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**BLENDED LEARNING PERSPECTIVES FOR STUDENTS
(UNIVERSITY EXPERIENCE UNDER CONSTRAINTS DUE TO COVID-19 PANDEMIC)**

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Abstract

Today, measures to prevent the spread of the coronavirus COVID-19 have covered all spheres of life in Russian society and directly influenced the system of organizing the educational process, in particular in higher education. During the COVID-19 pandemic, the integration of technological advances and the educational process has been transformed from modern innovation to an urgent requirement of the time and has undergone intensive development. The study provides a theoretical analysis of the concept of blended learning. Based on an expert survey, the most preferred models of blended learning in the context of the COVID-19 pandemic have been identified, their capabilities and features have been considered, and foreign experience in the implementation of blended learning has been analyzed.

Keywords

Public-private partnership – Environmental programs – Contract – Concession – Joint venture

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Introduction

Due to the COVID-19 pandemic, according to the UNESCO, 91% of school and university students worldwide have been quarantined. Since the Second World War, this is the first global closure of schools and universities, for which national governments were not prepared¹. Although distance learning dates back to the end of the 18th century and digital education has been actively discussed by the scientific community for the last few years, the pandemic revealed the unwillingness of education systems to use digital tools in teaching on a large scale².

Despite the difficulties of implementation, the distance component will take its significant place in the educational process, regardless of external factors, such as quarantine restrictions of classroom studies. The new approach to learning will become familiar and enter the educational process³.

During quarantine, the traditional system is inevitably rejected and the educational process requires new tools and solutions to continue to effectively perform its function. In this connection, in our opinion, the model of blended learning, which is the most effective mechanism of modern pedagogical interaction, is becoming relevant. It combines the best experience of traditional learning and the latest interactive interaction on the Internet and is a system that works in constant correlation and forming a single whole. With the increase in the use of digital communication technologies and their availability, the blended learning model is gaining in importance, especially in the face of constraints due to the COVID-19 pandemic, and can provide for various teaching methods combined with the appropriate use of technology⁴.

The analysis of scientific literature shows that the majority of scholars adhere to the definition, which indicates that blended learning is a process of acquiring knowledge, skills and abilities, accompanied by a combination of various learning technologies⁵, offline and online learning in different proportions⁶, various educational technologies (traditional,

¹ A. Wahab, "Online and Remote Learning in Higher Education Institutes: A Necessity in light of COVID-19 Pandemic", *Higher Education Studies* Vol: 10 num 3 (2020): 16-25.

² M. G. Sergeeva; S. E. Shishov; V. A. Kalnei; G. Yulina y I. V. Polozhentseva, "The development of professional competence of students in management training", *Journal of Advanced Pharmacy Education and Research* Vol: 10 num 1 (2020): 196-202.

³ M. N. Dudin; J. S. Shishalova; E. A. Pogrebinskaya; V. N. Sidorenko; E. I. Sukhova y N. Y. Zubenko, "Cross-cultural management in the system of harmonization of interests in the multi-confessional educational environment", *European Journal of Science and Theology* Vol:15 num 3 (2019): 191-199 y A. L. Krivova, "Capabilities of Cloud Services and Webinars Effectiveness of Teaching Humanities Students", *Utopía y Praxis Latinoamericana* Vol: 25 (2020): 135-146.

⁴ V. D. Sekerin; M. N. Dudin; A. E. Gorokhova; T. P. Danko y N. I. Nikolaykin, "Applying Interactive Marketing Methods to Improve the Quality of University Educational Services", *Quality - Access to Success* Vol: 19 num 163 (2018): 37-42 y V. D. Sekerin; M. N. Dudin; A. E. Gorokhova; V. I. Gayduk y V. I. Volkov, "Creation of a Virtual Image: Digital Technology of the 21st Century", *Amazonia Investiga* Vol: 8 num 20 (2019): 340- 348.

