Innovations in education in times of war: research and evaluation of results

Innovaciones educativas en tiempos de guerra: investigación y evaluación de resultados

Iryna Zhyhora
https://orcid.org/0000-0002-5796-2062
Associate Professor of the Department, Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.

Viktoriia Vdovenko
https://orcid.org/0000-0002-0884-6209
Associate Professor of the Department, Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.

Iryna Baraniuk
https://orcid.org/0000-0001-8112-7318
Associate Professor of the Department, Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.

Natalka Kotelianets
https://orcid.org/0000-0002-0575-5205
Professor of the Department, Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.

Olena Nikitina
https://orcid.org/0000-0003-1045-5300
Associate Professor of the Department, Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.

Abstract

Implementation of the educational process during the war is a challenge for modern educational institutions, but despite the unfavourable situation, educational institutions are implementing important innovative solutions for the development of education in general. Therefore, the purpose of this study is to investigate innovations in education in times of war through the prism of a survey and evaluation of the results. The participants of this study are 265 students and teachers from different parts of Ukraine. The search for respondents was carried out both on a targeted basis and using the snowball sampling method. The results of the study demonstrated the diversity of means of developing education in war conditions: the use of video conferencing platforms, mobile applications, communication platforms, learning management systems, virtual and simulation technologies. The most important is the use of learning

management systems and platforms for conducting classes. The high scores of respondents demonstrate the importance of innovation in education during wartime. The conclusions emphasise that these innovations ensure the continuity of the learning process and provide access to knowledge in any crisis situation.

Keywords: digitalization, innovative tools, survey, war, Ukraine.

Resumen

La implementación del proceso educativo durante la guerra es un reto para las instituciones educativas modernas, pero a pesar de la situación desfavorable, las instituciones educativas están implementando importantes soluciones innovadoras para el desarrollo de la educación en general. Por lo tanto, el propósito de este estudio es investigar las innovaciones en la educación en tiempos de guerra a través del prisma de una encuesta y la evaluación de los resultados. Los participantes en este estudio son 265 estudiantes y profesores de diferentes partes de Ucrania. La búsqueda de encuestados se llevó a cabo tanto de forma selectiva como utilizando el método de muestreo de bola de nieve. Los resultados del estudio demostraron la diversidad de medios para desarrollar la educación en condiciones de guerra: el uso de plataformas de videoconferencia, aplicaciones móviles, plataformas de comunicación, sistemas de gestión del aprendizaje, tecnologías virtuales y de simulación. El más importante es el uso de sistemas y plataformas de gestión del aprendizaje para impartir clases. Las altas puntuaciones de los encuestados demuestran la importancia de la innovación en la educación en tiempos de guerra. Las conclusiones destacan que estas innovaciones garantizan la continuidad del proceso de aprendizaje y facilitan el acceso al conocimiento en cualquier situación de crisis.

Palabras clave: digitalización, herramientas innovadoras, encuesta, guerra, Ucrania.

Introduction

The Russian-Ukrainian war has had a dramatic impact on the development of education in Ukraine. Since the full-scale invasion, active military operations have demonstrated the need to introduce distance education (later blended learning), which directly depends on the introduction of many innovative solutions and technologies. Therefore, the functioning of the educational system in times of war is determined by an intensive search for various new approaches to the organisation of education, innovative methods and forms of organising the educational process, effective pedagogical and information solutions (Diachenko et al., 2022; Iastremska et al., 2023). Thus, supporting the active introduction of various innovations in the field of education during the war has become one of the important activities of the Ministry of Education and Science of Ukraine.

At the same time, educators and teachers themselves began to actively search for new ways to organise the educational process for students. In particular, many educational institutions have opened various platforms with educational resources and materials in the public domain. At the same time, modern researchers have also repeatedly drawn attention to the quality of training in wartime. For example, Al Qaidani (2019) described the development of higher education in the context of the conflict in Yemen. Chakhaia and Bregvadze (2018) identified the main aspects of the formation of the educational system of Georgia. Lucić (2020) in his comprehensive study raised the important question of the effectiveness of education in the conditions of war based on the consideration of educational realities in Sarajevo.

At the same time, Boiko (2023) characterized the experience of higher education in Ukraine, which involves the implementation of various innovative solutions and technologies. Iskakova (2023) described the main electronic technologies used in Ukrainian education to meet the individual needs of students. Kaminskyy and Viesova (2022) also identified some innovative solutions. Budnyk (2022) described the main modern

Innovations in education in times of war: research and evaluation of results. - Eduweb, 2024, abril-junio, v.18, n.2. / 88-99

89

innovative technologies that contribute to the development of knowledge among students in wartime. The interest of modern scholars in the development of education in wartime demonstrates that this topic remains not only popular but also relevant among modern researchers.

