

DOI: <https://doi.org/10.34069/AI/2023.67.07.5>

How to Cite:

Hrechanyk, N., Koval, D., Kovalchuk, I., Slovik, O., & Zinchenko, L. (2023). Exploring benefits and models of blended learning technology in modern professional training. *Amazonia Investiga*, 12(67), 54-65. <https://doi.org/10.34069/AI/2023.67.07.5>


Exploring benefits and models of blended learning technology in modern professional training

Впровадження технології змішаного навчання в сучасну професійну підготовку фахівців

Received: March 25, 2023

Accepted: June 29, 2023

Written by:


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
Abstract


The article shows the main ways of applying the mixed learning technology in the modern professional training of specialists. The purpose of the article is to find out the main ways of applying the technology of mixed learning in the modern professional training of specialists. The methodological concept provides a categorical and component analysis of the technology of mixed learning in the modern professional training of specialists in the following dimensions: philosophical, psychological, cultural, socio-pedagogical. The following methodological approaches were used in the article: sociosystemic, informational, synergistic, interdisciplinary, axiological, cultural, structural and functional and subject-activity. In connection with the digital transformation of education, we will distinguish three main components of mixed learning that can be implemented in a higher education institution, that is, in its information and educational environment (traditional learning (face to face));


Анотація

У статті показано основні шляхи застосування технології змішаного навчання при сучасній професійній підготовці фахівців. Метою статті є з'ясувати основні шляхи застосування технології змішаного навчання в сучасній професійній підготовці фахівців. Методична концепція передбачає категоріально-компонентний аналіз технології змішаного навчання в сучасній професійній підготовці фахівців у таких вимірах: філософський, психологічний, культурний, соціально-педагогічний. У статті застосовувалися такі методологічні підходи: соціосистемний, інформаційний, синергетичний, міждисциплінарний, аксіологічний, культурологічний, структурно-функціональний та предметно-діяльнісний. У зв'язку з цифровою трансформацією освіти виокремимо три основні компоненти змішаного навчання, які можна реалізувати в закладі вищої освіти, тобто в його інформаційно-освітньому середовищі

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self-study learning; joint online - learning (online collaborative learning). The four basic models of mixed learning, which are discussed in the article, are the most popular (rotational model, flexible model, self-mixing model, virtual-enriched model).

Keywords: technology of blended learning, professional training of specialists, digital transformation of education, information and educational environment, basic models of blended learning.

Introduction

The attention of personnel development specialists is increasingly focused on distance learning (e-learning), which is a way of organizing the learning process, which allows the transfer of knowledge at a distance without direct contact between the teacher and the student. This form opens up new opportunities for professional retraining and professional development. Obtaining a second higher education and, in principle, the organization of continuous education. This innovative format has a number of advantages. With distance learning, the student independently chooses a convenient time and place of study for him, determines a comfortable pace, selects a course or program that is interesting to him. However, such training has a number of disadvantages.

Critics of e-learning single out the lack of social contact with other study participants, the danger of misinterpretation of theoretical material, but the main thing is the need for a high level of self-education of the students. The search for more advanced methods of learning, using the advantages of e-learning and compensating for its shortcomings, led to the creation of mixed learning, combining distance format, face-to-face classes and self-training. Mixed learning is possible as a form of organization of the educational process, within which the traditional form is combined in equal proportion with distance learning, which involves the use of computer technologies and Internet resources to achieve the maximum efficiency of both forms of education. Blended learning allows you to take the best of online and offline formats and get rid of their shortcomings.

In connection with COVID-19, the whole world is under strict conditions of isolation of quarantine measures. Due to the spread of the coronavirus infection, quarantine has become a

(традиційне навчання (face to face); самостійне навчання (self-study learning); спільне онлайн-навчання (online collaborative learning). Найпопулярнішими є чотири базові моделі змішаного навчання, які розглянуто у статті (ротаційна модель, гнучка модель, модель самостійного змішування, віртуально-збагачена модель).

Ключові слова: технологія змішаного навчання, професійна підготовка фахівців, цифрова трансформація освіти, інформаційно-освітнє середовище, базові моделі змішаного навчання.

time of experimentation and innovation for higher education worldwide.

