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Pedagogical Conditions for the Introduction of Blended Learning Technologies in Ukrainian Higher Education Institutions

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Abstract: The study focuses on the pedagogical conditions for the introduction of blended learning technologies. Blended learning is a combination of classical live face-to-face learning with learning mediated by computer and other technologies. Approaches to the definition of "blended learning" have been analysed. The author has described the main advantages of blended learning. The range of problems associated with the introduction of blended learning has been studied. The author has also analysed the criteria of the blended learning system effectiveness. Teachers of Ukrainian HEI have been surveyed concerning the process of introduction of blended learning technologies. The general assessment of blended learning technologies according to the teachers of HEIs has been clarified. Blending distance learning platforms used by teachers have been determined. Most often, teachers use Zoom, Moodle and Google Class. The peculiarities of HEI teacher's adaptation to the blended learning conditions have been studied. Almost half (48%) of respondents stated they had problems in adapting to blended learning conditions. The most common problems of teachers in the conditions of the blending distance learning have been described. It has been found that teachers most often encounter problems related to the processes of distance communication, as well as lack of experience and necessary knowledge. Respondents' points of view on the possibilities of assistance in the form of methodological developments and in the online format have been analysed. A set of measures aimed at improving the pedagogical conditions for the introduction of blended learning technologies has been developed.

Keywords: *blended learning, distance learning, pedagogical competence, ICT-competence, pedagogical conditions.*

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Introduction

Relevance of the study is the need for a complex investigation of the teacher's professional competence transformation in the blended learning conditions. The pandemic restrictions have revealed the shortcomings of distance learning, which do not allow its use as the only form of education in basic educational programs. The most promising form of educational process organisation in terms of its digital transformation is blended learning, which actively involves the alternation of online and full-time learning formats. Today the experts pay special attention to the pedagogical aspects of blended learning that are related to the organisation of the process in higher education institutions.

The process of introduction of blended learning technologies requires solving a wide range of problems at all levels, starting with the basic requirements for teacher competence. Transformation of modern society, rapid technological progress and changes in the learning paradigm force teachers to adapt to the new conditions. The classical system of teacher's professional competence is no longer able to meet all the requirements of blended learning. That is why there is a strong need to study the current pedagogical conditions for the introduction of blended learning technologies.

The purpose of the article is to consider the theoretical principles and determine the effectiveness of the introduction of blended learning technologies in higher education institutions of Ukraine. The realisation of the purpose determines the implementation of the following tasks: to define the essence of the concept of "blended learning", to consider the factors influencing the use of blended learning technologies in higher education institutions; to analyse the experience of implementing blended learning technologies in higher education institutions of Ukraine for the last two years; identify ways to increase the effectiveness of the introduction of blended learning technologies in higher education institutions of Ukraine.

Literature review

The term "blended learning" was firstly used in a press release from the American Interactive Learning Center in 1999 (Garrison & Vaughan, 2008), but was actively introduced after the publishing of a large-scale study by American scientists Curtis J. Bonk and Charles R.Graham, titled "The Handbook of Blended Learning: Global Perspectives, Local Designs" (2006). This study presented a systematic definition of "blended learning",

which according to the authors, is a combination of classical, live "face-to-face" learning with learning mediated by computer technologies or other tools. The authors also note that blended learning can be seen as a wide range of educational opportunities presented by combining Internet technologies and electronic media with methods that require the physical presence of the teacher and students in the classroom.

The high potential of blended learning is confirmed not only by theoretical research but also by empirical data. Thus, more than 60% of students studying in the best universities in the United States believe that blended learning is more effective than traditional (according to a survey conducted by the The Sloan Consortium association). Most leaders of US educational institutions (70%), according to statistics from the Online Learning Consortium, are convinced that the level of interaction between teacher and student in blended learning is much higher than in traditional learning (Johnstone, 2005).