However, it is important not only to describe the main decisions or innovations of the educational system in the context of war, but also to determine their effectiveness based on empirical research and evaluation, which is the aim of this paper. Therefore, the aim of this paper is to empirically investigate the main innovations in wartime education based on the evaluations of teachers and students. This will involve solving the following tasks: conducting a systematic literature review, conducting a questionnaire among respondents, identifying the main assessments and attitudes of teachers and students towards the introduction of innovations in modern education.

Literature Review

Contemporary scholars have delved into the study of various aspects of the use of innovative solutions (mainly distance education) in wartime. At the same time, modern works have drawn attention to the relevance of blended or distance learning, digitalisation of the educational system, health-promoting practices and the effective implementation of psychological and pedagogical support (Galynska & Bilous, 2022; Barakat et al., 2022; Lymar, 2024). In these areas, the use of technologies that facilitate the individualisation of learning is currently relevant. Krylova-Grek and Shyshkina (2021) identified the main trends in the development of online education in Ukraine.

The main difficulties of implementing the educational process and training specialists in wartime are described in detail in Lymar (2024). At the same time, the most innovative technologies are presented in detail in the papers that studied the specifics of the organisation of the educational process during the Covid pandemic (Tarteer et al., 2022; Wahas & Syed, 2024).

Tinterri, Eradze, Limone, and Dipace (2022) identified effective strategies for implementing distance learning that would support all participants in the learning process. Meletiou-Mavrotheris, Eteokleous, and Stylianou-Georgiou (2022) demonstrated the main capabilities of e-learning based on empirical research. Onufer (2023) believes that in the period of distance or remote education, it is important to take into account the needs of all participants in the learning process, i.e. to implement a person-centred approach. Rafael and Justino (2022) demonstrate the importance of virtual laboratories for the organisation of an effective innovation space.

Castilho Barilli (2012) identified the importance of virtual reality as an important didactic resource in distance education. In their opinion, this technology contributes to the development of professionalism for the future generation of specialists. Vasilache (2022) described the main strategies for implementing active distance learning and determined how they contribute to the outcomes of students. Such research experiments help to understand the peculiarities of modernising the modern learning space and highlight all the spectrums of innovative activities that are implemented in accordance with the requirements of the modern education system and the needs of society.

At the same time, interest in the study of innovative technologies indicates their active implementation in different parts of the world. For this reason, innovation is an important driving force in the development of education and science. Nevertheless, there is a lack of research that would empirically determine the attitudes of participants in the educational process and, consequently, the effectiveness of using innovations in the educational environment.

Methodology

This study aims to identify the main innovations in the field of education and their effectiveness based on the analysis of the evaluative judgements of participants in the educational process. Thus, the work is classified as quantitative research.

a. Participants

The participants of this study are teachers (120 people) and students (145 people) from different educational institutions in Ukraine, living both near the war-affected areas and in safer areas of Ukraine. This was done to ensure that all participants in the learning process were involved as widely as possible.

Table 1 shows the aggregate geographical data of the participants.

Table 1.
Geographical data of the participants

No.	Geographical data	N	%
1	Kyiv (Kyiv region)	61	23%
2	Kharkiv	39	14%
3	Lviv (Lviv region)	32	12%
4	Dnipro	27	10%
5	Odesa	21	8%
6	Zaporizhzhia	16	6%
7	Ivano-Frankivsk	13	5%
8	Chernivtsi	13	5%
9	Kirovohrad	8	3%
10	Chernihiv	12	4%
11	Kherson	6	2%
12	Ternopil	12	4%
13	Poltava	6	2%
14	Zhytomyr	3	1%
15	Lutsk	3	1%

Source: Authors' development

Thus, a total of 265 teachers and students from different parts of Ukraine took part in the study.

b. Sample procedure

The search for respondents was carried out both on a targeted basis and using the snowball sampling method. In particular, information about the survey was disseminated through social media. The most popular ones in Ukraine were chosen for this purpose: Facebook, Instagram and TikTok. Thus, at the beginning, participants were found in a targeted manner. Later, they were asked to find other stakeholders in the research (snowball sampling was used. In this way, it was possible to involve everyone in the evaluation of innovative technologies in education.

c. Instruments

In order to collect quantitative data, a questionnaire consisting of several parts was used. The first part concerned demographic and geographical data. The second part focused on the role of innovation in education. Most of the questions were designed to be answered by both students and teachers. However,

some questions still focused on the experience of teachers only or were directed at students only (see Table 2).

