

**Yuliia Bahno\***

PhD in Pedagogical Sciences, Associate Professor  
Hryhorii Skovoroda University in Pereiaslav  
08401, 30 Sukhomlynskyi Str., Pereiaslav, Ukraine  
<https://orcid.org/0000-0003-3513-6154>

**Olena Serhiichuk**

PhD in Historical Sciences, Associate Professor  
Hryhorii Skovoroda University in Pereiaslav  
08401, 30 Sukhomlynskyi Str., Pereiaslav, Ukraine  
<https://orcid.org/0000-0002-2008-1122>

## Didactic principles of implementation of mixed forms of education in the educational environment of educational institutions

**Abstract.** Blended learning under martial law makes it possible to create an educational process that takes into account the individual needs of students, develops their critical thinking and helps to ensure a high level of learning outcomes, thanks to the creative approach of the teaching staff. The success of blended learning implementation depends on the creativity and pedagogical skills of the teacher. The purpose of the article was to study the experience of implementing blended learning, to study its didactic principles of implementation in educational institutions and to study its characteristics. The study involved an analysis of scientific literature, including articles, dissertation research, books and conference proceedings. The didactic foundations for the implementation of blended learning at the present stage are the achievement of learning outcomes by defining clear educational objectives; organisation of the educational process in the interests of the intellectual development of students on the way to implementing a personal educational trajectory; introduction of innovative teaching methods for the development of professional competence and relevant professional qualities of future specialists. At the same time, it was stated that the educational and methodological framework for the implementation of the educational process is not sufficiently developed, which creates the following problems: a significant burden on teachers due to the careful planning of each stage of the lesson, selection and systematisation of educational and methodological materials, methods and forms of work, which contributes to increased anxiety of both teachers and students. The results of this study can be used by educational institutions to optimise the process of implementing blended learning, especially in martial law

**Keywords:** general secondary education institutions; vocational education institutions; higher education institutions; blended learning; students; educational technologies; educational process

### INTRODUCTION

In modern rapidly evolving world, educational institutions need to implement new approaches to learning. One such approach is blended learning, which combines traditional methods with the use of information technology. This approach allows educational institutions and teachers to take advantage of both traditional and virtual learning, creating

more dynamic and interactive forms of education. Taking into account the needs of modern society and the development of educational technologies, the introduction of blended learning is an important step towards modernising education and preparing students for the challenges of the modern world.

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\*Corresponding author



The problem statement is the need to consider and analyse the effectiveness of the introduction of blended learning in the educational and information environment of educational institutions in modern conditions. After all, Ukraine, as a country that is in a difficult geopolitical situation due to military actions and the threat from the Russian Federation, must worry about the next generations that will build and develop it in the post-war period. That is why, in such a difficult time and complex military operations in Ukraine, blended learning is becoming the most common form of secondary, vocational and higher education. Of course, this is made possible by qualitative research that forms the theoretical basis of blended learning and its implementation in educational practise.

The study by O. Spirin *et al.* (2019) considers blended learning as an effective methodology for stimulating student collaboration in solving practical problems and developing their basic professional skills. The authors focus on pedagogical approaches and methods of blended learning, in particular: a combination of face-to-face and distance learning, cooperation of group members, development of teamwork skills, heterogeneous grouping, a combination of individual and peer assessment, monitoring of students' work by the teacher, task orientation, the ability of each student to be a leader, and the importance of feedback. The researchers recommend using private and public cloud technologies through an integrated academic cloud to support the implementation of group methods in the educational process.

Researcher T. Bykova (2021) has developed a methodology for implementing pedagogical conditions, which includes: updating and improving students' basic knowledge of the functionality of digital technologies; involving students in the training "Blended Learning: Towards Success"; directing teachers to professional development activities and self-education to master the basics of blended learning; training future masters of industrial training using blended learning models; and applying the didactic

capabilities of the learning management system. T. Sobchenko (2021b) considers blended learning as a comprehensive teaching system that includes a variety of models, methods, combinations of teaching methods and strategies, different forms of teaching, curricula, and other aspects. The authors of O. Stupak *et al.* (2023) see blended learning as an integral approach to creating an open educational and scientific space in higher education institutions aimed at developing the professional competencies of future professionals. A. Alammery (2024) identified and evaluated five types of delivery methods: face-to-face instructor-led, online instructor-led, face-to-face collaborative, online collaborative, and online independent work. Therefore, from a didactic point of view, blended learning is considered as a system, as a process and as an integral approach to organising the educational process.

The purpose of the article was to substantiate the didactic principles of introducing blended learning into the practise of different types of educational institutions; to identify the factors that facilitate or hinder its successful implementation and to outline ways to overcome possible obstacles. At the same time, it was important to find out how students are motivated to learn, how this affects their learning and, accordingly, their learning outcomes.

