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Instructional design of blended learning in higher education: an analytical review of international research

Svetlana Bakhisheva*

West Kazakhstan Innovation and Technological University
090001, 44 Ikhsanov Str., Uralsk, Republic of Kazakhstan

Akkumis Kemeshova

Abai Kazakh National Pedagogical University
050010, 13 Dostyk Ave., Almaty, Republic of Kazakhstan

Kairat Saginov

L.N. Gumilyov Eurasian National University
010000, 2 Satpayev Str., Astana, Republic of Kazakhstan

Zhadyra Kazhiakparova

West Kazakhstan Innovation and Technological University
090001, 44 Ikhsanov Str., Uralsk, Republic of Kazakhstan

Abstract

Relevance. The relevance of this study lies in the fact that in modern conditions the huge potential of constantly updated digital educational technologies is not sufficiently used in blended learning.

Purpose. The purpose of the study was to rethink traditional learning in accordance with the requirements of digital time, to consider the possibilities and contradictions of online learning, as well as to study blended learning in more depth.

Methodology. The research tasks involved analysing literature at the intersection of pedagogy, psychology, information technology, and technical sciences. Also, comparative analysis, modelling, and synthesis were used. As a research methodology, interdisciplinary, systemic, activity, synergetic approaches, project methods, and blended learning didactics were implemented, the results of the experiment were analyzed and its results were summarized, and the differentiation of digital resources in education was compared.

Results. It was determined that a methodology for assessing the formation of general and professional competencies of students through blended learning can be achieved by creating tools for measuring expected competencies. The results of previous studies have revealed the lack of resources that can provide a link between online and offline learning, and the need to develop a blended learning design using digital communication in learning. The analysis of the process of transformation of education during the pandemic and after it revealed the lack of didactic and technological justification for blended learning.

Conclusions. The study provides a comprehensive analysis of blended learning in the digital era, offering practical tools and highlighting areas for further development in educational practices.

Keywords: blended learning; instructional design; digital communications; information technology; educational trends; new directions in learning; multimedia.

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*Corresponding author



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Introduction

The development of modern digital technologies is at a high level, and, combined with the desire of the education system for various innovative processes, it stimulates the modernization of the education system in a higher education institution and the optimization of students' self-organization. The use of blended learning technology can become one of the most convenient and effective methods of monitoring and managing students' self-organization and their independent work. This type of learning can be implemented through the use of information technologies in combination with traditional ones, which is the essence of blended learning (phygital) [1; 2]. Blended learning is a method in education that includes both traditional methods of learning (face to face with a teacher) and learning using computer technology, and also combines the qualities of classroom learning and interactive (or distance) learning, in including accessible courses and motivationally designed for learners. Blended learning is the introduction of information technology into the usual classroom teaching methods, using such forms of learning as: presentations, videos, audio clips, computer graphics, etc. The features of the phygital system are that students and teachers have the opportunity to independently manage the educational trajectory of learning, as well as choose an individual pace, time and place of learning [3; 4].

For the correct implementation of the goals and objectives, the teacher, together with the student, must determine the percentage of elements of electronic and traditional learning, while it is important to take into account the psychological characteristics of each student. The figital system is characterized by its relation to traditional education in the amount of 30% to 80%, and if it exceeds 80% or vice versa, it is below 30%, then it should be talked about another type of education, but not about mixed [5-8]. The instructional design of blended learning combines theory and practice; on the one hand, it is a model for the transformation of education, and on the other hand, it performs an interdisciplinary function in the digital space. Its structural and content model forms an integral system of blended learning, consisting of principles, an algorithm, the content of goals, methods and techniques, resources and technologies that ensure the achievement of the expected results. The educational process is organized through the control module of the proposed structure, the educational module provides for the activities of asynchronous and synchronous communication services in the digital environment, and the content module provides for the placement of library, audio, and video resources [9; 10].

For example, the study of instructional design of blended learning in higher education institutions has been studied by many scientists, such as H. Singh [1] from USA. In his research, the author comprehensively considers the terms "distance learning" and "blended learning", and also develops his own model of blended learning, which covers the most possible number of tools and ways to organize the educational space using traditional and modern technologies. A team of co-authors from Norway K. Almendingen, B. Sparboe-Nilsen, L. Gravdal Kvarme, J. Šaltytė Benth [2] conducted a study among students using a previously developed methodology to evaluate the effectiveness of blended learning. The results showed that

blended learning tools help to increase knowledge, but the results were lower than expected.

