Role of e-learning environments in training applicants for higher education in the realities of large-scale military aggression

El papel de los entornos de aprendizaje electrónico en la formación de los aspirantes a la educación superior en la realidad de la agresión militar a gran escala

Nataliia Bakhmat
bakhmat.nataliya@kpnu.edu.ua
https://orcid.org/0000-0001-6248-8468
Ph.D. hab. (Education), Professor Head of Department of Elementary Education Theory and Methods of Primary Education Faculty of Pedagogics Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Maryna Burenko
marynaburenko@gmail.com
https://orcid.org/0000-0001-9369-802X
Candidate of Pedagogical Sciences, Docent Department of physical therapy, occupational therapy and physical culture and sports Faculty of rehabilitation pedagogy and social work Municipal institution of higher education "Khortytsk National Educational and Rehabilitation Academy" of the Zaporizhzhia Regional Council, Ukraine.

Volodymyr Krasnov
volodkras@gmail.com
https://orcid.org/0000-0002-5967-9260
DMedSci, Full professor Head of Department of pedagogy, psychology, medical and pharmaceutical law Teaching staff's advanced training faculty Shupyk National Healthcare University of Ukraine, Ukraine.

Larysa Olianych
larisa.olyanich26@gmail.com
https://orcid.org/0000-0002-4924-145X
Candidate of historical sciences, associate professor Docent Department of History and Socio-Economic Disciplines Kharkiv Humanitarian and Pedagogical Academy, Ukraine.

Dmytro Balashov
balashov05021978@gmail.com
https://orcid.org/0000-0001-7573-6598
Candidate of Pedagogical Sciences, Associate Professor of Theory and Methodology of Physical Culture, Sumy State Pedagogical University named after A.S. Makarenko, Ukraine.

Svitlana Liulchak
svitlanal2016@gmail.com
https://orcid.org/0000-0001-8437-4226
Candidate of pedagogical sciences, Associate Professor Department of Innovation and Information Technology in Education Educational and scientific institution of pedagogy, psychology, training of specialists of higher qualification, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, Ukraine.

Abstract

Electronic educational environments in the conditions of quarantine restrictions of COVID-19 have become a common phenomenon for the organization of distance educational activities. The purpose of the article is to analyze the role of electronic educational environments in the process of training applicants for higher education. General scientific, pedagogical methods were used. In the results, the general properties of the Internet educational platforms common in Ukraine, the peculiarities of using the Moodle and Prometheus platforms were discussed. The conclusions state that the military actions drew the attention of universities in Ukraine to the formation of their own educational platforms.

Keywords: educational platforms, distance education, the war in Ukraine, electronic educational environments, the Internet.

Resumen

Los entornos educativos electrónicos en las condiciones de COVID-19 se han convertido en un fenómeno común para la organización de actividades educativas. El propósito del artículo es analizar el papel de los entornos educativos electrónicos. En los resultados se discutieron las propiedades generales de las plataformas educativas de Internet comunes en Ucrania, las peculiaridades del uso de las plataformas Moodle y Prometheus. En las conclusiones se afirma que las acciones militares atrajeron la atención de las universidades de Ucrania hacia la formación de sus propias plataformas educativas. Esto es especialmente relevante para las instituciones técnicas y militares de educación superior.

Palabras clave: plataformas educativas, educación a distancia, guerra en Ucrania, entornos educativos electrónicos, Internet.

1. Introduction

The COVID-19 pandemic and quarantine restrictions have created objective conditions for the use of distance learning with the active involvement of communication media and online platforms for teaching, searching for information, and conducting classes.

In the Ukrainian reality, the actualization of distance learning occurred under the influence of Russian military aggression - since February 2022, Ukrainian universities have been working exclusively on the use of electronic educational environments. This approach was a forced step since many universities were located on the line of contact or even in the zone of occupation of the Russian army. Other universities were subjected to military destruction, and their management was unable to ensure the safety of teachers and students, so they were forced to conduct classes remotely. The article aims to analyze the role of electronic educational environments in the process of higher education training in the realities of large-scale military

aggression, to consider the positive and negative experiences of their use in the educational process of distance learning. The realization of this goal required solving the following tasks:

1. Characteristics of common educational platforms and resources
2. Analysis of training of Ukrainian knowledge seekers as a result of using national and international e-learning systems
3. SWOT-analysis of MOODLE platform, which is one of the most common in higher education in Ukraine
4. Development of a model for the formation of the high-quality educational electronic environment.