Methodology

The scientific objective of the study is to describe the optimal pedagogical conditions for the introduction of technologies; to study the process of adaptation of teachers and its main problems, as well as suggest ways to solve them. In our research hypothesis, we predict the presence of groups of various factors that hinder the introduction of blended learning technologies. In order to better investigate the current state of implementation of blended learning technologies in Ukrainian HEIs, we have conducted a sociological study among teachers of the following Ukrainian universities: H. S. Skovoroda Kharkiv National Pedagogical University, V. N. Karazin Kharkiv National University, Ternopil Ivan Puluj National Technical University, Berdyansk State Pedagogical University, National University of Civil Defense of Ukraine, Zaporizhzhia Polytechnic National University, Bohdan Khmelnytsky National University of Cherkasy, National University of Pharmacy, Kharkiv State Academy of Physical Culture, Vasyl Stefanyk Precarpathian National University, West Ukrainian National University, N. Ye. Zhukovskiy State Aerospace University "Kharkiv Aviation Institute", KROK University of Economics and Law. The sampling frame is 420 respondents. It is representative in the main socio-demographic indicators of the academic staff of Ukrainian HEIs. Standard deviation is 1.31–2.18% at a reliable 95%. Method of obtaining information: individual interviewing at the place of work face-to-face with respondents and online surveying during the lockdown period. The questionnaire consists of 8 questions in order to describe the most popular

educational platforms, problems of adaptation and its current state, ways to increase the efficiency of blended learning etc. The last survey was conducted on May 20, 2021.

Results and discussion

Blending distance learning is a significantly new type of educational process in which modern technologies are combined with centuries-old traditions and pedagogical heritage. First of all, it is an open educational system, which provides active interaction between teacher and student with the help of modern technologies and multimedia (Transformation of modern educational space, 2020). Internet technologies are an integral element of distance learning, since it is with the help of online tools (chats, e-mail, webinars, video communication rooms) that the teacher interacts with students.

The specialised literature provides other terms that reflect the content of blended learning, including:

- hybrid learning;
- mixed-model learning;
- integrated learning;
- web-enhanced learning.

Although these terms may expand the understanding of blended learning and place some emphasis on its individual aspects (for example, web-enhanced learning emphasises the key role of the blending distance learning), most scientists agree that the essence of blended learning can be reduced to a combination of full-time and distance learning. This combination has its own synergy, combining the most effective aspects of full-time and distance learning and creating its own advantages, which have been highlighted herein as shown in Fig.1.

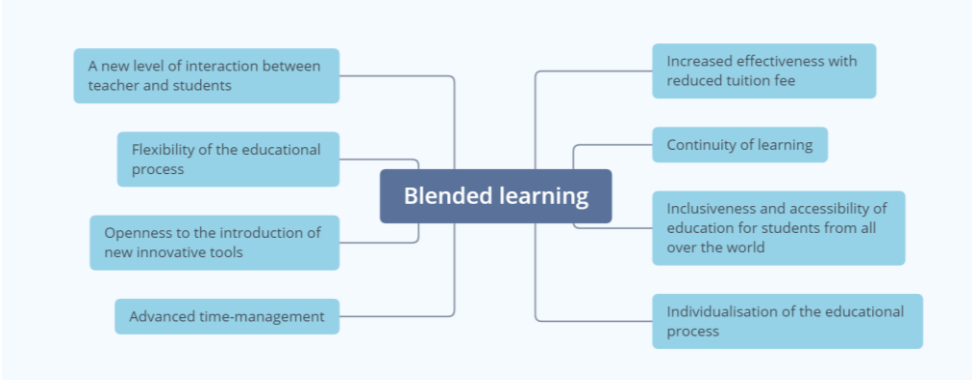


Fig.1. Advantages of blended learning

Despite the simplicity of the basic principles and a large number of advantages, the practical implementation of blended learning mechanisms in the educational process of Ukrainian HEIs is a very complicated process, associated with difficulties and risks at all stages of its introduction, as well as a range of requirements necessary for the effective functioning of blended learning systems. Neglecting these requirements may either shift the educational process completely into virtual space with the practical value of the acquired knowledge lost, or leave it within the standard didactics of "past" generations.

According to scientists, the main problems accompanying the process of implementing blended learning technologies include:

• vague position in legislation and lack of regulations governing the blended learning process;

• disciplines that couldn't be transferred into a distance format without loss of effectiveness;

• significant costs for material and technical base and provision of administrative support;

• insufficient teacher's competence to hold blended courses professionally (especially in terms of distance learning);

• problems related to user authentication;

• ineffectiveness of classical pedagogical methods and the need to adapt them to new conditions.

• unwillingness of teachers to transform the process of interaction with students (changing the teacher's role in the learning process).

