DOI: https://10.30841/2708-8731.5.2023.286764
UDC 618-073.432.1

Studying the discipline of free choice «Ultrasound Diagnostics in Obstetrics and Gynaecology»

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Today, in the education system, an important opportunity for higher education applicants is the right to form an individual educational trajectory according to the relevant qualification level. Higher education seekers have received not only academic mobility but also the opportunity to study disciplines to consciously choose their specialty and study it more deeply. The skills of ultrasound diagnostics increase the professional level of a doctor of any specialization and open wide diagnostic possibilities.
The article reveals the peculiarity of studying one of the subjects of free choice by medical higher education applicants on the basis of Odesa National Medical University – "Ultrasound Diagnostics in Obstetrics and Gynaecology". The adaptation of the educational process in a mixed format with the possibility of using digital learning technologies and mastering professional skills on ultrasound machines of different classes is described. In the course of studying the discipline, the necessary basic digital skills of using an ultrasound scanner and knowledge of the main visualization modes, adjustment principles, as well as sets of functional capabilities inherent in all modern devices are formed.
The method of presentation of theoretical information and the use of case scenarios during the discussion of clinical tasks with mandatory visualization of ultrasound video recordings is described. The applicants' digital skills are directly related to the course being studied and are necessary to master the proposed professional field. The possibility of learning using the latest medical equipment in combination with the use of digital learning tools and video resources contributes to the acquisition of professional competence and the formation of responsibility and interest of students. In the process of training manual scanning skills, the doctor's thinking and the ability to analyze and interpret the received ultrasound data are formed. Practical classes help to discuss the most interesting issues for this specific group of higher education applicants in a comfortable and trusting environment. The use of a combined approach in the presentation of the material, the author's style and the format of the transfer of professional skills by experienced teachers who are engaged in constant practical activities motivate, improve the training process and give a high result.
Keywords: *digital learning technologies; training of medical personnel; higher medical education; modern diagnostic technologies; ultrasound diagnostics.*

Вивчення дисципліни вільного вибору «Ультразвукова діагностика в акушерстві та гінекології»

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Сьогодні у системі освіти важливою можливістю здобувачів є право формування індивідуальної освітньої траєкторії згідно з відповідним кваліфікаційним рівнем. Здобувачі освіти отримали не лише академічну мобільність, а й змогу опановувати дисципліни з метою усвідомленого вибору своєї спеціальності та її більш глибокого вивчення. Навички ультразвукової діагностики підвищують професійний рівень лікаря будь-якої спеціалізації та відкривають широкі діагностичні можливості.
У статті розкрито особливість вивчення здобувачами медичної освіти однієї з дисциплін вільного вибору на базі Одеського національного медичного університету – «Ультразвукова діагностика в акушерстві і гінекології». Описано адаптацію навчального процесу у змішаному форматі зі змогою використання цифрових технологій навчання та оволодіння професійними навичками на ультразвукових апаратах різного класу. У ході вивчення дисципліни формуються необхідні базові цифрові навички використання ультразвукового сканера та знання основних режимів візуалізації, принципів налаштування, а також оволодіння наборами функціональних можливостей, які притаманні всім сучасним апаратам.
Наведено методику викладання теоретичної інформації, застосування кейс-сценаріїв під час обговорення клінічних завдань із обов'язковою візуалізацією ультразвукових відеозаписів. Цифрові навички претендента безпосередньо пов'язані з циклом, що вивчається, і необхідні для оволодіння знаннями у запропонованій професійній галузі. Можливість навчання на новітньому медичному обладнанні у поєднанні із застосуванням цифрових інструментів навчання та відеоресурсів сприяють набуттю професійної компетентності та формуванню відповідальності і зацікавленості здобувачів.
У період відпрацювання мануальних навичок сканування формується мислення лікаря, здатність аналізувати та інтерпретувати отримані ехографічні дані. Практичні заняття допомагають обговорювати найцікавіші питання для даної конкретної групи претендентів у комфортному та довірчому середовищі. Використання комбінованого підходу у викладанні матеріалу, авторський стиль та формат передачі професійних навичок досвідченими викладачами, які займаються постійною практичною діяльністю, мотивують, удосконалюють процес підготовки та дають високий результат.
Ключові слова: *цифрові технології навчання, підготовка медичних кадрів, вища медична освіта, сучасні діагностичні технології, ультразвукова діагностика.*

