THE DIDACTIC ASPECTS OF BLENDED LEARNING IN HIGHER EDUCATIONAL INSTITUTIONS DURING THE PANDEMIC

Nadiia Balyk[1], Galyna Shmyger[2], Yaroslav Vasylenko[3], Anna Skaskiv[4], & Vasyl Oleksiuk[5]

Ternopil Volodymyr Hnatiuk National Pedagogical University
2 M. Kryvonosa St., Ternopil, Ukraine 46027
[1] nadbal@fizmat.tnpu.edu.ua, ORCID 0000-0002-3121-7005
[2] shmyger@fizmat.tnpu.edu.ua, ORCID 0000-0003-1578-0700
[3] yava@fizmat.tnpu.edu.ua, ORCID 0000-0002-2520-4515
[4] skaskiv@fizmat.tnpu.edu.ua, ORCID 0000-0002-3548-2383
[5] oleksyuk@fizmat.tnpu.edu.ua, ORCID 0000-0003-2206-8447

Abstract: *The article considers the didactic aspects of the implementation problem of blended learning in higher education in the context of the COVID-19 pandemic. The concept of "blended learning" is studied. It turns out that there is no single vision for the essence of blended learning. Different scientists consider this concept as a model, method, teaching system, a set of teaching methods and strategies, form of learning, program. The tasks and advantages of blended learning, didactic aspects of its introduction into the educational process of the university are determined. The model of the environment of blended learning and didactic aspects of two-level implementation in the university of blended learning for the purpose of training improvement are offered, the choice of methods of its realization is substantiated. It is established that the use of blended learning in the process of studying the courses "Technology of e-learning", "Computer information technologies in education and science" in master's programs in a pedagogical institution of higher education creates conditions for the implementation of effective student-centred learning. It has been proven in practice that blended learning is more effective than pure distance learning and offers many benefits for students, such as accessibility, better design of methodological instructions, consideration of individual opportunities, increasing student involvement level due to social interaction, time monitoring.*

Keywords: blended learning; didactics; implementation; pandemic time; higher education; masters.

INTRODUCTION

In the 21st century, it has become clear that online learning is entering the mainstream and is becoming a growing market as it expands access to learning for a significant number of people. It has evolved from part-time programs of the last century into professional and well-designed institutional online offerings for modern learning. It can be predicted that online education will continue to expand its presence and influence higher education through an effective process of improvement and restructuring (Smyrnova-Trybulska & Morze, 2019).

In connection with the global pandemic, the role of blended learning has increased significantly. It is no coincidence that after the first wave of the pandemic, the vast majority of the world's leading universities have announced plans to introduce blended learning, when classic face-to-face classes are complemented by work on online platforms.

Well-designed blended learning enables effective mixing of educational audience's boundaries, combining formal and informal learning with a wide range of professional online communities.

Blended learning originated as a mix of online and offline learning. Now they are often compared. Both formats have their undeniable advantages, but the effectiveness is different for each case. The result depends on the context, subject, learning objectives, personal characteristics of the student, the quality of the educational product and the effective training of teachers.

Analysts of the National Agency for Quality Assurance in Higher Education gave the profession of online teacher the fourth place among the professions of the future, which will be the most popular in the next ten years (Kvit & Yeremenko, 2021).

In this article we will consider the didactic aspects of the introduction of blended learning in higher education institutions.

1. ANALYSIS OF RESEARCH PUBLICATIONS IN THE FIELD OF BLENDED LEARNING

The term "blended learning" is used alongside the terms "hybrid learning", "combined learning", "flexible learning", which are considered synonymous. All concepts are often used in research because they refer to the same technology.

The Recommendations for the introduction of blended learning in Ukrainian institutions of professional before higher and higher education determine that blended learning is an approach, pedagogical and technological model, methodology that, along with online technologies, relies on direct interaction between students and teachers in the classroom (Stadny & Nikolaev, 2021).

According to the Christensen Institute, blended learning is a formal educational program that involves learning within an educational institution, distance learning, and the methods that combine these forms of learning (Christensen et al., 2013).