## MATERIALS AND METHODS

The study was based on a theoretical and review approach and does not contain empirical results of an experimental nature. In the course of the study, the methods of studying scientific literature, its analysis, synthesis, comparison, and generalisation were used to study the state of theoretical development of the research problem and to compare the positions of scientists on the essence of the didactic foundations of blended learning; to study the practise of its implementation in educational institutions. In particular, based on the study and analysis of modern scientific sources, the directions of studying the theoretical foundations of blended learning are determined (Table 1).

**Table 1.** Theoretical foundations of blended learning

Areas of study of blended learning (BL)	Scientists
Theoretical substantiation of the didactic foundations of the key definitions of the LN	K. Osadcha <i>et al.</i> (2022); V. Rudnytskyi (2022); A. Solodchuk (2023).
Experience of introducing SL into the educational process of educational institutions	O. Efremova (2023); M. Ivashchenko & T. Bykova (2019); D. Koroviy & N. Lazarenko (2022).
Vocational training with the use of LMS	T. Bykova (2021); O. Dubinina <i>et al.</i> (2021); M. Kulinich & A. Safarova (2021).
Using innovative technologies in blended learning	V.L. Dudar <i>et al.</i> (2021); M. Kademiia <i>et al.</i> (2021); M. Marienko & A. Sukhikh (2021).
EI as a form of organisation of the educational process	R.S. Gurevich <i>et al.</i> (2023).

Source: developed by the authors

The study, based on the analysis of modern research by Ukrainian and foreign scholars, identifies some didactic aspects of the introduction of blended learning in the educational process of educational institutions. The research was aimed at studying the experience of solving educational tasks in a blended learning format and ways to achieve learning outcomes during lectures, practical and seminar classes for the intellectual development of students. Of particular importance for the study were the works that reveal the use of innovative methods, techniques, teaching aids and ways to intensify the learning activities of students and their development in a blended learning environment.

## RESULTS AND DISCUSSION

An analysis of recent research and publications shows a growing interest in the problem of blended learning and improving its effectiveness. In particular, scholars are actively researching this aspect of the introduction of blended learning in various contexts, from general secondary education to higher and vocational education. Their works concern both theoretical analysis of concepts and pedagogical approaches and practical aspects of blended learning implementation in different educational institutions. For example, L. Virginia *et al.* (2019) used discussion exercises in a blended format, including “Try My Transformations!”, which were performed individually by students, respectively, and are based on providing feedback and assessing the correctness of tasks.

In general, recent studies and publications confirm the importance and relevance of the problem of blended learning. However, it is necessary to conduct a more detailed study on the issues of theoretical didactic substantiation of the content of blended learning. Therefore, it is necessary to carefully analyse the experience of introducing blended learning into the educational and information environment of educational institutions, which will allow us to get a more complete picture of the state of research on this problem and identify prospects for further research, since this approach combines traditional teaching methods with the use of information technology, creating a more effective and flexible learning environment. Based on the analysis of scientific sources, it is found that at the present stage of development of pedagogical science, the statements that constitute the didactic basis of blended learning are formulated:

1) *Creating an educational environment that includes online and offline formats.* Implementation of online learning with the help of high-quality digital technologies involves: continuous development and modernisation of the material and technical base (computers, projectors, software); use of technologies such as augmented (AR) and virtual (VR) reality; online meetings of participants in the educational process should provide interesting communication, full of modern innovative achievements in the field of education and become a powerful information resource that will be available to the user at any time, if necessary; the content offered should be understandable, accessible, interactive, easily and vividly presented through open learning

management systems (e.g. MOODLE), additional web resources (e.g. YouTube), online communication programmes (Zoom, Skype, Google Meet), sites and platforms (e.g. Canva), social networks and messengers (Kademiia *et al.*, 2021). The introduction of digital technologies into the educational process is aimed at optimally solving fundamental didactic tasks (Marynchenko & Tsyhanok, 2020).

2) *Use of various forms of blended learning.* Three forms of blended learning implementation have been identified: individual (each student performs individual tasks); individual-group (some tasks are individual, the rest are performed by the group); group (tasks are performed by the whole group). The experience of individualised learning is outlined, which has the following features: the requirement of complete mastery of the necessary material and the possibility of moving on to new material only after mastering the previous one; the use of lectures as a guiding form of learning, rather than as the main source of information; summarising the work of students, managing the process of their knowledge acquisition (Romanko, 2020).

3) *Integration of traditional and e-learning.* The didactic capabilities of each type of learning allow for an optimal combination of their advantages, including a significant increase in opportunities for personalisation and individualisation of the educational process; dominance of individual student work in the structure of the educational process, which contributes to the development of learning independence and the formation of skills that provide the possibility of self-education in the next stages of life; use of various interactive learning activities (Rudinsky, 2022).