In order to describe the necessary pedagogical conditions for the introduction of blended learning, it is first necessary to investigate in detail the current educational environment in Ukrainian HEIs.

Modern higher education institutions in Ukraine are an open academic community of students and teachers, flexibly reacting to the challenges of a digitalised society and responding to external changes with its own humanitarian initiatives (Boychuk & Kazachiner, 2021). The educational environment of higher education is in a state of permanent development and has the nature of a dynamic social organisation that stimulates not only vertical but also horizontal communication channels of interaction between teachers and students. The modern university community immerses students and teachers in constant contact to gain wisdom and draw conclusions from life experiences (Te Pas et al., 2016).

The academic staff today is, above all, an organisation of professionals that uses classical and modern communication technologies in educational and organisational activities (Nortvig et al., 2018). The

interaction of teachers and students goes beyond the lecture audience, transforming into a scientific and educational network that actively uses effective technologies of life (messengers, blogs, sites, social media profiles). Modern HEI is distinctive in digitalisation and high information density of the activities of students, teachers and staff working in the technological support of the educational process.

Rapid development of society requires higher education to develop innovative methods aimed at improving the knowledge stability. Academic teaching should meet life expectations and professional ambitions, requirements and assessments of participants in the educational process. Thus, Snezana Jovanova-Mitkovska and Dijana Hristovska (2011) in their study identify the following key competencies of a European student:

• possession of a stable system of knowledge and skills, as well as understanding the ways of their practical application;

• fluency in at least one foreign language;

• intellectual independence and ability to critically analyse sources of information;

• constant increase and expansion of own competencies, which includes a high level of educational motivation, creativity, ability to cooperate, understanding of the social context of education;

• ability to actively use a wide range of educational strategies to achieve individual goals and objectives.

Virtual educational space also has a high potential to be used as a resource of social initiatives, in particular volunteer ones. This has been proved by the results of a study conducted by one of the authors on the impact of virtual space on the motivation and professional competence of future professionals in the social field to carry out relevant professional activities (Kostina, 2021). The introduction of blended learning technologies implies a certain rational balance in the use of traditional and digital educational technologies. Notably that the need of a personal teacher-student contact is not denied. It is the communication in cyberspace that is given a preference. Such communication can be represented by both synchronous (in the format of chats, forums, video conferences) and asynchronous interaction (in the format of video lectures, interactive laboratory work, sending of the tasks performed in electronic form, etc.). The educational process built in this way today is defined as the most effective system of blended learning.

The criteria for the effectiveness of the system of blended learning of students in terms of providing the methodological component of the

educational process and administrative mechanisms of the higher educational institutions are:

• a high-quality ICT-competence readiness of the academic staff to work with distance learning tools;

• a clear management regulation of local legal aspects of this issue;

• an effective mechanism for interaction between teachers and the administration of the higher educational institutions;

• a well-thought-out motivational mechanism for encouraging and stimulating teachers to use blended learning technologies in the educational process.

Of course, penetrating into the structure of the educational process, electronic technologies are not able to radically transform it (Boychuk & Kazachiner, 2021). They can only significantly improve and optimise the conditions for higher education, as well as increase the efficiency of independent work of students, improve the procedure of teacher-student interaction and provide positive trends in the formation of mutual competencies of both teachers and students (Shcherbak et al., 2021).

The first step of our study was to clarify the general teacher's assessment of current changes in the learning process associated with the introduction of distance technologies. Only 2% of respondents perceive distance learning technologies extremely negatively. 37% of respondents assessed the current changes negatively, slightly less (36%) were neutral. 18% of respondents were positive about the changes, and 7% were extremely positive. For clarity, the results are presented in Fig. 2. Although distance technologies bring many benefits to the learning process for both teachers and students, the overall assessment of change by teachers indicates the possibility of improving this process.