Institutions of higher education directed their activities to the needs of society and the individual to quality continuing education through the development of educational programs and forms of an education organization (distance, full-time, part-time, mixed, part-time, etc.). Digitization of the educational space directs effective sequential learning and the formation of digital (information and communication) competence and promotes professional awareness, changing the traditional education system, which allows students of higher education to increase virtual mobility (Tsiuniak & Rozlutska, 2021).

The application of mixed learning technology in the modern professional training of specialists provides a powerful potential for training in crises and forms the professional competencies of education seekers in the situation in which world education has found itself today, starting from 2020. It is possible to bring the results of educational activities closer to the standards of the European educational space and to achieve significant changes in the educational process of institutions of higher education through constant innovations and changes in the professional activity of a teacher with his competitive orientation to the digitalization of the educational process, constant innovation in the educational space of a higher education institution and his ability to implement personal creative potential. The application of blended learning cannot be considered a mechanical process that promotes the transfer of educational interaction, and its selective types, to the online environment. For such an educational process, it is necessary to change the role of the institution of higher education and to promote the innovative

transformation of teachers in the educational process of the institution, to change the culture of the educational institution and interpersonal relations between the participants of the educational process (Shevchuk, 2023).

Today, blended learning around the world is the main impetus for the innovative development of higher education. The main goal of higher education institutions is to find ways to update the educational process and to be ready to organize the educational process in the event of an indefinite suspension of classroom work and a full transition to distance education. There is a need to transition to Internet technologies, which have accelerated the development of the information society, filling many aspects of our lives and overcoming geographical barriers. The educational Internet space with the help of Internet technologies makes it possible to make the educational process comprehensive and comprehensive. Therefore, one of the main ways to improve education is the organization of mixed education, which, in the presence of favorable conditions, combines distance education with face-to-face (Vyshkivska et al., 2022).

In connection with the digital transformation of education, the article highlights the main components of blended learning that can be implemented in a higher educational institution; blended learning models are shown; the factors of mixed learning in the educational process are characterized; the task of mixed learning technology in the modern professional training of specialists of higher educational institutions is summarized; the key features of the mixed learning technology in the modern professional training of specialists are clarified; aspects of the application of mixed learning technology in the modern professional training of specialists are highlighted; innovative models of blended learning are shown; the characteristic features of the mixed learning technology in the modern professional training of specialists are highlighted.

Literature Review

The problem of the application of mixed learning technology in the modern professional training of specialists is a prominent object of research by scientists of the entire world educational space. Let's pay attention to studies that thoroughly or indirectly reveal the outlined problem.

O. Tsiuniak & H. Rozlutska (2021) considered the possibility of using blended learning in higher

education institutions during the quarantine and strict quarantine measures caused by the COVID-19 coronavirus infection when the whole world was in such isolation conditions and it became a problem for all participants in the educational process; revealed the meaning of the concept of "blended learning"; proved the significance and necessity for the educational field of blended learning, showed its innovativeness in the organization of the educational process in institutions of higher education; showed ways to transform the structure and content of education; emphasized the need to change the traditional roles of teachers and students of education. To implement training in institutions of higher education, the scientists showed the possibilities of combining online services with digital educational resources and emphasized the important aspects of blended learning, which makes it possible to distinguish between professional material to be studied in the classroom and that which will be presented in the informational and educational electronic environment.

K. Osadcha & V. Osadchy (2022) highlight the issue of improving foreign practices through mixed education in higher education. The authors emphasize the importance of blended learning, which is one of the most popular technologies today because it provides an opportunity to use the convenience and flexibility of distance technologies from any course and the advantages of traditional (auditory) learning. In the world's best institutions of higher education (Great Britain, the USA, Finland, Germany), the experience of mixed education is summarized, the foreign works of scientists from the leading countries of the world are analyzed, and progressive ideas of the introduction of mixed education in institutions of higher education are singled out for implementation in the educational process of institutions of higher education.

I. Puchkov (2017) considered the possibilities of introducing mixed learning into the educational process of higher education institutions, revealed his pedagogical experience of working at the university in teacher training; grouped the most essential features of blended learning; substantiated the structural content of the distance course: "Fundamentals of computer science with elements of programming"; analyzed the results of his scientific work, the effectiveness of which he proved using the methods of mathematical statistics.

