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ABSTRACT

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EXPERIENCE OF USING MODERN INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE PROFESSIONAL TRAINING OF FUTURE DENTISTS

The objective of the research is to justify the appropriateness, possibilities and peculiarities of using information and communication technologies in the educational activities of the Ivan Horbachevsky Ternopil National Medical University, considering the advancing global innovations in medical science and practice.

Materials and methods. The following scientific methods were applied: a) theoretical – analysis of psychological and pedagogical scientific literature to summarize domestic and international experience in the application of modern digital technologies in higher education institutions; b) empirical – pedagogical observations of the educational activities of the environment's subjects using information and communication technologies, surveys, interviews, anonymous questionnaires of dental students to assess the effectiveness of the functioning of modern digital technologies; c) statistical – descriptive statistics for the analysis and interpretation of research results.

Results. The article describes the experience and peculiarities of using digital technologies in the educational activities of Ivan Horbachevsky Ternopil National Medical University. The study of the advanced experience in European and American medical education in higher education institutions contributed to the adoption by the academic council of Ivan Horbachevsky Ternopil National Medical University of the Development Concept "Integration into the World Medical Education Space", which marked the beginning of the implementation of modern educational technologies. The article provides an overview of the university's information technology platform in the training of medical professionals, describes the current state of distance education, its features in forming the general and professional competencies of future doctors using interactive methods, rational organization of students' independent work using innovative forms and digital

technologies. An analysis of anonymous student surveys on the effectiveness of the existing educational process organization at Ivan Horbachevsky Ternopil National Medical University using the resources of modern information and communication technologies has been conducted.

Conclusion. Modern digital technologies prove to be an effective educational tool in the professional training of future medical professionals. An analysis of the conducted anonymous survey has shown that the majority of students confirmed the appropriateness and effectiveness of using computer-oriented educational environment resources as a means of organizing pedagogical interaction at Ivan Horbachevsky Ternopil National Medical University.

Keywords: quality of education, computer-oriented education environment, distance education, training technologies; professional competence of the doctor.

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ДОСВІД ВИКОРИСТАННЯ СУЧАСНИХ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ У ПРОФЕСІЙНІЙ ПІДГОТОВЦІ МАЙБУТНІХ ЛІКАРІВ-СТОМАТОЛОГІВ

Мета дослідження – обґрунтувати доцільність, можливості та особливості використання інформаційно-комунікаційних технологій в освітній діяльності Тернопільського національного медичного університету імені І. Горбачевського з огляду на прогресивні світові інновації в медичній науці та практиці.

Матеріали та методи. Застосовувалися наступні наукові методи: а) теоретичний – аналіз наукової психолого-педагогічної літератури для узагальнення вітчизняного та світового досвіду застосування сучасних цифрових технологій у вищих навчальних закладах; б) емпірико-педагогічні спостереження за навчальною діяльністю суб'єктів середовища з використанням інформаційно-комунікаційних технологій, опитування, інтерв'ювання, анонімне анкетування студентів-стоматологів для оцінки ефективності функціонування сучасних цифрових технологій; в) статистична – описова статистика для аналізу та інтерпретації результатів досліджень.

Результати. У статті описано досвід та особливості використання цифрових технологій в освітній діяльності Тернопільського національного медичного університету імені І. Горбачевського. Вивчення передового досвіду європейської та американської медичної освіти у вищих навчальних закладах послугувало прийняттю вченою радою Тернопільського національного медичного університету імені І. Горбачевського Концепції розвитку «Інтеграція у світовий медичний освітній простір», що покляло початок впровадженню сучасних освітніх технологій. У статті подано огляд інформаційно-технологічної платформи університету в підготовці медичних кадрів, описано сучасний стан дистанційного навчання, його особливості у формуванні загальної та професійної компетентностей майбутніх лікарів із застосуванням інтерактивних методів, раціональну організацію самостійної роботи студентів із використанням

інноваційних форм і цифрових технологій. Проведено аналіз анонімного анкетування студентів щодо ефективності існуючої організації освітнього процесу в Тернопільському національному медичному університеті імені І. Горбачевського з використанням ресурсів сучасних інформаційно-комунікаційних технологій.

