E-Learning Technologies in Continuing Medical Education of Family Doctors in Ukraine: Challenges and Opportunities

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Abstract: Continuing medical education faces new challenges and the need for improvement. The active development of technology since the middle of the 20th century has changed the requirements for education in view of the demand for knowledge-intensive specialties. Analysis of the state of scientific elaboration of the problem of e-learning in Ukraine and the experience of its implementation in the practice of higher education showed that despite some achievements, this pedagogical problem needs further research. E-learning improves postgraduate training of doctors. The main purpose of teaching in postgraduate education is to achieve high-quality practical training based on knowledge, skills and abilities in traditional and modern educational technologies. E-learning is a promising form of pedagogical technologies in the field of medical education, as it is more flexible and corresponds to modern realities of society. The implementation of various online resources in the training of health professionals in quarantine activities related to the COVID-19 pandemic as well as during the war, highlights the problem of information literacy and the use of information technology among physicians of all ages and psychotypes, and shows that the latest resources of telecommunications and computers. computer technologies should be widely implemented in all areas of health care.

Keywords: Continuing Medical Education, Family Doctors, E-Learning, Information Networks.

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Introduction

The global process of transition to the information society, as well as the economic, political and social changes that accompany it, are accelerating the reform of the education system. First of all, it concerns providing access to educational and professional training for all those who have the necessary abilities and relevant knowledge (Ayanso, & Lertwachara, 2014), (Korzh, & Krasnokutskiy, 2016). The most effective solution of these problems is facilitated by e-education, which is carried out on the basis of modern pedagogical, information and telecommunication technologies (Angst, & Agarwal, 2009).

To ensure the quality of medical care, the doctors must constantly improving their knowledge and skills. Currently, there are increased requirements for the level of theoretical and practical training of a doctor, the use of information and computer technology in his professional activity, which is associated with the rapid development of new areas and technologies in medicine (Korzh, 2021). The need for constant updating of doctor's knowledge, rapid retraining and changing the scope of their knowledge are dictated by the transition from the traditional system of postgraduate training of doctors to the system of continuing medical education (Soja, 2017).

Analysis of the state of scientific elaboration of the problem of e-learning in Ukraine and the experience of its implementation in the practice of higher education showed that despite some achievements, this pedagogical problem needs further research.

Due to the quarantine measures, the Google Classroom service has become more convenient for teachers and students to interact with personal Google accounts. The teachers can add students to the study themselves or send a code to join. Google Classroom provides the ability to create, test, and evaluate tasks in electronic form. In addition, the service allows teachers to make announcements and create discussions instantly, while learners can share resources with each other and answer questions in a chat.

The use of the Zoom system has also become convenient and appropriate. In 2017, Zoom announced the release of the first scalable telehealth product that allows doctors to receive their patients via video for consultation, now a solution called Zoom for Telehealth integrates with other health programs in hospital infrastructure and provides “virtual waiting room for patients”. With distance learning for doctors in synchronous mode, the Zoom system provides features such as teacher meetings with learners on multiple screens and devices, sharing the HD screen and wireless network.

However, among the strategic issues related to the implementation of mobile education in the activities of higher medical educational institutions that need immediate solution, we should highlight the organizational, legal, methodological, informational, personnel, technical and financial support.

And for quality training of physicians with the use of informatization, regardless of its type, it is very important to have not only reliable technical support (high-quality and fast Internet access, modern smartphones or tablets, remote server access, IT consultations), lack of new technologies in educational activities, original pedagogical forms and methods of teaching, as well as a high level of professionalism and skill of the teacher.

E-learning in medicine: pros and cons

Informatization of society and introduction of innovative approaches to the learning process have created conditions for conducting training courses using distance learning. What is meant by e-education? E-learning is

the interaction of teacher and students at a distance that reflects all the inherent components of the educational process (goals, content, methods, organizational forms, teaching aids) and is implemented by specific means of Internet technology or other means of interactivity. E-education is widely used in advanced training courses (Ayanso, & Lertwachara, 2014), (Soja, 2017).