S. Shevchuk (2023) proposed a method of using mixed learning in the professional training of

future specialists; the purpose, principles, essence, and models of blended learning through the competence approach are revealed. The author presents blended learning as a combination of forms of interaction between teaching staff and students of education (direct and indirect); as a process of increasing the efficiency and optimization of the educational process for those seeking higher education to best ensure the educational interests and needs of future specialists by transforming the educational process with the use of modern pedagogical approaches and the application of the possibilities of modern digital technologies.

L. Movchan & N. Komisarenko (2022) in the context of teaching in institutions of higher education defined the concept of "blended learning" based on foreign experience as an innovative organization of the educational process in institutions of higher education; the main elements of the mixed type of educational process are grouped; blended learning technologies are described; the expediency and relevance of the implementation of the innovative organization of the educational process in higher education institutions has been proven; models of blended learning depending on the purpose of teaching were investigated. It has been established that mixed learning determines the technological readiness of teachers, students of education and the educational institution, methodical preparation of all disciplines, organization of classroom classes, and, most importantly, independent work of students. The element of mixed learning – program complexes are considered.

T. Sobchenko (2021) researched the content of blended learning and showed its necessity in connection with the pandemic and the development of information and communication technologies throughout the world. The organization of the educational process has undergone significant corrections and updates, including the introduction of blended learning; the concept of "blended learning" was clarified and considered as a model, teaching system, method, mixture of learning strategies and methods, program, the form of learning, etc.; the tasks of mixed learning, which are set in institutions of higher education, are summarized. A. Tkachenko & T. Romanenko (2021) devoted their research to the problem of using technology of mixed education of students in higher education institutions. Scientists have found out that the methods, forms, content, and means of teaching the traditional acquisition of knowledge are becoming less and less relevant and need to

be improved and updated by the requirements of modern education; the need to use the technology of mixed learning in modern education, which has become the most relevant educational trend, has been established; the peculiarities of the organization of the educational process of students of higher education through the introduction of mixed learning technology are identified and substantiated, and the methodical approaches of using this technology to the design of the educational process are clarified.

B. Vyshkivska, O. Chemerys, A. Prus, & I. Kulyk (2022) showed the peculiarities of the educational process, the possibilities of its organization in institutions of higher education, the impossibility of working only in offline mode because education requires: learning in an electronic educational environment, the use of innovative forms of work with education seekers, development of information and communication competence in the teaching staff. The meaning of the concept of "mixed learning" is revealed, and the conditions of its influence on the effectiveness of the educational process are shown. Blended learning is presented as a didactic means of implementing the transition from a traditional educational model to an integrated model using electronic resources and environments; the role of blended learning in ensuring quality professional training of each student is clarified, because blended learning is characterized by: flexibility, adaptability, accessibility; the usual approach to education was revised, redistribution of educational space resources and the creation of a new educational paradigm were proposed.

The analysis of research allowed us to single out those questions that were considered by scientists regarding the problem of applying the technology of mixed learning in the modern professional training of specialists. We drew attention to the fact that scientists, on the basis of foreign experience, defined the concept of "blended learning", researched the content of blended learning and showed its necessity for the field of education; the possibilities of applying blended learning in institutions of higher education are considered, the issue of improving foreign practices through blended learning in higher education is outlined, the possibilities of introducing blended learning into the educational process are shown, the methodology of applying blended learning in the professional training of future specialists is proposed, and the conditions of its influence on the effectiveness of the educational process are shown. It has been found that despite a wide range of research areas

devoted to this problem, there is still no unanimity in science in understanding the solution to the problem of the application of blended learning technology in the modern professional training of specialists. Thus, the controversy surrounding the problem of the application of mixed learning technology in the modern professional training of specialists continues to this day. Therefore, we set the following tasks in the research: to show the necessity of using the technology of mixed learning, to highlight the characteristic features of the technology of mixed learning, its organizational forms in the modern professional training of specialists; reveal the three main components of blended learning that can be implemented in a higher education institution; characterize the basic models of blended learning, show the key features of blended learning technology, highlight the stages of blended learning technology.

The aim of the study: to find out the main ways of applying the technology of mixed learning in the modern professional training of specialists.