2. Literature review

Currently, education based on e-learning environments is used at all levels of education, which in turn affects the emergence of many pedagogical studies. Kem (2022) characterized the features of the use of personalized and adaptive learning systems that are used in e-learning. Ayoub et al. (2020) in their empirical study outlined the importance of the Coursera platform by characterizing its main features. Chan et al. (2021) in a monographic study identified the impact of the COVID-19 pandemic on the organization and implementation of education in higher education. The authors paid considerable attention to the importance of information and communication technologies. Pinheiro & Santos (2022) identified the promise of online learning. In addition, these scholars attempted to predict the spread of e-learning use in the future. At the same time, Rajab (2018) investigated the problem of the effectiveness of distance learning in territories where warfare is taking place. suffering from warfare. Bader et al. (2022) characterized the problem of digitalization of education based on the Ukrainian experience. The team of authors also identified the advantages and disadvantages of using modern electronic platforms for digital learning. Tsekhmister et al. (2022) studied current educational trends and technologies. The work of Zahorodna et al. (2022) is also important for this study, which analyzed the features of the formation and development of communicative competence. Tytova & Mereniuk (2022) analyzed the problem of the formation of digital literacy of future teachers against the background of the spread of the Russian-Ukrainian war. Graves (2018) analyzed key aspects of lifelong learning and its relevance to the present. Leon-Martinez & Tapia-Rangel (2020) outlined the importance of adult education based on an analysis of e-courses. However, the mechanisms of improvement of the digital education system are still little explored. In addition, the peculiarities of Ukrainian students' use of educational resources of international significance against the background of the spread of military aggression have not been analyzed.

3. Methodology

This study is formed on the methods of theoretical pedagogical knowledge. In particular, the work used analysis and synthesis. As a result of using content analysis of modern pedagogical literature, the understudied aspects of the problem are highlighted, the relevance of electronic educational environments in the training of applicants for higher education against the background of military aggression of Russia is characterized. Based on predictive method characterized the further importance of electronic educational resources and platforms in the system of training Ukrainian students.

The study also used empirical methods of scientific knowledge. In particular, based on modeling, a model of forming an effective educational environment, taking into account current learning

trends and military realities was made. The paper also includes a SWOT-analysis of the strengths and weaknesses of MOODLE platform, one of the most widespread in Ukrainian higher education.

4. Results and Discussion

Educational distance learning environments in Ukraine: development opportunities

Due to the spread of the COVID-19 pandemic, quarantine restrictions are causing the development of digital education (Vijayashree & Srinivasa, 2021). Learning actors began to increasingly implement distance education through the use of many online platforms, courses, or webinars (Pinheiro & Santos, 2022). The transformation then influenced most educational institutions to adopt new digital educational practices. In order to support education in an uncertain period, the powerful electronic resource "Coursera" was the first to allow universities free access to 3,500 courses (Ayoub et al., 2020).

As a result of full-scale Russian aggression against Ukraine (February 24, 2022) there is a new requirement to expand the network of national digital systems for e-learning. Office of the President of Ukraine in collaboration with UNICEF contributed to the development of several digital learning environments for distance learning for students in Ukraine. (Ministry of Education and Science of Ukraine, 2022). For example, an accessible electronic platform "United Ukrainian University" (UUU) was created.

There are many other opportunities for Ukrainian students to organize effective learning. In particular, in cooperation with Harvard University, Massachusetts Institute of Technology in 2012 the center of e-learning "EdX" was formed. This platform is now open-access and runs on a free system called OpenEdX. A variety of courses, both general and specific, are taught here. In a simplified mode, such online lectures translate some courses held at Harvard and other worldwide academic institutions (Abbasi & Foudi, 2020). There is no charge for Ukrainian students to join these courses, but there is a fee to obtain an official certificate. The educational resource "Udacity" is specifically designed for students in technical fields.