C. Huang [3] from Ling Tung University in Taiwan also used an experiment among students in his study, which consisted in establishing the factors that affect satisfaction with the blended learning methodology. The author came to the conclusion that the use of blended learning has a positive effect on student learning satisfaction. Pedagogical trends researchers G. Heilporn, S. Lakhal, M. Bélisle [4] from The Université de Sherbrooke in Canada studied how university teachers use blended learning in their teaching methods. The study found that in addition to a competent combination of online and offline learning tools, the emotional component during learning is also important, and establishing contact between the student and the teacher at the very beginning of learning is one of the key factors for achieving the desired results. In addition to the above authors, such researchers from Singapore as M. Nakayama, K. Mutsuura, H. Yamamoto [5], B. Bruggeman, J. Tondeur, K. Struyven, B. Pynoo, A. Garone, S. Vanslambrouck [6] and others have also studied blended learning, but its integration into the educational process has not been sufficiently considered, so this topic is considered in this study.

The aim of the study was to systematize, classify and identify the most effective approaches to blended learning, by studying the experience of its use in the practice of higher education.

Materials and Methods

The scientific and experimental base of the study was West Kazakhstan Innovation and Technological University (Uralsk, Republic of Kazakhstan). The students of 3-4 courses of pedagogical specialties, in whose education blended learning is used, made up the sample. A total of 115 people (60 boys and 55 girls) took part in the experiment. The study consisted of conducting a survey aimed at determining the attitude of respondents towards blended learning. The methodology of this study focused on the theoretical and methodological substantiation and practical implementation of the instructional design of blended learning at the university and dissemination of the experience of scientific and practical activities. The main hypothesis of the study assumed the development of an instructional design for blended learning at the university based on the integration of digital educational technologies that provide an increase in the scientific, methodological and scientific-technological potential of the university in the implementation of the tasks of preparing future specialists ready to solve the urgent problems of transforming education in the country.

The realization of research tasks was planned in stages: the study and analysis of methodological, research, pedagogical and psychological literature; application of theoretical and empirical research methods, such as a thought experiment, comparative analysis, the transition from the real to the abstract, modeling, analysis of a typical object; direct, indirect and long-term observation, analysis of detention and content, questioning, testing, reflective diagnostics, rating, monitoring, generalization and modeling, experimental work, statistical and mathematical methods, etc. At the end of the study, based on the analysis of the results and mathematical processing, findings and

conclusions were drawn up on the hypothesis of the project. The research strategy of the work was based on the idea of implementing a pedagogical experiment, in which it was planned to conduct a study of the methodological foundations of the instructional design of blended learning at a university based on the integration of digital educational technologies. As part of the study of the conceptual and methodological foundations, it was determined that interdisciplinary, humanitarian, systemic, synergistic, competence-based, reflexive approaches, the theory of change based on an innovative technological approach, the concept of digitalization of education, etc. are used as a descriptive stage of the study. For the purpose of conceptual and methodological substantiation, such methods of theoretical research as retrospective analysis, the dialectical method of ascent from the abstract to the concrete, the study of literary sources, theoretical analysis, comparison, analogy, methods of logical generalizations and modeling were used. In accordance with the purpose, the study is planned in several stages:

1. Scientific substantiation of the need to rethink the model of education in the digital age, based on the analysis of scientific and pedagogical literature and the results of pedagogical research. This task was the basis of the study and revealed the relevance of the scientific project. Rethinking traditional learning in accordance with the requirements of the digital society, exploring its possibilities and contradictions led to the search for new ways of learning. An analysis of the lessons of the pandemic and online learning, the impact of social networks and digital resources on the learning process, the study of scientific and theoretical literature on the research topic made it possible to substantiate the actual problems of the development of higher education in the post-pandemic period. The implementation of the task was carried out in the context of the modern pedagogical paradigm on the humanitarian, interdisciplinary, activity, project, synergetic, result-oriented and personalized approaches. The study of the best experience of traditional and distance learning, the wide possibilities of digital resources will allow us to develop instructional design of blended learning based on the integration of digital educational technologies.

2. Study and generalization of the world and Kazakh experience of blended learning in the system of higher education. To ensure the completeness of the research, the task was to study the experience of teaching international and Kazakh universities in the post-pandemic period. This will allow not only to analyze the degree of development of the pedagogical and technological aspects of blended learning at universities, but also to identify new ways to solve the problems of blended learning based on the synthesis and integration of various approaches.

3. Development of instructional design, presentation of a structural-content model of blended learning with methodological, didactic, technological justification. This task involves the development of a methodological concept of blended learning, including the didactic potential of digital technologies, and the creation of an instructional design of blended learning based on the integration of digital educational technologies. Its structural and content model forms an integral system of blended learning, consisting of approaches, principles, algorithm, content of

goals, methods and techniques, resources and technologies, expected results.

4. Development of an integrated model of digital educational technologies LAMS (Learning Activity Management System), LMS (Learning Management Systems), CMS (Content Management Systems), criteria and indicators for evaluating its effectiveness. To achieve this task, a unified model of blended learning will be developed based on the integration of digital educational technologies. The LAMS will define effective blended learning strategies and policies, barriers and success factors. To achieve learning outcomes based on the use of a LMS, learning models and products, communication services and evaluation tools will be defined. Methodological instructions with resources will be developed to ensure active learning based on the use of a CMS. Evaluation criteria and indicators will be focused on evaluating the effectiveness of the platform, and evaluating students' competencies as a result of the implementation of blended learning.