Modern high technologies have long been used in various spheres of human life. Advances in electronics and robotics, as well as the use of computer technology, have become a necessary component of modern medicine. Current graduates of higher medical schools need to have not only deep basic theoretical knowledge but also be able to apply their communication skills in an interdisciplinary team and have an understanding of various healthcare systems. An important skill of a modern professional is knowledge of information and communication technologies and also the free use of high-tech professional equipment in practical activities. The main quality of a successful specialist is the ability to systematize, analyze and use the information received from various educational resources, and apply it in practice.

Modern challenges and emergencies have pushed humanity to the widespread use of digital technologies. And today there is a need for further use and promotion of digital technologies in the educational process in higher medical schools. Also, digital transformation has affected the scientific community and forever changed the approaches to the training of medical personnel and the scope of medical services. The experience gained has become valuable in terms of the use of digital educational resources in the preparation of higher education seekers in higher medical schools [1].

The current health care system of Ukraine is in search of a new model that is close to European standards of medical care to join the global educational space. An important regulatory document is the developed Strategy for the Development of Higher Education in Ukraine for 2021–2031 [2]. In this regard, the role of the information and professional space and the provision of a high level of the educational process are of significant importance. In the conditions of modernization of higher education, an important point is the program of academic mobility and the opportunity in higher medical schools to study academic disciplines of free choice.

According to the Law of Ukraine «On Higher Education», higher education seekers have the opportunity to form an individual educational trajectory independently [3]. It is determined by taking into account the priorities, capabilities, skills and experience of the student. There is an opportunity to choose academic disciplines within the limits provided for by the relevant educational program, in the amount of at least 25 per cent of the total number of credits of the European credit-transfer-accumulation system [4, 5].

Analysis of the latest research and publications

The changes taking place in the social, political and economic spheres, and the changes that have taken place in the health care system, as well as the rapid development of science and technology, dictate the need for further improvement of medical education. As the group of authors O. I. Potapchuk, I. B. Lutsik and others emphasize, in the conditions of distance education, the concept of the smart university was implemented, where the main thing is the combination and interconnection of the four components of «4T»: technologies, tactics, talents, traditions. The main thing today is learning in an interactive educational environment, which is an online platform for learning both at the stage of obtaining higher education and at the stage of subsequent advanced training, exchange of ideas, and achievements in the educational and scientific sphere between teachers of partner universities, their professional development [6].

In modern education, the possibility of using Internet technologies is also mandatory. Yu. S. Ilyasova and L. S. Shevchenko share their own experience of using Internet technologies in professional disciplines. The authors introduced educational blogs, mental maps and online exercises of the LearningApps service into the educational process of medical schools. In their opinion, the use of online Internet technologies contributes to improving the quality and efficiency of professional training in higher medical schools [7].

Effective learning is possible with a clear organization of academic online interaction between teachers and students in a virtual educational environment [8]. At the same time, it is important to evaluate effective teaching in the online format, which requires an appropriate theoretical and methodological basis. For example, M. Byrka et, al. [9] analyzed and identified a five-level structure of twelve principles that expands the possibilities of online learning. The stated principles are illustrated by examples of specific methods that are considered the most important and effective in modern conditions for higher and postgraduate education.

Due to the rapid development of information and communication technologies, the teaching aids used are constantly evolving and improving. Changing technologies are closely related to distance education [10]. At the same time, students' perception of distance education is dynamically changing. The authors also suggest using the «Distance Education perception Scale - Medical Students» (DEPS – Medical Students), which helps to understand the attitude of students to distance learning. The scale allows the application of methods to encourage effective learning and further influence learning strategy [11].