⁵ R. Woods; J. D. Baker y D. Hopper, "Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction", *Internet and Higher Education* Vol: 7 (2004): 281-297 y A. P. Rovai y H. M. Jordan, "Blended learning and sense of community: A comparative analysis with traditional and fully online graduate courses", *International Review of Research in Open and Distance Learning* Vol: 5 num 2 (2004): 1-13.

⁶ D. R. Garrison y H. Kanuka, "Blended learning: Uncovering its transformative potential in higher education", *The Internet and Higher Education* Vol: 7 (2004): 95-105 y L. M. Jeffrey; J. Milne; G.

distance, mobile) and learning strategies⁷. Scholars understand learning strategy as some educational models that define clear learning outcomes and are aimed at achieving them for the implementation of educational programs that are developed taking into account various learning technologies⁸.

There is also an approach that assumes the presence of a certain format of e-learning courses (ELC), in the study of which active learning methods are developed and implemented. The educational material is presented within the framework of the ELC, which is studied by the student independently before the lesson, and the material is consolidated during face-to-face meetings with the teacher, who uses active learning methods⁹.

Some researchers¹⁰ focus on the combination of learning tools and define blended learning as the combination of formal learning tools – working in classrooms, studying and working out theoretical material – with informal ones, for example, discussion via e-mail and video conferencing, providing advice via the Internet, reinforcing learning material using multimedia teaching tools¹¹.

In Wivell and Day¹², blended learning is interpreted as a formal educational program that involves learning within an educational institution, distance learning and methods that combine these forms of education.

Despite a large number of different interpretations and definitions, scholars adhere to a common opinion on the combination of various learning technologies – traditional and electronic (in particular, computer, distance, mobile, etc.), the use of which is an important condition for the effective implementation of blended learning models¹³.

Summarizing the above, we define blended learning as a purposeful process of transferring and assimilating knowledge, skills and methods of human cognitive activity, based on a combination of technologies of traditional, computer-oriented, distance and mobile-oriented learning.

Suddaby y A. Higgins, “Blended learning: How teachers balance the blend of online and classroom components”, *Journal of Information Technology Education: Research* Vol: 13 (2014): 121-140.

⁷ J. E. Rooney, “Blending learning opportunities to enhance educational programming and meetings”, *Association Management* Vol: 55 num 5 (2003): 26-32 y B. Tynan; Y. Ryan y A. Lamont-Mills, “Examining workload models in online and blended teaching”, *British Journal of Educational Technology* Vol: 46 num 1 (2015): 5-15.

⁸ R. Boelens; M. Voet y B. De Wever, “The design of blended learning in response to student diversity in higher education: Instructors’ views and use of differentiated instruction in blended learning”, *Computers & Education* Vol: 120 (2018): 197-212 y V. D. Sekerin; M. N. Dudin; A. E. Gorokhova; V. I. Gayduk y V. I. Volkov, “Creation of a Virtual Image...”

⁹ P. W. Swenson y P. A. Redmond, “Online, hybrid, and blended coursework and the practice of technology-integrated teaching and learning within teacher education”, *Issues in Teacher Education* Vol: 18 num 2 (2009): 3-10.

¹⁰ V. Chandra y D. L. Fisher, “Students’ perceptions of a blended webbased learning environment”, *Learning Environments Research* Vol: 12 num 1 (2009): 31-44

¹¹ V. N. Dolzhenkov, “Software Tools for Ontology Development”, *International Journal of Advanced Trends in Computer Science and Engineering* Vol: 9 num 2 (2020).

¹² J. Wivell y S. Day, “Blended learning and teaching: Synergy in action”, *Advances in Social Work and Welfare Education* Vol: 17 num 2(2015): 86-99.

¹³ G. Hughes, “Using blended learning to increase learner support and improve retention”, *Teaching in Higher Education* Vol: 12 num 3 (2007): 349-363

The purpose of the study is to explore the blended learning perspectives for students amid constraints from the COVID-19 pandemic.