5. Approbation and implementation of an integrated model of blended learning on the digital educational platform of the university.

Results

At the present stage of development of the education system, traditional methods are being replaced by electronic counterparts using information and communication technologies (ICT), this was influenced by the rapid development of innovative programs and machines, as well as the desire of people to reduce personal energy costs in the workplace. New formats of education in electronic mass media determined the need to rethink the role of the teacher, his pedagogical capabilities and search for new methods of education using innovative technologies. A project was developed that continues to improve, which is currently a priority in the higher education system, thanks to which students will receive high-quality knowledge not only within the university, but also outside its walls, and even after graduation. But the introduction of digital education resources does not exclude traditional methods, and the correct combination and their interaction is a priority and strategically important at the moment in the post-pandemic period [7; 8]. To implement e-learning, special internal services are required that provide not only software and hardware, but also the correct organization of the learning process, which are prescribed in the regulatory documents of the educational institution. Software and technical support consists of resources, interface design, installation and purchase of the necessary software, monitoring of IT services, computer equipment and local networks.

The following advantages of blended learning are highlighted: the possibility of interactivity and synchronous and asynchronous communication; unlimited temporal and spatial use; variability and ease of access; low cost of educational materials; increasing the motivation of all participants in the learning process; individual approach to students. Therefore, updating the mechanisms for harmonization, organization, implementation and a diverse combination of electronic and traditional methods of learning are the essence of the concept of blended learning. It can also serve as an additional basis for creating a diverse educational process,

taking into account the possibilities of “augmented” reality [9; 10]. The development strategy of the system of a phygital organization should take into account that digital education is a new educational paradigm. Taking into account the fact that the university is an electronic, geographically distributed, international scientific, educational and innovative-entrepreneurial complex, certain (scientific, organizational, educational, educational, economic, international) goals and objectives have been set, which are being implemented properly. Among the main aspects of blended learning are:

- the institutional one is engaged in the development of digital educational resources, namely: the presence of internal regulatory documents that regulate activities in blended learning; solution of administration features; providing resources for the functioning of blended learning;

- managerial and technological consists in the implementation of the learning process in an electronic environment through ICT tools and management services for the implementation of blended learning, which are needed for hardware and software and the organization of the educational process;

- the instructional aspect is necessary for the implementation of blended learning from the point of view of the teacher and the student.

Blended learning design combines theory and practice. On the one hand, learning design acts as a model for the transformation of education, and on the other hand, design performs an interdisciplinary project function in the digital space. If traditional learning consists of direct communication between a teacher and a student in the classroom, then the design of blended learning is designed on the basis of digital resources, synchronous-asynchronous, mixed types of learning activities and forms an integral system that includes a curriculum, content structure, educational environment and teaching methods. Thus, design is a theoretically substantiated, proven applied and practical embodiment of science [11]. Factors on which the successful implementation of blended learning depends:

- personal work; the level of knowledge of each student, the individual characteristics of the perception of new information and the type of thinking are taken into account;

- focus on good results; the motivation of the student depends on the opportunity given to him to show his best qualities;

- skills that are the basis of new knowledge; in order for the student to master new skills and information, he needs to confirm that he has consolidated previous knowledge;

- relational orientation; one of the main roles is played by properly built relationships between all participants in the process, such as teacher-student, student-student, student-group;

- self-organization, self-control and self-analysis, providing the opportunity and right for each student to choose for himself the most favorable pace and mode of study, as well as intermediate control.

The principles of blended learning are described in the regulatory documents that regulate the entire educational process at the university, and in the documents on the educational process in the electronic environment. This is

a provision concerning the organization and implementation of educational activities, independent work of students, the use of a numerical rating system for assessing knowledge and work programs in disciplines. Special e-learning regulations include guidelines for the implementation of webinars, a description of the electronic course, step-by-step instructions on the features of conducting attestation of students on the Internet, on monitoring the activities of a teacher in an electronic environment. The obligations of the teacher to implement the learning process using innovative methods and electronic pedagogical technologies are stipulated in his employment contract with the university [12; 13]. Therefore, the blended education plan is built from the top down, is discrete in nature and indicates the possibilities of the educational institution to introduce blended learning into the traditional educational process.

