



ISSN 2450-6486

<http://ehs.eeipsy.org>DOI: <https://doi.org/10.38014/ehs-ss.2022.4.06>

This publication was made with the funds of a joint Grant of
EEIP (Ukraine - France) and ChF "Education: Future"

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Education in the conditions of war in a higher medical education institution: problems and possible ways to solve them

IHOR KIKHTENKO, VIKTOR ZAVIZION, YULIA KHVOROSTENKO, NATALIIA CHEREDNYCHENKO. **Education in the conditions of war in a higher medical education institution: problems and possible ways to solve them.** *The article describes some of the difficulties of the educational process at Dnipro State Medical University during the war. The author analyzes and provides a comparative characterization of various forms of the educational process under martial law. Probable ways of preserving and developing the educational process in the face of a constant threat to life during rocket attacks on the entire territory of the country, which have been going on in Dnipro around the clock for almost a year, are highlighted.*

Keywords: war, education in war, Ukraine

ARTICLE
INFO

Отримано 02.12.2022

Рецензовано 08.12.2022

Доопрацьовану версію отримано 18.12.2022

Прийнято до друку 28.12.2022

Introduction. It has been a year since fierce hostilities have been conducted on the territory of Ukraine with the use of modern, including missile weapons, which makes no citizen of the country feel safe, especially for his or her life.

Teaching in wartime in general, and teaching in a medical higher education institution (HEI) in particular, is an exceptionally new phenomenon in Ukraine with no experience on the part of the participants in the educational process, which requires the concentration of extraordinary efforts to maintain the quality of education and its possible development.

Education during war in a higher medical education institution is the object of our study.

The goal is to identify this problem and ways to solve it.

Education in times of war is a new concept that incorporates the qualities of two interacting terms: war and education.

The definitions of the terms “war” and “education” and their mutual influence can serve as guidelines in describing this problem and some ways to solve it. It is in the definition that the description of the characteristic qualities of the definition is concentrated, taking into account which it is possible to outline the direction of movement to achieve the goal.

Human history is a history of wars. The interpretation is clarified with this definition, since such a phenomenon as war consists of many components and stages, where hostilities are one of the components of the acute stage of confrontation.

The Ukrainian Academic Dictionary defines war as “an organized armed struggle between states, social classes, etc.” [1].

A more detailed definition is given by the Encyclopedia of Modern Ukraine, according to which “war is a socio-political phenomenon that is one of the forms of resolving socio-political, economic, ideological, national, territorial, religious and other contradictions between states, peoples, nations, classes, social groups by means of armed violence. War is a continuation of politics by violent means and is associated with a change in relations between political actors” [2].

If we exclude the figurative meaning, the second definition of the term “war” is an extreme aggravation of a conflict in a certain social sphere, the main content of which remains a set of military actions with the use of weapons.

In addition to weapons, all material and intangible means that can affect the moral and volitional state of all citizens of both parties to the

conflict and countries involved in it are used to achieve the goals [2, 3].

Thus, war affects all aspects of society's life, radically changes them and is a constant threat to everyone's life. For society, war is an unconditional destructive phenomenon that threatens the very existence of society as such.

The Encyclopedia of Education defines the term "education" as follows: "Education is the purposeful cognitive activity of people to acquire knowledge, skills and abilities or improve them, the process and result of a person's acquisition of a certain system of scientific knowledge, practical skills and abilities and the associated level of development of their mental, cognitive and creative activity, as well as moral and aesthetic culture, which together determine the social face and individual identity of this person" [4].

The Law of Ukraine "On Education" expands the concept of "education" by adding to the list of tasks aimed at the comprehensive development of an individual, for his/her social and economic well-being, which unite individuals into a community, defining it, education, as a guarantee of the development of society and the state [5].

At the same time, the state is obliged to create a safe educational environment that makes it impossible for participants in the educational process to suffer physical, property and/or moral harm [5].

Thus, there is a clear contradiction in the phenomenon of "education in war" where the first part – "education" – is a constructive factor, and the second part – "war" – is destructive. It is obvious that there is a contradiction underlying one of the main laws of dialectics – the Law of Unity and Struggle of Opposites [6].

But the realities of today are such that they leave no choice. The educational process is taking place in a time of war, and we need to find ways to resolve this dialectical contradiction, reducing the destructive impact of its second part on the first as much as possible.

In order to find effective ways, we will cite some features of the initial process at the Dnipro State Medical University, in particular when teaching radiation diagnostics and radiation therapy.