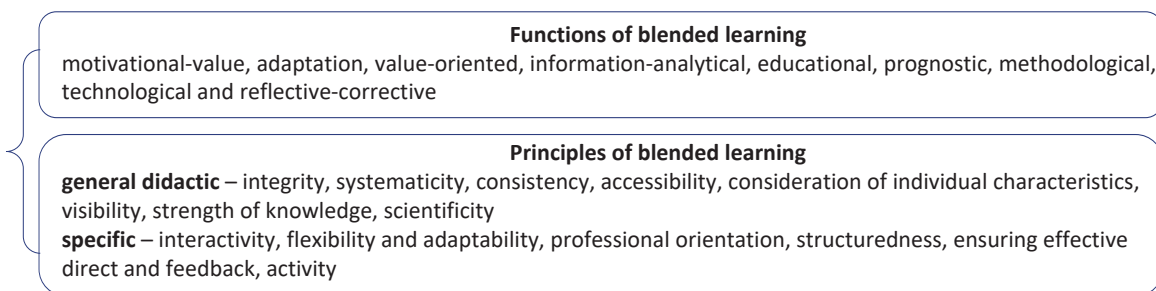
4) Identification of certain aspects of SL as components of the didactic system (Fig. 1) (Sobchenko, 2021a).

5) *Modelling of blended learning.* The main models of blended learning are the Rotation model – work in small groups or as a whole group, group projects, individual work with the teacher and written assignments (rotation by stations, rotation by laboratories, flipped classroom, individual work); the A La Carte model – involves studying an educational course online and, if necessary, listening to it at home or in an educational institution to consolidate the main course material; enriched Virtual is a model where students independently divide courses into online and offline parts using web surfing and coaching methods; Flex is a flexible model where students receive personalised instruction mainly via the Internet in online mode to receive consultations if necessary) (Dubinina, *et al.*, 2021; Sobchenko, 2021a).

The modern educational environment of educational institutions is a complex system that includes a variety of educational and information resources, infrastructure and technologies that contribute to the effective acquisition of knowledge and development of students' skills. The essence of the educational and information environment is to create a favourable and dynamic space for learning, where information becomes accessible and the educational process is as effective as possible. This environment contains a wide range of components, such as curricula,

electronic textbooks, multimedia materials, websites, on-line learning platforms, computer laboratories, libraries, video and audio materials, interactive exercises and tasks for interaction with each other and with the teacher. These components are the basis for creating an educational environment that promotes the active involvement of students in the educational process, stimulates their motivation and facilitates the assimilation of knowledge. Under such conditions, the educational environment is a key condition for developing students' competencies in various fields of knowledge, forming their critical thinking, creativity and skills of independent work with information and

educational materials. On the other hand, such organisation of the educational environment contributes to the development of digital literacy, adaptation to modern educational and digital technologies, and preparation for the challenges of the modern information society. Accordingly, thanks to the development of information and communication technologies and the continuous improvement of teaching and learning methods, the educational process is also being updated. This opens up new opportunities for effective and high-quality education, simplifies the interaction between teachers and students through new methods and innovative teaching technologies.



**Figure 1.** Components of the didactic system

**Source:** developed by the authors

Researchers have concluded that blended learning is a combination of traditional teaching methods and modern information technology tools that allow for learning at any convenient place and time, such as at home, while traveling or on vacation. This approach involves not only the provision of materials in electronic format, but also mandatory feedback from students to the teacher, which can be carried out both in virtual and face-to-face form. Studies show that when blended learning was implemented, students lacked real-time personal communication with the teacher and classmates (Virginia *et al.*, 2019). Based on the analysis of the responses, students concluded that blended courses should be improved by organising more synchronized meetings that would allow students to receive immediate feedback from the teacher and student to solve the problems that students face in completing assignments and eliminate difficulties.

The basis of learning motivation is the need that stimulates the cognitive activity of the student, his or her readiness to learn (Khomenko, 2022). Studying students' opinions on the motives for choosing blended learning, the following conclusions were made: 1) flexibility and optimisation of the educational process, which makes it possible to combine classroom and distance learning in the virtual space; 2) convenience, which covers several aspects, in particular, the ability to combine learning with other activities without losing live contact, it is convenient to combine with work, but you want to have live contact with teachers and other students; 3) time saving and balance between financial costs of education; an attractive aspect of blended learning for students is time management, as it is easier to

organise free time, which is motivated by the opportunity not to lose live, direct, classroom contact (Živilė, 2022). Blended learning allows for the development of individual learning trajectories, as well as the development of live communication (Romanko, 2020). At the same time, “with the introduction of a blended learning model, a number of organisational tasks arise, the solution of which requires special theoretical research and practical developments to create a system for managing the educational process (availability of a workplace: a teacher’s workplace with Internet access, the possibility of free access to learning servers via WI-FI) in a blended learning environment (taking into account the time spent by teachers on preparing and conducting online classes, working with students in a chat, forum or Skype mode)”.

The most important features of blended learning for higher education institutions are: formal training within the activities of higher education institutions and a targeted process of acquiring competencies within certain educational components, some of which are implemented remotely; use of the educational process by means of information and communication technologies (ICT), which are also technical means of education (TME) – personal computers, mobile phones, tablets, projectors, software, operating and search engines, etc., depending on the teacher’s ability, ICTs are used to organise the educational process and learning interaction (consultations, discussions), to store and deliver educational material, and to implement control measures taking into account the time, place and pace of the student’s learning and his/her ability to self-control (Efremova, 2023). The research concerns the theoretical sub-

stantiation of the definitions that form the basis of blended learning and reveals several terminological variants of the concept of “blended learning”, namely: “blended learning”, which is also called hybrid learning, combined learning, mixed-mode learning, or webenhanced learning (Gurevich *et al.*, 2023). Despite the different terms, the essence of blended learning is a rational synergistic combination of traditional and e-learning with the ability for students to choose the time, place and pace of learning, allowing them to use their strengths and minimise their weaknesses.

