DIGITAL EDUCATIONAL TECHNOLOGIES AND CHALLENGES OF WAR: A CASE OF DNIPRO UNIVERSITY OF TECHNOLOGY

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With the beginning of russia's full-scale aggression in February 2022, life in Ukraine has fundamentally changed in all spheres of life. The sphere of higher education is no exception.

The official website of the Ministry of Education and Science of Ukraine contains a chronology of events in the field of education and science under martial law [1]. Here are some facts a large list about higher education:

– the 3rd day of the war (February 26) – Ukrainian students and professors become blood donors, join the Territorial Defense and the Armed Forces, carry out active volunteer activities;

– the 5th day of the war (March 1) – educational institutions become aid headquarters. Participants of the educational process and scientists transfer funds to the Armed Forces of Ukraine, write letters and create video appeals to international media. An educational front is emerging;

– the 14th day of the war (March 10) – in Ukraine, more than 280 educational institutions were damaged or destroyed by Russian bombing and shelling. The Ministry of Education and Science has developed an interactive map, within which information on the number of damaged and destroyed institutions is constantly updated [2];

– the 55th day of the war (April 20) – Ukraine received the first tranche of funds in the amount of US$ 88.6 million US$ within the framework of the investment project «Improving higher education in Ukraine for the sake of results». The funds are intended to provide social benefits – salaries, pensions, scholarships, etc. The total amount of social payments that will be made thanks to the joint project with the International Bank for Reconstruction and Development (IBRD) will amount to US$ 100 million;

– the 104th day of war (June 7) – 1,772 educational institutions were damaged in Ukraine, 184 were completely destroyed;

– the 121st day of war (June 24) – fundraising for the reconstruction of the sphere of education and science of Ukraine within United24 was announced [3];

– the 190th day of the war (September 1) – the new academic year began.

The Ministry of Education and Science has collected numerous facts and arguments to refute this statement: the Russian troops destroy schools and universities,

kindergartens and orphanages. As mentioned above, an interactive special map was created and published [2].

On this page Ministry of Education and Science will update information on the number of destructions caused to Ukrainian education institutions due to the Russia's attack on Ukraine. As of the first week of 2023, the following data were published: «3 025 education institutions have suffered bombing and shelling, – and 361 of them have been destroyed completely» [2].

Educational institutions in 9 regions were the most affected, in table.1.

Table 1.

Data on the regions of Ukraine where educational institutions were most affected

Region	Education institutions, which were affected						Total
	Destroyed			Damaged			
	Total	Schools	Universities	Total	Schools	Universities	
Donetsk region	65	29	3	682	292	9	747
Kharkiv region	52	35	1	572	269	23	624
Mykolaiv region	25	13	-	211	103	5	236
Kyiv region	13	5	-	180	110	1	193
Kherson region	23	16	-	165	96	1	188
Luhansk region	22	9	-	164	85	3	186
Zaporizhzhia region	161	89	5	11	4	2	172
Dnipropetrovsk region	6	6	-	143	67	1	149
Chernihiv region	12	6	-	103	47	4	115

Source: authors based on materials [2]

Organizational changes also took place. The usual processes of professors and university administrations' activity (teaching, evaluation, opening of new educational programs, working with students who are writing a diploma, writing scientific papers, participating in scientific conferences) have been supplemented with new mandatory types of activities. The of Education and Science of Ukraine configures the following areas of activity of educational institutions during martial law [4]:

– carry out the educational process remotely (if possible);

– implement measures of civil defence plans for a special period;

– notify the educational process' participants about the unsafety limits, consequences, ways and methods of protection, as well as actions in the zone of a possible emergency situation;

– ensure the protection of the educational process participants and the surrounding areas, if necessary, carry out evacuation to a safe place.

First aid trainings and webinars on psychological aspects of handling crisis situations were also added to the new activities of the university staff.

Already in the first months after the start of a full-scale war, geographical changes in the placement of staff and students became a challenge for universities. In the

conditions of constant threats of rocket and artillery fire, a significant number of students and individual professors moved to the West of Ukraine or left the country. At the same time, the vast majority of staff and professors remained and continue to provide educational services.

About 24 000 respondents from 56 professional Ukrainian higher education institutions and 46 higher education institutions took part in the survey, which was conducted from August 5 to 15, 2022 [5]. Key results of a survey conducted by the State Service for the Quality of Education of Ukraine:

– from September 1, 69.4 % higher education students were ready to study face-to-face;

– at the same time, two-thirds of them doubt the effectiveness of campus form of the educational process organization in the current conditions;

– it is noted that the majority of institutions still chose a blended (face-to-face - distance) format;

– eight out of ten students and teachers expressed a desire to start the 2022/2023 academic year online;

– distance format is chosen by educational institutions of the eastern and southern regions;

– the western, central and partly northern regions of Ukraine chose blended format.

Five categories of students during martial law can be distinguished:

– remain in the city and can periodically visit the university physically;

– temporarily moved to another region of Ukraine, can study remotely;

– went abroad, have certain problems with regular connection;

– were included in the Armed forces of Ukraine and territorial defence forces, in fact do not have the opportunity to study in a synchronous format;

– found themselves in the temporarily occupied territories, periodically have connection for both synchronous and asynchronous forms of education.

We should note that at the beginning of 2023 Dnipro University of Technology was technically and organizationally ready to transition to a fully online format and also had the potential to introduce an asynchronous learning format.

Even before the start of a full-scale war, Digital Educational Space had already been created at the Dnipro University of Technology which includes:

– university official web-site (https://nmu.org.ua);

– e-repository (http://ir.nmu.org.ua; http://libarch.nmu.org.ua; http://media.nmu.org.ua);

– web-sites of divisions;

– information and analytical management system of the educational process «Dean's Office»;

– web-sites of scientific issues;

– server equipment, cluster;

– accounting, management, budget accounting;

– ensuring reporting to regulatory authorities

– regional scientific and technical center of technical protection of information

– Microsoft products and services: user accounting, electronic document management, office applications, corporate mail, video conferencing, etc.

Thanks to digital technologies, we can effectively provide educational services to students of all levels of higher education. The formats that are most in demand at the moment are the following two: e-learning on Dnipro University of Technology platforms; synchronous & asynchronous format.

From November 2022, another challenge arose – stabilization and emergency shutdowns caused by the destruction of the energy system of Ukraine. It is extremely difficult to plan and carry out work when the light and Internet are turned off according to schedule for 4-8 hours. Professors started to work on laptops batteries using the mobile data. Students have the same problems. Sometimes both teachers and students are forced to move around the city in search of places with electricity and Internet: the university, relatives, «points of invincibility», cafes & co-working spaces that have generators. The Dnipro University of Technology informs about all possibilities through the Telegram channel.

Under these conditions, we combine more actively online for those who have the opportunity to connect, with asynchronous format. Students get in touch in many different ways, they can call, email, or send messages from different digital platforms.

In the period of all the trials that Ukraine is currently facing, new research topics have appeared for scientific research work, master's and PhD theses, problems to be solved in practical classes by teams: resilience, recovery, revitalization of territories and communities in Ukraine.

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