The method of teaching using e-learning technologies differs significantly from traditional learning technologies and is mainly based on independent study of the course by the student, and much of the teacher's work is translated into electronic computers (Korzh, 2020). In fact, educational systems "acquire" knowledge from an expert teacher and "bring" them to the student. Therefore, it can be stated that the main feature of distance education is to provide students with the opportunity to independently obtain the necessary knowledge using modern information technology. The ability to individualize learning is one of the main advantages of using information technology in the learning process.

The question of the use of this form of education in medical schools remains debatable. On the one hand, the advantages of e-education are the ability to teach a large number of students, facilitating the learning process, in the case of learning for the disabled, manufacturability – learning using modern software and hardware makes e-learning more effective, and usually e-learning is cheaper question than education regular platform learning norton, primarily remains by case reducing another the discussion cost surgery of showed moving, sciences living medicala in material another scientific city, research reducing connecting the contact cost forms of should organizing the city courses creation themselves component (Ayanso, & Lertwachara, 2014), (Tams, et al., 2014), (Tsodikova, et al., 2020).

Opponents of the use of e-education in medicine believe that the development of practical skills, which are the main component in the training of health professionals, in this way is impossible. However, in our opinion, the use of this form of education in medical schools is not only possible but necessary. Naturally, teaching a doctor practical skills requires traditional face-to-face contact, but all theoretical training and decision-making exercises can take place remotely. In order to properly divide the study time into distance and traditional "phases", it is necessary to carefully revise the curriculum.

Also, e-learning is an ideal and most optimal form of postgraduate training and advanced training, as it helps to solve a number of problems that arise in an already certified specialist, for example, due to different work shifts and schedules of doctors, different approaches to work and study (Tsodikova, et al., 2020), (Korzh, & Tsodikova, 2019). There is also the possibility of using e-learning technologies in cases of full-time students, for example, in the development of general theoretical courses.

Of course, it should be noted that medical education has its own characteristics associated with the teacher-student and doctor-patient relationships. But even in such cases, e-learning demonstrates its flexibility. The

following types of e-learning are possible: without the presence of a teacher, in the case of mastering a theoretical course, with the partial presence of a teacher, during practical and laboratory classes.

E-learning improves postgraduate training of doctors. The main purpose of teaching in postgraduate education is to achieve high-quality practical training based on knowledge, skills and abilities in traditional and modern educational technologies. Innovations in postgraduate education include the introduction of e-learning internships in the technology of training doctors.

E-learning involves several different technologies that can be used in the learning process: case technology, internet technology and telecommunications technology (Korzh, & Tsodikova, 2019), (Goh et al., 2016). The choice of training technology depends on the needs of the doctor, his capabilities, the amount of time for training.

The effectiveness of e-learning at the postgraduate stage of education of doctors is determined by:

-the effectiveness of interaction between teacher and doctor;

-active feedback;

-the quality of preliminary design of the distance education process and means of its management; development of didactic materials.

The technology of work consists in interaction of teachers of department with doctors by means of modern telecommunication Internet-technologies, and means of realization of similar interaction are e-mail, teleconferences, dialogues in a real-time mode, etc. During the live broadcast, a multimedia presentation is performed, which is one of the options for preparing a doctor for the lesson (McAfee, & Brynjolfsson, 2017).

With the help of Internet-technologies the study of methodical developments for classes and materials for interactive reading and testing are provided. Also for the educational process use videos of clinical cases and situations from medical practice (McAfee, & Brynjolfsson, 2017). The videos help in the differential diagnosis of diseases in each case, diagnosis, determination of the required amount of examinations, interpretation of research results and determination of patient management tactics.

In modern conditions, which require constant systematic updating of professional knowledge and skills of the specialist, the possibilities of user access to various information resources, including multimedia, are growing. E-learning is based on the use of modern information technologies and means of communication (television, video and audio teaching aids, computer global and local networks).

Returning to the issue of digitalization in the educational activities of physicians, in particular the use of distance learning for the quarantine period, it should be noted about the existing opportunity to study regardless of the location of the specialist. This is the so-called mobile learning (m-learning) or virtual interactive work with the listener using the platform of support and organization of distance learning Moodle. Physicians

studying in the cycles of specialization and advanced training acquire skills of using electronic resources in the distance cycle (texts, graphics, formulas, illustrations, audio, video, glossary, etc.) and skills of appropriate tools for interactive communication with teachers, master various forms of knowledge control.