The didactic tasks of teaching correspond to traditional functions – description and discussion of the educational process and the conditions for its implementation, improvement of the organization of education, creation of new educational systems, new technologies. In a digital society, educators are called upon to develop the skills to analyze various information resources and create an effective learning environment. The abilities and capabilities of modern students are fundamentally different, so the educational process should be organized on the basis of differentiation, the development of certain skills that are significantly enhanced by computer technology – information processing, working with graphs, database access technology are crucial for learning outcomes, but are often ignored teachers. Recently, much attention has been paid to improving the quality of graduates to ensure compliance with the requirements of the labor market. This is partly reflected in the push for digital literacy and the wider use of learning technologies. If you don't make any blogs, podcasts, videos, if you don't make any effort to get students to actively use their mobile phones in the learning process, if you don't introduce them to any of these technologies as part of the curriculum, then it will be difficult for students to receive education in modern conditions. Blended learning includes the benefits of traditional learning and learning using information technology:

- thanks to the transition to e-learning, it is possible to unload the classroom while maintaining the educational process;

- during the full-time phase of blended learning using information technology and video communication, students have the opportunity to interact with each other and the teacher at the same time;

- some students have a fear of speaking in public, stiffness, difficult social interaction, and communication not face to face helps them feel more comfortable;

- cognitive abilities and emotional intelligence develop through active forms of interaction;

- people come into contact with computer technologies every day and throughout their lives, so the skills gained during e-learning will be useful to students after graduation from the university;

- some students find it easier to study not in the morning, but at other times of the day, and e-learning gives them the freedom to choose the pace and time of study,

which favorably affects their academic performance and results;

- when students perform certain tasks, the teacher can track the results and speed of completing the tasks of each student, as this is reflected in his electronic program;

- with the use of information technology, teachers have the opportunity to diversify both individual and group types of work with students, including chats, forums, electronic projects and conferences;

- the teacher is freed from paperwork, which allows him to pay more attention to the creation of new training programs, methods, various types of work and counseling.

Along with a theoretical review of research on the topic, the analysis of the application of blended learning in the practice of universities is a priority task. It was revealed that in many universities the methods “blended learning”, “flipped learning”, “padlet” are used separately as

elements of blended learning. It is not practiced to create a holistic design of blended learning based on educational technologies, digital and non-digital objects. Thus, there was a need for a methodological, conceptual, didactic and technological justification for the instructional design of blended learning through an effective combination of the principles of traditional and digital didactics. Difficulties encountered by students in the development of learning platforms at the beginning of the experiment on the introduction of blended learning were considered from the standpoint of several aspects. In particular, the technological aspects of blended learning were considered in response to the questions “Evaluate the possibility of completing tasks on the resources offered to you on a 3-point system (3 – average, 4 – sufficient, 5 – good)”, and the results were obtained, which are displayed in Figure 1.