Methodology

The following research methods were used for the research: theoretical: methods: study of psychological, philosophical-cultural, historical-pedagogical, sociological literature on the problem of studying the advantages of mixed learning technology in modern professional training of specialists; instructional instructions, documents of higher education, regulatory and legislative framework, methodical documents for improving professional education, methods of conceptual and comparative analysis; analysis of the theoretical foundations of research, summarization of data from literary sources, retrospective analysis, identification of socio-pedagogical problems, theoretical modeling of the experimental model of mixed learning technology in modern professional training of specialists, forecasting of research results – methods of structural and systemic analysis; generalization of the experience of using mixed learning technology in the modern professional training of specialists based on the study of the work of teachers of higher education institutions in order to substantiate the theoretical and methodological foundations of the professional training of future specialists; empirical: psychodiagnostic (psychological-pedagogical observation, conversations, method of solving problem situations, self-assessment analysis) with the aim of clarifying the results of scientific research activities of students when applying

mixed learning technology in modern professional education.

In connection with the expansion of the introduction of mixed learning technology in the modern professional training of specialists, the main goal of the study is the need to substantiate the theoretical and methodological foundations of the introduction of mixed learning technology in the modern professional training of specialists. The conceptual foundations of mixed learning technology in modern professional training of specialists need justification at the following levels of scientific research: methodological, theoretical, and methodical.

The research methods used by us were used to clarify the possibilities of qualitative application of mixed learning technology in modern professional training of specialists. For this purpose, the conceptual foundations of the blended learning technology based on the following levels of scientific research were identified: methodological, theoretical and methodical. In our study *the methodological concept* provides a categorical and component analysis of the technology of mixed learning in the modern professional training of specialists in the following dimensions:

- philosophical, the relationship between practical human activity and cognition is investigated based on social, biological, and spiritual factors, the study of the socio-pedagogical thesaurus of mixed learning technology in modern professional training of specialists, etc.;
- psychological, a psychological analysis of the structure of mixed learning technology is carried out in modern professional training of specialists, taking into account the individual and age characteristics of such future specialists;
- cultural, there is an analysis of the socio-pedagogical activity of mixed learning technology in the modern professional training of specialists, which is based on modern studies of civilization, informatization, and intercultural interaction;
- socio-pedagogical, includes goals, principles, content, forms, methods, results, etc., which are structural components of mixed learning technology in modern professional training of specialists, the basis of which is the organization of an information environment for individual and group training of education seekers.

The following methodological approaches were applied: socio-systemic, informational, synergistic, interdisciplinary, axiological, cultural, structural-functional, and subject-activity.

The theoretical concept is represented by the rationale the substantiation of the interrelationship of several models of blended learning technology in modern professional training of specialists serves as the theoretical basis for the design of professional training of specialists.

The theoretical aspect of the research consists of: scientific provisions of the theory of activity; concepts of the subject activity of a person in the process of his professional formation; theoretical foundations of training a future specialist.

The methodical concept of the research of mixed learning technology in the modern professional training of specialists involves the introduction of informational and methodical support of the educational process.

Results and Discussion

The introduction into the system of higher education of mixed learning technology in the modern professional training of specialists is of great importance for the modernization of the educational sector and its integration into the European area of higher education. The term "blended learning" is synonymous with the terms "hybrid learning", "flexible learning", and "combined learning". To determine clear program learning results, during the modern professional training of specialists, the technology of mixed learning is a combination of remote, traditional educational, mobile technologies, and learning strategies. Scientists pay attention to the combination of formal and informal means of education. For example, there can be a discussion of theoretical educational material using video conferences, e-mail, the study of professional material using multimedia tools, and consultations via the Internet. When implementing the technology of mixed learning with modern professional training specialists, the combination of electronic technologies and traditional learning technologies (mobile, remote, computer) is of great importance, the use of which is a necessary condition for the effective implementation of blended learning (Shchyrbul et al., 2022).

In connection with the digital transformation of education, we will single out three main

components of blended learning that can be implemented in a higher education institution, that is, in its information and educational environment:

- traditional teaching (face-to-face), which takes place under the guidance of a teacher during traditional classes in the classroom;
- self-study learning includes independent work of students of higher education (work with online services, in cloud environments, laboratory, practical work, processing of educational materials);
- joint online learning (online collaborative learning), in which the work of teachers and students of education takes place online in the mode of synchronous interaction (holding of conferences, webinars, forums, etc.) (Kravchenko et al., 2022).