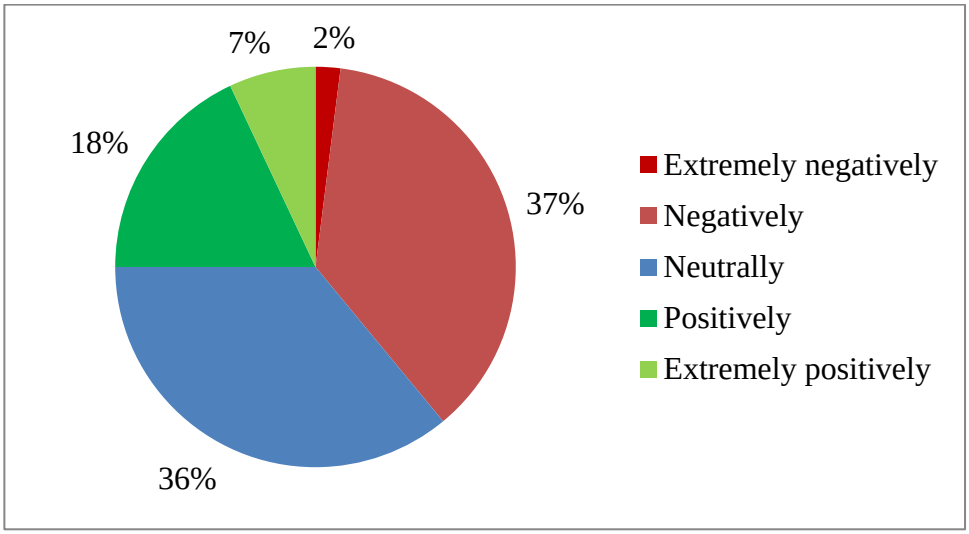


Fig. 2. How teachers assess changes in learning (introduction of blended learning technologies)

The next step in the study was to identify the most popular blended learning platforms. Distance learning requires teachers to use a range of tools: messengers, online platforms, virtual rooms, etc. Zoom is the most popular application with 74% of teachers using it in the educational process. Zoom is a service for video conferencing and online meetings, it is suitable for both individual and group classes. Users can use the application both on a computer and on a tablet or smartphone.

Teachers also actively use Moodle, 71% of respondents mentioned it in the list of their software package. Moodle is a free open distance learning management system providing a wide range of tools for educational interaction between teachers, students and educational institution' administration.

Google Class is the third most popular tool, 43% of teachers use it in their work. Google Classroom is a service that connects Google Docs, Google Drive and Gmail. It helps to organise online learning process using video, text and graphic materials. Teachers may conduct tests, monitor, systematise, evaluate activities, review the results of exercises, apply various forms of assessment, comment and organise effective communication with the students in real time.

17% of teachers use Microsoft Teams suite. It is a workspace for communication and information exchange with the integrated Office 365 software package. ATutor web-based learning management system is the

least popular. It is based on standards and formats for storing educational information. Only 7% of respondents use it. It should also be noted that 15% of teachers use other programs (or their suites) in the educational process.

Although the rich variability of software allows to expand the range of educational tools and provides more opportunities for teachers, at the same time it creates a heterogeneous educational space. We should not forget that the students are the main stakeholders in education process, and their needs should be made central. Simultaneous use of numerous platforms, requiring the use of different file formats; complex mechanisms for sending homework assignments on different platforms; confusion between programmes performing similar functions – all of these problems negatively affect the learning process. That is why it is appropriate to create a single, unified educational platform that could combine the benefits of existing programs and bring their own improvements into the educational process. For clarity, the results are shown on the histogram in Fig. 3