One of the main directions of the modern educational process is to improve the quality of education through the choice of certain disciplines that can form an individual learning path [12]. Student-centered practices in education include aspects of positive psychology and approaches aimed at identifying and developing the individual sides of each student. The attitude and interaction of stakeholders, joint work, information exchange, adaptation of the curriculum to individual needs and assistance to the most active and involved students in the process are important. Authors A. Gray and K. Woods emphasize that the key to improving positive learning outcomes is understanding the desires and needs of each student [13].

It should be noted that the blended form of education is quite convenient and popular among educational institutions today [14]. The experience of using blended learning and digital technologies is presented in the publications of foreign scientists A. Naciri [15], N. K. Ibrahim [16] and W. S. Chen [17]. On the one hand, this form involves the widespread use of digital technologies as an effective tool for all participants in the educational process. Digital devices save time, develop independence and transform the educational process. On the other hand, blended learning contributes to effective and productive communication with the teacher. In the process of such cooperation, the teacher focuses on the most important issues and problems, and the student acquires knowledge and skills in a particu-

ISSN 2708-8723 (print)
ISSN 2708-8731 (online)

lar discipline. This form of training takes into account both the individuality of the presentation of the material and the interests of the higher education seeker, his strengths and weaknesses, talents and abilities [18].

The development of communication skills of the future doctor is important today. After all, communication is a common element of all medical consultations, affecting a range of outcomes for clinicians and patients. Modern medical schools have introduced several approaches for teaching and developing interpersonal skills as core competencies for medical graduates around the world [19].

In the course of classes, it is important to use different types of learning material for mastering practical skills. The expansion of information and communication technologies has made it possible to transform educational materials. The academic environment combines text, audio, graphics, video and animated materials and interactive teaching methods to motivate students. Incorporating animation into the learning process fleshes out complex subjects and creates a rewarding learning experience without worrying about time [20]. The advantage of animation methods over still images is that the method visually demonstrates change, process, and dynamics. Compared to still images, videos are more realistic, easier to remember, and better suited for learning. Several authors believe that materials presented in a visual format increase the motivation of students due to their interest in advanced technologies [21].

Another educational tool that can increase motivation and support the efficient functioning of cognitive load is an interactive video. Interactive video at the present stage allows you to provide tasks for testing knowledge and make the higher education seeker more active in the learning process. Practical skills in basic and clinical sciences remain the most important trends in higher medical education [22].

In their work, L. Yeo and R. Romero [23] review the simulation-based training method for obstetric sonography and the problems encountered in the training process. The authors propose to use ultrasonic modelling with optical positioning, which is a new high-precision modern learning system. The use of ultrasound simulators is an effective means of teaching obstetric sonography, which provides training and feedback that allows the student to conduct continuous self-assessments during the training period.

Currently, practical training in ultrasound scanning for future doctors is supported by all international expert practitioners of ultrasound diagnostics, teachers and higher education seekers. Recommendations from the International Consensus Conference on Ultrasound Education for Medical Students help standardize ultrasound education and the core ultrasound curriculum and serve as a basis for additional research in medical education and the application of ultrasound in clinical practice [24].

Ultrasound is a modern, widely used diagnostic method. However, the method is largely operator dependent. The diagnostic significance of the method is lower in less experienced specialists. This may be due to incorrect position or inadequate pressure of the transducer, a change in the scan angle, excessive or insufficient use of ultrasonic gel, etc. Violation of the scanning technique and incorrect evaluation of the image lead to incorrect interpretation of the image and significantly reduce the diagnostic value of the study. In the process of training higher education seekers, the accumulation of their own clinical experience naturally occurs. The knowledge and skills of performing a study significantly improve the diagnostic accuracy of the method.

The purpose of the article is to reveal innovative approaches and opportunities in the professional training of future doctors in the study of the discipline of free choice «Ultrasound diagnostics in obstetrics and gynaecology». Training is carried out using information and communication educational tools, the latest medical equipment and interactive methods at the clinical department of the Medical University. The interest of applicants, the productivity of teaching the discipline proposed for choice and the establishment of further prospects for the development of disciplines of free choice in higher medical schools are determined.