The hypothesis of the study: the modernization of higher education at universities in conditions of restrictions due to the COVID-19 pandemic should be aimed at the implementation of blended learning, the use of new ICT tools, the creation of electronic resources to ensure the educational process using the blended learning methodology and the development of innovative curricula for all educational areas.

According to the results of the study, it can be concluded that the purpose of the study has been achieved.

Methods

To achieve the purpose of the study, a set of theoretical and empirical research methods was used:

theoretical methods (analysis, synthesis, comparison, generalization) – when studying scientific literature devoted to the problems of the prospects for blended learning of students in conditions of restrictions due to the COVID-19 pandemic;

empirical methods (expert survey method).

The main research method was the survey of experts in the field of higher education (peer review) with subsequent mathematical processing of the results to rank the blended learning models presented for discussion according to the ease of their implementation in a university's activities in the context of the COVID-19 pandemic (in terms of organization and technical support).

The ranking of blended learning models consisted in their arrangement by each of the experts in the form of a sequence according to the decreasing preference of their implementation at a university in the context of the COVID-19 pandemic. Moreover, each of the blended learning models was evaluated by the rank (number) under which it was located in the given sequence. The final rank of the blended learning model was the arithmetic mean of all expert ranks for the sample of experts.

With an acceptable probability of an expert assessment error (5%), the required number of experts ($N = 0.5 \cdot (3/b + 5)$ where b is the acceptable probability of an expert assessment error in percent/100) is 33 people.

The assessment was attended by 35 experts, university employees (administrators, technical staff and teachers) with at least 10 years of experience in higher education.

The expert discussion was based on the most frequently used blended learning models (seven models) used in Russian and international practice in organizing blended learning¹⁴:

– Rotation Model, in the form of four submodels: Station Rotation Model, Lab Rotation Model, Flipped Model, Individual Rotation Model;

¹⁴ L. M. Jeffrey; J. Milne; G. Suddaby y A. Higgins, "Blended learning...

PH. D. (C) VITALY V. GONCHAROV / PH. D. (C) DIANA IGOREVNA STEPANOVA / DR. DMITRIY VLADIMIROVICH KOVALEV
DR. TATYANA ANATOLYEVNA KOVALEVA / PH. D (C) ALFIYA ROBETOVNA BATYRSHINA

- Flex Model;
- Self-Blend Model;
- Enriched Virtual Model.

All survey participants were warned about the purpose of the survey and that the organizers of the study in the future planned to publish the results of the study in a generalized form.

Results

The final results of the expert discussion of the presented blended learning models used in Russian and international practice in organizing blended learning, as well as the preference for their implementation at the university in the context of the COVID-19 pandemic are presented in Table 1.

Nº	Blended learning model	Main idea of the model	Rank
1	Station Rotation Model	The activities alternate simultaneously not for the entire group, but individual minigroups at a certain pace. The content of the activity is determined by the teacher, who equips the audience in such a way as to ensure the work of study groups in full	7
2	Lab Rotation Model	Provides for the presence of a constant schedule of classes in classrooms and equipped laboratories, in particular computer classes. First, under the guidance of a teacher, students work in a regular classroom, then they move to a computer class, where they individually work to consolidate and deepen knowledge	6
3	Flipped Model	Acquaintance with theoretical material occurs independently online outside the educational institution and is characterized by the fact that the student themselves chooses the time and pace of study, independently manages their own educational activities. In the classroom, however, the teaching material is consolidated using active learning methods, the implementation of practical tasks and the organization of the productive work of students. In the process of this activity, the teacher only guides the teaching of students and helps to clarify incomprehensible points	1
4	Individual Rotation Model	The model can be implemented within the framework of traditional education, provided that appropriate curricula are drawn up for different students, taking into account their learning abilities, inclinations, interests, level and stage of the study. Each student has an individual learning schedule set by the teacher or adaptive software	5
5	Flex Model	Students learn the bulk of the curriculum online. The trainer is the coordinator of learning activities, tracking difficult-to-understand learning material, which can then be discussed in a classroom or individually	4
6	Self-Blend Model	The model is based on the student's self-selection of an ELC that they wish to study in addition to traditional ELC. Learning takes place completely remotely, individually, at home or	2

		based on a computer class. The student can independently compose their own curriculum	
7	Enriched Model	Virtual The model involves the study of one or more ELC remotely. At the same time, students can be both at home and university and work under the guidance of a teacher, depending on their needs	3

