

# Blended Learning in a Pandemic: Necessity and Opportunity

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**Abstract:** The article analyzes the potential and capabilities of the blended learning method as a didactic means of implementing the transition from a traditional learning model to an integrated one with the involvement of electronic environments and resources. Existing blended learning models are considered as well as ways of adapting them to the conditions of the COVID-19 pandemic are discussed. The problems that hinder the effective and rapid integration of electronic educational environments are identified, and some strategic initiatives are proposed to solve them.

## 1 INTRODUCTION


The educational sphere in the context of the pandemic has undergone the most dramatic and rapid changes. The main of them was the rapid introduction of information technologies into the educational process, which make it possible to conduct training remotely. And although the COVID-19 pandemic, unfortunately, is still far from the end, today it is already possible to draw the first conclusions about the lessons of transferring the entire education system to a distance format. Several stages can be distinguished in the development of digital education in a pandemic. The first stage, which took place in March-June 2020, included the transfer of the traditional teacher's work in the classroom to the format of remote interaction using computers and communication networks. And although this approach to the implementation of educational programs caused a lot of dissatisfaction both in the student and teaching environment, there was simply no other way out in that environment. However, as early as September 2020, the situation began to change. Some universities have tried to completely return to traditional educational technologies. Others have completely abandoned distance learning. However, most of the higher education institutions have tried to find a "middle ground" by combining


traditional education and online technologies, that is, to implement blended learning processes. It becomes obvious that the further development of education is impossible without serious scientific research. This article attempts to analyze the effectiveness of blended learning and the prospects for its further development.


## 2 STUDY RESULTS

### 2.1 Blended Learning Definitions

The current stage in the development of educational activities is determined by the dominance of information and communication technologies, which make it possible to intensify the forms and methods of traditional approaches to teaching. An increasing number of people are striving to get an education with minimal time losses, as the pace of life leaves less and less time for traditional full-time education. Such technologies became especially popular during the COVID-19 pandemic. The use of infocommunication technologies makes it possible to change the very principles of organizing the educational process, to create conditions for the implementation of dynamic personalized learning (Oreshkina, 2014). The Federal Law of the Russian Federation № 273-FZ "On

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Education" defines distance educational technologies as educational technologies implemented mainly with the use of information and telecommunication networks with indirect (at a distance) interaction between students and teachers. One of the modern educational technologies is blended learning, which is based on the concept of combining technologies of the "classroom system", e-learning, distance learning technologies. Among the main advantages of this training are the following:

- each student gets the opportunity to master the necessary knowledge and skills in a convenient format;
- planning and understanding what training needs should be met and what results will bring;
- providing effective learning management tools;
- reducing the time and financial costs of training, without losing the advantages of the traditional approach;
- technology and teaching enrich and complement each other;
- active social interaction of trainees both with each other and with teachers;
- availability of the teacher is almost constant;
- training is possible regardless of time and place;
- variety of didactic approaches;
- improving the quality of education (including through the use of more effective teaching aids);
- individual control over training;
- natural development by students of modern means of organizing work, communications;
- priority of the student's independent activity;
- organization of individual support for the educational activities of each student;
- using the organization of group learning activities;
- flexibility of the educational trajectory;
- integration of online and offline educational and methodological content.

Here are the main definitions of blended learning.

- Blended learning is a formal curriculum in which students at least partially study in an electronic, online format, and at the same time there are some elements of control over the timing, course and pace of learning; partly, the training takes place in person, outside the students' home. This learning uses different modalities to provide an integrated learning experience in the end (Staker & Horn, 2012).

- Blended learning is the integration of e-learning and traditional learning, with planning and pedagogical value (The Sloan Consortium, 2011).

- Blended learning is a teaching method that combines various resources, in particular, elements of

face-to-face training sessions and e-learning (Bielawski & Metcalf, 2003; Means et al., 2009; Mijares, 2012; Griff, 2012).

The main elements of the blended learning model are the following.

- Lectures: lecture materials are designed in the form of presentations and / or an online course.

- Seminar sessions (face-to-face sessions): sessions can be combined with lectures. Discussion of the most important topics of the discipline, as well as practicing skills.

- Teaching materials of disciplines (textbooks and teaching aids):

- Materials are presented in printed and electronic form, various multimedia applications are used.

- Online communication with teachers and students.

- Individual and group online projects (collaboration): development of skills for working on the Internet, analyzing information from various sources, working with a group, assigning responsibilities for the performance of work.