Висновок. Сучасні цифрові технології виявилися ефективним освітнім засобом професійної підготовки майбутніх медичних працівників. Аналіз проведеного анонімного опитування показав, що більшість студентів підтвердили доцільність та ефективність використання ресурсів комп'ютерно-орієнтованого освітнього середовища як засобу організації педагогічної взаємодії в Тернопільському національному медичному університеті імені І. Горбачевського.

Ключові слова: якість освіти, комп'ютерно-орієнтоване освітнє середовище, дистанційна освіта, тренінгові технології; професійна компетентність лікаря.

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ABBREVIATIONS:

COEE – Computer-Oriented Educational Environment

ICT – Information and Communication Technologies

TNMU – Ternopil National Medical University

INTRODUCTION

According to the Law on Higher Education [1], modern Ukrainian higher education provides training of competitive specialists capable of working at the level of European and world standards. Based on the analysis of the state of education development at this stage, the National Strategy for the Development of Education in Ukraine defines the purpose, strategic directions and main tasks to be fulfilled by the implementation of the state policy in the field of education. At the current stage of education development, the role of information and communication technologies (ICT) has significantly increased, as evidenced by the state document 344/2013 "On the National Strategy for the Development of Education in Ukraine for 2012–2021" [2], which focuses on the integration of vocational education into European education, reforming and developing vocational education through the introduction of new IR technologies for training specialists. Today, the requirements for the quality of training of specialists in the field of medicine have increased significantly due to the implementation of health care reforms and the large-scale use of ICT in medical science and practice. The amount of new information is increasing every day, so traditional pedagogical technologies are no longer able to ensure effective transformation of the acquired knowledge, skills and abilities of medical students to implement them in their future professional activities.

Within the complex of problems in the modern Ukrainian educational system, there is a lag in teaching technologies, incapable of ensuring the achievement of new educational outcomes. Therefore, within the traditional educational system, new approaches, means, and pedagogical technologies are necessary to facilitate the qualitative preparation of professionals [3]. Today, in the organization of the educational process, there is a need to actively leverage the unique opportunities that have arisen with the introduction of e-learning. However, an obstacle for distance education of university students, as noted in a range of studies [4, 5], is the lack of information and communication technology resources.

A radically new service – cloud-oriented educational environment – is fundamentally changing the educational process. An analysis of experimental research data conducted by Glazunova O.H. and co-authors [6] demonstrated that the cloud-oriented educational environment of a higher education institution facilitates communication tasks and the organization of the educational process. Cloud computing tools and services form the information technology platform of a modern educational and research environment, contributing to the enhancement of the components of open science competencies [7].

In 2018, Ukraine initiated a medical reform [8], envisioning the implementation of the e-Health

electronic healthcare system and access to the Internet. Given the rapid pace of innovative development, this reform requires the optimization of the training of future professionals in the medical field [9]. Due to advancing global innovations in medical science and practice, contemporary demands for the preparation of highly qualified medical specialists necessitate the refinement and optimization of higher medical education in Ukraine [10]. Integration processes in the modern world indicate that young professionals will be able to compete in the international job market only if the higher medical education system in Ukraine aligns with the requirements of the global community. Comparing the content, pace, and nature of the modernization of higher medical education systems in Poland and Ukraine provides grounds to conclude that changes in socio-economic policies impact the mechanisms of higher medical education development and the formation of professional competencies for future doctors [11].

As of today, integral components of continuous professional development for doctors should include modern innovative technologies and distance learning. The Covid-19 pandemic, caused by the coronavirus, forced educational institutions to switch to distance education. As one of the restrictions to reduce of the life-threatening coronavirus spread, reduce contact and continue education, the World Health Organization declared the prevention of face-to-face education, the introduction of distance education from preschool to higher education [12]. The coronavirus disease Covid-19 remains a serious problem for human health today, affecting many spheres of life, including the education system in the world, in particular, medical education [13–21].