The four basic models of blended learning are the most popular:

- rotary model;
- flexible model;
- self-mixing model;
- virtual-enriched model (Polishchuk et al., 2022).

The choice and effectiveness of the basic model of blended learning in the educational process depend on the following factors:

- form of educational process organization (full-time/part-time);
- level of educational achievements of education seekers;
- the level of information and communication skills of future specialists;
- the content of the academic discipline is designed for blended learning;
- the sufficient number of hours for independent work;
- availability of the appropriate material and technical base of the institution of higher education for the possible implementation of mixed education (Tsiuniak & Rozlutska, 2021).

The task of mixed learning technology in modern professional training of specialists in higher education institutions is summarized:

- expansion of opportunities of the educational process for education seekers due to flexibility and accessibility;
- increasing the motivation of education seekers in the process of applying mixed

- learning technology in the modern professional training of specialists for independence, reflection, self-analysis, educational and cognitive activity, social activity, and the formation of responsibility;
- taking into account individual educational needs, pace, and rhythm of educational material in the modern professional training of specialists through the technology of mixed learning;
 - changing the role of the teacher by moving from the presentation of the material to interactive interaction with the student;
 - formation of digital competence;
 - increasing the effectiveness of education during the application of mixed learning technology and learning results in general;
 - autonomy and pedagogical freedom of the teacher regarding the choice of educational platforms, services, and presentation of material during the application of mixed learning technology in the modern professional training of specialists;
 - the possibility of controlling one's activity during the application of mixed-learning technology;
 - personalization of the educational process during the professional training of specialists (definition of learning goals and ways to achieve them, taking into account interests, abilities, and educational needs; moreover, the teacher is an assistant) learning independence (Sobchenko, 2021).

Under the condition of the correct application of mixed learning technology and a clear ratio of independent work and classroom classes in the modern professional training of specialists, the quality of education will increase. It should be taken into account that the technology of mixed learning puts forward increased requirements for the level of competence of teachers in modern professional training of specialists, shifting the emphasis of organizing the educational process traditionally to working with databases, providing individualized assistance to students in modern professional training, adding online components to traditional training (online discussions, blogs, surveys, discussion of problematic issues, completion of tasks in electronic form, etc.) to solving problems of motivation and stimulation. The technology of mixed learning makes it possible to receive differentiated instructions for specialists with modern professional training and to work in a convenient mode and pace (Vyshkivska et al., 2022).

We will find out the key features of the technology of mixed learning in the modern professional training of specialists.

- first, the constant use of information and communication technologies during the application of mixed learning technology to find educational material and obtain new knowledge in the modern professional training of specialists, i.e. ICT is the main component of the education process;
- secondly, the integration of various methodological approaches, tools, methods, methods, presentation of new material in modern professional training of specialists, types of educational activities of education seekers, in particular, part of the information is divided into group work, part – into the independent study (Stratan-Artyshkova et al., 2022).

– During the application of mixed learning technology in the modern professional training of specialists, there is a noticeable transformation in the role of the teacher, which is manifested in three aspects:

- 1) the teacher in the modern professional training of specialists acts as a consultant during the application of the technology of mixed learning, choosing for students an individual trajectory of the educational process;
- 2) the teacher acts as a mentor during the application of mixed-learning technology;
- 3) the teacher performs the role of a facilitator of the educational process, namely, during the application of the technology of mixed learning in the modern professional training of specialists, he ensures the active involvement of students of education in team cooperation, promotes feedback communication between the teacher and students of education, organizes independent educational activities of students, promotes the use of electronic resources, ICT means (Kuchai et al., 2022).

The technology of mixed learning provides an opportunity for the student of education to learn using ICT tools according to an individual schedule, which is the most convenient for the future with modern professional training of specialists, carries out the process of consulting the student of education, directs him to the independent acquisition of skills, knowledge, abilities for carrying out practical activities, i.e. during the application of mixed learning technology in the modern professional training of

specialists, education seekers are assisted in the independent acquisition of professional, subject, social (soft skills) competences when applying innovative didactic support for the organization of their educational trajectory. During the application of mixed learning technology in the modern professional training of specialists, the teacher selects innovative methods, forms, and means of education that provide the opportunity for students to self-study, self-organization, responsible attitude to learning, independent planning time for education, etc. (Bershadska et al., 2020).