Table 2.
Sample of the survey

Section	Main questions
Geography and demographics of participants	1. In which city do you study/work? 2. Specify your position or employment
Characteristics of the main innovations	3. 3. What innovations do you use during classes (for teachers) 4. What innovations do your teachers use to conduct classes (for students) 5. On which digital platforms do you mostly conduct classes? (for teachers) 6. On which digital platforms do teachers conduct classes? (for students) 7. How often do you use these innovations? 8. How often is the distribution of educational materials in digital format?
Characteristics of the main innovations	9. How do you assess the use of modern platforms in the implementation of education during the war? (rating from 1 to 5) 10. How do you rate modern messengers for communication during distance education (Telegram, Whats Up, Viber) 11. How can you generally evaluate the use of innovations in the implementation of education during the war? (rating 1 - not at all effective, 5 - very effective)

Source: Authors' development

d. Data analysis

Based on the statistical analysis, the data were statistically processed. For this purpose, Microsoft Excel software was used, where tables were used to process the data. This software was also used to create graphs and charts. Thematic analysis was also used to characterise the main themes highlighted by the respondents. In order to process the data, a systematic research method was used, which defines educational innovations as being in constant motion. The method of comparison was used to compare the information obtained with the data presented in previous scientific works.

Results

Although the Ukrainian education system suffered significant losses due to the armed conflict, it continued to develop on the basis of the introduction of some new solutions. The authorities have partially succeeded in making effective decisions to stabilize the education system in such difficult conditions. The cohesion of the Ukrainian educational community, the motivation to continue teaching and learning, and the sufficiently effective digital internal policy of Ukrainian educational institutions play a major role in this process. Since then, the Ukrainian education system has begun to actively use various innovative technologies and forms of education. Many regions have switched to distance (later blended) education. These forms of education have become important tools for continuing the process of providing educational services.

The use of various platforms for remote lectures or seminars and video conferencing has become the norm for the educational system during the war. At the same time, adaptive technologies have begun to play an important role. The use of individual learning technologies facilitates the assessment of each student and promotes a person-centered approach. Based on the experiment, it was found that during the war, Ukrainian education mainly used video conferencing platforms (241 responses), learning management

systems (251 responses), electronic textbooks (239 responses), online testing and knowledge verification systems (230 responses), mobile applications for education (210 responses), messengers for communication (190 responses), interactive whiteboards (58 responses), virtual reality technologies (76 responses), and simulation technologies (61 responses) (see Table 3).

Table 3.
Innovative tools of education in war conditions

Innovative tools	N	%
Learning management systems	251	98.05%
Video conferencing platforms	241	90.94%
Electronic textbooks	239	90.19%
Online testing systems	230	86.79%
Mobile applications	210	82.03%
Communication messengers	190	74.22%
Interactive whiteboards	58	22.66%
Virtual reality technologies	76	29.69%
Simulation technologies	61	23.83%

Source: Authors' development

Thus, the survey results show that the most common innovative tools are learning management systems, video conferencing platforms, e-textbooks, online testing systems and various mobile applications. It is worth noting that the vast majority of Ukrainian educational institutions use Moodle for learning management (91%). At the same time, teachers' answers differed when it came to choosing a video conferencing platform. In particular, 149 teachers use the Zoom platform to conduct online lectures or seminars. 50 people indicated that they conduct classes on the Microsoft Teams platform, and another 35 people use the Google Meet application. Another 22 respondents indicated that they do not use the above-mentioned platforms, but conduct online training on the internal platforms of the institution (see Figure 1).
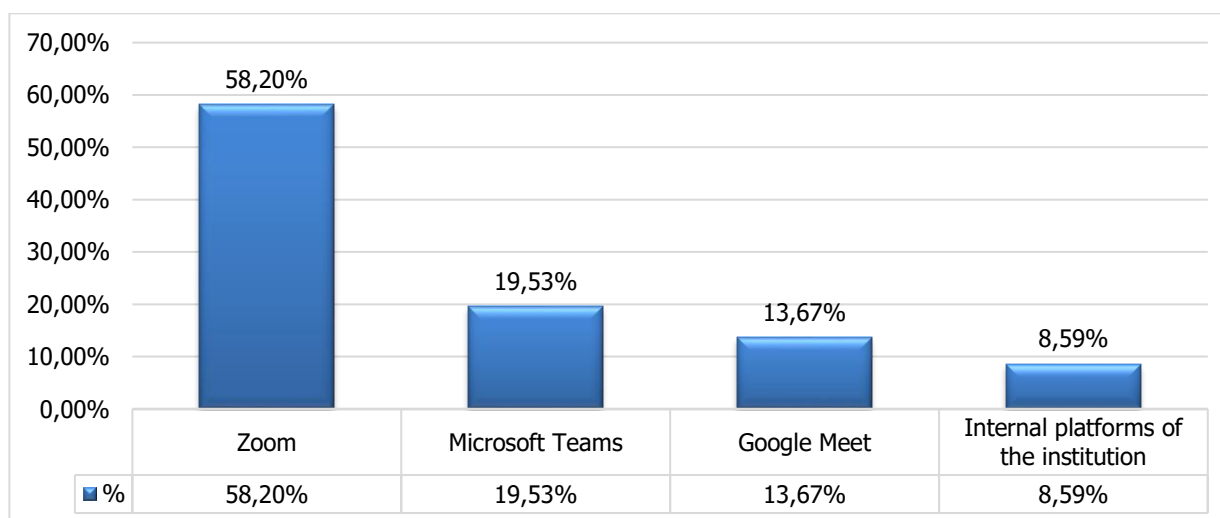