- Virtual classroom: communication of students with the teacher using various means of Internet communications.

- Audio and video lectures, animations and simulations.

## 2.2 Blended Learning Models

There are typical blended learning models to choose from:

1) Model "Face-to-Face Driver", when a significant part of the curriculum is studied at school with direct interaction with the teacher; e-learning is used as an add-on to the main curriculum.

2) Rotational model, when there is an alternation of ways of working with educational materials during the passage of the educational program; study time is allocated between one-to-one e-learning and classroom training with the trainer.

- Classroom rotation is the alternation of ways to study the material according to the established schedule (schedule) or at the discretion of the teacher, the use of e-learning, the involvement of a group of students or individually.

- Laboratory rotation - one of the ways to work with teaching materials is online laboratory work, the presence of an approved schedule, the movement of students within the educational institution.

- Flipped Classroom is the presence of an approved schedule of face-to-face educational activities, including work on projects; preferential use of e-learning with a certain control over learning; the

ability to choose a place for e-learning, use for the organization of independent educational activities.

- Individual rotation - is the presence of an individual schedule for studying a subject, a mandatory online stage of study.

3) Flex model - this is the predominant use of e-learning; providing online, offline and face-to-face support for trainees; availability of an individual schedule; work in small groups; organization of group projects; individual training.

4) Self-blend model (model of "training menu"), when there is a study of one or more e-learning courses completely online; simultaneous training in various institutions is possible.

5) Virtual enriched model is a model of the whole educational institution; optional daily school attendance; a combination of face-to-face and distance learning.

Each model is distinguished by the predominance of one of three components of blended learning technology:

- Direct personal interaction of participants in the educational process.

- Interactive interaction mediated by computer telecommunication technologies and electronic information and educational resources.

- Self-education.

### **3 BLENDED LEARNING EFFICIENCY IN A PANDEMIC**

The use of methods and technologies of full-time and e-learning allows you to simultaneously use the advantages of these forms of education. Face-to-face elements are used to motivate students. Traditional forms of education are based on direct personal communication between the student and the teacher. E-learning technologies provide multimedia content that is timeless for learners with different capabilities and needs. The combination of online and offline elements makes learning effective, cost-effective and convenient, and the educational process is interactive, person-centered and adaptive for all interested parties in learning. Of course, there are a number of reasons for the ineffective use of distance and e-learning technologies:

- lack of effective education management tools;  
- lack of funds for the development of educational content;

- lack of teaching staff in the field of distance learning technologies;

- specifics of training;  
- lack of modern teaching aids;  
- poor technical and software equipment of the trainees;  
- lagging of educational programs from real life, etc.

It should be taken into account that education with the help of Internet technologies is a new phenomenon. The culture of communication and work via the Internet has not yet been formed. Today, some disadvantages of using new technologies in education are already visible:

- most teaching materials created for traditional learning are not suitable for online or blended learning.

- a distant student, learning only with the help of information technologies, does not get the opportunity to develop the necessary skills that he could develop at lectures and seminars;

- lack of professionalism in the development of online educational materials and the need for special training of teachers to work with new technologies;

- the need to equip the educational institution with computer equipment and software that require constant updating;

- the developed courses do not correspond to different standards for interface, graphics, etc., can be taught by only one educational institution or only one teacher;

- lack of a system of incentives for participation in improving the quality of the education process, in the development of new principles of teaching with the use of distance learning technologies;

- problems of developing skills in working with information systems for all participants in the educational process.

Against the background of implementation problems, a blended learning model looks very beneficial - you can combine technologies. Teachers and students have more time and opportunities to master new technologies, because the number of online classes is increasing gradually. In the blended learning model, it is possible to progressively design courses, as this model does not require fully interactive and multimedia courses. At the initial stage of the introduction of innovative technologies, there are enough formalized text materials, a forum, a chat, a testing system and a file exchange system. Introduction to the educational process of blended learning allows you to solve a number of problems:

1) for trainees

- expanding the educational opportunities of students by increasing the availability and flexibility of education, taking into account their individual educational needs, as well as the pace and rhythm of mastering the educational material;

- implementation of individual curricula with an unlimited choice of subjects, the level of their development and methods of organizing educational activities;

- personalization of the educational process: the student independently determines his educational goals, ways to achieve them, taking into account his educational needs, interests and abilities;

- maximum objectification of the assessment procedure and results;

- stimulating the formation of the subject position of the student: increasing independence, social activity, motivation of cognitive activity;

- obtaining individual counseling from a teacher to overcome difficulties in mastering the educational material and fill gaps in knowledge;

2) for teachers

- advanced training of teaching staff;
- acquisition of qualification competencies,
- increasing the effectiveness of teaching activities in order to achieve new educational results;
- the use of new types of control and communication in the pedagogical process;
- the ability to organize quality work with highly motivated students;

- transform the teacher's style: move from the translation of knowledge to interactive interaction with the student, which contributes to the construction of students' own knowledge;

3) for educational organizations

- the possibility of saving money by increasing the level of effectiveness of teaching.

