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REVIEW ARTICLE

FEATURES OF THE PROCESS OF TRAINING IN EDUCATIONAL MEDICAL INSTITUTIONS OF UKRAINE AT THE PRESENT STAGE. PART 2. REACTION OF HIGHER EDUCATIONAL INSTITUTIONS TO DISTANCE LEARNING

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ABSTRACT

Higher education is one of the areas most affected by the Covid-19 pandemic and martial law. Against the backdrop of severe restrictions, universities faced the issue of the existing opportunities for the implementation of educational programs, the need to change the format of the educational process with the transition mainly to electronic educational technologies.

Under these conditions, it was necessary to consolidate all the forces and resources of the university community. The governments of many countries have recognized the need to provide infrastructural and technological support to educational institutions.

Thanks to the institutional support of the state and relevant ministries, universities managed to reduce financial losses and implement initiatives for continuous education. These measures have contributed to the sustainability of universities.

In response to the COVID-19 pandemic, educational institutions all over the world have adopted different approaches and made significant changes to the education system itself in accordance with their resources and capabilities.

KEY WORDS: educational medical institutions, medical students, COVID-19 pandemic, martial law, distance learning

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INTRODUCTION

Medical education in Ukraine, as in most other countries, has experienced major changes caused by the COVID-19 pandemic, and Russian military aggression has further worsened the situation. Universities across the country found themselves in different circumstances: some were destroyed, others suffered significant damage, some faced the issue of temporary relocation to another, safer territory. Both the Ukrainian society and university communities were faced with the question of not only survival, but also the continuation of functioning in extremely difficult circumstances [1-3].

THE AIM

To characterize the learning process in educational medical institutions of Ukraine at the present stage

MATERIALS AND METHODS

This article presents an assessment of more than 70 world literary sources published in the period from 2020

to 2023, which discuss the issues of distance learning process at medical universities. The study involved an evaluation of literary sources included in the PubMed, Google Scholar databases.

The assessment employed data from sociological studies on the attitude of students and teachers of universities to distance learning, conducted by expert organizations during the pandemic, analytical and information materials of universities, bibliographic sources. Secondary analysis and interpretation of the results of sociological surveys, systematization and classification of the theoretical and factual materials used, analysis of management practices and experience of universities in the conditions of extreme transition to remote mode were carried out.

REVIEW AND DISCUSSIONS

Given the current situation, first all over the world, and then aggravation in Ukraine due to the military aggression, a high degree of mobilization of university management teams was required to quickly respond,

search for and implement solutions to non-standard tasks and problems. In the context of the crisis, and especially the martial law in Ukraine, not only administration, but also communication with students, employees and other interested parties, stakeholders became a key task. For Ukrainian students, depending on their place of residence, the Ministry of Education and Science of Ukraine has developed several models of education using its different forms.

The circumstances required continuous communication between members of the university community, exchange of information in order to be aware of changes and be able to act appropriately during disruptions and destabilization [4].

Most universities have created separate sections on the websites of their universities, where they accumulated news, appeals from management, and instructions. Supporting services were also included, namely training materials with recommendations for transferring education to an online format, class schedules, information on how exams will be held and the admission campaign, assistance in temporary employment. A number of universities have actively used social networks to disseminate up-to-date information and recommendations at the present time. Some universities have launched a hotline for students and staff. Most universities have signed contracts with companies such as Microsoft that provide Office resources, Teams, or technology platforms to enhance virtual communication.

The COVID-19 pandemic has highlighted the growing need for broader concepts of academic sustainability that take into account important mental health issues [5-6].

A number of universities have developed effective screening and intervention strategies to build student resilience during their lockdown or any other emergencies in the future.

Mental health and wellness support programs include several means of behavioral assistance: phone support; self-managed mental health care; applications with recommendations for acquiring coping skills; individual therapy services [7].

Some universities have created online communities of students, teachers, administrators, which helped reduce the stress of social isolation. For example, Vanderbilt University School of Medicine has created a Virtual Wellness and Learning Communities (VWLC) program. The VWLC program consists of hour-long virtual events that offer students the opportunity to connect with their peers online through talks, game nights, or self-paced workshops to share interests. After attending a VWLC event, 79% of participants reported increased feelings

of connection with peers, 61% felt better, and 55% felt that such activities should be continued regularly [8].