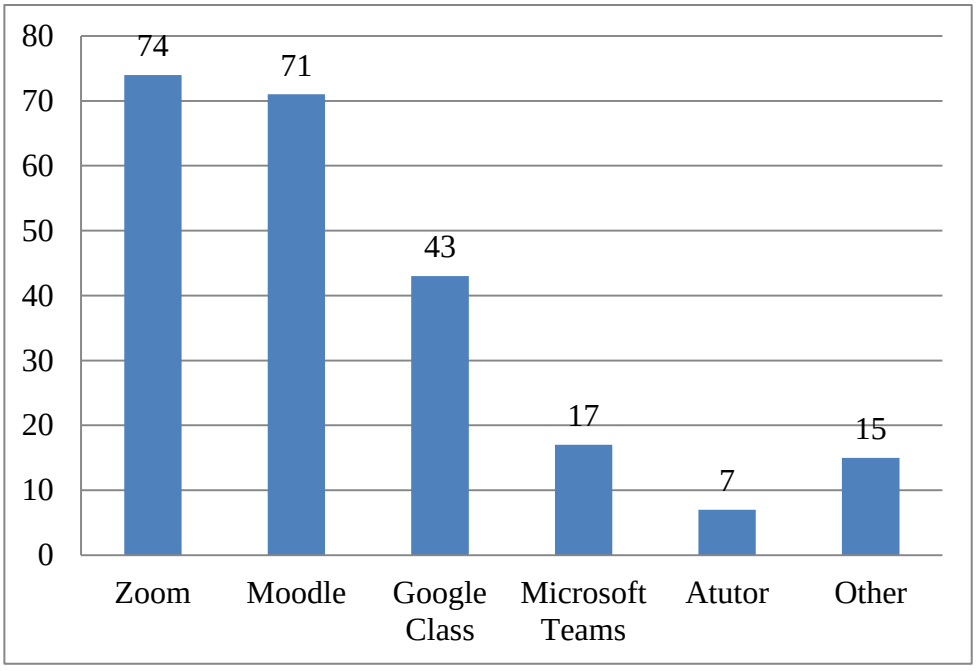


Fig. 3. Distance learning platforms used by teachers of Ukrainian HEIs

The next step of the study was to examine the teachers' assessment of their adaptation to the new distance learning conditions. The results are presented in Fig. 4.

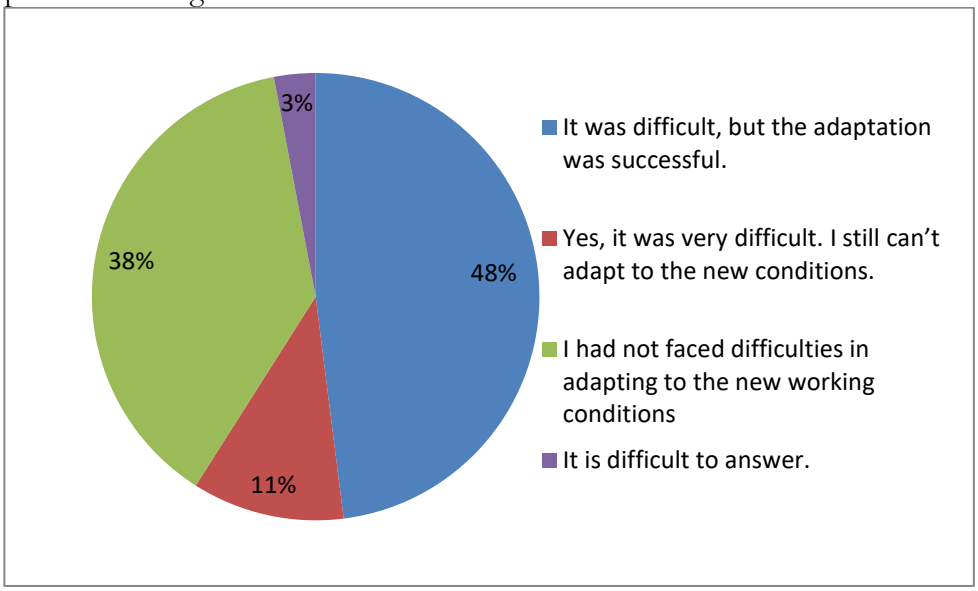


Fig. 4. How teachers assess their adaptation to the blended learning conditions

The diagram shows that almost half of the respondents (48%) determined their adaptation to the distance education conditions as difficult, but successful. 11% of teachers, who took part in the survey were unable to adapt at all. 38% of respondents did not face difficulties in adapting to the new conditions.

Having analysed the data obtained, we concluded that the adaptation to the distance education conditions today is far from perfect. More than half of the teachers had problems with adaptation, which requires the implementation of a support system (both methodological and online). The next step of our study was to identify current problems faced by teachers in the new conditions.

We have divided all the problems mentioned by the teachers into 5 groups:

• Organisational problems (poor teaching schedule, lack of synchronisation between the educational process and the report of student performance on educational platforms, imperfection of the exam process);

• Communication problems (barriers, lack of live contact with students, inability to receive feedback, lack of communication richness);

• Technological problems (poor communication on both sides, obsolescence of personal computers, lack of workplace equipment);

• The problem of insufficient knowledge and experience (technological ignorance in terms of software, excessive time spent on adaptation and problem solving, inability to implement classical methods in new conditions);

• Methodological problems (lack of methodological recommendations for teaching in the distance learning conditions, inadequate support from the educational institutions, lack of workshops and courses on distance learning technologies).