A Ukrainian electronic system called Prometheus allows university professors to distribute and publish courses and lectures for free. Separately, the courses consist of video conferences in which students and everyone else can debate with ejectors. Note that such discussions are open to teachers, academics, students, or anyone else who wishes to participate. Prometheus seminars are always available. The mentioned electronic system also has mobile applications for iOS and Android. The Ukrainian e-resource "Maidan Open University" acts as a remote system to promote the study of civic education. (Ministry of Education and Science of Ukraine, 2022). "Maidan Open University" owns more than 30 free courses for Ukrainian students. On this platform, lectures are organized by well-known Ukrainian professors. As a result of the successful completion of the selected courses, participants are issued a certificate confirming their training on this resource.

Moodle and Prometheus platforms in the context of military realities: peculiarities of use

Moodle platform has gained particular popularity in Ukraine against the background of the deployment of Russian military aggression, which has taken a leading position in many leading universities: Taras Shevchenko Kyiv National University, Ivan Franko Lviv National University,

National University "Lviv Polytechnic", Volyn National University and so on. The advantages of this educational platform are openness, free of charge (which is also very relevant in conditions of limited funding), and ease of general management. This educational environment is sufficiently flexible in application and meets the requirements for the organization of the distance learning process for both synchronous and asynchronous learning system (Vijayashree & Srinivasa, 2021). The problems with rearranging the new work requirements that many faculty members have had are partially solved by the introduction of preparatory courses. For example, the National University "Of Lviv Polytechnic" introduced a special discipline "Fundamentals of creating a distance learning course on the platform Moodle", designed for 1 credit ECTS with a practical direction of the main work. (Vega Falcón, 2020). Additional advantages of the Moodle electronic environment in a military environment were a number of features (See Table 1).

Table 1.
The main advantages of the educational electronic environment Moodle

Additional benefits of Moodle	
Ability to upload and share digital documents	Libraries and other information institutions are restricted in the midst of hostilities, exposing them to additional hazards. Teachers have the ability and platform to post their own lecture texts or other instructional materials so that students can access them remotely with the least risk to life and limb.
Open discussion	The possibilities of online chat, discussion of grades, consideration of other issues are supported by the system. This creates a number of advantages in a distance education environment.
Conducting tests and open evaluation log	The platform allows you to arrange open-ended, closed-ended tests, creative tasks, etc. Thanks to this it is possible to determine an objective assessment, which would take into account the performance of various tasks in percentage form.
Versatility	The educational environment based on Moodle is equally functional for the exact and humanities.

Authors' development

At the same time, certain problems and features of using Moodle in the educational process are relevant, which can determine the future and prospects for further implementation and use of this system in universities (Kaya Keles & Keles, 2018). Despite all the notable benefits of implementing information and communication technologies, some methodological elements of the arrangement of educational and methodological materials and work in this electronic educational environment requires improvement (See Table 2).

46

Role of e-learning environments in training applicants for higher education in the realities of large-scale military aggression - Eduweb, 2022, octubre-diciembre, v.16, n.4. /42-51

Table 2.
Problems of using the Moodle environment

Problems of using the Moodle environment	
Privacy	Only verified users from students and teachers get access to the information in the Moodle system. At the same time, the system cannot guarantee whether this information will not be spread on open platforms (students often use social networks to communicate and spread such information). In addition, everyone with a username and password will have access. For this reason, unauthorized people can gain access to Moodle.
Biased evaluation and restricted access issues	The first problem gives rise to the second: students can turn to their colleagues to help them solve problems. In Ukrainian reality, such cases are quite common. This creates unequal opportunities for others. It is difficult to solve such a problem: it is said about personal logins and the need to change them when you first log in.

Authors' development

For this reason, the use of Moodle has certain challenges, which in the conditions of open military confrontation are extremely relevant. Because of the inability to fully control the educational process, some universities associated with the Ukrainian defense sector have refused to use this platform (Vega Falcón, 2020). Some technical institutions of higher education, which are on other educational electronic environments of their own design, have done the same (Schrenk, 2020).

Another system, which is limitedly used in Ukrainian universities, is the educational environment "Prometheus". This platform is a commercial technology, which can automate the entire educational process. Like Moodle, the environment has a modular structure that allows you to increase, improve and upgrade the content. Advantages can be considered user-friendly interface, automatic execution of administrative functions, general accessibility in understanding the mechanisms of the system, centralized information database, performance, and available technical support. The Prometheus system is much better protected against extraneous interference, works more stably, with less chance of hang-ups. The purpose and functionality of Prometheus can be compared to Moodle, but the popularity of this environment is limited. Weighty disadvantages Prometheus is the high cost of this platform, as well as the range of tools for the development of distance courses, is much easier.