In peacetime, perhaps the most important problem for students is forced relocation from one educational base to another. Students have to move often, sometimes after each lesson, to another theoretical or clinical base, while the distances between them can be significant, which dictates the need for long breaks between the previous and the next subject, which are used for moving. These circumstances cause inconveniences

related to the extended school day, tiring transfers from base to base, which in the cold and rainy season force not only to carry additional means of protection against bad weather, but also contribute to an increase in the level of colds among students. Difficulties in following a diet, little remaining time for recovery, and limited time to complete the assigned homework for independent study become additional reasons for a drop in success.

During wartime, even in a non-combat city in the case of face-to-face training, moving becomes an additional risk factor for life and health due to air raids and rocket attacks.

In the Dnipro, air-raid sirens sound constantly, every day throughout the day and night. The siren of the danger of shelling is a direct appeal to the population to hide in specialized, prepared bomb shelters.

Despite the effective work of air defense, "arrivals" of rockets and unmanned aerial vehicles with explosives occur, as a result of which civilians die in their homes in densely populated, sleeping areas of the city.

If earlier it seemed that the implementation of the "two walls" rule could protect a person during shelling, now in connection with the rocket destruction of entire entrance blocks of high-rise buildings, in which dozens of people die and even more receive severe injuries, it seems ineffective.

Every time a siren sounds, probably every resident of the city is waiting for a rocket to hit their house, their apartment, with fatal consequences. It is not realistic to hide in a bomb shelter after every siren, so everyone, including students, is constantly in a state of stress due to the possibility of dying from a missile attack at any moment. According to our observations, the panic reaction among students is clearly defined when an air alert is announced in 15-30%. Approximately 50% of students expressed a desire to study online, citing the fear of being shot and killed as the main reason. During classroom classes, anxiety makes you leave everything and go down extremely quickly to the bomb shelter basement, which is located in another building and which is not intended for classes in it. After the end of the alarm – going up to the classrooms, then the alarm again and going down to the shelter. In practice, during one three- to four-hour class, it was necessary to go to the bomb shelter several times.

Among the additional complicating factors, the following should be highlighted: many refugee families who lost their homes, most

of their acquired property, work, kindergartens, their usual social environment: friends, relatives, acquaintances in various social and household spheres, which reduced the number of expenses – temporary, transport, intellectual, emotional... in everyday life. There are families that were fatally affected by the war, lost family members who were killed or seriously injured. Summarizing this part of the study, it is possible to single out the main factors influencing the war on education – the threat of death from hostilities and a change in the usual way of life in the direction of its complication and deterioration. Therefore, education during the war becomes a process of acquiring knowledge, abilities and skills from the subject being studied, in the conditions of unforeseen armed violence with a threat to everyone's life, high negative emotional stress and reorientation of all spheres of socio-economic and political life to ensure the needs of the nation's defense (first of all – armies).

In our opinion, the Hippocratic principle of “do no harm” remains at the top of the list of educational objectives during the war.

The most important thing in solving this problem is to organize the educational process in such a way as to minimize, and ideally completely eliminate, the threat to students' lives and health from rocket attacks.

To ensure a safe educational environment, it is believed that distance learning via the Internet partially solves this problem.

If we compare face-to-face education and distance learning via the Internet, the positive aspects of the former include the following: classes held in person at the training base increase the level of teacher-student feedback, thereby increasing the quality and quantity of the material studied. At the same time, this main argument in favor of face-to-face learning is not indisputable, and may even be erroneous.

Here are the arguments in defense of the latter assumption, about the alleged advantage of face-to-face education over distance education in the subject of radiation therapy.

If students study online using the Internet, they will not have to move from one training base to another several times a day and, when the alarm is announced, deprive themselves of the opportunity to hide in a bomb shelter or other place of their choice, and the university will not be the entity that deprived them of this opportunity by obliging them to come to classes at training bases, putting their lives and health at risk. Thus, in this part of the interaction between the subjects of the educational process, a possible negative outcome is eliminated.

Distance learning has a significant social factor in that most students are young people living in a family with their parents, which allows them to eliminate most of the everyday problems from their lives, thereby freeing up considerable time to master new material.

Removing mandatory multiple trips from the daily schedule adds free time and, in addition, reduces the risk of colds and other diseases.

The main complaints about distance learning come from parents of students, and students themselves, and they relate to the quality of the educational process and the forced isolation of students from the team. In our opinion, these "claims" have no basis in fact and are made due to lack of information.

What about the quality of education and whether distance learning reduces it?

It is worth saying that learning is a process where the learner interacts with the teacher.

Studying at a higher education institution is the acquisition of specialized knowledge, skills and abilities.