General scientific research methods were used in the work. These are methods of empirical research (observation, comparison, monitoring) and methods of theoretical research (analysis, synthesis, observation, comparison). Personal pedagogical experience and professional medical knowledge made it possible to show the need to combine different teaching methods. This is the use of digital technologies and innovative educational methods in the presentation of material for the formation of professional skills. The methods of mathematical statistics used to process the results of the survey using the online form made it possible to determine the attitude of higher education seekers toward the possibility of choosing disciplines.

Today, every graduate of a higher medical school must combine both the required professional theoretical knowledge and skills, and the necessary information, digital, and communication competence. Currently, the blended form of education is the most effective in the process of medical personnel training. It allows you to combine the possibilities of digital learning tools and traditional approaches in medical education, and is the most effective. To organize the educational process, the virtual learning environment Moodle is widely used. The system has significant capabilities and contributes to the improvement of the educational process. Microsoft Enterprise Platform Teams greatly facilitates communication between the teacher and students. The application, if necessary, allows you to create a video conference or meeting, and is used to provide systematized information in any format. The platform also enables fast and coordinated teamwork in the planned work schedule using the capabilities of audio and video calls, online gatherings and web conferencing, as well as quick messaging and file exchange.

With advances in technology, ultrasound imaging is an important diagnostic tool for evaluating various organs and systems. At the place of medical care rendering ultrasound has become more accessible and widespread with the advent of increasingly portable equipment. The possibility of conducting a study at the bedside of the patient is considered today as a continuation of the physical examination. The successful use of ultrasound as an adjunct to clinical decision-making requires a thorough knowledge of both human anatomy and an understanding of research methodology.

ISSN 2708-8723 (print)
ISSN 2708-8731 (online)

Taking into account current trends, several disciplines of free choice are offered at the Department of Obstetrics and Gynecology of Odesa National Medical University. Each of them is taught to both domestic and English-speaking higher education seekers.

Considering the diagnostic value of ultrasound diagnostics, one of the disciplines prepared at the department was «Ultrasound diagnostics in obstetrics and gynaecology». The working program is compiled based on the educational and professional program «Medicine» for the training of specialists of the second (master's) level of higher education in the speciality 222 «Medicine» of the field of knowledge 22 «Health care», approved by the Scientific Council of ONMedU (minutes No. 9 of June 23, 2022) [25].

The program of the course contributes to a deeper study of the subject. This educational program is thoughtful, structurally and logically organized and interesting. The course is aimed at applicants who are interested in the latest possibilities of diagnostic technologies in practical medicine and at practical training using modern ultrasound diagnostic devices. The department is equipped with various ultrasound devices, including the most popular in obstetrics and gynaecology expert class scanner General Electric Voluson E8. The course program includes 8 topics, 30 practical hours and 60 hours of independent work of higher education seekers.

The syllabus of the free choice discipline provides complete information about the existing structure, the strategy of the educational process, and the principles for evaluating students' work. There is a description of the main and recommended training materials. Free access to this information helps each seeker to decide in advance on the choice of a cycle when independently forming the established part of the individual academic plan.

Independent work of higher education seekers to study the material takes place using electronic information resources. For this course, a wide range of educational and methodological recommendations, didactic materials in electronic format and multimedia presentations on each topic of the course has been developed. During the training process, Microsoft software PowerPoint is widely used to explain and visualize the material in the presentation of the theoretical part of the discipline. The PowerPoint interface provides the ability to insert the desired video into the presentation, both from the teacher's digital archives and from any other resources. This feature greatly simplifies the presentation of the material and also helps students accumulate their baggage of ultrasound images. The video placement feature in a PowerPoint presentation is important for visualizing ultrasound examples.

The possibility of demonstrating a video loop in a presentation is more correct and illustrative than demonstrating a digital photo. This is because on showing a video loop, each participant in the educational process has the opportunity, based on the visualization of sections obtained in various sections of the human body, to orient in the topographic position and structure of the organs under study, which is sometimes difficult to do when viewing a picture. The ability to record a presentation in video format allows you to save information on the Internet or a disk.