According to scientists (Painter, 2006; Bates, 2021) blended learning is a combination of rigorous formal teaching methods (working in classrooms, studying theoretical material) with non-formal (discussion via e-mail and Internet conferences, consoli-

dation of learning material using multimedia teaching aids), organic integration of carefully selected traditional and online approaches.

From C. Maxwell's point of view, a formal educational program in which a student learns partially online with some element of control over the time, place, route, or pace of study may be called mixed (Maxwell, 2016).

According to most Ukrainian scientists, blended learning is a process of acquiring knowledge, skills and abilities, which is accompanied by a combination of different learning technologies: full-time, electronic, distance, mobile.

V. Kukharenko summarizes blended learning as a form of learning with determined boundaries of an online course, which uses synchronous meetings and network technologies, with asynchronous activities and possible face-to-face meetings (Kukharenko, 2016).

We adhere to the definition of Ukrainian scientist O. Korotun, who understands blended learning as a system of learning, in which takes place a purposeful process of interaction of learning subjects based on a combination of traditional and online learning models. This process takes place in the classroom and beyond, in synchronous and asynchronous modes and is based on a widespread use of information computer technologies (Korotun, 2016).

Thus, analysing the approaches to the definition of "blended learning", we see that it is considered to be a teaching system, model, method, technology, form of education, educational program. But the common denominator is that the interaction of subjects in the educational process is based on a combination of different types of learning, such as distance (online) and traditional (offline), because most scholars adhere to the definition that indicates that blended learning is a process of acquiring knowledge, skills and abilities, accompanied by a combination of different learning technologies. We fully agree that no training can exist in its pure form, but must be an effective combination of different technologies, which will significantly increase the effectiveness of training. When choosing forms of education, it is necessary to take into account the specifics of the discipline, material and technical equipment and support, the level of digital competence of teachers and training schedule.

2. RESULTS AND DISCUSSION

2.1. Research methods

The following methods were used during the research: analysis of research and publications in the field of e-learning and blended learning, official documents of the Ministry of Education and Science of Ukraine, the National Agency for Higher Education Quality Assurance (Ukraine) and state standards of higher education. Observational and interview methods were used in the experimental study. These methods determined whether masters know the basic principles of blended learning; do they have an idea of its advantages and disadvantages; whether they would like to master the technology of blended learning in practice with the aim of possible further use in professional activities.

2.2. Didactic aspects of blended learning in higher education institutions

Researchers Charles Graham and Jared Stein in the education field highlight the following benefits of a blended learning system: accessibility, improving of learning process, and reduced costs (Stein & Graham, 2013).

1. Availability.
2. Improving the efficiency of the educational process:
   - the detail designing of methodical instructions;
   - taking into account individual capabilities;
   - increasing the level of involvement due to social interaction;
   - monitoring time for tasks.
3. Reduced costs.

Based on the analysis of scientific publications (Al-Busaidi, 2012; Spring et al., 2016; Ghazal et al., 2018; Smyrnova-Trybulska & Zegzuła, 2020; Bokolo et al., 2020; Szulc, 2020; Morze & Smyrnova-Trybulska, 2021) and our own experience (Balyk & Shmyger, 2018) of blended learning implementation in Ternopil Volodymyr Hnatiuk National Pedagogical University (TNPU), we highlight the following didactic aspects of blended learning in higher education institutions:

- increasing the motivation of applicants to educational and cognitive activities, independence, social activity, reflection and introspection, the formation of responsibility;
- expanding the educational opportunities of students through accessibility and flexibility;
- personalization of the educational process, taking into account the individual educational needs of students;
- the ability to control their own educational activities;
- development of digital infrastructure of the institution and formation of digital competence of students;
- pedagogical autonomy of the teacher in the choice of presentation of material, educational services and platforms;
- changing the role of the teacher (transition from knowledge transfer to interactive interaction with the student).