One of the main elements of the application of mixed learning technology in the modern professional training of specialists is the feedback between the teacher and the student. When studying each academic discipline in the classroom, in online mode, during the independent work of students, the teacher ensures the implementation of feedback to discuss problematic issues, providing consultations, monitoring and correcting knowledge, conducting briefings, etc. Such work can be done using testing platforms, and ICT tools by students of online education (Tkachenko & Romanenko, 2021).

Computer network technologies have become a promising platform for developing electronic learning (e-learning), distance learning, and mobile learning (m-learning), which are effectively used for all forms of the educational process. The development of e-learning gave an opportunity for a new direction in education – blended learning, which is very important in the modern professional training of specialists. Therefore, we are observing the rapid development of the creation of e-learning software complexes of various orientations, including the organization of learning – LMS (Learning Management Systems), content delivery systems, which embody in their content: the development of educational courses, communication, administration, assessment of knowledge.

Nowadays, we see the movement of distance learning in a new direction:

1. E-learning has become more important, compared to distance learning.
2. Distance learning has moved to the workplace.
3. Blended learning is widely used in education.

4. E-learning began to focus more on the acquisition of professional knowledge and less on the course of lectures.
5. E-learning has become adapted to different levels of education.
6. Traditional educational technologies have taken a back seat.

The technology of mixed learning in the modern professional training of specialists consists of three stages:

- distance learning,
- in the form of day classes for mastering practical aspects,
- monitoring.

The basis for the selection of models of the application of mixed learning technology in the modern professional training of specialists is the degree of independence of students, the ratio of electronic and traditional forms of education when choosing course sections for independent study and mastering the educational material (Movchan & Komisarenko, 2022).

Different tools, primarily cloud technologies, are used in the implementation of blended learning. Currently, video materials play an important role in the application of mixed-learning technology in the modern professional training of specialists. The use of video in MOOS (massive open online course) limits (10 minutes) the duration of the educational video fragment.

Let's list the options for working with video:

- video creation (Screenr, Screencast-o-matic, Camtasia),
- video editing (YouTube),
- creation of animation
- creating a video with comments,
- creating a video by adding sound to the presentation,
- creating a video with testing,
- creating a video lesson (Guo, 2013).

The combination of distance learning and classroom learning provides good conditions for teaching flexibility, access to learning, and improvement of methods. In addition, the application of mixed learning technology in modern professional training of specialists can include asynchronous and synchronous online learning, provide innovative means of Internet learning, and a wide selection of modern technologies (Movchan & Komisarenko, 2022).

So, let's highlight the characteristic features of the technology of mixed learning in the modern professional training of specialists:

- the teacher's ability to pay more attention to students, not only during the classroom session. It is possible to consult education seekers via chat, e-mail, and forum;
- development of one's schedule of extracurricular activities. Students get an education at a time convenient for them: the materials are compactly arranged and are available on the distance educational resource and are presented online. Education seekers work with materials at a convenient pace, do not waste time looking for the necessary material elsewhere, but work in an electronic library, Internet cafe, or at home;
- the teacher's observation of the student's task completion time, his progress, and the capabilities of each student, which makes it possible to draw up a schedule of students' classes, approach each one individually and conduct consultations at a convenient time for each student. Students, with this approach, can eliminate debts, control their academic performance, improve educational results;
- the teacher changes and supplements educational materials, and improves his competence, which contributes to updating the learning process every year and makes it different from the previous one;
- every student is an individual and needs an individual approach, therefore, the educational process for every student of education is different.

With mixed learning, since it allows the inclusion of audio or video lectures, graphics, etc., all the peculiarities of the students of education are taken into account (Rashevskaya, 2010).

Modern education has developed innovative material for the use of mixed learning technology in the modern professional training of specialists in the educational process of a higher educational institution. One of the main directions of improving the professional training of future specialists is the development and application of distance courses, and their preparation for the use of information technologies (Puchkov, 2017).

The technology of mixed learning in the modern professional training of specialists does not become a completely online education that takes place in front of a computer constantly and does not have traditional classes. With the technology of mixed learning in the modern professional

training of specialists, the elements of online and personal training work together, to create a diverse base of education seekers, and not duplicate the content of the course in different formats (Panapto, 2019).