The interactive learning format has made the learning process more versatile. Seekers who came to the course not only choose the most interesting discipline for them but also have the opportunity to familiarize themselves with the necessary amount of information before the start of practical classes and return to the material during the period of studying the discipline.

In the educational process, attention is paid to the formation of professional competence. This is achieved through practical work on the ultrasound machine in real-time, as well as comparison and analysis of the collected and carefully selected images. The material and technical base of the department has the technical capabilities and provision for the full-fledged training of higher education seekers in this area.

The process of studying the discipline begins with the development of communication skills of a doctor with the patient, and this is not only the ability to collect information about the patient's complaints, the anamnesis of life and disease, but also the discussion of important deontological aspects during the ultrasound examination and the doctor's ability to convey information to the patient after the examination. The position of the patient during the examination, optimal approaches, scanning methods (transabdominal, transvaginal and transrectal), advantages and disadvantages of each research method, goals and objectives, indications and necessary conditions for ultrasound examination in obstetrics and gynaecology are discussed.

During the period of training and development of manual skills in scanning various organs and structures for obtaining images, specific issues of practical importance are also discussed. One of the advantages of practical training in the ongoing discipline of free choice is the possibility of multiple repetitions of research, and hence the consolidation of skills in correctly displaying the image on the screen at the time of the study. For easier assimilation of the material, it is proposed to follow standard algorithms for performing the procedure. The opportunity to learn by researching colleagues is a simple, fun, actionable and motivating process. It doesn't only allow them to acquire initial professional skills in an accessible form but also stimulates their further development. Each higher education seeker has the opportunity to practice certain scanning positions during a transabdominal examination in role-playing games during a practical lesson.

Transvaginal ultrasound is by far the most accurate method of imaging pelvic organs. However, the scanning technique has its characteristics, both ethical and technical. Therefore, in the learning process, different approaches to mastering professional skills are used. This is the development of practical skills with the help of a mannequin and the possibility of broadcasting the ongoing study from the ultrasound room to the training room, which allows you to show the procedure without a conflict of interest with patients. During the study, the image is displayed on the monitor screen in the training room, which allows you to observe the process of the study.

Modern ultrasound scanners use the latest technologies and sophisticated software, which makes the ultrasound machine multifunctional and reliable. Currently, ultrasound devices provide the possibility of three-dimensional scanning in real time, image optimization in various modes during diagnostics, have various automatic functions for

ISSN 2708-8723 (print)
ISSN 2708-8731 (online)

standard measurements, volume calculations and vascular indices. Often, a top-class device has an intuitive interface for an experienced doctor. However, for a higher education seeker, there is a need to develop digital competency skills in using ultrasound scanners of different classes. Therefore, in practical classes, issues of configuration and functionality of ultrasound devices are considered.

When conducting an ultrasound examination, the visualization of organs, tissues and structures consists of obtaining many sections during polypositional scanning. Therefore, the understanding of the principle of the scanner operation, the visualization of the image and the interpretation of the obtained echographic data take the leading place in the algorithm for examining the patient. During training, attention is paid to the normal and pathological echographic picture, and the construction of an echographic diagnosis, which is an important component of a preliminary diagnosis.

The process of studying the discipline is aimed at the formation of the most important professional competencies in obstetrics and gynaecology. First of all, this concerns the echographic picture of the normal anatomy and biometrics of the pelvic organs, and the ability to assess and describe the most common pathology. When considering situational tasks, possible options for describing changes in organotissue structures used in practice are demonstrated. This develops the seeker's clinical thinking, and the ability to describe any identified echographic changes and independently formulate an echographic (preliminary) diagnosis. As the discipline is studied, examples of echographic images of rare or difficult clinical situations with an appropriate description of the conclusions are prepared for seekers.