After analysing the opinions of scholars on the definition of blended learning, the author offers her own understanding of this concept: blended learning is an ordered didactic system that includes elements of traditional and online learning for students using innovative educational technologies and ensures the creation of an interactive educational environment that contributes to the achievement of high learning outcomes. The use of a variety of methods and resources, such as video lectures, webinars, interactive exercises, and independent work with the material, allows for more effective learning, and also stimulates students' independence and active participation in their own learning. Blended learning helps to increase the accessibility of education, individualise the process, and prepare students for the requirements of the modern world.

Current trends indicate that the use of technology in the educational process is growing. Blended learning opens up new opportunities for students and teachers, facilitating individualised learning and providing access to learning material from anywhere and at any time. Therefore, blended learning is an educational technology that allows to improve the educational environment through the effective combination of online resources with traditional classroom learning (Solodchuk, 2023). In general, secondary education institutions (GSEIs), blended learning is used to enrich traditional lessons and engage students in active participation in the learning process. For example, teachers can create online courses with additional materials, assignments, and video lessons to help students better absorb the material. In addition, blended learning allows teachers to track student progress and provide individualised support. In GCSEs, blended learning is used to extend the capabilities of traditional lessons and to engage students in a more active role in the educational process, for example:

1. Online courses and supplementary materials. Teachers can create online courses or use learning platforms with additional materials, assignments, and video lessons. This allows students to learn the material more deeply, as they can study it independently at their own convenience;

2. Individualised support. Blended learning allows teachers to track student progress through special platforms or tools, such as electronic notebooks or learning management systems. This allows teachers to provide individualised support to each student, paying attention to their needs and level of learning;

3. Active participation of students. Blended learning creates an opportunity for students to be more actively

involved in the learning process. For example, they can participate in discussions, solve problems in groups, or create their own projects using information technology.

Blended learning, as noted by Y. Bahno (2024), helps to make the educational process more interesting, accessible to students, and also allows teachers to interact more effectively with them and support them in their learning in conditions where offline learning has certain obstacles (the practice of teaching during the COVID-19 pandemic and the military conflict in Ukraine). Blended learning, which combines traditional methods with the use of information and communication technologies, is proving to be extremely useful in creating an engaging, accessible, and effective learning environment. First of all, it expands access to learning resources, allowing learners to study material at home, at any time convenient for them. This is especially important for students with different schedules and individual needs.

In addition, blended learning creates opportunities for more effective interaction between teachers and students. Teachers can provide individualised support through electronic platforms, communicate with students through online forums and chats, and track each student's progress using specialised training programs. In general, blended learning is becoming an important tool for improving the quality of education by drawing more attention to the learning process, making learning more accessible and effective, and promoting more active interaction between teachers and students. Every year, blended learning is becoming a necessary component of the educational process, where students have access to a large number of learning resources, such as lectures, online courses, interactive exercises, and videos. This allows you to flexibly plan your study schedule and study independently, increasing the effectiveness of learning (Vorotnikova, 2022). Students are given the opportunity to access a variety of learning resources, such as lectures, online courses, interactive exercises, and videos, which greatly enhances their learning opportunities and improves the quality of education. Some of the main benefits of blended learning in higher education include:

1. Flexibility in the learning process. Students can use the available online resources to study the material independently at their own pace and time. They can watch video lectures, solve problems, and complete other exercises according to their own schedule;

2. Expanding learning opportunities. Blended learning allows students to access a wide range of learning materials from different sources, which can improve their understanding and mastery of the subject. For example, they can use online resources with modern interactive teaching methods;

3. Increasing the activity of students. The use of interactive exercises and videos can stimulate more active participation of students in the educational process. For example, they can participate in forum discussions, solve problems in groups, and perform other tasks that contribute to their active learning;

4. Individualisation of learning. Blended learning allows learners to engage in learning at their own pace and choose tasks that meet their needs and level of knowledge. They can choose the materials to study and focus on the aspects of the subject that are most interesting or important to them.