In addition to creating and using teaching materials in the LMS Moodle system, mobile and handheld IT devices are increasingly used in teaching and learning: personal digital assistant (PDA), mobile phones, laptops and tablets, and select formats and platforms such as Zoom, Cisco Webex, Skype, Google Hangouts Meet, Avaya Spaces, etc., taking into account the technical capabilities and support of learners and the possibility of their authentication.

According to experts, mobile learning is correlated with the concepts of distance learning and e-learning. If the latter two concepts are understood as separate, then mobile learning has common features with e-learning in the use of "mobile devices" and wireless networks, and distance learning is combined with the fact that it is carried out at any time, anywhere, and in the educational process necessarily involves the interaction of teacher and learner.

In fact, we are seeing universities step up their efforts to make all of their educational content available online. We meet the free use of educational and methodological resources developed by teachers in some places (learning places). However, there are still educational resources to which students of their own university have limited or no access.

Teachers continue to choose platforms for placing educational resources (Moodle, Classroom, Edmodo, and so on) or use those provided by the university administration. Accordingly, the demand for Internet technologies and cloud technology tools (web services) has increased significantly.

Even during martial law in Ukraine, the importance of getting an education was demonstrated. The war destroyed educational institutions, depriving them of students and their teachers. Most of them lacked the resources needed to complete their education. During the war, it was inconvenient for them to study.

The difficulties that prevent students from studying properly are described, and the need for significant improvements in distance learning is emphasized. Opportunities for promotion students during the war. They manifest themselves in the balance of time periods that are increased for the completion of school assignments, the reduction of home (independent) tasks, the extension of sessions, and so on. After a combination of scientists and

From personal experience, recommendations are given on effective and useful web tools for teachers who do not have special knowledge and skills in working with applications, as they are great for improving their own educational electronic environment.

Organization of the educational process in postgraduate medical education

Training in accordance with the principles of continuing medical education, which uses e-learning technologies, has both positive and negative aspects. It is not expected that e-education will gradually replace the traditional, but only complement it and expand its capabilities. E-learning requires students to have some basic knowledge, including online skills. Appropriate technical support for participants in the educational process (both for the department and for students) is also needed.

Direct provision of the educational process with all the necessary teaching materials is also a very important task. These materials are presented in the Moodle system. In addition, during the classes it is necessary to provide students with appropriate handouts and/or textbooks in paper form in order to effectively conduct practical classes. The preparation of printed materials should also be properly organized. In addition, students should have carefully developed guidelines for independent work and, of course, had access to the necessary textbooks and manuals, in particular, through the Internet and the possibility of e-communication with teachers.

An important role in further improving the organization of the educational process is played by the final anonymous survey of doctors. In the questionnaires, they express their comments and suggestions for improving its organization and conduct. These comments are analyzed at meetings of the department and, if necessary, lead to further adjustment of the educational process.

Thus, with minimal human and technical resources, it is possible to organize e-learning courses in parallel with traditional teaching methods. The basis for the introduction of these technologies can be trial courses organized on the basis of certain departments of the educational institution, and in clinical departments on the basis of treatment and prevention facilities. At the same time, the system of e-learning and advanced training of medical professionals should consist of the following components: conducting distance lectures, conducting seminars with in-depth study of previously read lecture material; practical classes on various methods of diagnosis, treatment and surgery, as well as individual telemedicine consultations.

At the Department of General Practice-Family Medicine of the Kharkiv National Medical University, individual elements of distance educational technologies are implemented in the system of continuous medical education: at the cycles of thematic improvement and in the process of training future specialists-doctors of family medicine in internship.

We have used the forms of distance education as lectures in text and presentation versions, methodological developments in electronic form, as well as e-books presented to doctors of the professional retraining course, certification courses for advanced training and thematic improvement in the specialty "general practice-family medicine".