At the present stage, the fundamental principles of organizing the educational process based on distance learning technologies in Ukraine have been identified. A crucial aspect of the informatization of the educational process is accumulating experience in ICT utilization at the educational institution level. According to Spirin OM. and co-authors [22], university web portals should contain complete and detailed information regarding the institution's structure and operations. Deploying the Moodle platform requires setting it up on the servers of the educational institution. However, many institutions currently lack the technical and financial capabilities to implement this, making distance learning technologies less effective for now. Worldwide educational experience demonstrates that one of the most effective interactive technologies that contributes to the formation of necessary professional qualities is the Case Study. Currently, a multi-profile innovative task is the creation of educational games, the proper

organization of which increases student motivation, thereby enhancing the effectiveness of learning [11]. There is a growing volume of scientific and pedagogical literature dedicated to the methodology of case development and teaching. In contemporary research [23], structural components of computer-oriented methodology for developing professional competencies of specialists are discussed. Technologies oriented towards case modeling are examined, addressing the essence of the case method as a tool that, if implemented into the educational system, could enhance the efficiency of the learning process [24].

Therefore, the implementation of large-scale national education informatization programs in Ukraine has led to the creation of computer-oriented learning environments (COEE) in higher education institutions. This allows for the application of advanced information and communication technologies in the educational process. Given the relevance of this issue, contemporary Ukrainian pedagogical science continues to search for effective mechanisms to implement three-party relationships (teacher-student) in computer-oriented learning environments for organizing pedagogical interaction among participants in the educational process in higher education institutions, including medical institutions [25].

The objective of the research is to justify the appropriateness, possibilities, and peculiarities of using information and communication technologies in the educational activities of Ternopil National Medical University in connection with advancing global innovations in medical science and practice.

MATERIAL AND METHODS

The following scientific methods were applied: a) theoretical – analysis of psychological and pedagogical scientific literature to summarize domestic and international experience in the application of modern digital technologies in higher education institutions; b) empirical – pedagogical observations of the educational activities of the environment's subjects using information and communication technologies, surveys, interviews, anonymous questionnaires of dental students to assess the effectiveness of the functioning of modern digital technologies; c) statistical – descriptive statistics for the analysis and interpretation of research results.

As the student is a leading subject in the educational process [26], we analyzed the feasibility of involving interactive methods, platforms, and programs for distance learning, as well as the effectiveness of existing ICT in the educational activities of TNMU. During the research, an analysis of anonymous surveys was conducted among 5th-year students of the Dental Faculty (115 individuals) regarding the effectiveness of

the existing Center for Innovative Educational Technologies.

The questionnaire raised a number of questions, in particular, whether the respondent is satisfied with the education system at TNMU, it was proposed to give an assessment of the information support of the educational process, the quality of the Web page on the Internet, an assessment of the lectures with multimedia support, an assessment of the quality of test tasks in the Moodle system for practical classes and semester exams. Each respondent had the opportunity to make suggestions for improving the ensuring of educational process.

The results of the survey of higher education applicants were subjected to statistical processing, after which it was possible to evaluate the obtained data. Statistical analysis of the data of the student questionnaire survey was carried out using the standard software package for personal computers "Microsoft Excel-2007" for Windows and the package of licensed mathematical programs "Statistica for Windows. Version 8". For statistical data processing, descriptive statistics were used, in particular, the percentage distribution of responses. To test statistical significance, the chi-square test (χ^2) was applied, allowing for the determination of whether there were significant differences between groups. Analysis of variance (ANOVA) and Fisher's exact test were used to assess and analyze statistical significance.

Results and discussion. *The information technology platform of higher education institutions in the training of medical professionals.* The efficient utilization of ICT in the educational process holds invaluable importance on the path towards the European educational space. The level of education informatization correlates with the ICT Development Index, a composite indicator calculated using the methodology of the International Telecommunication Union (ITU), a specialized UN agency that sets global standards in ICT development, characterizing the achievements of countries worldwide in this field. The results of the ITU monitoring, presented in the published report "Digital Trends in the Commonwealth of Independent States 2021: ICT Development Trends in the CIS Region, 2017–2020", showed that Ukraine lags behind global leaders in ICT development, holding the 79th position in this ranking [27].