- attracting an additional contingent of students through the organization of multidisciplinary training;

- solving the problem of the shortage of teaching staff;

- intensification of educational activities in order to save time for the implementation of other educational and cultural needs.

Examples of blended learning are e-learning, hands-on learning, project-specific work, service rotation, e-books, mobile learning, coaching, podcasts, face-to-face training, onsite learning, learning games and simulations, formal training with certifications, and more.

## 4 BLENDED LEARNING READINESS ASSESSMENT

To implement the technology of blended learning, it is necessary to have the appropriate hardware. Recently, not only personal computers, but also mobile phones have been used for this purpose. According to the analytical agency We Are Social and the SMM platform Hootsuite (We Are Social, 2018), more than 4 billion people use the Internet, and two-thirds of the world's population have mobile phones (Figure 1 and Figure 2).

For example, in Russia, 91.4 million people constantly use the Internet in their daily life, and 61% of all mobile devices are smartphones (Figure 3).

These factors clearly indicate the need to take into account significant changes in the learning environment and the growing need for mobility (Nagaeva, I.A., Frolov, A.B., & Kuznetsov, I.A., 2021).

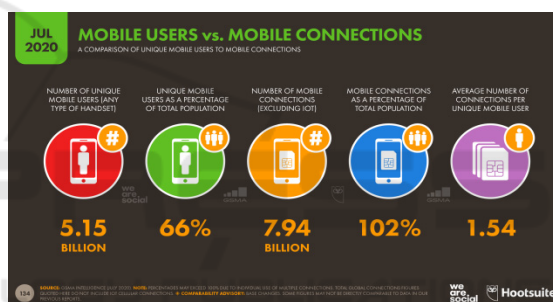


Figure 1: Mobile users and mobile communications.

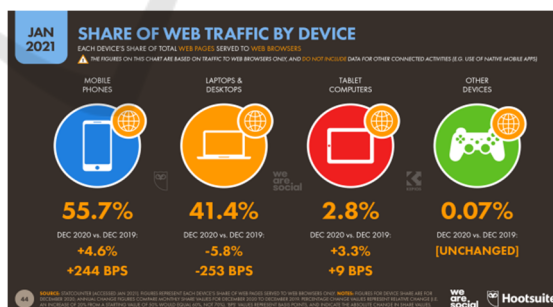


Figure 2: Share of web traffic by device worldwide.

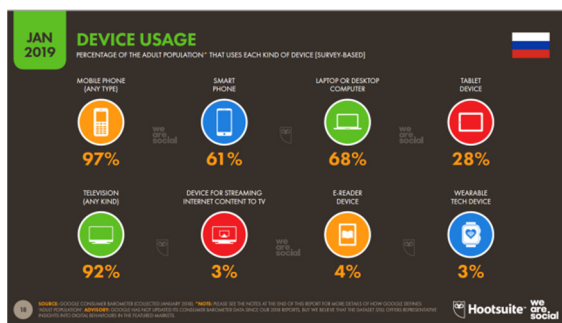


Figure 3: Use of communication devices in Russia.

The use of mobile devices makes it possible to raise distance learning technologies to a new qualitative level. In a pandemic, they simply became a salvation for some categories of students. After all, not every student has personal computers, especially from remote areas. Without the use of mobile devices, it would not have been possible to quickly implement the organization of distance learning in a pandemic. We can say that we are on the verge of mobile learning–Mlearning (Mobile learning), the goal of which is to make the learning process flexible, accessible and personalized, which is part of the blended education process. Such training implies:

1) Learning, when the student has mobile access to educational resources, and can also interact with the teacher and other students.

