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THE BENEFITS OF USING THE BLENDED LEARNING METHODOLOGY IN CONDITIONS OF WAR

OS BENEFÍCIOS DO USO DA METODOLOGIA DE APRENDIZAGEM HÍBRIDA EM CONDIÇÕES DE GUERRA

Marianna Zhumbei
Associate Professor, Associate Professor of the Department of Foreign Languages and Country Studies, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine.
marianna.zhumbei@pnu.edu.ua

Oksana Nych
PhD in Education, Associate Professor at the Department of Foreign Languages, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine.
oksana.nych@pnu.edu.ua

Iryna Tymkiv
PhD In Pedagogy, Associate Professor of Foreign Languages and Translation department, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine.
irynasavchak@pnu.edu.us.

Liliia Pryimak
PhD (Philology), Associate Professor, Associate Professor of the Department of Foreign Languages and Country Studies, Vasyl Stefanyk Precarpathian National University, Ivano - Frankivsk, Ukraine.
liliya.pryimak@pnu.edu.ua.

Nadiia Savchuk
PhD (Pedagogy), Associate Professor, Associate Professor of the Department of Foreign Languages and Country Studies, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine.
nadiya.savchuk@pnu.edu.ua

ABSTRACT

In the context of a full-scale war, participants in the educational process are implementing innovative strategies for adapting to new realities, based on the development and application of models of blended learning. The purpose of the academic paper is to study the features of the blended learning methodology in crisis situations with the identification of advantages and risks. The research was conducted using general scientific methods of cognition: analysis, synthesis, comparison, abstraction, specification, generalization, and formalization. In the course of the research, the existing models of the mixed type of educational process and the means of their practical implementation in educational institutions were analyzed. The problems of blended learning in the crisis period of military conflict are actualized, its features are presented. The risks accompanying the process of implementing the blended learning methodology are identified, and variations of measures to prevent them are proposed. It has been proven that the quality of the blended learning process depends on the teacher's digital competencies in the online process. It has been established that the trend under study enriches the students' learning experience and stimulates their motivation to study. The level of efficiency of blended learning is analyzed in comparison with distance and traditional learning. It has been determined that blended learning is much more effective than traditional and distance learning subject to careful planning of the educational process and a reasonable selection of tools. The essence of the methodology of blended learning as an innovative technology of the educational process and its effective anti-crisis format is proven. The practical significance of the research results lies in the possibility of their productive use in the process of optimizing the system of education in war conditions by improving existing and developing new methods and algorithms of blended learning.

Keywords: models of blended learning, adaptation of the educational process, digital competencies, multimedia, digitalization.

RESUMO

No contexto de uma guerra em larga escala, os participantes no processo educativo estão implementando estratégias inovadoras para se adaptarem a novas realidades, com base no desenvolvimento e aplicação de modelos de aprendizagem híbrida. O objetivo do artigo acadêmico é estudar as características da metodologia de aprendizagem híbrida em situações de crise, com a identificação de vantagens e riscos. A pesquisa foi conduzida utilizando métodos científicos gerais de cognição: análise, síntese, comparação, abstração, especificação, generalização e formalização. Ao longo da pesquisa, foram analisados os modelos existentes do tipo de processo educativo misto e os meios de sua implementação prática em instituições educativas. Os problemas da aprendizagem híbrida no período de crise de conflito militar são atualizados, e suas características são apresentadas. Os riscos que acompanham o processo de implementação da metodologia de aprendizagem híbrida são identificados, e são propostas variações de medidas para preveni-los. Foi comprovado que a qualidade do processo de aprendizagem híbrida depende das competências digitais do professor no processo online. Foi estabelecido que a tendência em estudo enriquece a experiência de aprendizado dos alunos e estimula sua motivação para estudar. O nível de eficiência da aprendizagem híbrida é analisado em comparação com a aprendizagem a distância e tradicional. Foi determinado que a aprendizagem híbrida é muito mais eficaz do que a aprendizagem tradicional e a distância, sujeita ao planejamento cuidadoso do processo educativo e à seleção razoável de ferramentas. A essência da metodologia de aprendizagem híbrida como uma tecnologia inovadora do processo educativo e seu formato eficaz contra crises são comprovados. A importância prática dos resultados da pesquisa reside na possibilidade de sua utilização produtiva no processo de otimização do sistema de educação em condições de guerra, por meio da melhoria de métodos existentes e desenvolvimento de novos métodos e algoritmos de aprendizagem híbrida.