Figure 1. Diagram of the use of electronic video conference platforms.
Source: Authors' development

The next part of the survey was to find out how often innovative solutions are used in education. To the question of how often do you use innovations in education, 110 teachers answered that every class, while 113 teachers answered several times a week and 33 teachers answered several times a month. At the same time, there was an option - "once a month", but none of the respondents indicated it. Thus, this

indicates the active use of innovations in Ukrainian education during the war. When asked how often they distribute educational materials in digital format, the vast majority of respondents (about 31%) indicated that they distribute them every week, while 35% distribute them several times a week. 25% of teachers distribute digital learning materials once a month. At the same time, 13% introduce students to educational resources several times a quarter. However, it should be noted that this frequency also depends on the number of classes taught. The participants of the experiment had to rate from 1 to 5 the use of modern platforms in the implementation of education during the war (see Figure 2).
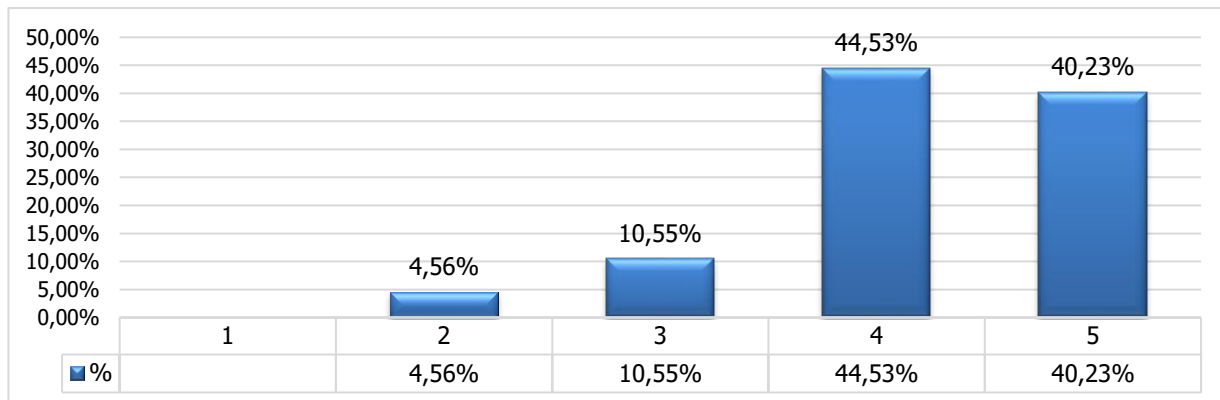
Figure 2. Evaluation of the use of modern platforms in the implementation of education during the war. Source: Authors' development

It should be noted that students gave high marks to the process of using modern platforms. Some teachers pointed to some difficulties in using them, including problems with access to the Internet and the underdeveloped material and technical base for the integrated use of various innovations. At the same time, the lack of funding has become an important challenge for the Ukrainian education and science system. The martial law has led to a reduction in spending on the education system, and thus on funding for the latest educational programmes, and has reduced access to important resources that contribute to the implementation of innovative solutions.

It is also worth considering that the use of innovations requires adaptation on the part of both implementers and students. The respondents emphasised that the stress of war and the need to adapt to a new learning environment were difficult challenges. Modern scholars believe that in order to actively adapt to new learning environments and technologies, teachers should communicate with students to understand not only their results but also their psychological state, and in case of need to contact a psychological counsellor from the educational institution, all respondents had to evaluate modern messengers for communication during distance education, in particular, such applications as e-mail or special messengers Telegram, WhatsApp, Viber. The majority of respondents said that they mainly use Telegram and email to communicate.