In general, learning as such is a way of acquiring knowledge.

There are many definitions of the concept of "knowledge", one of them is as follows: Knowledge is "a form of spiritual assimilation of the results of cognition, a process of reflecting reality, characterized by the realization of their truth" [7].

That is, knowledge is acquired in the process of cognition, which, in turn, is a reflection of the true reality in the mind. Knowledge acts as an "image" in the mind of an object, phenomenon or process of the environment. True knowledge is always objective because it reflects the existing reality. Obviously, if we add to the reflected image our idea of it, an attempt to "simplify", "color", "present it more clearly, at a modern level", etc., a new image is created that may be similar to the true one, but will be different. Therefore, the definition of knowledge as "the reflection of objective reality in the mind" seems to be the most accurate. If the concept is narrowed down a bit, the definition of knowledge can be given as "the reflection of a fact in the mind." A fact is an objective reality, i.e., one that does not depend on our consciousness, that exists regardless of the attitude of its supporters or opponents.

Thus, knowledge is the basis of human existence as a rational being and is indispensable in any activity.

Knowledge is acquired at a university by mastering sources of specialized knowledge, which include lecture material, textbooks in

the specialty, professional scientific journals, collections of articles and reports of scientific conferences, monographs, publications of patent offices, official websites of leading scientific and educational institutions, personal websites of recognized experts on certain professional issues, etc. Thanks to the Internet, all of these sources can be obtained, preferably from as many countries as possible.

It is understandable and natural that a student of a higher education institution, being an adult, conscious person, uses a large database of information, as extensive as he or she wishes to obtain knowledge on professional issues.

But what is characteristic is that information reaches our consciousness solely due to the reaction of detectors – analyzers: external – visual, auditory, tactile, pain, temperature, olfactory, taste; and internal – pressure, kinesthetic, vestibular. Thanks to them, information from any source, whether real or virtual, enters the consciousness in a processed, adapted form, by excitation of certain receptors, transmission of excitation through nerve conductors to the corresponding areas of the brain, where this excitation signal is transmitted to the “receiver” which converts it again in such a way that this signal is reflected in our consciousness in the form of a “true image”. It should be noted that today we know the parts of the brain that receive this or that information from the outside, but the mechanism of converting cellular excitation into a “true image,” the final link in which this image is created in the form we imagine, remains unknown.

It is quite clear that at any stage of perception, processing, transmission, and analysis of information by peripheral or central analyzers, both individual peculiarities of the structure of this system in a particular individual and peculiarities of perception associated with injuries or diseases may arise. The latter can change the “true image” of the external world to such an extent that the same object (phenomenon, process) will be “objectively” perceived differently by different people.

Thus, the statement that face-to-face learning, in the classroom or lecture hall, has objective advantages over learning (acquiring knowledge) via the Internet (online) is false, since we receive knowledge in any situation virtually.

In our opinion, the advantages are created by the student’s motivation and a comfortable environment for acquiring and assimilating information.

Regarding the comfort of the environment, no external efforts or educational institutions anywhere can replace the highest quality

“workplace” created only “for yourself”, taking into account all preferences and whims, which will reduce the number of obstacles and create maximum conditions for the acquisition of knowledge, work, of all known, one of the most energy-consuming.

As for teaching the subject of radiation therapy, at the current stage of development of this medical discipline, the entire cycle of diagnosis and treatment is virtual.

From the beginning of determining the localization, size, shape, and spread of the tumor, the patient undergoes X-ray computed tomography (RCT), and, if necessary, magnetic resonance imaging (MRI), radionuclide imaging, and more. All these methods of computer information processing are virtual, so the student, as well as the doctor in the department, uses a virtual image of the object, information obtained by processing the signals of a particular device, and a computer.

At the planning stage, the doctor draws virtual contours of future “zones of interest” – pathological focus, critical organs, metastases, etc. – on virtual slices of the computer image of the patient’s body parts.

The computer planning system is used to calculate and select the radiation regimen and dose delivery so that normal tissues receive the lowest possible dose, and pathologically altered tissues, on the contrary, at least the planned dose. This process is exclusively virtual.

Then the “virtual irradiation” of a specific patient is carried out by the proposed computer program of the regime, and if the “virtual irradiation” turned out to be optimal, only then do they proceed to the real radiation treatment of the patient, which is also virtual.

During the radiation treatment session, the patient is alone in an isolated room, while the entire staff monitors him on a computer monitor via video link, and observes the course of radiation on another computer monitor, where the main parameters of the treatment are displayed.