Palavras-chave: modelos de aprendizagem híbrida, adaptação do processo educacional, competências digitais, multimídia, digitalização.

Introduction

The forced and non-alternative transition to distance and blended learning has led to significant transformational processes in the education system. This dynamic resulted in the rapid popularization of e-learning methods. A blended learning approach combines offline and online learning based on the principles of mutual complementarity. At the same time, the creation of optimal conditions for the educational process, the formation of sustainable motivation, and the increase in the level of digital competencies are positioned as basic prerequisites for the successful implementation of a blended learning methodology.

The scientific achievements of modern scientists contain in-depth studies of relevant aspects of implementing a blended learning system. In particular, several scholars have paid attention to the principles and essence of this methodology (Skrypka, H. V., 2023; Kovtun, O., Melnyk, N., Pomytkina, L., Ladohubets, N., & Kokarieva, A., 2024). Some researchers (Keiliuk, A. A., 2023; Londar, L. P., 2022) argue that in addition to the learning process, educational institutions should guarantee a safe space, provision of vital resources, as well as psychological and emotional support. Other scholars (Hurevych R., Hordiichuk, H., 2023) believe that improving the quality of education on an innovative basis, focusing on the implementation of the inexhaustible potential of digital technologies, and creating opportunities for using the symbiosis of educational models are identified as the main trends in the modern educational system.

Scientific and methodological approaches and strategies for implementing blended learning in the educational process are considered in the scientific works of a number of modern scholars (Linnik, O., 2023; Sliusarevskyi, M. M., & Hryhorovska, L. V., 2022). Particular scientists (Shelever O. V., 2022) emphasize the fact that digital and multimedia tools, mobile communication, and the global network have become a necessary component of education and the modern educational process cannot take place without being connected to the overall informatization of society. Representatives of advanced scientific schools (Melnyk, A. I., 2022; Dzhedzhera, K., 2023) argue that the primary sustainable goal of the

education sector is to ensure the quality and permanence of the education process at all levels, which actualizes the need to implement scientific studies in the field and implement their results in the form of practical developments.

The relevance of the research subject is due to the systematic introduction of modern information and communication technologies into the educational process, which leads to the transformation of the types and forms of its organization. Within the framework of the outlined concept, the methodology of blended learning is positioned as an effective symbiosis of traditional and distance forms of the educational process, requiring scientifically based approaches to optimizing the process of practical implementation, taking into account the specifics of the education system during the wartime.

The purpose of the research is to analyze the practice of using blended learning in the education system of wartime as a modern educational technology, with the identification of advantages, risks, features and current challenges.

Literature Review

In the difficult conditions of the education system during the wartime, the issue of introducing the technology of blended learning into the Ukrainian education system is in the focus of interdisciplinary scientific studies (Belova, V., 2023). A significant number of studies have been conducted on the problem of blended learning in theoretical and practical pedagogy (Clark, J. T., 2020; Bojović, Ž., Bojović, P. D., Vujošević, D., & Šuh, J., 2020). The blended form of the educational process is positioned in the scientific literature as personalized and differentiated learning using web technologies.

A significant contribution to the formation of a modern strategy for the development of blended learning opportunities was made by some foreign scholars (Popa, D., Repanovici, A., Lupu, D., Norel, M., Coman, C., 2020). Their developments are focused on the possibilities of digital optimization of the educational process, factors motivating participants in the process, features of the communication process, and evaluation methodology. The scientists also describe in detail the

digitalization tools, advantages and risks of implementing the blended learning methodology and positioning it as a priority in crisis and emergency conditions (Kaplan, A. D., Cruit, J., Endsley, M., Beers, S. M., Sawyer, B. D., & Hancock, P. A., 2021).

There are numerous examples of successful experience in using blended learning methods in modern foreign scientific literature (Kusmaryono, I., Jupriyanto, J., & Kusumaningsih, W., 2021; Abbacan-Tuguic, L., 2021). Although the scientific results do not take into account the destructive factors of wartime, they can be helpful in forming successful conceptual foundations for the process's implementation and in understanding certain parts of its general methodology.