Model for the formation of a quality educational electronic environment

STEP 1.

When forming educational electronic environments, it is necessary first of all to take into account their main objectives. The educational digital environment should contribute to the formation of students' digital competencies, provide learning outcomes that meet the basic requirements of providing key knowledge and professionalism in specific areas of study, structuring educational materials so that students have the opportunity to learn their own level of mastered knowledge

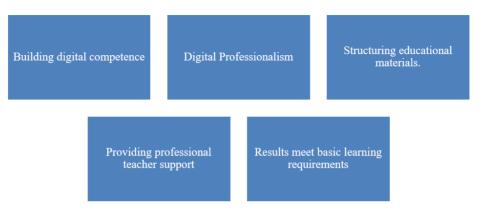and skills, providing professional mentoring support, etc. (Tytova & Mereniuk, 2022).   (See Figure 1).

Figure 1. The main objectives of educational electronic media, which should be considered in the formation of educational electronic media.
Author's development

STEP 2.

Consideration of the main components of e-learning system and outcomes. The introduction of e-learning environments in educational work promotes effective user involvement in learning with information and communication technologies (Bader et al., 2022). By organizing training based on electronic courses, using a variety of tools and resources of electronic environments, participating in project work using modern technologies, students master basic relevant skills of working with electronic materials and information, gradually developing key digital, information, communication competencies, mastering the skills of independent learning activities (See Table 3).

Table 3.
Key elements of electronic educational systems

The main components of the e-learning system	
Open access	We are talking about access to educational curricula, familiarization with the programs of disciplines, practices. Access to publications of electronic libraries and educational resources
Fixation and monitoring	There is a record of the educational process, monitoring the results of the development of certain educational programs.
Formation of the student's electronic portfolio	This step is necessary for individual analysis of the acquired skills of each student. Note that the person-centered approach should be the main one in the e-learning system.
Interaction	Synchronous and asynchronous interaction between participants in the learning process.
Ease of use	Electronic platforms and resources should preferably be user-friendly

Authors' development

STEP 3.

Consideration of modern learning and digital requirements. This study highlights those requirements that characterize the e-learning system as a whole and, according to the authors, are important in the formation of an educational digital environment (See Table 4).

Table 4.
Key requirements for the educational environment (consideration of pedagogical trends and war conditions)

Key requirements	
1. **Functionality**	The presence in the system of a variety of both educational and purely technical functions. We are talking about forums, chats, course management, analysis of the effectiveness of participants in the learning process
2. **Reliability and security of data**	This requirement includes not only the convenience of updating content but also the principle of protection from various external influences. During military hybrid attacks, the security of the educational environment is important, so the focus should be on platform security.
3. **Stability**	Based on the sustainability of the electronic system
4. **Support of basic educational standards**	Work should be based on the basic standard for e-learning SCORM (the basis for the international exchange of electronic materials, courses, programs).
5. **Development of a knowledge testing system**	Assessment of the quality of knowledge of students in synchronous or asynchronous learning
6. **Accessibility and usability**	The convenience parameter makes the platform competitive. The system should be simple, clear, and accessible to use. Learners should not have any barriers to accessing education.
7. **Prospects for the development of the system**	The e-learning system should be a constantly evolving learning environment.
8. **Quality technical support**	In wartime, due to various information attacks, maintaining a stable environment is essential. High-quality technical support also implies a quick response and elimination of errors in the system itself.

Authors' development

If all the proposed steps are taken into account, it is possible to create an effective educational electronic environment capable of resisting hybrid threats, to perform its main function, to be understandable to all users.

5. Conclusions

Russian military aggression has prompted a shift toward distance learning. Since the beginning of the COVID-19 pandemic, educational environments have established themselves. In particular, the electronic platform United Ukrainian University (UUU), Prometheus, the Ukrainian electronic resource "Open Maidan University", etc. was formed. The importance of educational electronic environments in war conditions is extremely important not only in terms of the educational component but also because of safety for the life and health of higher education applicants. Ukrainian students have unique opportunities for mostly free participation in various international and national E-learning systems.