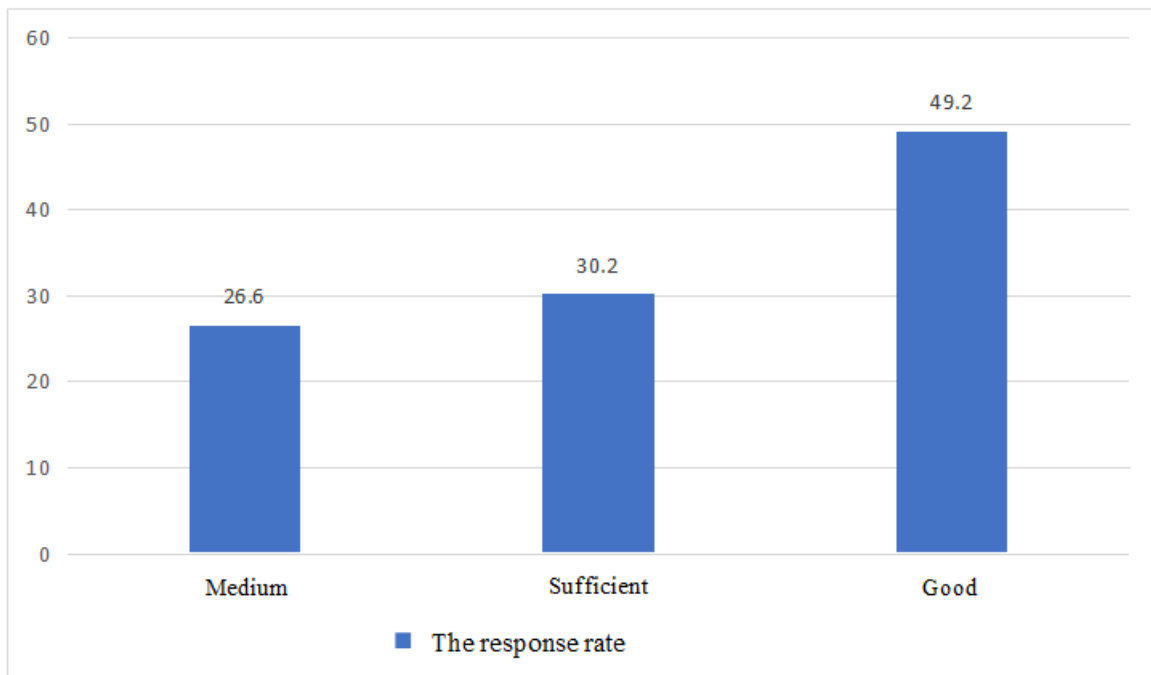


Figure 1. Level of ability to use blended learning tools according to students

The data in Figure 1 suggests that most of the respondents are satisfied with the opportunity to use the tools provided to them for blended learning, however, more than a quarter of students are not satisfied enough, which indicates the need to improve the proposed resources for completing assignments. When answering the question: “Evaluate the level of effectiveness of training on the platform of the organization of education according to a 3-point system”, the following results were obtained: “average efficiency – 25.1%, sufficient – 30.5%, good – 44.4%”. To questions about the methodological aspects of teaching, for example: “Did the teacher’s feedback in blended learning allow you to increase your

knowledge?” the following answers were received: “no – 11.1%, sometimes – 37.5%, yes – 51.4%”. Thus, it can be concluded that the interaction between the teacher and the student was not at a good enough level, and this suggests that the proposed methods of communication within blended learning need to be improved. Answering the question “Evaluate the effectiveness of blended learning on a 3-point system”, the following answers were received: “average – 28.6%, sufficient – 26.2%, good – 45.2%”. In conclusion, the students were asked which form of education was more effective for them, the answers to which are shown in Figure 2.

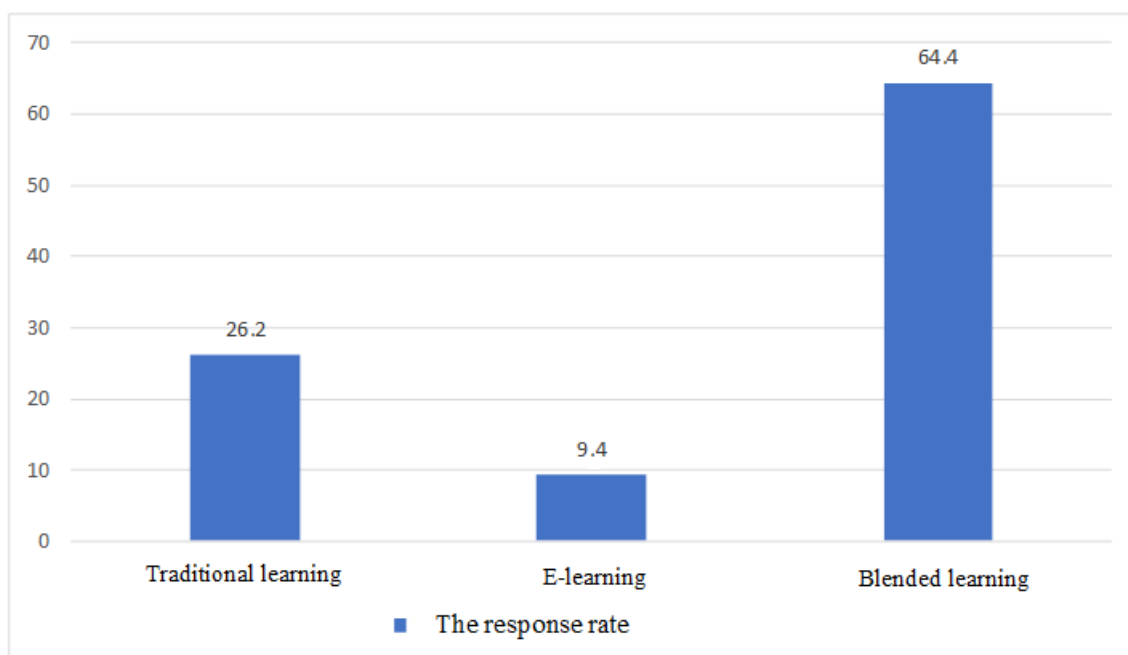


Figure 2. The most effective form of education according to students

It can be seen from the results of the study that most of the students do not want to completely return to traditional education. Based on this, it can be noted that students who have learned to work with online resources need the use of synchronous and asynchronous technologies by teachers, personalization of learning. A modern student freely manoeuvres in the digital space, knows how to independently extract information. They themselves can choose a convenient form of learning and convenient learning interactions within the framework of education, and consider it important to take this into account in the learning process. This situation requires new pedagogical actions from the teacher, necessitates the development of a blended learning methodology, including the personalization of learning. There is a need to develop a new learning design, create content and select methods with the integration of digital resources [14].