Thus, blended learning in higher education institutions allows for the implementation of quality education using modern information technologies, digital tools and innovative teaching methods that contribute to the successful training and development of future professionals for professional activities. Blended learning plays a key role in the training of future professionals in vocational education institutions, as it allows combining theoretical knowledge with practical skills using modern technologies and methods. Some of the main benefits of blended learning in vocational education include online resources for theoretical learning. Learners are given the opportunity to study theoretical material online using a variety of resources such as video tutorials, e-textbooks, and interactive exercises. This allows them to learn the basic concepts and principles of their profession at a time convenient for them and at the pace of practical training to apply knowledge. After studying the theoretical material, students can immediately apply the knowledge gained in practical classes. For example, they can perform practical tasks, solve cases, or work with modern technical tools and equipment. Preparing for the real challenges of the working world. Blended learning helps students to acquire not only theoretical knowledge but also practical skills necessary for successful work in their chosen field. This allows them to prepare for the real challenges of the working world and be ready for professional activities from the moment they graduate (Kovalenko *et al.*, 2021a; 2021b). For example, students of professional technical specialties can study the theoretical aspects of working with various technical systems online and then immediately apply their knowledge in practical classes on servicing and repairing these systems. This approach helps them gain a fully integrated learning experience and prepares them to work effectively in their chosen field.

Blended learning is becoming increasingly common in modern education, especially in the context of different types of educational institutions. In the context of general education schools, blended learning allows teachers and

student teachers to use modern technologies to improve the educational process in GSEIs. For example, students can study theoretical material at home through video lessons or interactive exercises, and then use classroom lessons to apply this knowledge in practice. In HEIs, blended learning allows students to access a wide range of learning resources, such as video lectures, e-textbooks, and online courses. This helps them to plan their study schedule flexibly and study independently, increasing learning efficiency. In addition, blended learning in higher education allows teachers to create interactive assignments and interact with students in a virtual environment, which promotes more active learning and student engagement. In vocational schools, blended learning helps prepare professionals for the real challenges and needs of the world. Students can learn theoretical knowledge online and then immediately apply it in practical classes. It helps them acquire the necessary skills and prepares them for real-world challenges. All of these examples show that blended learning is becoming not only an important but also a necessary component of the educational process in various types of educational institutions, as it allows for the effective use of modern technologies and methods to improve the quality of learning.

Blended learning is an approach that combines traditional classroom instruction with interactive online resources. This method allows students and teachers to enjoy the benefits of both face-to-face and virtual learning. Blended learning is becoming increasingly popular in institutions of all levels of education, from general secondary education to higher education and vocational schools. The main didactic features of blended learning include: a combination of didactic opportunities of traditional and e-learning; availability of blended learning at all levels of education and in any field of study; focus of the educational process on each student; development of independence and the ability to self-educate throughout life (Rudnytskyi, 2022). Blended learning, which combines traditional teaching methods with the use of information and communication technologies, has a significant impact on the education process in different types of educational institutions, such as secondary, higher, and vocational education. Table 2 shows how blended learning affects the educational process in each of these types of institutions and analyses the advantages and disadvantages of this approach.

**Table 2.** The impact of blended learning on the education process in different types of educational institutions

Parameter	Secondary education institutions	Higher education institutions	Vocational education institutions
Flexibility of training	<ul style="list-style-type: none"> <li>➤ Provides an opportunity to study the material at home using online resources.</li> <li>➤ Allows you to plan your study schedule flexibly.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provides students with the opportunity to study the material at home, which helps them to master the theory more deeply.</li> <li>➤ Allows students to flexibly choose subjects and courses according to their individual needs.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Allows students to acquire practical skills under the guidance of teachers.</li> <li>➤ Provides the opportunity to perform practical exercises and tasks using online resources.</li> </ul>

Table 2. Continued

Parameter	Secondary education institutions	Higher education institutions	Vocational education institutions
Personal training	<ul style="list-style-type: none"> <li>➤ Increases the ability to individualise learning through self-study.</li> <li>➤ Gives students more control over their own learning.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Allows students to learn at their own pace and choose learning resources that meet their needs.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provides an opportunity to receive individual support from teachers in practical classes.</li> <li>➤ Allows students to actively apply their knowledge in practice.</li> </ul>
Interactivity	<ul style="list-style-type: none"> <li>➤ Promotes student engagement through the use of interactive tasks and exercises.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Allows you to interact with students in a virtual environment through forums, chats, etc.</li> <li>➤ Provides the ability to conduct virtual discussions and collective projects.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Stimulates active participation of students in practical classes through the use of interactive teaching methods.</li> </ul>
Support for students	<ul style="list-style-type: none"> <li>➤ It allows students to get additional support from teachers through online consultations and open lectures.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provides individual support for students through remote access to teachers.</li> <li>➤ Allows students to communicate with their colleagues and receive mutual support in a virtual environment.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provides an opportunity for students to receive practical advice and consultations from teachers during practical classes.</li> </ul>

Source: developed by the authors

Blended learning has a significant impact on the education process in all types of educational institutions. It promotes flexibility of learning, personal development of students, increases interactivity and provides effective support for students in their studies.