Many studies of modern scholars are devoted to analyzing the challenges and risks arising from testing the blended learning system (Ando, K., Basilisco, J., Deniega, A., Gador, K., & Geraldo, P., 2022). Several modern researchers have focused on some aspects of the possibilities of individualizing the learning process and monitoring the process (McKenna, K., Gupta, K., Kaiser, L., Lopes, T., & Zarestky, J., 2020). Other scholars focus on developing ways to level the disproportion between the efficiency of blended and traditional forms of education (Monk, E.F., Guidry, K.R., & Pusecker, K.L., 2020).

As a result of analyzing the achievements of modern researchers, it has been established that several aspects of blended learning remain insufficiently studied. A number of issues remain unresolved regarding the formation of the digitalization concept of the educational process while maintaining the functional content and component composition of traditional educational approaches. The study of the practical aspects of improving the methodology of blended learning remains an urgent issue in view of the prospects and priority for different levels of education in conditions of wartime.

Materials and Methods

In the process of implementing the present research, particular general scientific and special methods of scientific cognition were used, including logical and comparative analysis, synthesis, abstraction and specification, inductive and

deductive methods. The theoretical and methodological basis of the research is based on the dialectical method, systematic approach, and the priority of the principles of complex studies. This concept of the academic paper made it possible to analyze the research subject as a system in the entirety of interconnections and interdependencies.

The methods of analysis and synthesis were used in the process of identifying the stages and factors of development, as well as the most influential elements of the object under study. The concept of a holistic process of a blended learning system is formed by means of abstraction. The method of formalization was used in the research at the stage of deriving the priority vectors of optimizing the methodology of blended learning based on digital optimization, highlighting the advantages and risks of the process under study. The inductive method is used for the purpose of predictive analysis of the expected efficiency of the mixed system of education at different levels.

Results

The issue of implementing and effectively using technologies of blended learning has become more relevant against the backdrop of a full-scale military invasion. In order to respond promptly to the criticality of the situation, it became necessary to make fundamental decisions regarding the organization of the educational process, which was manifested by the introduction of alternatives, that is, distance and mixed forms of the educational process. The effective implementation of teaching methods that differ from traditional ones involves the formation of a comprehensive approach to optimizing educational activities by digitalizing the vast majority of processes, taking into account the existing practical experience of foreign countries and the individual characteristics of the educational process in Ukraine in the crisis conditions of war. It is worth noting that information and communication technologies of education were widely developed during the pandemic, which was characterized by the massive adaptation of educational

institutions of all levels to the application of exclusively distance learning technologies.

The methodology of blended learning involves a number of variations in the format of the process, in particular, combining face-to-face and distance learning, synthesizing the main educational content with an external resource, synergy of multi-format learning with the active implementation of the potential of electronic resources. The basic features of blended learning are individualization and personalization of the educational process, a high level of requirements for self-control, the introduction of digital educational resources that create opportunities for optimizing communication, as well as interactivity, adaptability, variability of forms of educational content, digitalization of processes. It should be emphasized that traditional characteristics remain relevant, in particular, structuring, scientific approach, systematic presentation of educational material, and visualization.

The methodology of blended learning has a number of features, including the priority of independent activity of education seekers, the dynamics of accents in the relationship between participants in educational communication, the provision of individualized support, the application of digital tools, and the active use of group forms of work.

Distance learning has shown insufficient flexibility and limitations during the pandemic. In addition, participants in educational communication were unprepared for the digitalization of particular educational processes. The application of the methodology of blended learning makes it possible to overcome most of the identified shortcomings of the model of distance learning while forming a number of priority advantages: the possibility of organizing training according to individual educational trajectories and applying a flexible class schedule, integrating the adaptation of calendar and thematic planning, mastering a full module of material in video or with the help of training materials. The algorithm for combining synchronous and asynchronous modes in the structure of the educational process requires the development of specific adaptive models. At the same time, class time is maximized for discussing complex issues or practicing the key points of the

material, providing quality feedback from the teacher. The education seekers expand their knowledge and skills with more complex tasks after the lesson.

Currently, Ukrainian educational institutions are focused on using blended learning as a strategy for effectively adapting the educational process to war conditions. At the same time, this form of education is not enshrined in law: education seekers studying by a mixed methodology are actually enrolled in full-time, distance, or one of the individual forms of study mode.

The blended form creates opportunities for the most effective use of live communication, better adaptation and increased motivation of participants in the educational process. The learning process that ensures the acquisition of knowledge and skills through the integration of classroom and digitalized educational activities requires the integrated use of elements of traditional, electronic, distance and mobile learning technologies, providing that there is a sufficient level of self-control of education seekers.