The level of development of the doctor is assessed by his ability to independently acquire new knowledge and use them in educational and practical activities. Independent work occupies one of the leading places in the formation of creative activity. Only purposeful systematic independent work of each doctor allows to deeply master knowledge, to develop and consolidate skills, to turn them into the corresponding skills of mental work.

When conducting the full-time part of the advanced training courses for doctors in the specialty "general practice-family medicine", the department uses both interactive synchronous (on-line) and asynchronous (in recording) e-educational technologies in the form of webinars, webinar lectures, remote master classes, online trainings based on professional Internet sites.

Connecting to Internet resources during practical exercises for viewing and discussing a given topic intensifies the educational process and allows you to solve the problems of both the theoretical and practical parts of the training course.

For the purpose of an individual approach to the theoretical training of interns in the specialty "general practice-family medicine", the department also uses certain elements of e-education, namely:

1. Submission of information materials in electronic form on the subject under study in accordance with the approved training program (information material, methodological training manuals, guidelines, legislative and regulatory documents regulating the activities of family doctors).

2. Development by the teacher of topics for independent preparation of abstracts (in the form of text or presentation materials) with subsequent verification and discussion of them at seminars.

3. Individual test variable control tasks for individual modules of the program sent to students' e-mail addresses, followed by their verification and summing up.

4. Interactive synchronous (on-line) lectures on the studied topic based on a professional Internet resource.

5. Asynchronous (recorded) webinars and remote master classes on a professional site.

6. Testing and solving situational problems on topical problems using a professional site.

7. Participation in peer discussion through telemedicine of diagnostic patients presented by doctors for consultation from remote areas.

As our previous practice shows, such an approach to the theoretical training of doctors allows to ensure their high-quality training, individualize the educational process, and also disciplines and organizes the work of postgraduate students during their stay at the medical practice bases.

Among the important problems and shortcomings of the e-education in Ukraine is the shortage of direct contact between the personal teacher and the distance student due to the extreme professional workload of domestic teachers. Unfortunately, in Ukraine we have a lot of people willing to receive e-education, and there are few experienced teachers who are familiar with the latest technologies of distance communication.

But despite the shortcomings, e-learning technology is a powerful means of cognition. To increase the effectiveness of new information technologies in teaching, it is necessary to form a system that provides a different understanding of the essence of learning, the role of teacher and students in this process, the relationship between teacher and students, equipping teachers and students.

Our own experience

Referring to our own experience, we can say that doctors are still extremely reluctant and insecure to use the knowledge and skills of informatization in their professional activities. The range of information literacy and opportunities for the use of information technology among physicians is very wide, depending on a number of objective and subjective factors (age, specialty, position, psychotype, material support, motivation, etc.).

The introduction of new distance cycles for physicians requires not only new approaches to the relationship between traditional components of the educational process and the latest technologies, but also the restoration of interaction between students, teachers and educational environment, and changing stereotypes that were established at school or university. And this is a difficult process.

Almost 10 years of experience in the use of elements of informatization of education among general practitioners and pediatricians, which is embodied in the developed distance cycles of thematic improvement on the Moodle platform, shows the urgent need to constantly increase the motivation of students to learn. It is our use of such psychological and pedagogical techniques as attracting attention to the cycle, maintaining the importance and confidence of this form of learning, satisfaction with the results at the end of the cycle, allow our students to perform tasks honestly, solve situational problems and actively discuss them in forums with teachers and colleagues.

Today, conducting thematic improvement courses for primary care physicians in a remote format, we try not to overload the materials with unnecessary elements. In the postgraduate courses, we rationally and consistently present illustrated slides with links to "pop-up" windows, through which the learner gets acquainted with educational video and audio files, presentations, graphics, diagrams and more. The main thing is to draw the learners's attention to the presented material, sometimes with the help of unusual, non-standard, creative techniques.

To reduce the peak load on medical facilities and reduce the number of physical contacts, primary care physicians began counseling patients using elements of telemedicine. Thus, with the availability of technical capabilities and setting up special functions in electronic devices, doctors began to provide patients with online consultations, avoiding unnecessary visits to the hospital. Pediatricians are often consulted on child care, vaccination.