Distance learning has become a way out of a situation where the physical presence in institutions of higher medical education has become limited or impossible, and the usual teaching tools cannot be used due to unpredictable and insurmountable, force majeure circumstances. [9].

Learning management systems (LMS, for example: Google Classroom, Moodle, Blackboard, Canvas); applications for learning based on mobile devices; programs with extended offline functionality; massive open online courses (MOOCs); self-learning services; electronic readers; software for online collaboration (Zoom, Google Meet, WebEX, Skype); means of creating digital educational content and numerous electronic databases of educational materials were used as tools for organizing distance learning, providing social support for participants in educational relations [10].

From the point of view of supporting medical education, the PIVOT MedEd project of the Faculty Development Network of the Association of Medical Faculties of Canada (AFMC) Faculty Development Network is interesting. To support educators, faculty leaders at Canadian Medical Schools (FacDevCanada) co-curated medical education resources in three categories: guides to transitioning to classroom and online clinical programs; discipline-specific learning resources and general resources including basic sciences, patient safety, and others. FacDevCanada members have used crowdsourcing. The project involved communities of educators and authors from 74 countries: Canada (48%), USA (24%), Portugal, UK, Mexico (up to 3%) and others. This open access online resource has become a one-stop place to find materials and resources to support online education [11].

Under normal circumstances, developing an online course involves a process of designing and analyzing student needs and prior experiences, as well as a range of teaching methods and strategy selection, carefully considering the unique characteristics of the target groups and the chosen learning environment. In addition, course development is usually a collaborative effort of the course team (teachers, curriculum developers, technical specialists). The course contains several learning objects (video lectures, assignments, discussions) that meet various criteria set by national or international quality assurance indicators, as well as a number of rules (accessibility, copyright).

One of the fastest and most economical solutions in terms of resources in the context of the transition to distance learning formats was the active use of ready-made open online courses in the educational

process. Some universities have been quick to adapt and optimize the costs of moving to distance learning by taking advantage of available massive online courses, including from leading universities. Many elite universities have themselves actively developed online courses and systems. For example, Tsinghua University in China decided to continue working entirely online and quickly developed 4,000 courses [12], which then became widely available throughout China.

Many other universities have also made their online courses available to the public by publishing them on specially created electronic resources or posting them in sections of their official websites. In addition, such platforms as Coursera and Udemy have opened access to their online courses. With the start of the military invasion, Ukrainian medical educators and scientists were given free access to their electronic platforms ClinicalKey, Complete Anatomy, Osmosis (Elsevier Company), as well as the Research4Life project.

Online learning has necessitated the transformation of physical libraries of universities into digital libraries for online provision of information services. University libraries have provided access to full-text materials and diverse educational resources that have already been created during the pandemic [13].

With all the variety of formats, online learning, in terms of didactic characteristics, has two technologically different processes for obtaining knowledge, namely synchronous and asynchronous. This division is due to the communication approaches they use. Synchronous form is a learning format when all participants interact in real time in a text or video environment. The synchronous format often has a limited time frame and leaves the audience little time for activities. But it can be useful for discussing topics that are prepared in advance, getting quick feedback and enhancing the social presence of students. Asynchronous form is a format in which the contact between the student and the teacher is delayed in time. Participants do not intersect in the physical space and do not “see” each other in the virtual one. At the same time, the course fulfills its functions: students receive knowledge, feedback and move along a certain educational trajectory.

Obviously, the synchronous approach practically blurs the line between real and virtual learning and thus provides the maximum approximation to the conditions of traditional education. The advantages of asynchronous approach include flexible timeframe, the possibility of learning, taking into account the different pace of assimilation of educational material. But it requires the student to be dedicated, independent and self-organized, and the role of the teacher is rather reduced to the role of a facilitator or moderator

of communication.

In mass transition to distance learning, universities used both synchronous and asynchronous learning formats in their educational activities, depending on the educational tasks being solved.

Olha Bratanych et al. believe that the only possible form of mass education in Ukraine in war conditions is synchronous distance learning. Compared to offline learning, synchronous distance learning significantly increases the share of emerging feedback, which contributes not only to the activation of the learning process, but also to the socialization of students [14].