Note: compiled based on the expert survey

Table 1
Preference for a blended learning model in the COVID-19 pandemic

Thus, according to the experts, the easiest to implement in a university's activities (in terms of organization and technical support) in the context of the COVID-19 pandemic and minimizing the time spent in the university classrooms are the Flipped and Self-Blend Models. Firstly, they will not require additional technical equipment and computerized classrooms and, secondly, they have already been widely tested in many higher educational institutions in Russia and abroad.

Discussion

According to one of the experts, "the choice of a model and its effectiveness in the educational process depend on many factors, including: the form of organization of learning (full-time/part-time), the level of educational achievements of students, the level of information and communication competencies of students, the content of the academic discipline, the total number of hours for its study and the share of independent work, as well as the place of the discipline in the curriculum. Equally important is the availability of an appropriate material and technical base of the institution of higher education".

Thus, the Rotation Model as a whole involves the alternation of traditional classroom learning using various activities and online self-study in an individual mode. The organization of educational activities takes place within the framework of the entire group, project group, small group or individual work of each student under the guidance of a teacher.

According to the experts, the use of the Station Rotation Model as a submodel of the rotational model is justified if different types of activities within different groups can be organized to study the topic. This model is effective for laboratory work with various equipment, design and research activities. For example, as one of the respondents pointed out, the activity can be as follows: the teacher distributes students into groups so that they discuss a certain topic with the first group; at this time, the second independently works with online material while the third performs group activities and jointly solves a problem. All groups work together, interacting with each other, and perform tasks depending on the personal needs and level of learning of each.

The next submodel, the Lab Rotation Model, according to the experts, is similar to the Rotation Model, since in the educational activities of students, there should be at least one station where they have access to online materials and educational resources. The only difference is that in the first case, students move within one laboratory, in the other – within several.

The main idea of the Flipped Model is to involve students in real activities in the classroom, and not in passive perception of the teaching material and following the teacher's instructions. To achieve this goal, the content of homework and work in the lesson changes. The resources for acquaintance are mainly in the format of short video clips on the topic, which can be developed by the teacher or selected by them from a wide list on the Internet.

In the classroom, the teacher needs to organize joint activities of students to consolidate this topic, for example, solving problems, creating mini-projects, creating algorithms, conducting experiments and the like.

In the Individual Rotation Model, unlike other models, the student works only at the “station” whose tasks are planned in their individual curriculum. In general, as the experts noted, personalization is in accordance with the cognitive needs and capabilities of each individual subject of learning. Therefore, the advantage of such teaching is to provide the student with personalized educational materials and the opportunity to study them according to an individual schedule, using only those tools that will allow them to better master the academic discipline.

In the Flex Model, each student has an individual learning schedule, independently studies academic disciplines and practices the acquired knowledge and skills in an electronic information and educational environment. At the same time, the student is physically in the classroom and has the opportunity to visit classrooms for work in small groups or receive assistance from a teacher in the form of a consultation.

The Self-Blend Model and Enriched Virtual Model are generally similar, the only difference is that the latter is not completely individualized. Teachers communicate with students via video conferencing, forums and e-mail. Previously recorded video lectures are also used. In some cases, the teacher can come to the students at the place of study to conduct targeted consultations with the study group or individual students. The introduction of such a model into the educational process involves not only the implementation of a certain methodology for teaching disciplines, but also a change in the work model of the entire university.