A new challenge has emerged with the issue of COVID-19, which holds exceptionally crucial medical, social, and economic significance, remaining a top priority to this day. The emergence of a new variant of severe acute respiratory syndrome associated with the SARS-CoV-2 coronavirus and the subsequent global pandemic of coronavirus disease COVID-19 has significantly impacted healthcare systems worldwide.

The implementation of quarantine measures and restrictions in the majority of countries, including Ukraine, as mentioned in the Resolution of the Cabinet of Ministers of Ukraine [28], posed a challenge not only to the healthcare system but also to the education system in Ukraine and many countries globally [13, 14, 19, 21, 29]. The extensive invasion of Russia, initiated on February 24, 2022, resulting in a complex set of serious problems for Ukrainians due to armed conflict, further exacerbated the situation. During the period of quarantine restrictions and martial law in Ukraine, the role of information and communication technologies in the development of education increased significantly, necessitating the implementation of distance learning in educational institutions.

To improve its position in the ICT development ranking in Ukrainian education, it is necessary to conceptually rethink approaches to organizing the educational process, taking into account the experiences of leading countries worldwide. Through exchanging experiences with European Union countries, TNMU has been among the first in Ukraine to incorporate innovative advancements into the training of medical professionals. The study of advanced experiences in European and American medical education at higher education institutions, along with a detailed analysis of the obtained information, contributed to the adoption by the academic council of the Concept of Development of I. Horbachevsky Ternopil National Medical University "Integration into the World Medical Educational Space". This concept marked the beginning of implementing modern educational technologies in the institution and served as the basis for the reorganization of the educational process, starting in 2008. According to this concept, TNMU underwent significant changes in organizing the educational process. This included the introduction of several new teaching technologies such as placing educational and methodical materials on the university's web portal, implementing a distance knowledge control program using the Moodle system, transitioning from the widely accepted N-system to the practically-oriented Z-system of education, restructuring student independent work, introducing semester test controls, objective structured clinical examinations, and communication algorithms (communication skills).

The university has established a unique organizational structure for the internal quality assurance system in higher education, based on the "Standards and Recommendations for Quality Assurance in the European Higher Education Area", with the distribution of functions among various structural units of the system. For instance, the creation of an electronic educational and methodical complex for academic disciplines follows a dual approach: content

formation is carried out by faculty members of the departments, while the technical implementation is handled by specialists from the university's IT department and the software and hardware support department. The implementation of modern telecommunication technologies into the educational process at TNMU has created an informational educational environment for student learning. To prevent unauthorized access to the university portal, each student and faculty member has a personal access code to internal information reserves and their electronic profile. Students have the opportunity to communicate with instructors using contemporary technologies through the Moodle e-learning platform. This allows instructors and students to access modern educational information, including schedules for practical sessions and lectures, methodological recommendations, and materials for lecture and practical session preparation (multimedia support for lectures, texts, drawings, graphics, diagrams, videos, links to other internet sources, audio recordings, electronic books, journals).

Since 2018, TNMU has been a partner in the Ukrainian-Swiss project "Development of Medical Education", which has made various activities possible, including obtaining equipment for distance and simulation learning, learning English at levels B1 and B2, etc. It is worth noting that the Strategy for the Development of Medical Education in Ukraine [2], among other things, envisions continuous professional development for higher education instructors by developing and implementing a comprehensive program to enhance their proficiency in the English language and providing sufficient resources for its study [30]. However, an equally important educational component of the project is the diverse training opportunities that allow instructors to professionally improve and develop, which is particularly relevant today in the context of continuous professional development.

The current state of distance learning at TNMU.