Table 3.
Tools for communication between students and teachers

Tools for communication	N	%
Telegram	190	74.22%
E-mail	210	82.03%
Viber	76	29.69%
WhatsApp	50	13.67%

Source: Authors' development

Given the popularity of Telegram and Viber as the main communication apps respondents were asked to rate their effectiveness on a scale from 1 to 5. These apps mostly received high marks (from 4 to 5), which indicates their importance for effective communication between students and teachers during the war. The final question concerned the overall assessment of the use of innovations in the implementation of education during the war (a score of 1 meant not at all effective, 5 - very effective). The data obtained are shown in Figure 3.
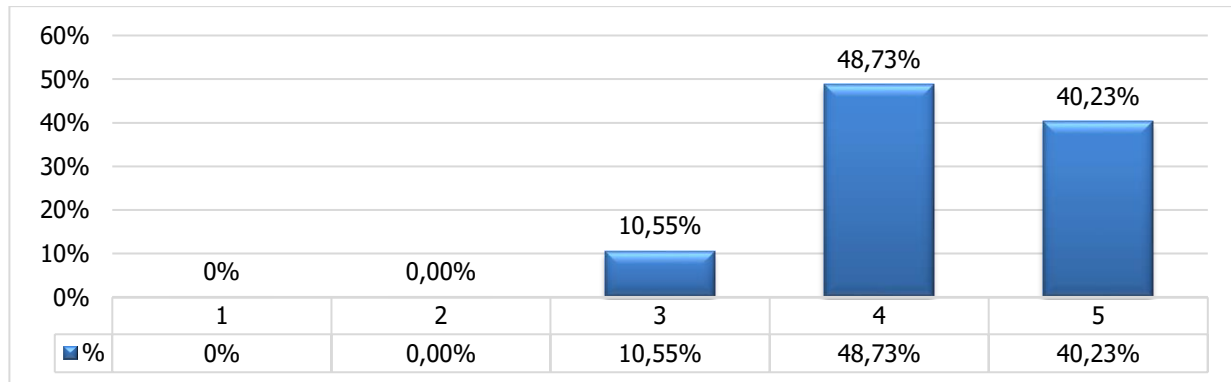
Figure 3. Overall assessment of the use of innovations in the implementation of education during the war. Source: Authors' development

Such high scores demonstrate the importance of innovative solutions in education during the war. Obviously, the war has a negative impact on the educational system (as we found out, it leads to a lack of funding and a shortage of material and technical resources), but martial law also facilitates the introduction of completely new technologies and innovations. However, it is important that modern Ukrainian teachers and students support the idea of introducing innovations into the education system, which is an important indicator of the development of education in Ukraine, even despite the war.

Discussion

After the outbreak of full-scale armed aggression, the situation in Ukraine's education sector has become more complicated, as evidenced by numerous studies (Malynovskyi, Duka & Yaroshenko, 2022; Martin et al., 2022; Kubiv et al., 2020). The educational process has been suspended, educational buildings have been destroyed all this time, and students and teachers have found themselves in different conditions. As in 2014, after the annexation of Crimea and the outbreak of hostilities in Donbas, the Ukrainian education system faced the challenge of relocating educational institutions to the government-controlled territory. All of this forced the educational process to adapt to new conditions and use innovative solutions, in particular, the peculiarities of the introduction of distance education in Ukraine are described in detail in Movchan, Komisarenko, Fernos and Kolisnyk (2023) and Krymets (2022).

The results underline the importance of innovative solutions in education during wartime. It was found that modern teachers use various innovative tools to support education. The results of modern scholars also demonstrate the importance of using platforms for e-learning (Bobro, 2023; Kuzheliev et al., 2023). More detailed ways of implementing distance education based on the analysis of the experience of using the Moodle and Microsoft teams platforms are covered in the study by Dezelak, Bobek and Sternad Zabukovsek (2022). However, current research also emphasizes cybersecurity when implementing these technologies (Lysenko et al., 2024; Kozlovskyi et al., 2024). Despite this, modern scientists prove that, despite various challenges, it is worth developing the direction of education as an important factor in the development of social capital (Shpykuljak & Mazur, 2014).