In our opinion, blended learning provides the student with the following didactic opportunities: obtaining complete information about the learning process, including grades during the semester; receiving all educational and methodical materials in electronic form through web resources; work with educational web resources in an individual, convenient for the master mode; communication through participation in webinars, forums; receiving remote consultations from teachers; exchange of messages with teachers; sending works for inspection; control of knowledge through testing, passing exams and tests in a remote session.

Thus, blended learning makes it possible to solve the most relevant didactic tasks.

2.3. Introduction of blended learning at the university in the context of the COVID-19 pandemic

The challenges posed by the Covid pandemic have forced teachers at TNPU to face new challenges in organizing the educational process, and pushed them to improve educational technologies that were not so relevant before – blended learning. We have a lot of experience in using blended learning technology and it started long before the pandemic (Balyk & Shmyger, 2017).

At TNPU blended learning is convenient for those who, due to the circumstances, cannot traditionally attend lectures and seminars at the university, but at the same time want to get a quality education. These are usually masters who work and study in a dual form of education. This type of study does not require you to attend classes every day, the main work is done by masters themselves. Communication with teachers and classmates face to face takes place at a predetermined time.

During blended learning, masters participate in video conferences, listen to lectures and reports of classmates, undergo training, work in groups with the support of a teacher, receive consultations from teachers remotely. In blended learning, classrooms are combined with distance learning using a variety of online tools. Such tools include Internet forums, video conferencing tools, such as Zoom, BigBlueButton, GoogleMeet.

The uniqueness of the master's educational programs developed by TNPU is that we offer future teachers not only an opportunity to study the technology of blended learning, but also to master the technology in theory and practice, in particular in courses such as "E-learning technologies", "Computer and information technologies in education and science", during the pedagogical practice. This, in our opinion, is extremely relevant for the effective organization of the educational process in a COVID-19 pandemic.

The tasks are built to harmoniously combine theory and practice. Our practice of blended learning implementation includes traditional (classical) teaching methods, online activities, electronic resources, assessment, which are used by teachers of our university to develop appropriate curricula to support students in improving learning (Figure 1).

The formation of skills in the implementation of educational activities on the technology of blended learning takes place in two levels: students study this technology on the principles of blended learning and perform practical tasks related to this technology in the classroom and during teaching practice. Thus, masters gain theoretical knowledge and practical experience in this technology. In particular, the concept of blended learning and its basic principles, examples of implementation, models of construction of the educational process, etc., masters study on the materials offered on the server of distance learning TNPU in the course "E-learning technologies". And not only a discussion of problematic issues, but also a presentation (a step-by-step description of this technology) is carried out during the practical lesson on the topic "Blended Learning" of this course.
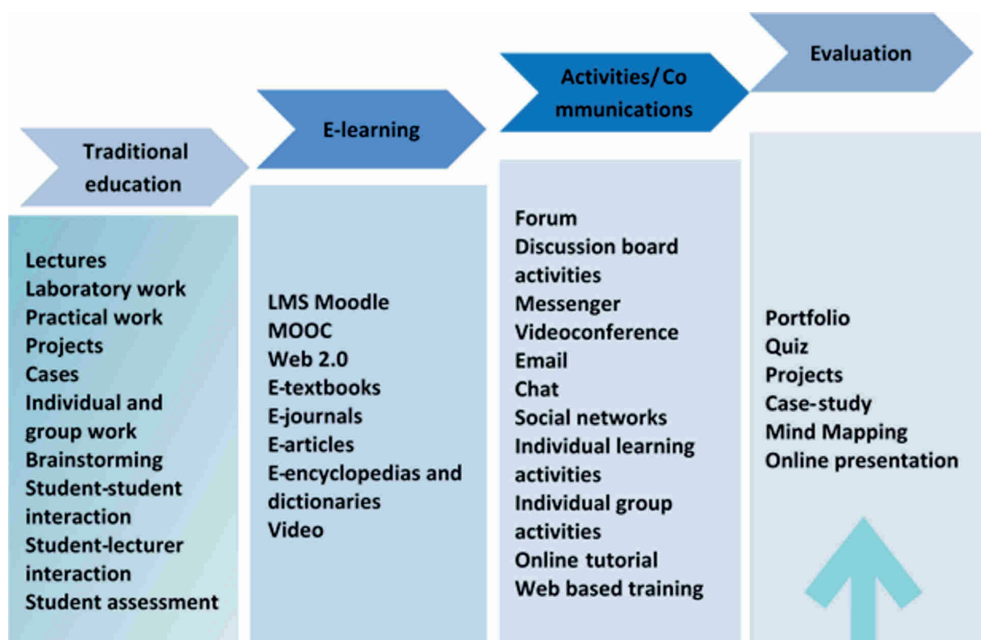
F i g u r e 1. Didactic aspects of blended learning in TNPU
S o u r c e: Own work.