The methodology of blended learning harmonizes the use of study time. It provides high adaptive capabilities of the educational process to the education seeker's individual needs, introduces diversification of knowledge sources, promotes the application of dynamic means of diagnostics and monitoring of learning achievements, ensures the organization of feedback, and increases the level of productivity and motivation of learning activities.

A personalized approach to each student in blended learning makes it possible to optimize the educational process by adapting the speed and time factors, which is positioned as a practical implementation of the principles of equality and individual approach in education. It is possible to organize training in such a way that all participants in the communication educational process receive the same information through the application of interactive panels. At the same time, everyone has the opportunity to determine how much time to spend on training. Having access to both the material of the lesson and the video, students can watch it as many times as they need, which will significantly improve their performance. The assessment process and tools should guarantee equal opportunities for participants of the learning process and open up opportunities for recognizing their own

progress in learning. The methodology of blended learning is positioned as an adaptive structure, and, therefore, assessment should also be dynamic, combining individual grades with evaluation of group work and team projects. At the same time, the assessment process can be implemented by both the teacher and the online toolkit. It is worth noting that the testing of self-assessment significantly increases the motivation of the education seeker, stimulating responsibility for the learning outcome. The indicator of psychological well-being of all participants in the educational process also requires special attention. Tools for effective stress management should become a common practice among teachers and education seekers.

Wartime poses special threats and challenges for blended learning. For instance, educational institutions are not provided with the necessary material and technical base; constant tension and stress lead to deterioration in the mental health of participants in educational communication, which results in a decrease in motivation to learn and teach. By the way, problems exist with the servers as well as technical limitations, and this greatly complicates the learning process since blended learning inevitably includes online processes that depend on the Internet, computers, and digital skills. In addition, the low level of digital literacy and skills in working with information and computer technologies is identified as a priority challenge. The factors hindering the widespread and more effective implementation of blended learning in Ukraine are the high cost of developing digital literacy courses, the lack of infrastructure development, and the complexity of licensing and accreditation procedures.

At the same time, blended learning, despite the crisis regime of its testing, has occupied a priority niche in educational activities, which was facilitated by a number of undeniable advantages of the methodology. These primarily include freedom and adaptability in learning, individualization and personalization of the education process, significant mobility, and the ability to choose the optimal pace of learning, the possibility of forming virtual communities to solve common problems, exchange information and experience. Blended learning combines real-world training with online components in order to provide a more individualized and efficient learning

experience. This approach allows educational institutions of different levels to adopt the most effective experience from both methods of the educational process, in particular, personal connections and interaction from the face-to-face learning system, as well as adaptability, convenience and dynamics of online learning. The methodology of blended learning also generates favorable prerequisites for preparing students for the digital future. After all, the value of competence in working with digital technologies cannot be overestimated in the light of the global trend of digitalization of all spheres of public life. Skills that are actively developed in blended learning, like information analysis, creativity, and emotional intelligence, are highly sought after today and frequently play a critical role in bridging gaps in the learning process.

The indisputable advantages of using the methodology of blended learning also include information accessibility, which implies constant access to educational materials by the education seeker with free choice of time, place, method and pace of learning; ensuring consistency of different forms of work – traditional and distance; positioning of adequate and optimal goals, content and training methods for each form of work. The blended learning technology does not have the advantage of full-time or distance learning; they function equally, act in parity, and each is aimed at achieving particular goals.

Therefore, blended learning is a type of hybrid educational methodology that combines elements of distance learning, traditional and independent learning, which has a number of benefits. At the same time, it means not only the use of modern interactive technologies as a supplement to traditional ones but also a qualitatively new, transformative approach to learning. Currently, there is no single universal model of blended learning since the process of its implementation is determined by the context, national features, strategic benefits and specifics of a particular educational institution. At the same time, the integration of digital tools and e-learning elements, partial face-to-face activities, and a personalized way of acquiring knowledge are positioned as an integral conceptual basis of the methodology.

It is obvious that educational institutions that actively implement the model of blended learning should ensure the implementation of the accompanying governance paradigm, as well as the relevant level of adaptability of the educational process, taking into account the symbiosis of synchronous and asynchronous modes. The prospect for further studies is the development of methods for optimizing the quality of education in conditions of blended learning.