Among the majority of countries that first introduced blended learning were educational institutions in Europe and the United States, where ICT, distance education technologies and modern learning strategies had been introduced for many years, long before the COVID-19 epidemic, and began with various seminars, forums and conferences dedicated to this new pedagogical problem.

In particular, an important contribution to the consideration of the problem of blended learning was made by the “Online Learning Consortium”, whose specialists organized an annual international conference on the introduction of blended learning. According to the organization’s estimates, more than 40 blended learning models have been developed to date¹⁵.

Most universities present their experiences in organizing blended learning, analyze tools for creating multimedia resources for blended learning courses and compare platforms for presenting educational materials and the like. In addition, universities organize training for teachers and students on the use of blended learning technologies¹⁶.

¹⁵ P. McGee y A. Reis, “Blended Course Design: A Synthesis of Best Practices”, *Journal of Asynchronous Learning Networks* Vol: 16 num 4 (2012): 7-22.

¹⁶ A. Hawkins; C. R. Graham; R. R. Sudweeks y M. Barbour, “Academic performance, course completion rates, and student perception of the quality and frequency of interaction in a virtual high school”, *Distance Education* Vol: 34 num 1 (2013): 64-83.

For example, specialists from the University of Central Florida are the first to introduce blended learning models. In particular, back in the mid-90s, it turned out that the number of students exceeded the capabilities of the study area at the university – that is why the active introduction of electronic (online) and blended learning began¹⁷. University specialists have identified the main goal of such a teaching technology – to improve the quality of education, flexibility and availability of courses and more rational use of monetary contributions and material and technical resources.

Realizing the promise of blended learning technologies, Stanford University specialists organized a free ELC “Blended and Online Learning Design from Stanford”, which aims to teach how to use online tools to design blended and online learning¹⁸.

In European countries, blended learning is being introduced as a new form of education, but in general the European Union does not have a specific policy for its implementation. This instructional approach is supported in documents and reports on the inclusion of ICT in education. In particular, the 2014 European Commission Report on New Forms of Learning and Teaching in Higher Education defined blended learning as a new practice that is predominantly used in higher education institutions¹⁹.

Among the European countries that are introducing blended learning, let us name Finland (University of Jyväskylä). University specialists have developed various blended learning models for the preparation of masters in information technology, which are based on the use of a flexible blended learning model (Flex Model), taking into account the individual characteristics and wishes of students. In most cases, an online platform is used, the teacher works with students as needed with small groups or individually with an individual student. All teaching sessions are recorded in real time, and the recorded video sessions can be made available to students working remotely²⁰.

In Germany, advanced blended learning technologies are being actively implemented by the University of Hagen, which specializes only in distance education. University teaching is based on a blended learning concept that combines written teaching materials, multimedia teaching tools and classroom instruction to make teaching as flexible as possible. For a long time, the University of Hagen has been using its own platform of “virtual university”, with the help of which teaching, communication and administration of the educational process is carried out. In addition to basic bachelor’s and master’s programs, the university offers correspondence courses for further obtaining the degree of candidate (“promotion”) and doctor of sciences (“habilitation”)²¹.

In the UK, blended learning is handled by specialists from the University of Exeter and the University of Hertfordshire.

¹⁷ K.-J. Kim; C. J. Bonk y E. J. Oh, “The Present and Future State of Blended Learning in Workplace Learning Settings in the United States”, *Performance Improvement* Vol: 47 num 8 (2008): 5-16.

¹⁸ B. Means; Y. Toyama; R. Murphy y M. Baki, “The effectiveness of online and blended learning: A meta-analysis of the empirical literature”, *Teachers College Record* Vol: 115 num 3 (2013): 1-47.

¹⁹ G. Pisoni, “Strategies for Pan-European Implementation of Blended Learning for Innovation and Entrepreneurship”, *Education Sciences* Vol: 9 (2019): 124.