When studying the discipline, issues related to ultrasound at different stages of pregnancy, assessment of the state of the fetoplacental complex, ultrasound parameters for assessing fetal maturity, characteristics and markers of congenital pathology during screenings at different stages of pregnancy are also considered. At this stage of the study of the discipline, a combination of interactive teaching methods, discussion of controversial issues and the use of archived medical images is successful. One of the main qualities of a teacher should be the ability to present the material in an accessible and simple way, as well as the constant improvement of teaching materials in the discipline being presented.

The learning process offers interesting materials, reports and videos from professional membership associations and media resources such as The International Society of Ultrasound in Obstetrics and Gynecology (ISUOG, the Society for Women's Imaging), American Institute of Ultrasound in Medicine, International Ovarian Tumor Analysis (IOTA). The use of these resources provides new opportunities and access to lectures, practical recommendations, guidelines, and diagnostic standards on ultrasound in obstetrics and gynaecology, and also provides access to conferences, congresses, symposiums and it is a platform for further development in this professional field.

To find out the opinion of students about the chosen elective discipline, as well as to clarify their interests and wishes, a survey was conducted at the beginning and the end of training using a Google form. The survey involved 100 6th-year students.

Before the beginning of the course, the applicants were asked the following questions: "What, in your opinion, are the most important sections that need to be covered in the course?». On this issue, the answers of the respondents were distributed as follows: for 41% of the respondents, the modern principles of differential ultrasound of benign and malignant ovarian tumours turned out to be important. At the same time, 22% were interested in performing an ultrasound at various stages of pregnancy, 15% in ultrasound assessment of the state of the breast, and 11% in the features of ultrasound imaging in cervical cancer. The possibilities of ultrasound in infertility were of interest to 6% of higher education seekers, and anomalies in the development of the genital organs in childhood and adolescence were of interest to 5% of the respondents.

To the question "Is there a connection between the chosen discipline of UD in obstetrics and gynaecology and your future profession?" Seekers answered unambiguously. 81% of the respondents answered positively, 18% expressed their interest in exploring the possibilities of using ultrasound diagnostics in obstetrics and gynaecology, and only 1% expressed no interest in the discipline of obstetrics and gynaecology. In response to the question "When choosing a discipline, was the practical orientation of the discipline important?» Almost all applicants said that they chose the discipline due to the widespread use of ultrasound diagnostics in medicine.

The following questions were asked to ensure continued engagement with applicants after the cycle. «Which of the developed and provided educational materials did you use most often?» 100% of respondents watched all multimedia presentations in PowerPoint on each topic of the discipline, and 78% of respondents noted that in the preparation process, they used not only presentations but also all the material provided. At the same time, 32% of students in the course said that during the period of the cycle they independently looked through additional information in Internet sources. To the question «Did the chosen academic discipline contribute to the mastery of your future speciality?» 93% of the respondents gave a positive answer, and 7% answered that they had received new knowledge in obstetrics and gynaecology from the position of ultrasound. To the question «Did the knowledge of computer technologies contribute to the improvement of ultrasound skills?» all applicants are unanimous in the need for digital knowledge and skills for a specialist during an ultrasound examination, they consider the information and communication training tools used to present the discipline to be effective and appropriate.

In our opinion, feedback on the practical component of the discipline is important. So, to the question «Are you satisfied with the acquired practical skills during the studying of the discipline?» all participants in the survey gave positive feedback about the opportunity to practice scanning skills.

The results of the survey showed that seekers show great interest in the proposed discipline, due to the possibility of personal interaction with the teacher, and the acquisition of skills in ultrasound diagnostics, as they are important points in the learning process. It should be noted that

the interests and preferences of different groups of students change. Therefore, the learning strategy takes into account the interest of higher education seekers, which contributes to more effective, creative learning, with the development of personal and social skills.

Considering the results of the survey, it can be argued that the ongoing discipline of free choice «Ultrasound diagnostics in obstetrics and gynaecology» increases the effectiveness of training and develops the necessary additional practical skills. During the course of the discipline, personal and communication skills, as well as the ability to work in a team, are important. In practical classes, activity in work, the ability to express and defend one's opinion or assumption are encouraged, and the desire for learning is welcomed.