However, for the successful implementation of blended learning, it is necessary to take into account the individual needs of students and provide appropriate technical support and training for teachers. The introduction of blended learning into the educational process includes a number of key aspects aimed at using information technology, individualising learning, and improving the efficiency of the educational process. Each of them is considered in more detail below:

*Use of information technologies.* The introduction of blended learning involves the widespread use of modern information technologies in the educational process. This includes the creation of electronic platforms for access to educational materials, the use of video tutorials, webinars, interactive exercises and other multimedia resources. Information technologies allow creating interesting and interactive learning content that keeps students interested and promotes better learning. Therefore, the use of information technology capabilities is necessary in training qualified personnel in the direction required by the enterprise and with the help of advanced innovative tools, including modern simulators (robotics, virtual tools and programs, simulators for modeling production processes). When developing competencies in the training of specialists, an important factor is the requirements of employers, who need employees to properly apply professional knowledge in practice in accordance with modern business conditions. The use of information technology allows teachers to interact more effectively with students, create interactive tasks and exercises, track learning progress, and provide individualised support. This helps to optimise time

and resources, ensuring better learning outcomes. The systematic use of educational technologies and digital tools, in the context of blended learning with video communication systems such as Google Hangouts Meet, Webex and Zoom for organising lectures and Google Classroom for practical classes, allow organising the educational process in accordance with the modern requirements of learning in higher education institutions (Dudar *et al.*, 2021). At the same time, these processes will contribute to the development and maintenance of an appropriate level of competence of both the teaching staff of higher education institutions and future specialists in the context of complex educational processes.

*Individualisation of learning.* Blended learning provides an opportunity to individualise the educational process according to the needs and capabilities of each student. This means that students can learn at their own pace, select and adapt materials to their individual needs. Individualised learning allows for different levels of training, interests, and learning styles of each student, which contributes to better learning and development. For example, the result of professional training of future specialists is an individual approach to perform professional duties, their style of problem solving, the formation of individual professional skills that ensure efficiency in their future activities, which is why DL is becoming widespread, as it allows students to individually choose the time, place and pace of study, thereby independently drawing up an individual plan that meets their personal needs, as well as combining learning with other activities, using the latest information and telecommunication technologies (Kulinich & Safarova, 2021).

*Efficiency of the educational process.* Blended learning, provided that the teacher is ready to implement it in educational practice, and that there is a strong educational, methodological, and digital support, contributes to the efficiency of the educational process through a variety of

pedagogical approaches and the possibility of individual work with each student. The overall success of blended learning depends on how effectively the use of information technology can be combined with individualised learning and increased efficiency of the educational process. In addition, careful planning, training, and support for all participants in the educational process are critical aspects to achieving success in this area. In general, the following trends in the organisation of blended learning in educational institutions are outlined:

- personalisation of learning – involves the creation and implementation of the educational process on the basis of Individualisation of learning and building a personal educational trajectory that takes into account the needs, interests and developmental characteristics of each student;
- openness – open resources, adaptive courses and interactive platforms that allow students to focus on the important aspects of learning that are most useful to them;
- interactivity – active participation of students in the learning process on the basis of subject-subject interaction of participants in the educational process in real time: discussion of educational material, organisation of discussions and debates, raising problem situations and their joint solution;
- focus on practical application – studying educational material related to real professional situations, which not only contributes to its better understanding and memorisation, but also lays the foundation for modeling and designing the behavior of future professionals in their professional activities;
- reflection - analysis of one's own practical activities, identification of real problems based on it, identification of tasks to prevent them in the future based on a critical approach to the sources of information used, involvement in discussions, debates, which helps students develop analytical and critical skills and avoid mistakes in future professional activities (Bahno, 2024).

To successfully implement blended learning, it is necessary to take into account the needs and capabilities of both students and teachers. This means designing balanced learning programs that take into account the diverse learning styles and individual characteristics of each student. In addition, it is important to provide adequate support and training for teachers so that they can effectively use information technology and adapt their teaching approaches to meet the needs of the group. Only with cooperation, collaboration, and mutual understanding among all participants in the educational process can the full potential of blended learning be achieved and its successful implementation be ensured.

Activity-based blended learning occurs when educational activities include both classroom and online learning (Shandra *et al.*, 2021). In terms of higher education, the use of technological tools in the classroom makes the classroom more authentic, especially when the use of information and communication technologies allows for the involvement of a subject matter expert to deliver a lecture

or seminar at a distance, creating both face-to-face and online learning. Examples of combining levels of activity include the use of online discussion forums, e-mail, or other means of online communication, such as videoconferencing, during class assignments. Educational practice shows that higher education institutions have faced difficulties in creating an IT structure and providing both parties with instructions on responsibilities and tasks, organising the learning process, creating course plans for online learning, creating and supplementing resources, such as teaching materials that were only in print, creating and updating the assessment system. Researchers insist that the challenge is to overcome the incomplete understanding and perception of online learning, i.e. new opportunities, and to restore traditional offline learning with elements of online learning (Koroviy & Lazarenko, 2022).

In an ideal world, blended learning combines all the benefits of traditional classroom learning with the additional features of the online format, such as constant accessibility, flexibility, interactivity, adaptability, responsiveness, and unlimited space. However, in practice, the implementation of blended learning often does not allow for the full realisation of all its benefits. This leads to problems that are not really related to the shortcomings of the method itself, but to the fact that the capabilities of the educational institution do not meet the requirements of blended learning. Therefore, when assessing the advantages and disadvantages of this approach, it is more appropriate to focus on objective performance indicators, such as student satisfaction with the learning process and outcomes, compliance of the educational process with the needs of the institution, accessibility and efficiency of education (Ivashchenko & Bykova, 2019).