²⁰ C. R. Graham, “Emerging practice and research in blended learning”, *Handbook of Distance Education* Vol: 3 (2013): 333-350.

²¹ R. Sari; R. Evianty y M. Amran, “Listening Skills for Learning German Using Blended Learning Models”, *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* Vol: 2 num 4 (2019): 616-621

At the University of Exeter, blended learning is identified as the main education and case study strategies, in which learners use a range of technologies to enhance learning, ranging from blogs and wikis to video lectures on the Internet. In addition, the University of Exeter is part of a consortium of leading British universities that offer massive open online courses through the FutureLearn platform²².

In Ireland, blended learning has been introduced into the work of educational institutions such as the Dublin City University, National University of Ireland, St. Nicholas Montessori College and Trinity College Dublin²³.

In China²⁴, blended learning is recognized as the highest trend, the concept of which covers all educational institutions involved in the project. In particular, specialists from the Open University of China are working on the deployment of a system of “cloud” classrooms, which combines the use of physical classrooms with electronic information and educational space, filled with video, educational resources and having the ability to organize pedagogical interaction between students and teachers.

The University of Hong Kong’s Strategic Education Plan sets out its vision for enhancing learning by promoting innovative curriculum development, ICT applications, new teaching methods and knowledge assessment. To this end, e-learning policies and strategies have been formulated, including blended learning²⁵. The University also has a teaching grant schedule that is open to all full-time faculty members who can experiment with innovative approaches to improve student performance. Blended learning is spelled out in each grant as the core learning model.

Conclusion

Taking into account all the features of blended learning will effectively implement and optimally combine in the educational process the forms, methods and means of traditional, computer-oriented, distance and mobile-oriented learning. Analysis of all models of blended learning and the features of their implementation makes it possible to identify their potential in organizing the practical and technical training of future specialists.

The analysis of foreign experience has shown that blended learning is a promising direction for organizing the educational process in conditions of restrictions due to the COVID-19 pandemic and contributes to improving the quality of education. Experts from foreign educational institutions argue that blended learning makes it possible to achieve flexibility and greater accessibility of ELC, improve learning using a range of technologies (from blogs and wikiprojects to video lectures) and make rational use of monetary

²² M. M. J. Engelbertink; S. M. Kelders; K. M. Woudt-Mittendorff y G. J. Westerhof, “Participatory design of persuasive technology in a blended learning course: A qualitative study”, *The Journal of Education and Information Technologies* (2020): 1-24.

²³ M. Goos; J. O’Donoghue; M. N. Ríordáin; F. Faulkner; T. Hall y N. O’Meara, “Designing a national blended learning program for “out-of-field” mathematics teacher professional development”, *ZDM: the international journal on mathematics education* Vol: 52 (2020): 893-905.

²⁴ W. Zhang; Y. Wang; L. Yang y C. Wang, “Suspending Classes Without Stopping Learning: China’s Education Emergency Management Policy in the COVID-19 Outbreak”, *Journal of Risk and Financial Management* Vol: 13 num 55 (2020): 1-6.

²⁵ J. C. Evans; H. Yip; K. Chan y C. Armatas, A. Tse, “Blended learning in higher education: professional development in a Hong Kong university”, *Higher Education Research and Development* Vol: 39 num 4 (2019): 1-14.

contributions and material and technical resources. An important aspect of the implementation of blended learning is the organization of both internal projects and external international projects. This makes it possible to study the state and prospects of the introduction of blended learning, carry out the purposeful integration of information technologies into the educational industry and combine innovative practices and systemic strategies for the introduction of modern technologies into education.

Thus, the results confirmed the hypothesis of the study that the modernization of higher education in universities in the face of restrictions due to the COVID-19 pandemic should be aimed at implementing blended learning, using new ICT tools, creating electronic resources to ensure the educational process using the blended learning methodology and development of innovative curricula for all educational areas.

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