In the course "E-learning technologies", in particular, we pay attention to the most important **aspects of the didactics of blended learning** in school:

1. Expanding the concept of "lesson".
2. Expansion of the concept of "school premises".
3. A new approach to the schedule.
4. Access to digital technologies and reliable Internet.
5. Autonomy of teachers.
6. Flipped classroom.
7. Allocating time for live dialogue.
8. Transparency of planning and learning expectations.
9. A clear system for assessing student achievement.
10. Cooperation with parents.

The practical aspect of mastering blended learning technology by masters is based on acquaintance with the best practices and models of blended learning.

For example, in the course " Computer and information technologies in education and science" we discuss the design of educational mixed courses, which will help change the teaching style:

1. Improved communication.
2. More personalized instructions.
3. Learning and motivation of students.
4. Improving self-organization skills.

Transferring part of the learning process in online mode distinguishes blended learning from the classical system and requires the creation of a blended learning environment (Figure 2). For example, masters study the theoretical part at home, watching videos and studying accompanying materials. After that, in class, they perform practical exercises with teachers and classmates or work in groups on the project. Under this model, teachers become moderators of the educational process. During the work, they determine how well individual masters understand the topic.
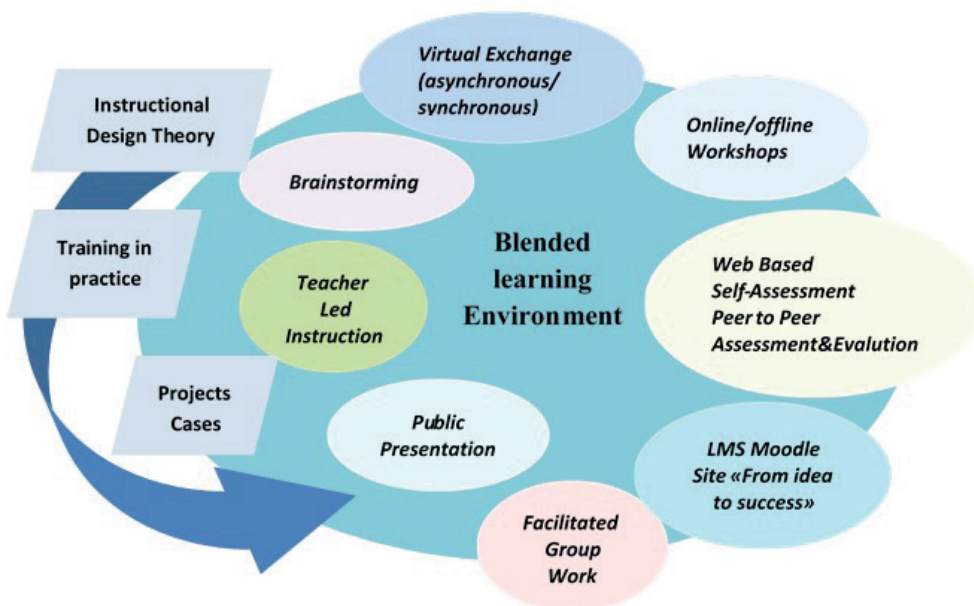
F i g u r e 2. Model of blended learning environment of the course "Computer and information technologies in education and science"

S o u r c e: Own work.