Discussion

Innovative events in the field of education in wartime crisis conditions should be focused on ensuring the continuity of the educational process under any variations in the impact of external and internal conditions. Many modern researchers strongly support this viewpoint (Míguez-Álvarez, C., Crespo, B., Arce, E., Cuevas, M., & Regueiro, A., 2022). Scholars insist on the need to use existing and develop new interactive tools, as well as expand the possibilities of communicative cooperation between participants of the educational process.

Foreign experts (Kilag, O. K., Obaner, E., Vidal, E., Castañares, J., Dumdum, J. N., & Hermosa, T. J., 2023) believe that blended learning is a combination of digital opportunities and traditional learning based on an adaptive approach that effectively takes advantages of digitalized classes, involving a range of methods that can improve the education seekers' outcomes.

Researchers (Kumar, A., 2021; Batista-Toledo, S., & Gavilan, D., 2022) argue that blended learning involves a purposeful educational process aimed at acquiring knowledge and skills, implementing cognitive activities and developing creative capabilities based on the integrated and systematic use of traditional and innovative pedagogical technologies in synergy with information and communication tools, on the principle of mutual complementarity. At the same time, some scholars (Ghazali, F., 2022) claim that the methodology of blended learning transforms the role of the teacher, who changes the position of the observer to the function of the mentor.

Based on the findings of explorations conducted by some authors (Balolong, M., 2022), who study the risks of implementing blended learning, it can be noted

that the lack of technical capabilities can be really made up for by a variety of forms and modes of learning – synchronous, asynchronous, face-to-face. Scientists are convinced that blended learning makes it possible to implement them in full. At the same time, scientists note that it is important not to limit the time for completing tasks in order to avoid additional stress and increase the level of education seekers' motivation. According to the opinion of many scientists (Baral, G., & Baral R. S., 2021), the technological implementation of blended learning is promising and relevant due to cloud technologies.

Some modern scholars (Martín-García, A. V., 2020; Mae, C. E., Mae, G. S., Piolo, M., & Muico, E. J. G., 2023) argue in their publications that the effectiveness of the integration process in the educational sphere depends on the efficiency of managing various forms of interaction. At the same time, scientists emphasize that the lack of motivation among education seekers can be increased by the structuring of work, constant two-way communication, and involvement of the potential of creativity and emotional intelligence. Along with this, the optimization of the psychological state of participants of the educational process is effectively implemented through communication at face-to-face classroom consultations or videoconferences. It is challenging to argue against scientists in the age of global digital change because education should reconsider its useful function in public communication and become a contemporary hub for learning and communication.

The results of scientific inquiries conducted by individual representatives of scientific schools (Sher, V., Hatala, M., & Gašević, D., 2020) indicate that the traditional education system does not meet the current needs of the education seeker and society as a whole. At the same time, scientists believe that remote and electronic technologies can improve the adaptation process, creating opportunities for fruitful cooperation between participants in the educational process not only during classroom classes but also outside the educational institution.

The results of scientific inquiries and studies presented above are in line with the conclusions of the present research and emphasize the need to optimize communication in the process of obtaining education at various levels through digital tools, by increasing digital literacy, introducing effective tools to stimulate

motivation. At the same time, the effective implementation of digitalization tools creates the possibility of establishing feedback and communication in the educational process of blended learning, based on the principles of accessibility and openness.

Based on the results obtained in the present research, it is reasonable to assume that the mixed form of education will be the priority of educational methods during the military operations in Ukraine. Moreover, it seems expedient to apply the method of blended learning in a partial mode and in the post-war period because the methodology under study has proven to be a fundamentally new tool for optimizing the learning process, transforming communication processes towards effective interaction between the teacher and the education seeker.

Conclusions

Summarizing the research results, it can be argued that the mixed form of education is currently the best option for organizing the educational process in higher educational institutions of Ukraine, given the conditions of war. Despite the existing challenges and risk factors, blended learning has a number of obvious benefits, including individualized learning, variability of forms of the educational process, and revealing the potential of education seekers based on motivation, responsibility, and self-control.

The research made it possible to analyze the existing models of blended learning and the ways in which they are implemented in Ukrainian educational institutions. In the course of the research, it has been proved that the method of blended learning is more effective than other forms of education provided that the educational process is effectively planned and the means are reasonably selected. The risks associated with the implementation of the methodology of blended learning are highlighted, and variations of measures to prevent them are proposed.