CONCLUSIONS

Currently, every higher education institution is interested in recruiting the most prepared, talented, active, creative, purposeful and sensible seekers. In turn, applicants with a high level of knowledge and training also select higher education institutions, focusing on the selectivity of profile education. The most attractive for applicants are those higher medical schools that provide the greatest choice of disciplines and the opportunity to manoeuvre in the learning process, as well as contribute to gaining practical experience. Elaborate and interesting programs in higher medical schools, focused on the needs of higher education seekers, are also important. In the process of training, seekers form an individual trajectory, taking into account their preferences. The disciplines of free choice greatly enhance educational programs and make education easier, constructive and interesting. They also contribute to in-depth training and contribute to the development of the necessary practical skills. The preparedness of future doctors and the implementation of the state program for providing medical care to the population largely depend on the skill and competence of the teaching staff.

The proposed choice of discipline «Ultrasound diagnostics in obstetrics and gynaecology» allows each student to expand their professional skills. In our opinion, every graduate of higher medical schools, regardless of their professional orientation, should have practical skills in using ultrasound diagnostics in providing medical care.

The implementation of elective educational disciplines of vocational training undoubtedly stimulates the development of internal competition in an educational institution between teachers, departments and faculties, and increases external competition between all higher educational institutions in the country.

Without a doubt, personal growth, self-development and the formation of individual potential occur at the stage of education in higher educational institutions. Academic mobility and the possibility of creating an individual educational trajectory for each applicant contribute to the formation of the potential for becoming a trained and successful specialist.

Conflict of interest. The authors did not declare any conflict of interest.

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ISSN 2708-8723 (print)
ISSN 2708-8731 (online)