Moodle platform is especially popular in Ukraine, it is popular in many leading universities and has proved itself positively in war conditions. Among its main advantages are high functionality and relative ease of use. At the same time, disadvantages related to security are tangible. The study proposes a certain model for developing an online distance learning environment that can be effective in the face of hybrid information attacks. In particular, we are talking about three systemic steps necessary to form a universal educational environment: determining the main tasks they should solve, taking into account the main components of the e-learning system and their results, addressing modern learning and digital requirements. The proposed paradigm is only theoretical, attempts to further implement it in practice will require additional clarification and research.

6. Bibliographic references

Abbasi, A., & Foudi, M. (2020). The E-learning future in Algeria. Journal of Distance Learning and Open Learning, 8(14), 75-102. https://doi.org/10.21608/jdlol.2020.78696

Ayoub, A., Amin, R., & Wani, Z. A. (2020). Contribution of developed countries towards MOOCs: An exploration and assessment from a representative platform Coursera. Asian Association of Open Universities Journal, 15(2), 251-262. https://doi.org/10.1108/aaouj-03-2020-0016

Bader, S., Oleksiienko, A., & Mereniuk, K. (2022). Digitalization of future education: analysis of risks on the way and selection of mechanisms to overcome barriers (Ukrainian experience). Futurity Education, 2(2), 21–33. https://doi.org/10.57125/FED/2022.10.11.26

Chan, R. Y., Bista, K., & Allen, R. M. (2021). Online teaching and learning in higher education during COVID-19: International perspectives and experiences. Routledge.

Graves, M. R. (2018). Lifelong learning. SFU Educational Review, 11(1), 91–96. https://doi.org/10.21810/sfuer.v11i1.755

Kaya Keles, M., & Keles, A. E. (2018). Distance education with Moodle in engineering education: online programming assignments. Technical Bulletin [Tehnički glasnik], 12(1), 27–33. https://doi.org/10.31803/tg-20180130122812

Kem, D. (2022). Personalised and adaptive learning: Emerging learning platforms in the era of digital and smart learning. International Journal of Social Science and Human Research, 05(02), 385-391. DOI: 10.47191/ijsshr/v5-i2-02

Leon-Martinez, J., & Tapia-Rangel, E. (2020). Building New Spaces for Education throughout Life, Aprendo+ Courses. EDEN Conference Proceedings, (1), 398–406. https://doi.org/10.38069/edenconf-2020-ac0038

Ministry of Education and Science of Ukraine (2022, March 17). Digital platforms for learning, self-development, and receiving help and verified information. Retrieved July 3, 2022, from

https://mon.gov.ua/ua/news/distancijni-platformi-dlya-navchannya-samorozvitku-ta-otrimannya-dopomogi-j-perevirenoyi-informaciyi

Pinheiro, M. M., & Santos, V. (2022). Building the future of distance and online learning. Online Distance Learning Course Design and Multimedia in E-Learning, 114-141. https://doi.org/10.4018/978-1-7998-9706-4.ch005

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

Schrenk, R. (2020). Distance Learning mit Moodle – Aktuelles aus Österreichs Schulen. GW-Unterricht, 1, 51–56. https://doi.org/10.1553/gw-unterricht158s51

Tsekhmister, Y., Malatsai, I., Nechitailo I., Yemelianova, O., Korol O., & Statsenko, N. (2022). Suchasni tendentsii ta aktualni problemy pidhotovky menedzheriv osvity. Current trends and current problems of training of education manager. Financial and Credit Activity Problems of Theory and Practice, 6(41), 556–563. https://doi.org/10.18371/fcaptp.v6i41.251532

Tytova, N., & Mereniuk, K. (2022). Digital literacy of future teachers in the realities of large-scale military aggression (Ukrainian experience). Futurity Education, 2(3), 43–54. https://doi.org/10.57125/FED/2022.10.11.13

Vega Falcón, V. (2020). Moodle Research Software: Emotional Context in Ecuadorian Higher Education. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3546621

Vijayashree, L., & Srinivasa, S. (2021). Covid 19 and stress among students. South Asian Journal of Marketing & Management Research, 11(7), 1–9. https://doi.org/10.5958/2249-877x.2021.00049.7

Zahorodna, O., Saienko, V., Tolchieva, H., Tymoshchuk, N., Kulinich, T., & Shvets, N. (2022). Developing communicative professional competence in future economic specialists in the conditions of postmodernism. Postmodern Openings, 13(2), 77-96. https://doi.org/10.18662/po/13.2/444