dentistry, and orthodontics. Methods of analysis, systematization, generalization, and comparative analysis of literary sources were employed. Modern digital educational platforms, diagnostic technologies (CBCT, digital cephalometry, intraoral scanning), CAD / CAM systems, virtual simulators, and elements of artificial intelligence were examined.

The Role of Digital Technologies in Orthodontic Education

Electronic educational platforms

The use of electronic learning platforms (LMS) allows for structured access to educational materials, video lectures, clinical cases, and assessment modules. These platforms facilitate independent learning, provide feedback between instructor and student, and allow for objective knowledge assessment.

Digital diagnostic methods in the educational process

Incorporating digital diagnostic methods into orthodontic training is crucial. The use of cone-beam computed tomography, digital orthopantomograms, cephalometric analysis, and intraoral scanning allows students to:

to study the anatomical and topographic features of the maxillofacial region;

analyze the spatial relationships of the dental arches and jaws;

to develop skills in interpreting diagnostic data.

Working with digital images and 3D models promotes the development of clinical thinking and increases the accuracy of diagnostic decisions.

Artificial intelligence in the educational process. Elements of artificial intelligence are increasingly being used in orthodontic education to analyze clinical cases, automatically diagnose, and predict treatment outcomes. In an educational context, AI can be used as a decision-support tool, fostering analytical thinking and an understanding of evidence-based medicine principles.

Advantages and limitations of digital learning. The main advantages of using digital technologies in orthodontic education include:

increasing the visibility and accessibility of educational material;

integration of theory and practice;

individualization of learning;

increasing students' motivation;

objectification of the assessment of knowledge and skills.

At the same time, there are certain limitations associated with the need for significant material and technical resources, training of teaching staff, and the development of methodological recommendations for the use of digital technologies.

Development prospects. A promising direction is the integration of digital technologies into a blended learning model that combines traditional and innovative methods. Further advances are possible, including the expanded use of virtual and augmented reality, as well as the more active implementation of artificial intelligence in orthodontic educational programs.

Conclusions. Digital technologies play a key role in the modern educational process in orthodontics. Their implementation improves the quality of education, develops professional competencies, and trains specialists who meet the requirements of modern digital dentistry. A rational combination of traditional and digital teaching methods is the optimal approach to training future orthodontists.

References

1. Pinchuk T.V., Orlova N.V. Interactive teaching methods in higher medical education (analytical review) // Medical education and professional development. 2020. Vol . 11, No. 3. P. 102–116.
2. Freire P. Pedagogy . M .: KoLibri , 2017. - 159 p.
3. Acharya S., Shukla S., Acharya N., Vagha J. Role play-An effective tool to teach clinical medicine. J. Contemp. Med. Edu. 2014. Vol. 2. P. 91–96.
4. Penman J., Oliver M. Meeting the challenges of assessing pedagogical sciences clinical placement sites in a bachelor of nursing program // Journal of University Teaching & Learning Practice, 2017, pp. 60–73.
5. Whitman N. A. Peer teaching: To teach is to learn twice. 2016, p.54