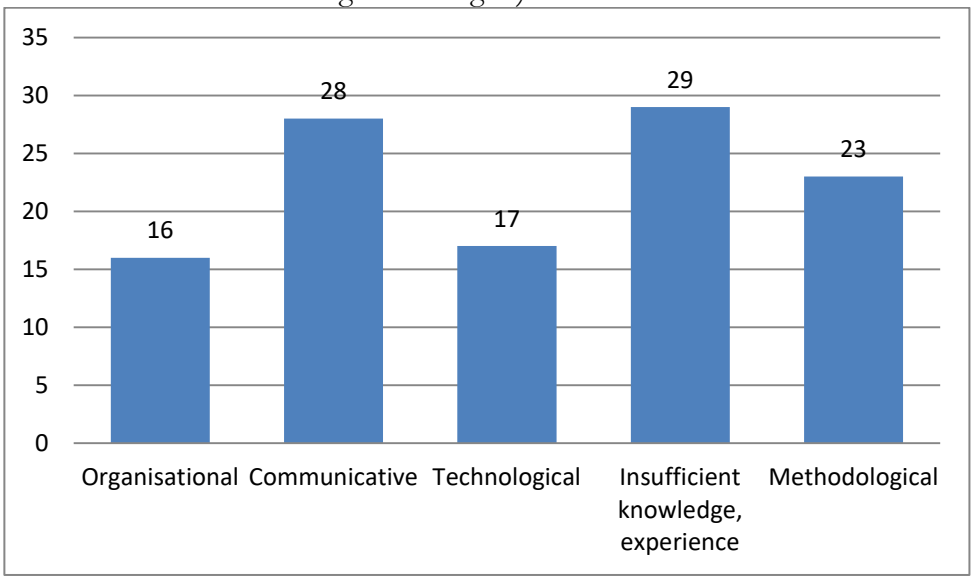


Fig. 5. The most common problems of teachers in distance learning conditions

Organisational problems proved to be the least relevant, as only 16% of respondents mentioned them. Technological problems were noted by 17% of respondents. The problem of insufficient knowledge and experience proved to be the most common, as it was specified by 29% of respondents. Communication problems turned out to be also popular, as they were mentioned by 28% of the surveyed teachers. Methodological problems were relevant for 23% of surveyed teachers.

The next step of the study was to consider the teacher's opinion about the necessary changes in the learning process.

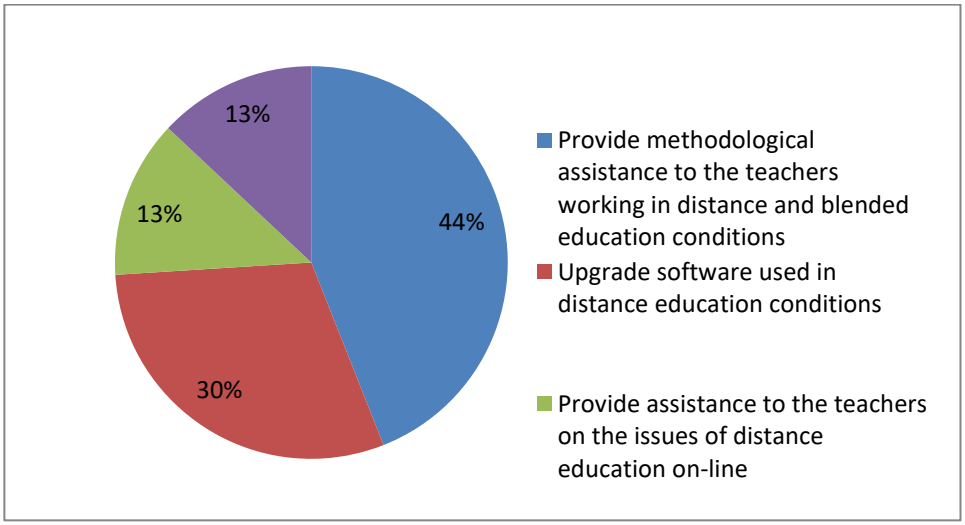


Fig. 6. The ways to improve blended learning technologies (respondent's opinion)

It was found that 44% of respondents considered it necessary to provide methodological assistance to the teachers working in distance and blended education conditions. 30% of respondents insisted on the software upgrade. Providing online assistance to teachers on the problems of distance education process is necessary for 13% of respondents, another 13% specified other options to improve the blended learning process (increased motivation, support from management, complete abolition of blending distance learning).