The introduction of distance education at TNMU in 2008 contributed to the development of distance learning technologies in medical education, the creation of high-quality distance learning courses, the practical implementation of laws and orders regarding the integration of distance education technologies into the training system, and, consequently, the improvement of the quality and accessibility of professional training for future physicians. Distance learning at TNMU during the COVID-19 pandemic and the period of martial law in Ukraine allows students not only to continue studying a subject according to the syllabus but also to acquire the knowledge, skills, and abilities necessary for modern professionals. Students have the opportunity to

receive quality educational services during distance learning through platforms such as MS Teams, Zoom, Google Meet, and utilize the resources of the Moodle platform. The department's web pages contain the necessary theoretical information for each topic of practical classes and lectures in accordance with the curriculum of the academic discipline. Modern lectures, seminars, and practical sessions are conducted using multimedia technologies, enriching their content with illustrations, interactivity, and data from contemporary literature sources. Distance online lectures, which the faculty delivers through the MS Teams program, aim to generate interest among the audience, increase motivation to study the academic discipline, improve students' performance, and stimulate them to seek information on the given topic. Additionally, distance education, by enhancing the creative activity of the instructor in line with innovations, turns them into a mentor-consultant, a tutor whose role involves coordinating the cognitive process and overseeing the organizational, informational, consultative, and control components of the educational process.

Years of experience in developing software and methodological materials, along with the capabilities of the COEE, allow for prompt updates to the content of the electronic educational and methodological complex of disciplines and monitoring the quality of student preparation. Computerized testing of students' knowledge on each practical session topic is conducted through the Moodle platform. For monitoring students' knowledge during the examination session, a centralized independent assessment of students' knowledge is applied in a separate structural unit of the university – the Educational and Scientific Department of Independent Testing. This allows for objective evaluation of students and simultaneously prepares them for the licensure integrated exam "KROK 2". The active use of ICT in dental departments occurs through the improvement of methods and forms of training for future dentists, contributing to the enhancement of educational quality indicators. Achieving this goal is possible through the development of modern educational technologies, which manifest in the processes of forming professional and communicative competencies of future dentists.

Formation of general and professional competencies in the future doctor. The modern educational technologies at Ternopil National Medical University aim to organize students' work in a way that allows harmonious integration of information, contributing to the formation of both general and professional competencies in students. During the study of academic disciplines, each student prepares a thematic case history of a "virtual patient" with detailed

descriptions of clinical and laboratory examination data. During the MS Teams meeting, which allows simultaneously displaying a presentation on the monitor screen and commenting on it, the student demonstrates the ability to present the material, illustrating it with respect to the "virtual patient". This form of educational work creates conditions for the formation and consolidation of professional knowledge, skills, and abilities of students, contributing to the development of both general and professional qualities of the future specialist.

The use of ICT helps students learn through active methods of acquiring new knowledge, stimulates creative and innovative abilities, and brings education closer to the practice of medical activities. The advantages of innovative methods are hard to overestimate, as they play a leading role in the formation of general and professional competencies, as well as the personal qualities of future professionals. According to the definition of experts from the World Health Organization [31], "a modern highly qualified doctor is a person who provides medical care, makes decisions, communicates, manages, and considers the interests and needs of society". The main focus should be on preparing a doctor with quality professional knowledge, comprehensive intelligence, capable of successfully addressing the tasks of human health care.

The organization and implementation of interactive methods in shaping the general and professional competencies of future doctors. One of the interactive technologies used at TNMU is case technology, the introduction of which into practice is associated with the overall focus on the development of medical education at the modern stage. It is oriented not so much towards students acquiring specific knowledge but towards the formation of general and professional competencies. One of the instruments for competency development is interactive techniques, such as business and role-playing games. They hold a significant place in activating cognitive activity, particularly in developing clinical reasoning, thereby enhancing the motivation of dental students for practical mastery of professional activities. One form of educational interaction is the quest: during the game, the team solves logical tasks, seeks original solutions, and develops communicative competence, allowing the integration of the game into the learning process [32]. In accordance with the topic of a practical class in pediatric dentistry, the instructor constructs a plot-role situation where each student is assigned a specific role: a young patient, their relatives, a dentist-therapist, a dentist-surgeon, an orthodontist, a radiologist, a department head, a nurse, a registrar, etc. It is well-known that no scientific, technical, or methodological achievements, no matter how advanced,

can replace the doctor's ability to communicate with a young patient. A pediatric dentist must establish a psychological connection with the child and their parents and communicate with colleagues. The communication skills of a pediatric dentist with a young patient, the ability to dialogue with them and their parents, as well as with colleagues, ensure the most effective conduct of therapeutic-diagnostic dental manipulations [33]. Professionally oriented role-playing games and quests enhance the student's motivation to study the session topic, contribute to a better assimilation of theoretical material, as the clinical situation being played out is close to their future professional activities.