Online learning can be seen as an alternative method of teaching in the classroom to learn theoretical material. However, concrete experience is an important part of any learning process. In medical education, clinical experience is a central part of the development of medical competence. The teaching of clinical disciplines has always been based on the formation of skills that require personal presence of students and their direct contact with patients and teachers.

Faced with new conditions, most medical universities were forced to make appropriate adjustments to the organization of the educational process. The COVID-19 pandemic forced us to change not only the methods of teaching students clinical disciplines, but also their content in an emergency mode.

Medical educators developed clinical and procedural skills through e-learning using open access didactic materials, podcasts, reflective sessions, remote simulations, and even clinical rotations [15].

Due to the limitation of the educational process at clinical sites, new possibilities for using simulation teaching methods have become apparent. Simulation training in the last decade has been an integral part of the professional development of future specialists. Their importance has increased significantly in the conditions of martial law in Ukraine.

The World Academic Council for Emergency Medicine has published a paper describing the best practices of simulation centers, from when COVID-19 first hit countries around the world to the current state of their functioning in the “new normal” [16].

The spectrum of simulation training has expanded from simple partial task simulators, low to high fidelity simulations, hybrid simulations, the use of standardized patients, laparoscopic surgical simulators, simulated operating rooms and rehabilitation suites, and even applications that include virtual, augmented and mixed reality techniques.

For example, VR simulations have been successfully used in training in resuscitation, communication, and bronchoscopy. In contrast, AR has shown utility in

teaching anatomical correlates using diagnostic imaging such as ultrasound. Alternative reality is used as a tool for developing clinical thinking skills, longitudinal management of a panel of patients [17].

The hardware provides the user with an immersive experience through stereoscopic 3D displays, motion tracking, haptic feedback, and natural user interfaces. Simulation-based learning using virtual reality or game environment enriches online educational programs with synthetic clinical scenarios.

For example, one of the papers [18] describes the implementation of a neonatal phantom that can simulate physiological vital parameters such as pulse rate and thermoregulation. It also mimics the look of premature babies using a 3D printed base structure coated with multiple layers of skin-colored modified silicone. Thus, the proposed neonatal phantom can be used to simulate various life parameters of premature babies and allows implementing image processing algorithms for health analysis.

Another study describes the experience of using ultrasound puzzle phantoms to assist in teaching isolated transducer movements and sonographic concepts to medical students prior to human anatomy imaging [19]. This experience is confirmed by the results of a survey after an online ultrasound course using virtual simulators. 58% of students believe that they have achieved the goal of the ultrasound imaging course [20].

Classes on endovascular simulators significantly improve the attitude of students towards interventional radiology (IR), which is a rapidly developing field of medicine, but also stimulate interest in a particular subspecialty [21].

A growing group of researchers are conducting powerful retrospective reviews of patient-specific 3D models generated from large numbers of medical scans on hospital image servers to illustrate the power of 3D reconstructions combined with imaging to improve understanding of new surgical approaches and options in surgical anatomy [22-23].

It can be argued that due to the development of technology and the use of augmented reality, virtual environments, students have the opportunity to study in conditions as close as possible to real ones, which can significantly increase the level of their professional training. When organizing the educational process, conditions are created for the formation and consolidation of various skills through visual contact and tactile interaction with equipment simulating real situations, which provides additional interactivity, immersion and safety. This, in turn, increases the involvement of students in the learning process and reduces the level of stress, increases adaptability to professional activities.

In addition, they have the opportunity to repeatedly practice actions at various stations, honing their skills to maximum accuracy.

An integral part of teaching students within the framework of simulation training is debriefing, which allows discussing and, in the future, eliminating inaccuracies and mistakes. Debriefing provides an opportunity to assess the knowledge, skills and attitudes of participants in the simulation course, on the basis of which they make decisions during the task. This form of feedback is used to find the cause of inconsistencies between actions taken and expected. Watching audio and video recordings during debriefing can be a useful tool for evaluating the work done [24].

Healthcare is a team activity and it makes perfect sense that medical professionals need team training. Simulations to eliminate misunderstandings and other sources of error, especially in the context of team learning and systems practice, are also a key component in optimizing patient outcomes.