Based on a theoretical analysis of the literature and an empirical study on the effectiveness of blended learning, we have developed a set of measures that, in our opinion, are necessary to create optimal pedagogical conditions for blended learning in Ukrainian HEIs. They can be roughly into 3 groups:

• Measures aimed at improving and accelerating the process of teacher's adaptation to blended learning conditions.

• Activities directed at supporting teachers both in real time and in the format of methodological recommendations.

• Measures aimed at expanding the range of blended learning tools used by teachers of Ukrainian HEIs, as well as activities designed to unleash the maximum potential of such tools.

Speaking about the professional adaptation of a HEI teacher, S.Parsons et al. (2018) has defined it as a process of expanding knowledge and skills acquired in a HEI, as well as improving the pedagogical skills; as the ability to choose optimal methodological approaches depending on the

specific case of educational process and to predict the results of the pedagogical influence of the academic staff and a separate individual, as well as to predict adaptation to the specific conditions of the pedagogical activities organisation. H. Marsh, H. Martin, A. Yeung and & R. Craven (2017) have defined the concept of professional and pedagogical adaptation of a novice teacher of the HEI as a process of achieving optimal compliance of a teacher's professional pedagogical training, their personal professional potential with the current requirements for their pedagogical activities in the higher education institution. Zee and Koomen (2016) has considered the professional pedagogical adaptation as a complex dynamic process of full mastering of profession and acquiring a pedagogical skill based on the previously acquired knowledge and skills, yielding in active interaction of both a novice teacher and the academic staff of the HEI to perform the professional activities effectively.

Model of criteria for the HEI teacher's readiness to work in a blended learning conditions is extremely relevant today and describes those aspects of the teacher's pedagogical competence that are not enough to maximise the potential of blended learning (Elliott, 2017). Thus, the majority of teachers are sceptical about the blending distance learning. They lack motivation to develop their own ICT-competence, which is necessary for the effective activities in blended learning conditions (Sushko & Pronchev, 2021). A low level of professional and pedagogical reflection and the inability to adequately analyse one's own shortcomings lead to a significant decrease in the effectiveness of blended learning. Other criteria and their indicators are presented in Table 1.

Table 1. Criteria for the effectiveness of blended learning technologies

Criterion title	Criterion indicators
Motivational orientation	Assessment of motives, personality characteristics, values of the teacher, ability to self-education, impartiality, interest in the technology of blended learning and its application in own practice.
Content and operational	Systematic and deep knowledge of blended learning technologies, attained skills to use blended learning technology in the educational process of the HEI, awareness of own actions in the process of technology implementation, flexibility in the process of professional use of blended learning tools.

Control and evaluation	The level of professional and pedagogical reflection, the ability to predict the ways and content of self-education, to develop self-esteem skills, to adequately assess the level of professional development

Special attention should be paid to the communication problem within the blending distance learning (which was noted by 28% of survey respondents). Brewer and Movahedazarhouligh (2018) emphasises in his study that communication through Internet technologies is a special social process with its specific properties, such as:

• synchronous and asynchronous nature of communication (blended learning involves a combination of both types);

• conciseness of messages;

• different ways of presenting information in a multimedia format;

• democracy and openness of communication if certain rules are observed;

• use of special vocabulary, symbols, Anglicisms, Internet slang.

The last two points should be discussed in more detail. Democratic, open and productive communication between participants in the educational process in blended learning conditions is possible only if certain rules are followed (Valieiev et al., 2021). However, since these rules have not been formalised (and not always obvious to participants in the educational process), communication problems are among the most popular among both teachers and students.

The study confirmed the hypothesis that the complexity of specific Internet vocabulary is one of the main problems in the effective implementation of blended learning. 68% of respondents confirmed this statement. This is especially true for teachers, who may not have extensive experience in the Internet space and, as a result, lack the ICT-competence. Effective and productive communication is possible only if the participants fully understand each other in the learning process (Bilotserkovets et al., 2021).

The next problem is conflict situations that arise due to a combination of synchronous and asynchronous forms of communication ("flood" in chats, calls or letters during non-working hours, no webcam and mute microphone during lectures), as well as Internet communication features (interrupting each other by participants in the learning process due to communication delays, untimely response to information posted in the

chat). Almost all respondents (97%) faced such a problem. For 40%, these difficulties have become a cause for serious nervous experiences.