The research has established that the development of the educational process in the direction of digitalization plays a significant role in optimizing the quality of communication, strengthening the position of participants of the learning

process as an educational and communication hub. It has been determined that the quality of the blended learning process to a large extent depends on the teacher's digital competencies in the online process. It is substantiated that the tendency under study enriches the educational experience of education seekers, stimulates their motivation to learn. It has been established that when organizing educational activities on the basis of blended learning, it is necessary to individualize the educational process for all participants according to individual needs.

Based on the research results, priority areas for further scientific studies on the relevant topic are proposed; the essence of the methodology of blended learning as an innovative technology of the educational process and its effective anti-crisis format is substantiated. The need for further study of the possibilities of using digitalization tools with the involvement of international practical experience to increase the effectiveness of blended learning in wartime realities is evident. Such conceptual fundamentals will form the possibility of applying the positive experience of organizing blended learning in educational institutions of different levels, taking into account positive practical experience, mandatory use of adaptive technologies and individualization of learning to increase motivation.

REFERENCES

Abbacan-Tuguic, L. (2021). Challenges of the New Normal: Students' Attitude, Readiness and Adaptability to Blended Learning Modality. International Journal of English Literature and Social Sciences (IJELS), 6(2). https://journal-repository.theshillonga.com/index.php/ijels/article/view/3547

Ando, K., Basilisco, J., Deniega, A., Gador, K., & Geraldo, P. (2022). Learning without Learning in the New Normal: College Education Students Lived Experiences in Blended Learning Modality. Psychology and Education: A Multidisciplinary Journal, 2(6). 455–464. https://scimatic.org/show_manuscript/394

Balolong, M. (2022). Challenges of Blended Learning: A Phenomenological Inquiry. http://dx.doi.org/10.2139/ssrn.4103847

Baral, G., & Baral R. S. (2021). E-learning: a Modality of Medical Education in the

Period of Crisis. Journal of Nepal Health Research Council, 18(4). 776–778. https://doi.org/10.33314/jnhrc.v18i4.2767

Batista-Toledo, S., & Gavilan, D. (2022). Implementation of Blended Learning during COVID-19. Encyclopedia, 2(4). 1763–1772. https://doi.org/10.3390/encyclopedia2040121

Belova, V. (2023). Features of distance education in higher educational institutions in the conditions of war and pandemic. European Science, 3. 105–116. https://doi.org/10.30890/2709-2313.2023-20-03-006

Bojović, Ž., Bojović, P. D., Vujošević, D., & Šuh, J. (2020). Education in times of crisis: Rapid transition to distance learning. Computer Applications in Engineering Education, 28(6). 1467–1489. https://doi.org/10.1002/cae.22318

Clark, J. T. (2020). Distance education. Clinical engineering handbook. 410–415. Academic Press. https://doi.org/10.1016/B978-0-12-813467-2.00063-8

Dzhedzhera, K. (2023). Motivational factors for ensuring the quality of education in higher educational institutions in the context of distance learning. New pedagogical thought, 3(115). 31–35. https://doi.org/10.37026/2520-6427-2023-115-3-31-35

Ghazali, F. (2022). Towards an optimal blended learning model during disrupted education periods. Pegem Journal of Education and Instruction, 12(3). 97–105. https://doi.org/10.47750/pegegog.12.03.11

Hurevych R., Hordiichuk H. (2023). Blended learning as a modern form of building the educational process. Modern Information Technologies and Innovation Methodologies of Education in Professional Training Methodology Theory Experience Problems, 69. 14–35. https://doi.org/10.31652/2412-1142-2023-69-14-35

Kaplan, A. D., Cruit, J., Endsley, M., Beers, S. M., Sawyer, B. D., & Hancock, P. A. (2021). The Effects of Virtual Reality, Augmented Reality, and Mixed Reality as Training Enhancement Methods: A Meta-Analysis. Human Factors, 63(4). 706–726. https://doi.org/10.1177/0018720820904229

Keiliuk A.A. (2023). Functioning of the education system in the conditions of war and global challenges of the XXI century. Modernization of the educational process in modern educational institutions: a collection of scientific papers. Odesa: Ushynsky University. 59–64. https://dspace.pdpu.edu.ua/jspui/handle/123456789/1764

Kilag, O. K., Obaner, E., Vidal, E., Castañares, J., Dumdum, J. N., & Hermosa, T. J. (2023). Optimizing Education: Building Blended Learning Curricula with LMS.