Concerned parents send photos of rashes or other changes on their child's skin and mucous membranes, the results of laboratory tests for their interpretation. The patients receive advice on the treatment and prevention of exacerbation of chronic disease, dose adjustment and duration of medication. In cases of extreme necessity, after clarification of symptoms, the patient is quickly referred for examination by a specialist, for a personal appointment, or, using emergency medical care, urgently sent to the hospital.

The war that began in Ukraine changed our lives and to some extent stopped it. Under the influence of hostilities, everyone's priorities have shifted. They put their own safety above all else. Processes and activities are inserted, including educational ones. However, the Ukrainians quickly rallied, and although slowly, almost all areas of activity were launched.

It should be noted that the impact of war and violent conflict on education not only reduces the effectiveness of the organization of the learning environment, but also has a significant impact on student achievement. Despite the difficulties, the education system tries to continue the learning process and gives young people the opportunity to gain knowledge, which pleases everyone.

In addition, the quality of the learning environment is also an important factor. The attention of scientists is focused on the consequences of the war, which consists in the destruction of the educational infrastructure, which causes the deterioration of the psychological, physical, social, cognitive and emotional states and can demotivate learning participants. However, these are not the only disadvantages that war brings to children and students, and they will vary according to specific circumstances.

In the event of critical situations, e-learning is one of the few learning systems still available for the educational process. Educational strategies have been modified to improve student achievement. E-learning strategies are based on some well-known learning theories such as behaviorism, cognitivism and constructivism. Their combination, which is present in all e-learning forms, works well in learning and teaching processes and is aimed at students with different characteristics.

Conclusion

E-learning is a promising form of pedagogical technologies in the field of continuing medical education, as it is more flexible and corresponds to modern realities of society. E-education at the postgraduate stage provides

doctors with the opportunity to independently acquire the necessary knowledge, using modern information technology, as e-learning requires a doctor a high level of professional and cognitive motivation, self-control and self-discipline.

Filling distance learning courses with information material (e-books, presentations, etc.) and tests, providing opportunities for learners to communicate (forums and chats, which discuss current issues and solutions to practical classes), promotes the activity of doctors to attend the distance learning course and increase their interest to educational material. And timely, constructive feedback from the teacher - the tutor of the course, also strengthens the motivation to informatize learning. We do our best to ensure that the feedback from the teacher is informal, targeted and supportive.

In general, e-learning is aimed at solving problems generated by the characteristics and differences of individual students, at providing an opportunity to organize comfortable learning conditions, and in some cases at providing education itself, for example, when a country is at war (Kianto , et al., 2019). Or when there are simply no other options left.

Ukraine is concerned about the age and competence of both technical support and teaching staff. Both are crucial not only for the ability to organize, implement and maintain the educational process during critical situations (pandemic and Ukrainian war), but also for motivating teachers to possess and share the stable productivity of their knowledge that they give to students. These terrifying factors for any educational process are actually good reasons to join the 100% distance learning community (Marek , et al., 2016).

A significant part of the work of teachers is to create effective online courses, conduct classes through online video conferences (Zoom, Google Meet, etc.), record video lessons, produce lecture (presentation) material, develop online tests, maintain electronic journals, etc. e. In addition, the experience and ability of teachers in the e-learning process varies [(Kerres, 2020).

This transition has caused difficulties not only for teachers, but also for students, who are acutely aware of the lack of live communication. This is an urgent problem that should be solved by the administration of the educational institution as soon as possible, as it can negatively (and irreversibly) affect the psychological state of students (Gillett, 2017), (Looi, 2022).

Recommendations

The opportunity to be educated in a safe environment is critical. As a result, the experience of studying the effectiveness of e-learning in combat remains the only right decision. E-learning can achieve the stated educational goals as well as provide a safe learning environment.

Currently, scientists and teachers of Ukraine are discussing the types, forms and methods of continuing the educational process in educational buildings during hostilities in the country. The administration of educational institutions is obliged to prepare and equip safe conditions (bomb shelters) in case of rocket or bomb attack, allowing students and pupils to receive education safely.

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