Thus, the radiation treatment of a patient in a hospital in all its stages is virtual, and if the student learns it also virtually (because otherwise it is impossible), then it will take place in full accordance with how it is done in the department, with the exception of the great advantage of not doing it in a department, but in comfortable conditions (at home, in a bomb shelter, in another country).

In full, all of the above can be attributed to radiation diagnostics, which has always been a virtual tool.

There is one disadvantage of distance learning – it is the absence of the effect of presence. This circumstance makes it somewhat truncated,

artificial, incompletely real. One may get the impression that the presence in the classroom or in the department adds to the quality of learning due to the fact that the student sees with his own eyes that exactly what he read in the textbook or listened to in the lecture is happening in the department. To eliminate these impressions, the latest virtual reality technologies can be involved in the educational process, which will allow to create not only the effect of presence, but also the effect of participation.

Immersive technologies, which have been developing rapidly all over the world recently, can make this possible.

These are technologies of augmented reality with its components – augmented reality, virtual reality and 360° – video. The use of these latest means of creating a virtual environment can fully create not only the effect of presence, but also the effect of participation in students.

Technologies of mixed reality, when the combination of virtual and augmented reality allows to include any object in the surrounding environment of the student, thereby ensuring the most comfortable perception and assimilation of information [8].

It should be noted that the equipment for reproducing the image and its formation, offered by manufacturers, is very diverse, with the help of which every student, wherever he is and who has the appropriate gadgets, can take an active, “direct” part in all actions according to the lesson plan. Even modern smartphones can be useful for broadcasting everything that happens around the teacher.

At the very least, it can be a reproduction of a training and lecture hall with all participants of the educational process: teacher, students, visual aids, etc., and a complete reproduction in the mind of each participant of real events taking place in real time.

There is no particular difficulty in “watching through the eyes” of a teacher for the entire chain of planning and carrying out a session or the entire course of radiation therapy online or with the help of an educational film that can be created with the help of appropriate equipment.

In our conditions, it may still seem unreal, but special gloves for virtual reality will allow you to take an “active direct” part in planning and conducting educational treatment of the patient. Thanks to this, this type of obtaining and mastering knowledge, when the student directly participates in the planning and treatment of the patient with the possibility of their creation and correction, can be considered as an effective way for him to acquire skills and abilities.

Thus, the introduction of immersion technologies into the scientific process will allow raising the level of the educational process to a new level, which will not be inferior to face-to-face learning, and in many respects will surpass it.

In **conclusion**, it should be noted that in the difficult situation of war, it may seem as if education can be given less attention, left on the sidelines until better times. But this will lead to the destruction of the very foundations of society, because education is precisely the cornerstone of its foundation, and with a protracted conflict, such a phenomenon is inevitable. Therefore, despite all the difficulties of the time, in our opinion, education should be given as much attention as possible, as one of the critical structures for society, the country.

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Abstracts

ІГОР КІХТЕНКО, ЮЛІЯ ХВОРОСТЕНКО, ВІКТОР ЗАВІЗІОН, НАТАЛІЯ ЧЕРЕДНИЧЕНКО. **Освіта в умовах війни у вищому медичному навчальному закладі: проблеми та вірогідні шляхи їх вирішення.** У статті описані деякі труднощі навчального процесу в Дніпровському державному медичному університеті в умовах війни. Проаналізовано та надано порівняльну характеристику різних форм освітнього процесу в умовах військового стану. Висвітлені ймовірні шляхи збереження та розвитку освітнього процесу в умовах постійної загрози життю при ракетних обстрілах усієї території країни, що у Дніпрі тривають цілодобово впродовж майже року. **Ключові слова:** війна, освіта в умовах війни, Україна.

IHOR KIKHTENKO, VIKTOR ZAVIZION, YULIA KHVOROSTENKO, NATALIYA CHEREDNYCHENKO. **Edukacja w warunkach wojny w wyższej szkole medycznej: problemy i możliwe sposoby ich rozwiązania.** W artykule opisano trudności, z którymi się mierzy Dnieprzański Państwowy Uniwersytet Medyczny w czasie wojny. Przeanalizowano i podano charakterystykę porównawczą różnych form kształcenia w warunkach stanu wojennego. Autor przedstawia możliwe sposoby zachowania ciągłości i rozwoju procesu edukacyjnego w warunkach ciągłego zagrożenia dla życia podczas ataków rakietowych na terenie całego kraju: rosjanie ostrzeliwują Dnipro (Dniepr) i obwód dniepropietrowski niemal każdego dnia od początku wojny. **Słowa kluczowe:** wojna, edukacja w warunkach wojny, Ukraina.