Discussion

Researchers are actively developing the concept of blended learning. At the same time, it should be noted that there is no consensus on its definition and understanding of its meaning, since the ways of combining its traditional and digital components are diverse. In this vein, the observation that the physical is both a simple and complex phenomenon seems fair. One of the most common definitions of this technology focuses on the combination of traditional and e-learning and emphasizes its technological component. Thanks to the analysis of scientific sources, it was possible to identify the types of modern models used in the system of blended learning at the university. The classification was developed using a functional approach to the design of important elements for digital, as well as using theoretical provisions on the combination of levels of the basic components of blended learning, including activities, disciplines/courses, curricula of the organization. These components are divided into 4 stages: institutional (characterized by a change in educational programs through the introduction of digital

learning); technological (application of computer technologies); didactic (training; asynchrony / synchronism); synergetic (complex models that take into account the modernization of the education system through the inclusion of new electronic elements in the learning process).

Information support at the administrative level is an example of a business model, such as the introduction of courses using the Internet in the education process of a higher education institution. All components of the educational process, such as: the ways of interaction of its participants, the selection and application of the selected teaching methods, depend on the didactic models of blended learning. Not unimportant when choosing educational methods is the pedagogical approach, which includes the content of training, various types of tasks, the activities of participants in the learning process, while shifting the emphasis on the educational component, instead of the technological one. Synergetic models are characterized by interdisciplinarity, flexibility and dynamism of subsystems interacting according to a non-linear principle. N.Y. Indriyanti, S. Yamtinah, D. Muawiyah [15] from The Universitas Sebelas Maret in Indonesia have been studying the development of metacognition in collaborative university students and their achievements in blended learning. They concluded that the implementation of the blended learning design had a positive effect on students' metacognition. Blended learning allows students to use a variety of online resources, and projects can be assigned and completed together. This research can educate students on the frequent use of blended learning to maximize results, both in terms of cognitive development and skill development.

The aim of the study by N. Nussli from The University of Applied Sciences and Arts Northwestern Switzerland in Switzerland and her co-author K. Oh from The University of San Francisco in California [16] was to develop a tool to help educators design digital learning experiences by systematically applying the principles of the four

paradigms, namely meaningful learning, ubiquitous learning and design. Universal learning design and culturally sensitive learning. M. Baldassarre, M. Dicorato, I. Fiore [17] from The University of Bari Aldo Moro in Italy argue that currently teaching in the academic field is carried out to a greater extent by transmission-type teaching methods, including due to the large number of students attending courses. Hence the tendency of teachers to neglect laboratory studies and conduct lessons and / or frontal studies, where more attention is paid to theoretical content. Such an approach, on the one hand, makes students very prepared in terms of content, on the other hand, deprives them of the experience of mastering the constructivist matrix, which allows them to actively form knowledge through the processes of cooperation and agreement. The authors came to the conclusion that the organization of educational activity in a mixed mode is effective in a university setting. By making the course organization more flexible, it will be easier for the adult user to meet their work needs. In addition, given the diversity of previous experiences and the main learning paths of learners, online artefact-building activities provide an ideal context in which to use the potential of all as an enriching element for all.

Research by R. Kaliisa, A. Kluge, A. Mørch [18] from The University of Oslo shows that creating valuable links between learning analytics and learning design requires detailed analysis of student checkpoints (e.g., online inputs) and process analysis, online content and interaction dynamics to find meaningful learning behaviours. In addition, teachers participating in the study found learning analytics visualization useful in understanding student online learning processes. The authors concluded that the potential of learning analytics to support learning design increases when multiple levels of learning analytics are considered. J. Bidarra from The University of Alberta and E. Rusman from The Open University of the Netherlands [19] described a new development framework to properly organize and support higher education systems using blended learning based on a collaborative and interactive approach supported by tools on an ICT framework called the Science Learning Activity Model (SLAM). This design structure is important in response to complex changes in society and education (e.g., rapid exchange of knowledge, changing labor market) that require students to be more creative in solving problems in the world around them. The design framework proposes three dimensions of design: context, technology and pedagogy, and aims to integrate learning in formal and informal contexts through blended learning scenarios using modern, flexible, interactive and immersive technologies (e.g. mobile devices, augmented reality, virtual reality).

N. Sharma [20] from The University of Vermont in Burlington described a wide range of blended learning. This has shown how some blended learning research supports a number of aspects of the blended learning approach, although attempts to demonstrate better learning outcomes remain elusive. One of the biggest challenges when creating a blended learning course is that the course cannot be tailored to anyone's learning preferences. One of the reasons for the confusion at one publication was the inability to obtain funding for printed books, which required the use of free online materials. R. Jayashanka, K. Hewagamage, E. Hettiarachchi [21] from The University

of Colombo point out the need to create synergy between learning analytics and learning design in order to improve student achievement, engagement, interaction and satisfaction. The accumulated research on these collaborative learning technologies has proposed and evaluated various models, frameworks, and implementation tools that engage learners in blended learning environments. However, it is unclear to what extent the synergy between Learning Analytics and Learning Design can support blended learning. This article is a review of research that aims to answer this question by providing information on the context of use, technologies, activities, and collaborative mechanisms developed that can be used to improve blended learning in higher education.