REFERENCES

1. Park JC, Kwon HE, Chung CW. Innovative digital tools for new trends in teaching and assessment methods in medical and dental education. J Educ Eval Health Prof. 2021;18:13. doi: 10.3352/jeehp.2021.18.13.
2. Ministry of Education and Science of Ukraine. Strategy for the development of higher education in Ukraine for 2021-2031 [Internet]. Kyiv: MESU; 2020. 71 p. Available from: rozvitku-vishchoi-osviti-v-ukraini-02-10-2020.pdf.
3. Verkhovna Rada of Ukraine. Higher Education [Internet]. 2014. Order No. 1556-VII. 2014 Jan 07. Available from: https://zakon.rada.gov.ua/laws/show/1556-18#Text.
4. Ministry of Education and Science of Ukraine. Order of the Ministry of Education and Science of Ukraine On the approval of Requirements for interdisciplinary educational (scientific) programs [Internet]. 2021. Order No. 128. 2021 Feb 01. Available from: https://zakon.rada.gov.ua/laws/show/z0454-21#Text.
5. Barna Yu, Medvid LH. The formation of individual educational trajectory of students in the conditions of modernization of higher education. Innov Pedagog. 2019;3(19):178-84. doi: 10.32843/2663-6085-2019-19-3-37.
6. Potapchuk OI, Lutsyk IB, Hevko IV, Buyak BB. Implementation of the concept of a smart university in terms of distance education. Inform Technol Learn Tools. 2022;92(6):140-53. doi: 10.33407/itlt.v92i6.5009.
7. Iliasova YuS, Shevchenko LS. The use of internet technologies in education of medical students. Inform Technol Learn Tools. 2022;91(5):36-51. doi: 10.33407/itlt.v91i5.3996.
8. Yagelo S, Vergun A, Stechak H, Vergun O. Distance learning experience for medical students during a pandemic and martial law. Proc Shevchenko Scie Soc. Med Scie. 2022;69(2). doi: 10.25040/ntsh2022.02.19.
9. Byrka M, Cherevko I, Yakubovska N, Shorobura I, Kurish N. How to empower online teaching: 12 principles for higher and postgraduate education. Inform Technol Learn Tools. 2022;91(5):70-83. doi: 10.33407/itlt.v91i5.4989.
10. Rojanasarot S, Milone A, Balestrieri R, Pittenger AL. Personalized Learning in an Online Drugs and US Health Care System Controversies Course. Am J Pharm Educ. 2018;82(8):6391. doi: 10.5688/ajpe6391.
11. Özkaya G, Aydin MO, Alper Z. Distance education perception scale for medical students: a validity and reliability study. BMC Med Educ. 2021;21(1):400. doi: 10.1186/s12909-021-02839-w.
12. Bansal A, Greenley S, Mitchell C, Park S, Shearn K, Reeve J. Optimising planned medical education strategies to develop learners' person-centredness: A realist review. Med Educ. 2022;56(5):489-503. doi: 10.1111/medu.14707.
13. Gray A, Woods K. Person-centred practices in education: a systematic review of research. Support for Learning. 2022;37(2):309-35. doi: 10.1111/1467-9604.12410.
14. Ministry of Education and Science of Ukraine. Recommendations for the introduction of blended learning in institutions of professional higher and higher education [Internet]. Kyiv: MESU; 2020. 31 p. Available from: https://mon.gov.ua/ua/osvita/visha-osvita/ rekomendacij-shodovprovadzhennya-zmishanogo-navchannya-u-zakladah-fahovoyi-peredvishoyita-vishoyi-osviti.
15. Naciri A, Radid M, Kharbach A, Chemsi G. E-learning in health professions education during the COVID-19 pandemic: a systematic review. J Educ Eval Health Prof. 2021;18:27. doi: 10.3352/jeehp.2021.18.27.
16. Ibrahim NK, Al Raddadi R, AlDarmasi M, Al Ghamdi A, Gaddoury M, AlBar HM, et al. Medical students' acceptance and perceptions of e-learning during the Covid-19 closure time in King Abdulaziz University, Jeddah. J Infect Public Health. 2021;14(1):17-23. doi: 10.1016/j.jiph.2020.11.007.
17. Chen WS, Yao AYT. An empirical evaluation of critical factors influencing learner satisfaction in blended learning: a pilot study. Uni J Educ Res. 2016;4(7):1667-71. doi: 10.13189/ujer.2016.040719.
18. Lokareva GV, Bazhmina EA. Personalization in education: students managing their learning by means of digital technologies. Inform Technol Learn Tools. 2021;86(6):187-207. doi: 10.33407/itlt.v86i6.4103.
19. Gilligan C, Powell M, Lynagh MC, Ward BM, Lonsdale C, Harvey P, et al. Interventions for improving medical students' interpersonal communication in medical consultations. Cochrane Database Syst Rev. 2021;2(2):CD012418. doi: 10.1002/14651858.CD012418.pub2.
20. Barut Tugtekin E, Dursun OO. Effect of animated and interactive video variations on learners' motivation in distance Education. Educ Inf Technol (Dordr). 2022;27(3):3247-76. doi: 10.1007/s10639-021-10735-5.
21. Qaddumi H, Bartram B, Qashmar AL. Evaluating the impact of ICT on teaching and learning: A study of Palestinian students' and teachers' perceptions. Educ Inform Technol. 2021;26(2):1865-76. doi: 10.1007/s10639-020-10339-5.
22. Abbasi Abianeh N, Yazdani S, Heydari M, Farmad SA. Global perspectives on trends in health higher education. J Family Med Prim Care. 2022;11(9):4991-5003. doi: 10.4103/jfmpc.jfmpc_2461_21.
23. Yeo L, Romero R. Optical ultrasound simulation-based training in obstetric sonography. J Matern Fetal Neonatal Med. 2022;35(13):2469-84. doi: 10.1080/14767058.2020.1786519.
24. Hoppmann RA, Mladenovic J, Melniker L, Badea R, Blaivas M, Montorfano M, et al. International consensus conference recommendations on ultrasound education for undergraduate medical students. Ultrasound J. 2022;14(1):31. doi: 10.1186/s13089-022-00279-1.
25. Odesa National Medical University. Educational programs. [Internet]. Available from: https://onmedu.edu.ua/osvita/osvitni-programi/.

Стаття надійшла до редакції 05.06.2023. – Дата першого рішення 12.06.2023. – Стаття подана до друку 13.07.2023