With blended learning at the university, masters in practice are convinced of the changing role of teachers. Here they are facilitators of the educational process. That is, people who organize a collective discussion so that all students are involved as much as possible and problems are solved quickly and efficiently. Therefore, the main goal of teachers is not to assess students in the exam, but to actively interact with them, monitor progress and help if necessary. So teachers stop being just observers and take on the role of mentors.

We would like to note the techniques of pedagogical design of the considered courses, which proved to be effective in practice: the development of relations; participation; timeliness; communication; organization; flexibility. In our opinion, the establishment of good relations and communication between teachers and masters is crucial and can be achieved through teachers' empathy for masters, willingness to help masters achieve success. Understanding the nature of communication in the online environment, we suggested that in the future in their professional activities, online

teachers respond in a timely manner to emails and text messages. To do this, practical strategies should include instructions for the tasks, information about the evaluation criteria, timely feedback on the tasks performed, answers to written questions.

In the practical cases of these courses, we implement learning scenarios taking into account the characteristics of the main components of our proposed environment of blended learning:

1. Class activities. Provides part of the usual work "in the classroom" with teachers and other students. Depending on the blended learning system, the number and type of offline activities will be different in a particular case.
2. Online content (independent learning). During this type of work, students independently work on materials at a pace and place convenient for them. It is important that teachers provide complete and clear instructions on the work they need to do on their own.
3. Cooperation. Combines two key elements: working with peers and working with teachers. Through working with peers, students can find new solutions and share experiences and knowledge. Through personal work with the teacher, the student can get answers to individual questions and clarify unclear points. Such a model should be created for a specific type of training and course. It is important that such cooperation can take place both in the classroom during group tasks and through e-mail or social networks.
4. Assessment. Assessment is important for both students and teachers. Students can monitor their progress, while teachers can assess their knowledge and adjust the learning process through individual instruction. Students are given explanations about taking a certain course. Such a model should be created for a specific type of training and course. Teachers can also use testing to understand how students perceive the material and how to improve the process.

Along the way, we are also exploring how better Moodle platform can be used to implement a blended learning model in an educational institution.

We believe that a successful blended learning program is the deliberate integration of educational and digital technologies to improve the learning process. Students interact with content through a variety of methods and digital tools.

The educational results of masters at the completion of the courses "E-learning technologies", "Computer and information technologies in education and science" indicate the effectiveness of the proposed technology of blended learning, development of skills of independent planning and organization of their own activities, deepening skills to independently obtain and analyse their own knowledge, select the necessary information and data, make decisions, engage in self-education.

The effectiveness of these courses is evidenced by high marks for modular and semester control. As the practice and results of the intermediate and final assessment show, 16 study weeks, during which masters master blended learning, is a sufficient period during which they form stable skills of teaching methods by the specified technology.

Masters who worked on blended learning technology after completing the courses used elements of blended learning technology during training sessions based on pedagogical practice.

In general, these courses aim to provide masters and practicing teachers with a better understanding of how to implement blended curricula.

Blended learning has become the main technology for presenting the content of our courses at TNPU. We found that course design, motivation, and communication are factors that contribute to the overall success of blended learning courses and the satisfaction of masters with blended courses.

Blended learning, as a symbiosis of classical and online learning, combines the best of both forms of teaching. If in standard teaching in the lecture hall all masters are expected to have a general level of preparation and classes are held according to the standard scheme, where individual abilities and skills are not taken into account, then classes with blended learning technology allow each master to choose the pace and priorities. Blended learning is maximally focused on the educational and professional needs of each of the participants of the master's program.

CONCLUSION

The development of the modern information society and the permanent course of the pandemic requires the transfer of part of the educational process from classrooms to the Internet. Blended learning has become the best for us in a pandemic. Therefore, we believe that its implementation is an important direction of modernization of modern higher education.

Analysis of the scientific literature shows that despite the large number of different interpretations and definitions, scientists agree on a combination of different learning technologies, such as traditional and electronic (computer, distance, mobile, etc.), the use of which is an important condition for effective implementation of mixed teaching. Thus, blended learning is a modern system of education in which there is an approach to the organization of the educational process in higher education institutions, which transforms the structure and methods of teaching, changes the roles of teacher and student.