Effective organization of independent student work using innovative forms and digital technologies. In accordance with European standards, one of the main types of educational activities is independent student work – a form of learning organization that encompasses various types of individual and collective learning activities. At TNMU, independent student work, organized with the use of ICT, is conducted under the guidance of an educator acting as a moderator, tutor, or with their direct participation. The forms and methods of independent work, closely linked to the use of ICT, allow for differentiation and individualization of learning, expanding informational possibilities, performing creative tasks, and facilitating control and self-control. The rational organization of independent student work with the use of ICT not only defines it as more independent, prioritized, and creative but also lays the foundation for further self-education and self-improvement. A high level of motivation for independent student work, its proper organization, informational, methodological, and advisory support for students, as well as collaborative relationships, represent a sequence of steps toward success in achieving professionalism. Students at TNMU have the opportunity to participate in scientific and practical conferences for students and young scientists, both within Ukraine and abroad. For instance, dental students, under the guidance of faculty from the Department of Pediatric Dentistry, participate in the "International Medical Congress of Students and Young Scientists", an annual event held at TNMU.

Assessment by Ternopil National Medical University students of the effectiveness of the educational process in the Center for Innovative Educational Technologies. The aim of the survey was to study the effectiveness of the organization of the educational process and to assess its components by higher education students. The survey results provide insights into students' attitudes toward various aspects of the educational process at the university, as well as

identify its strengths and weaknesses. The results of statistical processing of the interviewed people questionnaires were interpreted in order to study the students' evaluation of information support and establish the effectiveness of the educational process system at TNMU.

The first question we asked the respondents was an assessment of the learning system at TNMU. Students had the opportunity to choose one of three response options: positive, negative, or minor shortcomings. Descriptive statistics, particularly the percentage distribution of responses, showed that 79.13% of respondents rated the learning system positively, 7.82% rated it negatively, and 13.05% indicated minor shortcomings. To test statistical significance, the chi-square test (χ^2) was applied to determine whether there were significant differences between the groups. However, the results of the chi-square test ($\chi^2 = 3.56$, $p = 0.168$), suggesting no substantial differences in students' responses.

Students were asked to assess the quality of informational support for the educational process, particularly the availability of textbooks, lecture materials, and the accessibility of websites for methodological materials for practical classes. The percentage distribution of responses regarding the provision of textbooks and lecture materials was as follows: high level – 48.70%, sufficient level – 39.13%, and low level – 12.17%. The quality of the TNMU website was evaluated by respondents as follows: high level – 67.82%, sufficient level – 27.83%, and low level – 4.35%. The overall trend indicates a high level of student satisfaction with informational support. Analysis of variance (ANOVA) was used to assess statistical significance, revealing that these differences were statistically significant ($F = 3.87$, $p = 0.015$), indicating significant differences in the evaluation of material quality and the website.

Respondents evaluated the quality of multimedia lectures. The role of the lecturer was assessed as follows: high level – 59.13%, sufficient level – 26.96%, and low level – 13.91%. The accessibility of lectures for students was rated as high by 70.43% of respondents, sufficient by 20.87%, and low by 8.70%. According to the survey results, most students are satisfied with the quality and delivery of lecture materials. Fisher's exact test was used to analyze statistical significance, indicating no statistically significant differences in respondents' evaluations (Fisher's exact test = 0.42, $p = 0.751$).

Another important aspect assessed by students was the test assignments in the Moodle system for practical classes and semester exams. Respondents evaluated the

difficulty of the tests based on several criteria: compliance with the curriculum, test volume, clarity of task formulation, and whether the tests required a specific answer. A high level of test quality in the Moodle system was indicated by 72.17% of respondents, a sufficient level – by 25.22%, and a low level – by 2.61%. These results indicate overall positive student feedback regarding the quality of test assignments in Moodle. The chi-square test (χ^2) was used to assess statistical significance, revealing that the differences in ratings were statistically significant ($\chi^2 = 6.42$, $p = 0.040$).