Excellencia: International Multi-disciplinary Journal of Education (2994-9521), 1(4). 238–250. https://multijournals.org/index.php/excellencia-imje/article/view/54

Kovtun, O., Melnyk, N., Pomytkina, L., Ladohubets, N., & Kokarieva, A. (2024). Constructive factors in the development of higher education in the post-pandemic and post-war environment: Ukraine's experience. Proceedings of the National Aviation University. Series: Pedagogy, Psychology, 23. 45–58. https://doi.org/10.18372/2411-264X.23.18172

Kumar, A. (2021). Blended Learning Tools and Practices: A Comprehensive Analysis. IEEE Access, 9. 85151–85197. doi: 10.1109/ACCESS.2021.3085844

Kusmaryono, I., Jupriyanto, J., & Kusumaningsih, W. (2021). A systematic literature review on the effectiveness of distance learning: Problems, opportunities, challenges, and predictions. International Journal of Education, 14(1). 62–69. doi: https://doi.org/10.17509/ije.v14i1.29191

Linnik, O. (2023). Blended learning as a strategy for adapting the educational process at school before the war. Pedagogical education: Theory and practice. Psychology. Pedagogy, 39 (1). 25–32. https://doi.org/10.28925/2311–2409.2023.394

Londar, L. P. (2022). Education in Ukraine in the conditions of war. Education of Ukraine under martial law to ensure distance learning: management, digitalization, European integration aspects, 36.

Mae, C. E., Mae, G. S., Piolo, M., & Muico, E. J. G. (2023). Social Media as a Supplemental Tool in Blended Learning. Journal of Media, Culture and Communication (JMCC), 3(01). 7–13. https://doi.org/10.55529/jmcc.31.7.13

Martín-García, A. V. (2020). Blended learning: convergence between technology and pedagogy. Springer International Publishing. https://link.springer.com/book/10.1007/978-3-030-45781-5

McKenna, K., Gupta, K., Kaiser, L., Lopes, T., & Zarestky, J. (2020). Blended Learning: Balancing the Best of Both Worlds for Adult Learners. Adult Learning, 31(4). 139–149. https://doi.org/10.1177/1045159519891997

Melnyk, A. I. (2022). Problems of using elements of distance learning under martial law. Bulletin of Kyiv National Linguistic University. Series Pedagogy and Psychology, 37. 64–75. https://doi.org/10.32589/2412-9283.37.2022.272900

Míguez-Álvarez, C., Crespo, B., Arce, E., Cuevas, M., & Regueiro, A. (2022). Blending learning as an approach in teaching sustainability. Interactive Learning Environments, 30(9). 1577–1592. DOI:

https://doi.org/10.1080/10494820.2020.1734623

Monk, E.F., Guidry, K.R., & Pusecker, K.L. (2020). Blended learning in computing education: It's here but does it work? Educ Inf Technol 25. 83–104. https://doi.org/10.1007/s10639-019-09920-4

Popa, D., Repanovici, A., Lupu, D., Norel, M., Coman, C. (2020). Using Mixed Methods to Understand Teaching and Learning in COVID 19 Times. Sustainability, 12(20). https://doi.org/10.3390/su12208726

Shelever O. V. (2022). Online education: prospects and problems in the context of military conflicts. Scientific Publications of the Department of Psychology, 49(2). 184–188. https://dspace.uzhnu.edu.ua/jspui/handle/lib/44110

Sher, V., Hatala, M., & Gašević, D. (2020). Analyzing the consistency in within-activity learning patterns in blended learning. Proceedings of the Tenth International Conference on Learning Analytics & Knowledge (LAK '20). 1–10. https://doi.org/10.1145/3375462.3375470

Skrypka H.V. (2023). Implementation of virtual reality technology in the conditions of distance and blended learning of a modern school. Scientific notes. Series: Pedagogical Sciences, 211. 201–208. https://doi.org/10.36550/2415-7988-2023-1-211-201-208

Sliusarevskyi, M. M., & Hryhorovska, L. V. (2022). Psychological support of participants of the educational process in the conditions of war. Bulletin of the National Academy of Pedagogical Sciences of Ukraine, 4(1). https://doi.org/10.37472/v.naes.2022.4129