The study also pays special attention to the problem of adaptation of participants in the educational process and new solutions and innovations. Although it has been demonstrated that teachers and students have successfully adapted to new realities and consider innovations important, adaptation is still essential for the successful organisation of learning. This correlates with the study by Sytnik, Miroshnychenko and Svidenska (2022), which investigated key aspects of students' emotional states during the war. This work demonstrated that students' emotional states have undergone significant shifts in comparison to the pre-war period: the dominant emotions have changed, which have generally become more labile, and anxiety has increased. There is also a negative impact on communication (Dubiaha et al., 2023; Krylova & Krylova, 2023; Dovha et al., 2019).

Therefore, the authors of this article consider the introduction of ongoing psychological support and the creation of internal platforms to support the mental health of applicants to be an important innovation. Separately, this study also emphasises the challenges and difficulties in implementing innovations during the war, in particular, the logistical difficulties, the importance of adaptation and the lack of funding. At the same time, contemporary scholars also highlight other difficulties in implementing innovations (including e-learning): limited access to certain technologies, issues of a safe learning environment, and certain systemic and bureaucratic obstacles (Makhynko, 2023; Marchenko, 2023).

Based on the analysis of the evaluative responses of the participants in the experiment, this study demonstrated the importance of introducing innovations in education in war, which has been confirmed in other studies based on other conflicts. In particular, Rajab's (2018) empirical study of the role of e-learning in war-affected areas also demonstrated the effectiveness of innovative solutions.

Based on a study of more than 20 courses and student outcomes, the author demonstrated that 26 e-learning courses had a 100% pass rate compared to 16 face-to-face courses. In this way, this study also shows the effectiveness of innovative means. Thus, the novelty of this study is based on the assessment of judgements from teachers and students about the introduction of innovations in education and demonstrated the effectiveness of the latter in supporting the modern educational environment.

Conclusions

Therefore, modern innovations play the role of an important element of the transformation of education in the crisis of wartime. In particular, innovative means not only contribute to the reform and renewal of the education system, but also ensure the effective functioning of the education sector in general.

The obtained evaluations of the participants of this study demonstrated a high level of importance, and therefore the value of innovative solutions in the Ukrainian education system. The participants of this study evaluated the basic tools and innovative instruments used in Ukrainian education, which in turn demonstrated not only their familiarity with these tools, but also the fact that Ukrainian students and teachers are well versed in innovative technologies.

It has been determined that the use of digital technologies in educational institutions is multi-platform and cross-cutting, i.e., various mobile applications, learning platforms, or communication messengers are used. It is demonstrated that communication is an important element of the functioning of education. As a result, it is determined that modern teachers are actively using innovative tools to support students, and thus implement the approach of personalised or personality-oriented learning, which is popular in Europe.

Bibliographic References

Al Qaidani, K. A. (2019). *Higher Education Systems and Institutions, Yemen. In Encyclopedia of International Higher Education Systems and Institutions* (pp. 1–10). Springer Netherlands. https://doi.org/10.1007/978-94-017-9553-1_487-1

Barakat, N., Al-Shalash, A., Biswas, M., Chou, S.-F., & Khajah, T. (2022*). Engineering experiential learning during the COVID-19 pandemic. In Mobility for smart cities and regional development - challenges for higher education* (p. 991–1003). Springer International Publishing. https://doi.org/10.1007/978-3-030-93907-6_105

Boiko, S. M. (2023). The Ukrainian experience of implementing innovative practices in experimental educational institutions in the wartime conditions. *Higher Education of Ukraine in the Context of Integration to European Educational Space, 91*((II)1), 228-241. https://doi.org/10.38014/osvita.2023.91.20

Bobro, N. (2023). Effectiveness of artificial intelligence usage in the educational process. *Science and technology today, 14*(28). https://doi.org/10.52058/2786-6025-2023-14(28)-168-174

Budnyk, O. (2022). Education innovations: new wartime experience of Ukrainian universities. *Journal for Educators, Teachers and Trainers, 13*(5), 464-471. https://doi.org/10.47750/jett.2022.13.05.042

Chakhaia, L., & Bregvadze, T. (2018). *Georgia: Higher Education System Dynamics and Institutional Diversity. In Palgrave Studies in Global Higher Education* (pp. 175–197). Springer International Publishing. https://doi.org/10.1007/978-3-319-52980-6_7

Castilho Barilli, E. C. V. (2012). *Virtual reality technology as an didactical and pedagogical resource in distance education for professional training*. In Distance education. InTech. https://doi.org/10.5772/50625

Dezelak, Z., Bobek, S., & Zabukovsek, S.S. (2022). User experience (UX) comparative analysis of distant learning solutions moodle and microsoft teams. *In 16th international technology, education and development conference*, IATED. https://doi.org/10.21125/inted.2022.1175

Diachenko, I., Kalishchuk, S., Zhylin, M., Kyyko, A., & Volkova, Y. (2022). Color education: A study on methods of influence on memory. *Heliyon, 8*(11). https://doi.org/10.1016/j.heliyon.2022.e11607

Dovha, T., Kotelianets, N., Plachynda, T., & Kotelianets, Y. (2019). Integration of reflection and self-regulation as factors of personality's self-actualization. *Opcion, 35*(Special Issue 20), 617-631.