An analytical review of scientific research shows a growing interest in rethinking learning. According to Russian researchers and specialists, in modern conditions it is not enough to consider the use of digital technologies only as a learning tool [22]. In this regard, the development of a holistic design of blended learning at the intersection of pedagogical techniques and digital educational technologies, based on humanitarian and interdisciplinary approaches, becomes relevant. Blended learning allows you to effectively use the advantages of traditional and digital education, includes elements of control over the pace, time and place of learning, as well as the integration of teaching practice with a teacher and online.

Conclusions

An analysis of the educational models of blended learning used in Kazakhstan and abroad showed a lack of unity in their definition and description. Since this system of education is quite new, it is still being modernized and improved due to its practical application in higher education institutions. There is a classification of e-learning, which includes various learning models, among them: technological, institutional, didactic and synergistic models, identified by the control function and compared taking into account approaches to the definition of phygital, as well as its basic components and foundations of construction. Thanks to this study, it was possible to find out that the participants in the educational process in higher education are ready for the changing education system and their degree of readiness is at a fairly high level. Teachers need to rethink their role as a tutor, assistant, facilitator in the electronic environment of the university and the transformation of the educational environment. It is easier for students to adapt to the digital system, because, firstly, the younger generations keep up with the times and master computer technologies outside the educational institution, and secondly, teachers have been mastering the traditional teaching system for many years, and therefore it is more difficult for them to adapt to the new format. In the future, for natural social reasons, there will be an equalization of demand for this educational technology. At the moment, e-learning is already showing good results and there is a positive trend for the future of the new learning system. This speaks of the good results of the modernization of the education system of both Kazakhstani and international higher education.

Due to the lack of knowledge and the need to develop an instructional design for blended learning, further theoretical and methodological justification is needed in

accordance with the requirements of digital time, the study of its capabilities and contradictions. The development of the instructional design of blended learning as an educational resource includes the entire process of designing the educational process, resources, programs, content using modern technological methods, digital devices. This means that a significant part of the organization and implementation of blended learning is the technologization of the educational process and the development of an accessible design for an integrated model of digital educational resources at the university.

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Conflict of Interest

The authors declare that there is no conflict of interests.

References

- [1] Singh H. Building Effective Blended Learning Programs. *Educ Technol.* 2021;43(6):51-54.
- [2] Almendingen K, Sparboe-Nilsen B, Gravdal Kvarme L, Šaltytė Benth J. Core Competencies for Interprofessional Collaborative Practice Among Teacher Education, Health and Social Care Students in a Large Scaled Blended Learning Course. *J Multidis Healthc.* 2021;14:2249-2260.
- [3] Huang C. Using PLS-SEM Model to Explore the Influencing Factors of Learning Satisfaction in Blended Learning. *Educ Sci.* 2021;11(5):249.
- [4] Heilporn G, Lakhali S, Bélisle M. An examination of teachers' strategies to foster student engagement in blended learning in higher education. *Int J Educat Technol Hig Educ.* 2021;18:25.
- [5] Nakayama M, Mutsuura K, Yamamoto H. Evaluation of Student's Notes in a Blended Learning Course. *Int J New Comp Arch Their Applic.* 2011;1(4):1056-1065.
- [6] Bruggeman B, Tondeur J, Struyven K, Pynoo B, Garone A, Vanslambrouck S. Experts speaking: Crucial teacher attributes for implementing blended learning in higher education. *Inter Hig Educ.* 2021;48:100772.
- [7] Müller C, Mildenerberger T. Facilitating flexible learning by replacing classroom time with an online learning environment: a systematic review of blended learning in higher education. *Educ Res Rev.* 2021;34:100394.
- [8] Bahri A, Suryani Idris I, Muis H, Arifuddin M, Fikri MJN. Blended Learning Integrated with Innovative Learning Strategy to Improve Self-Regulated Learning. *Int J Instruc.* 2021;14(1):779-794.
- [9] Rasheed RA, Kamsin A, Abdullah NA. Challenges in the online component of blended learning: A systematic review. *Comp Educ.* 2020;144:103701.
- [10] Al-Marouf R, Al-Qaysi N, Salloum S, Al-Emran M. Blended Learning Acceptance: A Systematic Review of Information Systems Models. *Technol Knowl Learn.* 2021;27:891-926.
- [11] Abbacan-Tuguic L. Challenges of the New Normal: Students' Attitude, Readiness and Adaptability to Blended Learning Modality. *Int J Eng Lit.* 2021;6(2):443-449.
- [12] Owston R, Malhotra T, York DN, Sitthiworachart J. Evidence-Based Blended Learning Design. In: *Blended Learning (pp. 338-350)*. London: Routledge; 2021.
- [13] Whitelock-Wainwright A, Tsai YS, Lyons KM, Kaliff S, Bryant M, Ryan K, Gašević D. Disciplinary differences in blended learning design: a network analytic study. In: *Proceedings of the Tenth International Conference on Learning Analytics & Knowledge (pp. 579-588)*. New York: Association for Computing Machinery; 2020.
- [14] Bakhisheva S, Kemeshova A, Mukhtar Z. Post-pandemic learning design and modern didactics. *J Educ Sci.* 2022;70(1):32-46.
- [15] Indriyanti NY, Yamtinah S, Muawiyah D. An Inquiry into Students' Metacognition and Learning Achievement in a Blended Learning Design. *Int J Emerg Technol Learn.* 2020;15(21):77-88.
- [16] Nussli N, Oh K. Intentionality in Blended Learning Design. In: *Optimizing Higher Education Learning Through Activities and Assessments (pp. 78-86)*. Pennsylvania: IGI Global; 2020.
- [17] Baldassarre M, Dicorato M, Fiore I. Learning design of blended learning at university. *Proc First Worksh Technol Enhan Learn Env Blen Educ.* 2021;2817:30.
- [18] Kaliisa R, Kluge A, Mørch A. Combining Checkpoint and Process Learning Analytics to Support Learning Design Decisions in Blended Learning Environments. *J Learn Analyt.* 2020;7(3):33-47.
- [19] Bidarra J, Rusman E. Key pedagogical and technological factors for effective blended learning design. *Comp Sci.* 2017;1:20-22.
- [20] Sharma P. Blended Learning Design and Practice. In: *M. Carrier, R.M. Damerow, K.M. Bailey (Eds.), Digital Language Learning and Teaching (pp.163-174)*. New York: Routledge; 2017.
- [21] Jayashanka R, Hewagamage K, Hettiarachchi E. Improving Blended Learning in Higher Education Through the Synergy between Learning Design and Learning Analytics. *IEEE 18th International Conference on Advanced Learning Technologies (ICALT) (pp. 227-228)*. Mumbai: IEEE; 2018.
- [22] Vlasova VI, Sytko EV, Hilyuvchits YuA. The format of mixed learning: pros, cons, prospects. *World Sci Cult Educ.* 2021;2(87):393-395.