In a blended learning environment, for many teachers, the main means of delivering educational content is the use of video materials (tables, images, diagrams, drawings, pictures, presentations, etc.), as learning management systems, classroom response systems, thanks to modern means of information and communication technologies: adaptive learning platforms, tablets, smartphones, etc. the range of tools and technologies for blended learning is not only huge, but also continues to evolve (Svyrydiuk, 2021). However, the most common technology used in blended learning has been and remains video. Flipped classrooms, for example, require students to view lecture materials before class. This often involves teachers or tutors creating short video lessons. These lessons typically include screen recording, recording via the teacher's webcam, video demonstrations, or a combination of these. Videos are usually made available to students through a learning management system or video content management system. In some blended learning courses, instructors record videos as supplemental materials to help students learn more complex topics or to deepen their knowledge of a subject. In addition, educators can create e-textbooks that incorporate hypermedia and virtual reality elements that provide a high level of visibility, illustration, and high interactivity,

reflecting new forms of structured presentation of large amounts of information and knowledge.

In the context of the organisation of the educational process, there are three main components of blended learning that can be implemented in the information and educational environment of a higher education institution:

- traditional learning (face to face) – traditional classroom classes under the guidance of a teacher;
- self-study learning – independent work of higher education students: practical and laboratory work, search for educational materials; work in cloud environments and with online services);
- online collaborative learning is the joint work of higher education students and teachers in a synchronous online interaction mode, such as webinars, conferences, forums, etc. (Tsiuniak & Rozlutska, 2021).

Analysing the research on the implementation of blended learning as a pedagogical phenomenon, it can be noted that it has become a widespread mass pedagogical experience abroad, while in Ukraine this experience is advanced. It is based on the use of well-known forms, methods and tools in order to improve them in order to achieve efficiency of pedagogical activity. In other words, in most developed countries, the introduction of blended learning has become commonplace. In terms of creative independence, the experience of its implementation in higher education institutions can be considered innovative, since it is based on already known forms and methods, but differs in a new approach to their application, which contributes to improving the quality of the educational process. The achievements of blended learning include: openness of the educational process; formation of self-development and self-education through the acquisition of new knowledge on electronic resources; own pace of mastering the last component and the amount of work; increasing the level of computer literacy of both students and teachers (Kudela, 2020). In view of this, we can note that at the current stage of education development, practical aspects of blended learning have been developed, and its results have been analysed, in particular, the psychological state of students and teachers (Osadcha *et al.*, 2022).

However, the significant positive aspects of blended learning, its validity and systematisation demonstrate some disadvantages: insufficient communication between students and teachers and among themselves; insufficient objectivity in assessing knowledge due to problems with the Internet and short deadlines for completing and solving tasks; lower quality of education (not all students can attend classes on time due to problems with the Internet and military operations); insufficient development of educational and methodological complexes; significant workload on the teacher due to careful planning of each stage of the lesson; selection and systematisation of educational and methodological materials, including methods and forms of work; creation of an educational environment that is the basis for achieving the goal and learning outcomes; increased anxiety of both teachers and students.

The use of the blended learning model creates a number of problems, such as a free and diverse educational environment for students, the passive and uninitiative state of students in learning, which requires improving teaching methods in accordance with changing external conditions, as well as improving the quality of teaching in educational institutions (Kryshtanovych & Kryshtanovych, 2023).

The introduction of blended learning in educational institutions should meet the following criteria: forms of presentation of educational material and multimedia (information is provided in different forms simultaneously, individual peculiarities of students' perception are taken into account, and the visual component of the lesson is increased); structure of the material presentation (compact placement of large amounts of information and establishment of clear logical links between information elements); interaction with the learning content (providing quick and convenient search by content, as well as prompt automatic or semi-automatic assessment of completed tasks); variability of the content of the learning material (implementation of multi-level differentiation of learning, implementation of the principle of variability) (Marienko & Sukhikh, 2021).

The role and features of the introduction of innovative teaching technologies for the optimal rational use of time in the process of presenting educational material in compliance with the guidelines for performing educational tasks (timeliness, creativity, compliance with legal and ethical standards, etc.), which is important for learning in a blended format, are outlined. The study found that the negative factors of blended learning include problems with insufficient development of teaching and methodological complexes; a significant burden on the teacher due to careful planning of each stage of the lesson, selection and systematisation of teaching materials, methods and forms of work; increased anxiety of both teachers and students, as well as the quality of communication and Internet speed. Based on the study of the experience of implementing blended learning, it is noted that this form of work fully satisfies the implementation of the student's individual educational trajectory, which is the basis for the development of his or her professional qualities and competencies. Blended learning provides students with free access to educational material at any time and from any place, which contributes to its independent mastery, and skillful management of individual and group work during the performance of tasks contributes to the achievement of learning outcomes. Thus, blended learning reflects all the components inherent in the educational process: purpose, content, methods, forms of organisation and means of learning, and is aimed at the constant interaction of all participants in the educational process and allows for a personally oriented approach to students.