Dubiaha, S., Huz, V., Shevchenko, Y., Fedorenko, S., & Kolomiiets, Y. (2023). Formation of speech regulation of educational activity in junior schoolchildren with speech disorders. *AD ALTA: Journal of Interdisciplinary Research*, *13*(XXXV), 88-95. http://eprints.mdpu.org.ua/id/eprint/12944/1/стаття_2023.pdf

Iastremska, O., Tryfonova, O., Mantaliuk, O., & Baranets, H. (2023). The impact of strategic decisions on the future development of organisations and economic dynamics. *Futurity Economics & Law, 3*(4), 117-134. https://doi.org/10.57125/FEL.2023.12.25.08

Iskakova, M. (2023). Electronic Technologies to Ensure Individual Learning of Education Seekers with Special Needs. *Futurity of Social Sciences, 1*(1), 4-20. https://doi.org/10.57125/FS.2023.03.20.01

Ivanchuk, S., Kakhiani, Y., Hryboiedova, T., Bilychenko, H., & Huzii, I. (2024). Policy for the formation of social consciousness during students training in educational institutions: pedagogical aspect. *Amazonia Investiga*, *13*(73), 387-400. https://doi.org/10.34069/AI/2024.73.01.32

Galynska, O., & Bilous, S. (2022). Remote learning during the war: challenges for higher education in Ukraine. *International Science Journal of Education & Linguistics, 1*(5), 1-6. https://doi.org/10.46299/j.isjel.20220105.01

Kaminskyy, V., & Viesova, O. (2022). Innovative activities in healthcare institutions of the future: models for overcoming dilemmas. *Futurity Medicine, 1*(1), 17-26. https://doi.org/10.57125/FEM.2022.03.25.02

Innovations in education in times of war: research and evaluation of results. - Eduweb, 2024, abril-junio, v.18, n.2. / 88-99

97

Kozlovskyi, S., Kulinich, T., Vechirko, I., Lavrov, R., Zayukov, I., & Mazur, H. (2024). Relationship between net migration and economic development of European countries: Empirical conclusions. *Problems and Perspectives in Management, 22*(1), 605-618. https://doi.org/10.21511/ppm.22(1).2024.48

Krylova-Grek, Y., & Shyshkina, M. P. (2021). Online learning at higher education institutions in Ukraine: Achievements, challenges, and horizons. *Information Technologies and Learning Tools, 85*(5), 163-174. https://doi.org/10.33407/itlt.v85i5.4660

Krylova, S., & Krylova, V. (2023). The phenomenon of the academic charisma of a scientist in science and education. *Higher Education of Ukraine, 2*, 46-52. https://doi.org/10.32782/NPU-VOU.2023.2(89).06

Krymets, L. (2022). What must the education of the future be like to be really future? (Attempts of philosophical reflection). *Futurity Philosophy, 1*(4), 28-41. https://doi.org/10.57125/FP.2022.12.30.03

Kubiv, S. I., Bobro, N. S., Lopushnyak, G. S., Lenher, Y. I., & Kozhyna, A. (2020). Innovative Potential in European Countries: Analytical and Legal Aspects. *International Journal of Economics and Business Administration, VIII* (Issue 2), 250-264. https://doi.org/10.35808/ijeba/457

Kuzheliev, M., Zherlitsyn, D., Nechyporenko, A., Lutkovska, S., & Mazur, H. (2023). Distance learning as a tool for enhancing university academic management processes during the war. *Problems and Perspectives in Management, 21*(2), 23-30. https://doi.org/10.21511/ppm.21(2-si).2023.04

Lucić, L. (2020). War Schools: teaching innovations implemented across makeshift educational spaces during the military siege of Sarajevo. *Pedagogy, Culture & Society,* 1-20. https://doi.org/10.1080/14681366.2020.1768582

Lymar, L. (2024). Undergraduate and postgraduate education during war in Ukraine: The challenges to overcome. *Collection of Scientific Papers «ΛΌГΟΣ»*, (March 29, 2024; Cambridge, UK), 423–425.. https://doi.org/10.36074/logos-29.03.2024.088