Third, the Internet space is characterised by problems related to user authentication, which in turn is relevant for the blending distance learning (especially in terms of knowledge assessment and monitoring in distance learning conditions). More than 64% of respondents in our study highlighted this problem as important.

Thus, the need to create a single, unified code of ethics for communication in blended learning conditions becomes obvious. Designed in the form of formalised methodological recommendations, but at the same time flexible and open to change, taking into account the specifics of a higher education institution or a specific training course, such a code of ethics can solve a number of problems related to communication. Mandatory structural sections of such a code in our opinion should be:

• Glossary of distance and blended learning terms, Internet slang and technical terminology;

• Rules of communication in the Internet space between teacher and students

• Recommendations for implementing an integrated system for unification of the educational process participants, both during lectures or workshops, and during knowledge assessment (proctoring).

It should be noted that in 2020 the Ministry of Education and Science of Ukraine has issued its own methodological recommendations for the organisation of distance learning in primary, secondary and higher schools. These highlight the general principles of organising distance education, provide background information on tools and platforms that may be used for distance teaching and learning. The recommendations also include specific distance learning methods for primary, secondary and higher schools, which are extremely relevant in the current context.

Without denying the effectiveness of these methodological recommendations, it is fair to note that this format of assistance to teachers and students is not exhaustive. Because we have found that although teachers in blended learning conditions often face organisational and methodological problems, they are not the main ones at this stage. It is insufficient knowledge and experience of working with distance and blended learning platforms that proved to be the main obstacle in the conditions of teaching in Ukrainian HEIs. In our opinion, the most effective form of assistance in this case may be special support chats, in which the teacher will be able to quickly solve the problem by sending a screenshot, share a current

image on the screen, describe the problem in a voice message, or even provide remote access to their own PC for a technician.

In order to achieve maximum efficiency and systematic increase of teacher's ICT-competence, the introduction of support chats should take place in combination with methodological recommendations in the form of technical "guides". As modern distance learning programs and platforms have a very wide range of functionality, it is impossible to comprehend it completely intuitively (Schipor & Duca, 2021). A guide is a manual, an action plan. It describes the procedure for achieving concrete results. Accordingly, it should be as clear and easy as possible. Scientists identify a list of principles for building an effective guide:

• Clear algorithm. The perfect guide is like a recipe, in which each step includes one simple and clear action.

• Explanation of a specific result. In order to help the teacher form a clear understanding of the action plan, they should understand the result of each operation.

• Factuality and conciseness. Explanations of actions should be at the same time as concise as possible in order not to confuse the user, and complete, i. e. contain all the necessary information.

• Comprehensibility and compliance of information with the level of the teacher's competence. As distance learning technologies have become widespread only in recent years, the vocabulary of guides should be understandable to a wide audience of users, and the complexity should be minimised.

• Availability of illustrations and animations. In addition to a textual explanation of the necessary actions, images of the working windows of a particular programme, as well as animations (.gif format is suitable) are appropriate for guides.

Conclusions

Blended learning is a combination of full-time and distance learning that complement each other, eliminating weaknesses and creating a significantly new educational space. The studies allow us to confidently assert the high effectiveness of blended learning technologies. To achieve this, however, the necessary pedagogical conditions should be created. These are represented by a set of requirements to the level of teacher's professional competence (which in turn includes ICT-competence) and to the educational process organisation. The absence of these conditions can lead to a number of problems that we investigated in a sociological study that involved 420 teachers of Ukrainian HEIs.

We have found out that the process of introduction of blended learning technologies in Ukrainian HEIs needs to be upgraded. Thus, 48% of teachers encountered problems in adapting to the conditions of blended learning, and 11% could not adapt at all. In the further professional activity teachers face a number of problems. Most often it is insufficient knowledge and experience in distance learning, as well as problems related to communication in the new conditions.

To create the necessary pedagogical conditions for the introduction of blended learning technologies, we have developed a list of measures aimed at improving and accelerating the process of adaptation of teachers in a blended learning conditions; supporting teachers both in real time and in the format of methodological recommendations; expanding the blended learning tools for teachers of Ukrainian HEIs and unleashing its maximum potential. The implementation and testing of these measures will be reflected in further studies.

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Documentation: Valentyna Kostina

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