## CONCLUSIONS

Blended learning opens up new perspectives for educational institutions of different levels. The implementation of this approach allows for more efficient use of time and

resources, providing students and teachers with access to modern teaching methods and learning materials. Blended learning has gained the most popularity as it facilitated a safe learning process for students during the long quarantine period. The experience of introducing blended learning into the educational and information environment shows the positive impact of this approach on the quality of education and training of future specialists. The analysis of existing experience and scientific sources allows us to conclude that blended learning has a positive impact on the quality of education and prepares students for the challenges of the modern world. Blended learning is proving to be an effective tool for improving the educational process, as it combines the advantages of traditional methods with the innovative capabilities of information technology. The advantages of blended learning are the creation of a flexible and accessible learning environment that takes into account the individual needs and capabilities of each student. Interactivity and Individualisation of learning contribute to the active involvement of students in the educational process and increase their motivation to study the material independently.

In addition, blended learning enables students to study in accordance with modern requirements and challenges, ensuring their preparation for real-life situations in their professional activities. The use of information technology allows students to obtain up-to-date information, develop digital literacy skills, and adapt to a rapidly changing information environment. The results of the study of experience and research made it possible to identify the didactic foundations for the implementation of blended learning: a clear definition of educational tasks in achieving learning outcomes; focus of lectures, practical and seminar classes on the intellectual development of students; focus of educational compensations on the implementation of the individual educational trajectory of the student, which is the basis for the development of his or her professional qualities and competencies; focus of the tasks of educational

compensators on the implementation of the individual educational trajectory of the student, which is the basis for the development of his/her professional qualities and competencies; widespread use of innovative methods, techniques, means and ways to intensify the educational activities of students and their development; introduction of innovative teaching technologies; formation of national consciousness, mentality, identity through the prism of internationalisation processes; formation of universal professional values based on morality and law; optimal rational use of time for the presentation of educational material (using the necessary equipment and teaching aids) and methods of performing educational tasks (clarity of performance, creativity, compliance with legal and ethical standards, etc.); skillful management of individual and group work during the performance of tasks. Thus, blended learning proves to be an important tool for improving the quality of education and preparing students for the challenges of the modern world. Their implementation contributes to the development of competencies necessary for successful career and personal growth of students. Further research is needed on the issue of studying the practice of implementing innovative teaching methods and controlling the knowledge of students at all levels of education in the process of blended learning.

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## CONFLICT OF INTEREST

None.

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### Юлія Багно

Кандидат педагогічних наук, доцент  
Університет Григорія Сковороди в Переяславі  
08401, вул. Сухомлинського, 30, м. Переяслав, Україна  
<https://orcid.org/0000-0003-3513-6154>

### Олена Сергійчук

Кандидат історичних наук, доцент  
Університет Григорія Сковороди в Переяславі  
08401, вул. Сухомлинського, 30, м. Переяслав, Україна  
<https://orcid.org/0000-0002-2008-1122>

## Дидактичні засади впровадження змішаних форм навчання в освітнє середовище закладів освіти

**Анотація.** Змішане навчання в умовах воєнного стану дає можливість створити освітній процес, який враховує індивідуальні потреби здобувачів освіти, розвиває їхнє критичне мислення та допомагає забезпечити високий рівень результатів навчання, завдяки творчому підходу викладацьким складом. Від творчості і педагогічної майстерності викладача залежить успішність впровадження змішаного навчання. Мета статті полягала у вивченні досвіду впровадження змішаного навчання, вивчення його дидактичних засад впровадження в заклади освіти та вивчення його характерних рис. В ході дослідження застосовано аналіз наукової літератури, зокрема статті, дисертаційні дослідження, книги та матеріали конференцій. Дидактичними основами реалізації змішаного навчання на етапі сьогодення визначено досягнення результатів навчання шляхом визначення чітких освітніх завдань; організація освітнього процесу в інтересах інтелектуального розвитку здобувачів освіти на шляху реалізації особистісної освітньої траєкторії; впровадження інноваційних методів навчання для розвитку професійної компетентності та відповідних професійних якостей майбутніх фахівців. Разом з тим констатовано, що є не достатньою розробленою навчально-методична база для реалізації освітнього процесу, що створює такі проблеми: суттєве навантаження на викладачів у зв'язку з ретельним плануванням кожного етапу заняття, підбором та систематизацією навчально-методичних матеріалів, методів та форм роботи, що вплаває на підвищення тривожності як викладачів, так і здобувачів освіти. Результати даного дослідження можуть бути використані освітніми закладами для оптимізації процесу впровадження змішаного навчання, особливо в умовах воєнного стану

**Ключові слова:** заклади загальної середньої освіти; заклади професійної освіти; заклади вищої освіти; змішане навчання, здобувачі освіти; освітні технології; освітній процес