A combination of learning environments can:

- expand opportunities and educational space for attracting different lecturers, use, and training of innovative technologies;
- to promote support for communication, monitoring, and feedback from education seekers, application of own assessment system;
- to increase the availability of resources and saturation of information for those seeking education. More use of interactive educational methods to learn the material and develop creative projects;
- involvement of students in partnership work through cooperation during classes;
- motivation for education seekers and their interest in the future profession.

The technology of mixed learning in the modern professional training of specialists can be used for supporting learning in large and small groups, learning in person between the teacher and students, independent, distance, autonomous learning, communication between the teacher and groups of students, or individual students, between the students themselves. With the technology of mixed learning, with modern professional training of specialists, it is possible to "mix" time, for example, standard classes with video classes; venue, for example, a traditional excursion versus a "virtual" one using the Internet, websites; interesting people, for example, video communication with visiting scientists in this field; equipment and activities such as the classroom or online surveys. In general, the technology of mixed learning in the modern professional training of specialists has several advantages for those seeking education and is much more effective than the traditional (Edera R&D, 2019). When applying the technology of mixed learning in the modern professional training of specialists, teachers focus on a creative approach, communication, and the formation of the worldview of education seekers; a combination of teaching methods, independent work with support from the teacher (Peresunko & Smolnikova, 2022).

There are various organizational forms of mixed learning technology in modern professional training of specialists.

Innovative models are distinguished

The "Rotation" model, which is based on the principle of rotation. During the educational process, the student's learning time is divided between classroom learning and individual electronic learning. When learning in the classroom, the educational process takes place together with a teacher who provides remote support for electronic learning. This model has the following varieties:

- the rotation model with the presence of "online stations" (training of education seekers takes place in groups according to the prescribed rotation schedule, which is shared by all);
- the rotation model with laboratory works (the class, in which students work in the laboratory, is equipped with computer equipment for the possibility of using computer technologies);
- "flipped classroom" (students receive prepared educational material and instructions online for their independent processing; such classes are held with the active participation of students in educational activities);
- individual rotation model (students study according to individual rotation schedules).

The "Flex" model creates the conditions of e-learning for students to learn most of the material, the teacher helps students remotely, but if students have difficulties understanding complex issues, the teacher organizes classroom consultations with each individual or small groups of students. The model allows for substantial face-to-face support for learners.

The "Self-blend" model allows students to additionally study the material in online courses at their institutions of higher education and other educational institutions. This model divides the study time between the distance form of education and the attendance of classroom classes by the students of education. With this approach, students have the opportunity not to visit an educational institution every day. This is a model of the work of the entire educational institution, and not just a system of studying a course or a discipline (Dubinina, 2018).

Conclusions

The combination of distance learning and the classroom process creates conditions that contribute to the flexibility of teaching, increasing access to learning, and improving

methods and methods. In addition, the high-quality application of mixed learning technology in the modern professional training of specialists significantly improves the monitoring of the learning process, and the educational process, provides an opportunity to support students, and enables the automation of part of the teacher's work. Methodical approaches contribute to the interest of education seekers in the process of assimilation of material, training, and effective interaction between the personalization of training, and subjects of the educational process. In the article, the main ways of applying mixed learning technology are proposed for high-quality modern professional training of specialists. Three main components of mixed learning that should be implemented in the information and educational environment of a higher education institution are singled out (traditional learning (face-to-face); self-study learning; joint online learning (online collaborative learning). The article considers four basic models of blended learning, which are the most popular (rotational model, flexible model, model of self-mixing, and virtual-enriched model). When implementing blended learning technology, various tools are used, primarily cloud technologies, and video materials. The essence of innovative models is shown (model "Rotation", "Flex" model, "Self-blend" models). The choice and effectiveness of the basic model of blended learning in the educational process depend on the factors analyzed in the article (the form of organization of the educational process (full-time/part-time), the level of educational achievements of the students, the level information and communication skills of future specialists, the content of the educational discipline is designed for mixed learning, a sufficient number of hours for independent work, the availability of the appropriate material and technical base of the higher education institution for the possible implementation of the technology of mixed learning). Peculiarities and organizational forms are singled out, and the stages of mixed-learning technology are shown.

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