Didactic aspects of blended learning in higher education include: elements of traditional learning (Lectures, Laboratory work, Practical work, Projects, Cases, Individual and group work, Brainstorming, Student-student interaction, Student-lecturer interaction, Student assessment), elements of E-training (LMS Moodle, MOOC, Web 2.0, E-textbooks, E-journals, E-articles, E-encyclopaedias and dictionaries, Video), activities / communications (Forum, Discussion board activities, Messenger, Videoconference, Email, Chat, Social networks, Individual learning activities, Individual group activities, Online tutorial, Web based training), assessment (Portfolio, Quiz, Projects, Case-study, Mind Mapping, Online presentation).

The master's educational programs developed by us are two-level, as we offer future teachers not only an opportunity to study the technology of blended learning, but also to master the technology itself in theory and practice.

Our proposed model of a blended learning environment and didactic aspects of the implementation of blended learning technology in the courses "E-learning technologies", "Computer and information technologies in education and science" in master's

programs in a pedagogical institution of higher education are effective. This is evidenced by the results of masters at the end of these courses.

Given the advantages of blended learning listed in the article, we conclude that the effectiveness of this form of learning in the educational process of higher education institutions in general and in the study of computer science disciplines in particular. However, the introduction of this form still requires a lot of effort from teachers.

We see the prospect of further research in the development of didactics of teaching masters on the basis of a model of blended learning, highlighting modern digital tools aimed at its effective implementation.

REFERENCES

A l - B u s a i d i, K. (2012). Learners' Perspective on Critical Factors to LMS Success in Blended Learning: An Empirical Investigation. *Communications of the Association for Information Systems*, *30*. https://doi.org/10.17705/1CAIS.03002.

B a l y k, N. & S h m y g e r, G. (2017). Formation of Digital Competencies in the Process of Changing Educational Paradigm from E-Learning to Smart-Learning at Pedagogical University. In E. S m y r n o v a - T r y b u l s k a (Ed.). *Effective Development of Teachers' Skills in the Area of ICT and E-learning. E-learning Series*, *9*, 483–497. Katowice–Cieszyn: STUDIO NOA for University of Silesia. ISSN 2451-3644 (print edition), ISSN 2451-3652 (digital edition), ISBN 978-83-60071-96-0.

B a l y k, N. & S h m y g e r, G. (2018). Development of Digital Competences of Future Teachers. In E. S m y r n o v a - T r y b u l s k a (Ed.). *E-learning and Smart Learning Environment for the Preparation of New Generation Specialists. E-learning Series, 10,* 487–501. Katowice–Cieszyn: STUDIO NOA for University of Silesia. ISSN 2451-3644 (print edition), ISSN 2451-3652 (digital edition), ISBN 978-83-66055-05-6.

B a t e s, T. (2021). Are you ready for blended learning? *Online Learning and Distance Education Resources*, personal site, 13 July. Retrieved from https://www.tonybates.ca/2016/12/12/are-we-ready-for-blended-learning/ (accessed 13 July 2021).

B o k o l o, A. et al. (2020). A managerial perspective on institutions' administration readiness to diffuse blended learning in higher education: concept and evidence. *Journal of Research on Technology in Education, 52*(1), 37–64. https://doi.org/10.1080/15391523.2019.1675203.

C h r i s t e n s e n, M., H o r n, M., & S t a k e r, H. (2013). *Is K-12 Blended Learning Disruptive? An introduction to the theory of hybrids*. Clayton Christensen Institute. Retrieved from https://www.christenseninstitute.org/wp-content/uploads/2014/06/Is-K-12-blended-learning-disruptive.pdf (accessed 10 July 2021).

G h a z a l, S., A l - S a m a r r a i e, H., & A l d o w a h, H. (2018). "I am Still Learning": modeling LMS critical success factors for promoting students' experience and satisfaction in a blended learning environment. *IEEE Access, 6*: 77179–77201.

G r a h a m, C.R. (2013). Emerging practice and research in blended learning. In M.G. M o o r e (Ed.). *Handbook of Distance Education Publisher*: New York and London: Routledge.