In the context of the pandemic and military aggression, the demand for telemodeling has significantly increased as one of the alternative methods of simulation training. Telesimulation is defined as the use of Internet communication technologies to provide simulation-based medical education when students and teachers are located remotely from each other [25].

Telesimulation can be performed with all students and facilitators participating in physically remote locations. Using a video teleconferencing platform such as Zoom, Google Meet, or Skype, facilitators can share audio clips, still images, or pre-recorded videos [26].

An example is the Simbox toolkit for simulating patient admissions, hosted in the public domain by the American College of Emergency Physicians (ACEP <https://www.emergencysimbox.com/>) [27]. It contains pre-recorded videos of medical examination results and patient monitors that can be controlled by facilitators using a video conferencing platform in accordance with the scenario and actions of participants during the simulation. Students interact with each other, built-in participants and a simulated patient and/or a display of vital signs on a computer screen. Facilitators observe students in real time and provide immediate feedback during a remote session. Telesimulation eliminates the need to co-locate instructors, students, and high-precision patient simulators (HPS), allowing simulation-based classes to be conducted in facilities remote from simulation centers or when other barriers limit face-to-face communication [28].

These electronic resources provide an opportunity to participate in live broadcasts of lectures by leading experts, professors, researchers; include training videos

of operations, methods for diagnosing diseases, their prevention and treatment; video lessons in important scientific areas; highlight the latest scientific discoveries and achievements of medical science.

The introduction of telemedicine technologies in the educational process helps prepare doctors for effective future work in hospitals and clinics and the provision of high-quality medical care to patients. Telemedicine in medical education is a very important area that requires the mandatory inclusion of this type of training in curricula. In addition, telemedicine facilitates remote collaboration and provides access to expensive remote tools that are not always available.

Nowadays, an increasing number of students recognize the importance of telemedicine and, more importantly, express a clear desire for telemedicine to be included in the curriculum from the first year of study [29].

Engaging medical students in telemedicine activities will help preserve and improve patient health, empower medical teams and systems, and increase medical student engagement, opportunities for hands-on learning, and professional identity building.

Under the conditions of the military invasion in Ukraine, final-year students of medical universities receive clinical skills, taking an active part in helping the sick and wounded, participating in volunteer organizations. Due to the increasing burden on the healthcare system, medical students are increasingly on duty in hospitals, go to calls with ambulance teams. Many universities are urgently introducing courses on emergency medical care, artificial lung ventilation, new methods of diagnosing and treating patients in high-risk conditions, requiring well-coordinated teamwork and knowledge of new action algorithms, into the curriculum. The formation of the universal competencies of a doctor to act in extreme situations is a fundamental need for Ukraine in the conditions of war, power outages and possible man-made/environmental disasters. It is undeniable that these acquired clinical skills greatly

enhance the opportunities for students in their future career as a doctor. This unique practical experience has yet to be comprehended.

Back in the middle of the 20th century, C.S. Lewis proposed three rules that could help counter the educational crisis during the war, and they remain relevant to this day: self-control instead of excitement, faith instead of disappointment, and sobriety of thought instead of fear [30]. Favorable conditions for learning will never come, and a person must learn to seek knowledge in any conditions. Education is a door that opens up many possibilities. And when these opportunities happen is unknown, so it is important not to stop, but to go towards your goals, despite any obstacles.

CONCLUSIONS

Distance learning has become a challenge for all participants in the educational process. At the same time, distance learning helped to implement the progressive principles of modern educational strategies: mobility, accessibility, openness [31].

Successful cases of distance learning include implemented online platforms and learning management systems that provide effective interaction between teachers and students, round-the-clock access to educational material in synchronous and asynchronous modes, the use of simulation teaching methods and telemedicine technologies.

An analysis of studies on the prospects for the development of the healthcare sector leads to the conclusion that it is necessary to modernize the medical education system based on an innovative approach focused on the predictable digitalization of healthcare and the effective use of medical data, increasing the role of practical training.

Taking into account the cyclicity in the manifestation of social risks, it is fair to talk about the need to develop special action protocols in education in cases of emergency situations.

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