Lysenko, S., Bobro, N., Korsunov, K., Vasylchyshyn, O., & Tatarchenko, Y. (2024). The Role of Artificial Intelligence in Cybersecurity: Automation of Protection and Detection of Threats. *Economic Affairs, 69*(1). https://doi.org/10.46852/0424-2513.1.2024.6

Martin, A., Vyshnivska, N., Shkurenko, O., Sukhopara, I., Vashchenko, O., Romanenko, L., & Romanenko, K. (2022). The influence of natural objects on the emergence and overcoming of the Child's anxiety during interaction with others at the beginning of Children's teaching at school. *Pegem Education and Training Magazine, (12/3),* 12-19. https://doi.org/10.47750/pegegog.12.03.02

Makhynko, L. (2023). *Open educational resources: Facing challenges of distance learning. In Higher education reforms in Ukraine: Challenges, status, and prospects* (p. 234–264). Publishing house "Baltic Publishing". https://doi.org/10.30525/978-9934-26-360-6-11

Malynovskyi, S., Duka, R., & Yaroshenko, K. (2022). Distance education in war conditions: Learning practical surgery skills. *Sworld-Us Conference Proceedings*, (usc11-01), 34-37. https://doi.org/10.30888/2709-2267.2022-11-01-014

Marchenko, T. (2023). Higher education during the war time in Ukraine. *Scientific Journal of Polonia University, 59*(4), 49-57. https://doi.org/10.23856/5907

Meletiou-Mavrotheris, M., Eteokleous, N., & Stylianou-Georgiou, A. (2022). Emergency remote learning in higher education in Cyprus during COVID-19 lockdown: A zoom-out view of challenges and opportunities for quality online learning. *Education Sciences, 12*(7), 477. https://doi.org/10.3390/educsci12070477

Movchan, L., Komisarenko, N., Fernos, Y., & Kolisnyk, V. (2023). Distance education in Ukraine during the war. *In 15th International Conference on Education and New Learning Technologies*. IATED. https://doi.org/10.21125/edulearn.2023.1665

Onufer, L. (2023). *Faculty development for inclusive online teaching: lessons learned during the pandemic. In Diversity in Higher Education Remote Learning* (p. 65–69). Springer International Publishing. https://doi.org/10.1007/978-3-031-31214-4_6

Rafael, S., & Justino, J. (2022). *Conceptual maps applied to remote/virtual laboratories for active learning. In Mobility for Smart Cities and Regional Development - Challenges for Higher Education* (p. 361–369). Springer International Publishing. https://doi.org/10.1007/978-3-030-93904-5_37

Rajab, K. D. (2018). The effectiveness and potential of e-learning in war zones: an empirical comparison of face-to-face and online education in Saudi Arabia. *IEEE Access, 6*, 6783-6794. https://doi.org/10.1109/access.2018.2800164

Shpykuljak, O., & Mazur, G. (2014). Institutional Principles of the Formation of Social Capital in the Mechanism of Development of Rural Territories. *Economy APK, 8*, 63-68. http://nbuv.gov.ua/UJRN/E_apk_2014_8_12

Sytnik, S. V., Miroshnychenko, O. M., & Svidenska, H. M. (2022). Peculiarities of emotional states of higher education accessories during the war in Ukraine. *Habitus, (37)*, 48-51. https://doi.org/10.32843/2663-5208.2022.37.8

Tarteer, S., Much, Y. A., Ghanem, M., Odeh, A., Elian, S., Hashaykeh, S., Salha, S., Affouneh, S., & Khlaif, Z. N. (2022). *Challenges facing online learning during COVID-19. In Radical Solutions in Palestinian Higher Education* (p. 119–133). Springer Singapore. https://doi.org/10.1007/978-981-19-0101-0_10

Tinterri, A., Eradze, M., Limone, P., & Dipace, A. (2022). *Students' coping and study strategies: Did emergency remote teaching support the students during the pandemic?* In Higher Education Learning Methodologies and Technologies Online (p. 117–128). Springer International Publishing. https://doi.org/10.1007/978-3-030-96060-5_9

Vasilache, S. (2022). *Suddenly online: Active learning implementation strategies during remote teaching of a software engineering course*. In Mobility for smart cities and regional development - challenges for higher education (p. 395–402). Springer International Publishing. https://doi.org/10.1007/978-3-030-93904-5_40

Wahas, Y. M. A., & Syed, A. J. A. (2024). E-assessment challenges during e-learning in higher education: A case study. *Education and Information Technologies*, 1-20. https://doi.org/10.1007/s10639-023-12421-0

Innovations in education in times of war: research and evaluation of results. - Eduweb, 2024, abril-junio, v.18, n.2. / 88-99

99