K o r o t u n, O. (2016). Methodological principles of blended learning in higher education. *Information technology in education, 3*(28), 117–129. Retrieved from http://nbuv.gov.ua/UJRN/itvo_2016_3_11 (accessed 10 July 2021) [in Ukrainian].

K u k h a r e n k o, V. et al. (2016). Theory and practice of blended learning: a monograph. In V. K u k h a r e n k o (Eds.). Kharkiv: Miskdruk. Retrieved from http://repository.kpi. kharkov.ua/bitstream/KhPI-Press/23536/3/Kukharenko_Teoriia_ta_praktyka_2016. pdf (accessed 10 July 2021) [in Ukrainian].

K v i t, S. & Y e r e m e n k o, O. (Eds.). (2021). *Annual Report of the National Agency for Quality Assurance in Higher Education.* Kyiv: National Agency for Quality Assurance in Higher Education. Retrieved from https://naqa.gov.ua/wp-content/uploads/2021/02/%D0%A0%D1 %96%D1%87%D0%BD%D0%B8%D0%B9-%D0%B7%D0%B2%D1%96%D1%82-2020. pdf (accessed 10 July 2021) [in Ukrainian].

M a x w e l l, C. (2016). *What Blended Learning Is – and Isn't.* Retrieved from https://www. blendedlearning.org/what-blended-learning-is-and-isnt/ (accessed 10 July 2021).

M o r z e, N. & S m y r n o v a - T r y b u l s k a, E. (2021). Web-based community-supported online education during the COVID-19 pandemic. *International Journal of Web Based Communities 17*(1), 9–34.

N o u b y, A. & A l k h a z a l i, T. (2017). The Effect of Designing a Blended Learning Environment on Achievement and Deep Learning of Graduate Students at the Arabian Gulf University. *Open Journal of Social Sciences*, *5*, 248–260. https://doi.org/10.4236/jss. 2017.510022.

P a i n t e r, D. (2006). Missed steps: Blended learning helps increase collaboration and productivity, but firms often ignore key stages in the process. *American Society for Training & Development (ASTD)*, 10–11.

S m y r n o v a - T r y b u l s k a, E. & M o r z e, N. (2019). Innovative MA Programme "E-Learning in Cultural Diversity". In E. S m y r n o v a - T r y b u l s k a, & P. K o m m e r s, & N. M o r z e, & J. M a l a c h (Eds.). *Universities in the Networked Society. Cultural Diversity and Digital Competences in Learning Communities* (pp. 1–18). Springer. https://doi. org/10.1007/978-3-030-05026-9_1.

S m y r n o v a - T r y b u l s k a, E. & Z e g z u ł a, D. (2020). Virtual University: Model, Tools, Practice (11–12 June 2019). *International Journal of Research in E-learning, 6*(1), 1–4. https://doi.org/10.31261/IJREL.2020.6.1.12.

S p r i n g, K., G r a h a m, C., & H a d l o c k, C. (2016). The current landscape of international blended learning. *International Journal of Technology Enhanced Learning, 8*(1), 84–102. https://doi.org/10.1504/IJREL.2016.075961.

S t a d n y, Y. & N i k o l a e v, Y. (Eds.). (2021). *Recommendations for the introduction of blended learning training in institutions of professional before higher and higher education.* Retrieved from https://mon.gov.ua/ua/osvita/visha-osvita/rekomendacij-shodo-vprovadzhennya-zmishanogo-navchannya-u-zakladah-fahovoyi-peredvishoyi-ta-vishoyi-osviti (accessed 10 July 2021) [in Ukrainian].

S t e i n, J. & G r a h a m, C.R. (2013). *Essentials for Blended Learning: A Standards-Based Guide (1st ed.).* New York and London: Routledge. https://doi.org/10.4324/9780203075258.

S z u l c, J. (2020). Distance Learning – the Current Status and Directions for Further Research. *International Journal of Research in E-learning, 6*(1), 1–19. https://doi.org/10.31261/IJREL.2020.6.1.02.