Навчальний дизайн змішаного навчання у вищій освіті: аналітичний огляд міжнародних досліджень

Світлана Бахішева

Західно-Казахстанський інноваційно-технологічний університет
090001, вул. Іхсанова, 44, м. Уральськ, Республіка Казахстан

Акуміс Кемешова

Казахський національний педагогічний університет імені Абая
050010, пр. Достик, 13, м. Алмати, Республіка Казахстан

Кайрат Сагінов

Євразійський національний університет імені Л.М. Гумільова
010000, вул. Сатпаєва, 2, м. Астана, Республіка Казахстан

Жадира Кажіакпарова

Західно-Казахстанський інноваційно-технологічний університет
090001, вул. Іхсанова, 44, м. Уральськ, Республіка Казахстан

Анотація

Актуальність. Актуальність даного дослідження полягає в тому, що в сучасних умовах у змішаному навчанні недостатньо використовується величезний потенціал постійно оновлюваних цифрових освітніх технологій.

Мета. Метою дослідження було переосмислити традиційне навчання відповідно до вимог цифрового часу, розглянути можливості та протиріччя онлайн-навчання, а також глибше вивчити змішане навчання.

Методологія. Завдання дослідження передбачали аналіз літератури на стику педагогіки, психології, інформаційних технологій і технічних наук. Також використано порівняльний аналіз, моделювання та синтез. В якості методології дослідження реалізовано міждисциплінарний, системний, діяльнісний, синергетичний підходи, проектні методи, дидактику змішаного навчання, проаналізовано та узагальнено результати експерименту, порівняно диференціацію цифрових ресурсів в освіті.

Результати. Визначено, що методологія оцінювання сформованості загальної та професійної компетентностей студентів за допомогою змішаного навчання може бути досягнута шляхом створення інструментів для вимірювання очікуваних компетентностей. Результати попередніх досліджень виявили відсутність ресурсів, які могли б забезпечити зв'язок між онлайн і офлайн навчанням, і необхідність розробки дизайну змішаного навчання з використанням цифрової комунікації в навчанні. Аналіз процесу трансформації освіти під час пандемії та після неї виявив відсутність дидактико-технологічного обґрунтування змішаного навчання.

Висновки. Дослідження містить комплексний аналіз змішаного навчання в епоху цифрових технологій, пропонуючи практичні інструменти та висвітлюючи сфери для подальшого розвитку в освітніх практиках.

Ключові слова: змішане навчання; навчальний дизайн; цифрові комунікації; інформаційні технології; освітні тенденції; нові напрямки в навчанні; мультимедіа.