The survey results of TNMU students indicate overall satisfaction with the learning system and informational support, although certain shortcomings requiring improvement were identified. Statistical data analysis revealed significant differences in student feedback regarding the quality of test assignments, multimedia lectures, and informational support. To further improve the learning process at TNMU, it is advisable to conduct a more detailed study of the identified issues to develop specific measures for their resolution. In particular, it is recommended to enhance the test assignments in the Moodle system, improve the accessibility of methodological materials and textbooks, and increase the quality and availability of multimedia lectures for listeners.

Each respondent had the opportunity to make suggestions for improving information provision, which mainly involved enriching department web pages with quality video materials of educational and informational content, thematic master classes, and photo materials. Based on the analysis of the anonymous survey of students, we can state that the vast majority of students confirmed the appropriateness and effectiveness of using COEE resources as a means of organizing pedagogical interaction at TNMU.

The combination of a complex innovative approach in the training of future specialists became the key to their successful training. Thus, the certification of graduates of the educational and professional program 221 "Dentistry" of the second (master's) level of higher education at the stage of the objective structured clinical examination showed that the qualitative success rate was 95.79% with 100% absolute success rate. The results of the second stage of the unified state qualification exam – integrated test exam "KROK 2" in the specialty "Dentistry" by students of the Faculty of Dentistry of the Ivan Horbachevsky Ternopil National Medical University of the Ministry of Health of Ukraine confirmed the results of the previous stage of the exam. The analytical report of the Testing Center at the Ministry of Health of Ukraine provides data on the results of the second stage of the unified state

qualification exam – the integrated test exam "KROK 2" by domestic applicants of the specialty "Dentistry" in 2023 (the data of 2024 have not been published at this time). According to the published data of the analytical report of the Testing Center of the Ministry of Health of Ukraine, all domestic higher education applicants of TNMU successfully passed the "KROK 2" test exam in the specialty "Dentistry" [34].

The research results provide a basis for considering that students pursuing a higher education degree at the second (master's) level have the potential to improve the quality of professional education and require involvement in innovative forms of shaping the basic professional competencies of future dentists. The use of ICT, combined with the accumulation of knowledge, skills, and abilities, contributes to the development of students' creative abilities, revealing their personal qualities, shaping cognitive interests, fostering a desire for self-improvement and development. It motivates students for future practical activities, preparing a specialist capable of effectively applying theoretical knowledge in practical healthcare conditions, continuously enhancing qualifications throughout their professional career.

CONCLUSIONS

The implementation of ICT in the practice of medical institutions is a relevant and effective educational technology in the professional training of

future medical professionals. In the context of the reform of the education sector in Ukraine and the civilizational challenges in the field of education and science, the further activities of the teaching staff of the dental faculty of TNMU are focused on updating the content of theoretical and practical training of dental students based on European standards of higher medical education and the formation of competitive specialists ready for future professional activities. The teachers of dental departments at the university positively assess the experience of using ICT, interactive teaching methods, platforms, and programs for distance learning and plan to further improve them in the teaching of educational disciplines in the future. The conduct of this study does not cover all aspects of the issue of interactive educational technologies in medical education for physicians. The team of the Department of Pediatric Dentistry at TNMU directs its efforts towards implementing the concept of the development of higher medical education in Ukraine in accordance with European standards and recommendations, based on the best traditions of Ukrainian higher education combined with the use of modern educational technologies. Prospective directions for scientific development include the improvement of ICT, finding ways to implement laws regarding the integration of interactive educational technologies into the system of medical personnel training.

PROSPECTS FOR FUTURE RESEARCH

This study has only partially highlighted some aspects of the distance learning regime in a higher medical education institution during the period of the COVID-19 pandemic and martial law in Ukraine, but in the future it is necessary to conduct in-depth studies of the educational process in the online format in order to more fully provide the opportunity to form the necessary practical abilities and skills in the training of dentists.

AUTHOR CONTRIBUTIONS

All authors substantively contributed to the drafting of the initial and revised versions of this paper. They take full responsibility for the integrity of all aspects of the work.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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