2) Transfer of information to a mobile device, which can be downloaded and discussed, or passed a control test. This can be useful for employees of enterprises who want to get a second degree or just new knowledge without interrupting work, schoolchildren and students, travelers and tourists during hikes, excursions or visiting museums, citizens who want to receive medical, legal and other information. This type of training has the following characteristics:

- dynamism: providing up-to-date information;
- interactivity: the ability to contact specialists;
- functioning in real time: access to information regardless of time or place;
- collaboration: interacting with people interested in similar issues;
- student-oriented: providing information in accordance with the level of training of the student;
- multi-format: the use of various forms and methods of presenting information, both in the form of electronic textbooks and multimedia content, to a specific student;
- the possibility of training people with disabilities.

Of course, this approach to teaching cannot replace the traditional system, but it perfectly complements it in a form convenient for students. The introduction of mobile devices into the education process can lead to qualitative changes. Klopfer (2008) pointed out the following factors:

1) mobility, when the boundaries of the "class" are determined by the range of the wireless network;

2) social interaction, when data exchange between learners is added to traditional teaching;

3) individualization is the adaptation of the educational trajectory and pace of learning to the capabilities of a particular person;

4) connectivity, when a certain universal environment for network interaction is created;

5) convergence of the real and virtual (educational) worlds using different sensors.

## 5 DISCUSSION

When introducing distance technologies into the educational process, students become listeners, teachers - tutors, employees of dean's offices - organizers of the educational process. The teacher's activities are to coordinate the activities of students both internally and remotely in a high-tech information and educational environment, building individual educational trajectories; organization of various types of activities using information and educational resources; selection of electronic educational content. In a blended learning environment, the teacher provides feedback by commenting on the progress and speed of passing the educational material, the success of its implementation thanks to the functionality and information educational environment: videoconferences, forums, chats, etc. In addition, the teacher continuously monitors the educational process and comprehensive analysis of intermediate performance results each student by checking information about the activity of the network, the quality of control tasks performed in the test form, the number of attempts to complete one or another task, referring to additional educational resources (Nagaeva, 2013a). In some studies, the traditional approach is called teacher-centered. With this approach, the teacher is the actor and manager of the educational process. With a blended learning model, the approach changes to student-centered. In traditional teaching, the student is taught, in mixed teaching, the student is helped to learn. Participant of the educational process - Active Student, who can

adjust the educational process and independently plan the study time. The student's independent work consists in mastering online training materials, working in chats and forums, communicating by e-mail, passing online testing, etc.

With blended learning, there are fewer classes in the classroom - some of the classes are transferred online. For online classes, you need to independently master a certain material or complete assignments. Online classes can be "question-and-answer", or the teacher can set topics for discussion, can invite students to ask a topic. The deadlines for assignments in blended learning are fixed. An online lesson is divided into three stages: work "before", work "during", work "after". Work "before": students should prepare for the lesson, for contact with other trainees and the teacher, in order to be able to discuss and work through what they have learned, as well as ask all the necessary questions. Work "during" is contact: discussion of topics, assignments, consolidation and verification of the acquired knowledge using tests, questions or practical assignments. Work "after": consolidation of new material, homework, test, etc. Assessment of student progress can be carried out both online and in the classroom. Online testing and execution of various projects and tasks can be carried out. The final grade - credit or exam - is done in the classroom only. To organize the collaboration of students and teachers, Web 2.0 collaboration tools are used, such as social networks, user-generated content, wikis, blogs.

Changes to teaching technology include:

- learning in more than one environment, expanding the scope of the educational institution;
- joint work on projects, content filling;
- use of e-books with multimedia content instead of textbooks;
- active remote interaction of trainees with each other and with the teacher;
- adaptation of traditional teaching methods to new realities.

E-learning and the use of distance learning technologies make it possible to create for students a more accessible and flexible learning environment, which significantly expands the possibilities for students to work together (Nagaeva, 2013b). For the effective implementation of the study of the discipline in the blended learning system, it is necessary, first of all, to develop methodological support for the training program, which includes:

- educational and methodological materials: the content of the academic subject, corresponding

to the goals and objectives of education, aimed at the assimilation of students of a certain amount of scientific knowledge; materials for the formation of a worldview, cognitive activity, interest in professional activity;

- computer support created on the basis of information and communication technologies: software for the educational process (system and applied programs and software systems used in one form or another, including instrumental environments for creating educational programs and software systems); computing, telecommunication and other equipment; data transmission channels. Interactive training courses are a kind of electronic textbooks filled with text, animation, video, sound, simulations. Courses can be recorded on discs, taken in local mode, and uploaded to websites. The benefits of using online training courses are as follows:
  - development of skills of independent learning and self-control;
  - stimulating active learning;
  - interactive visualization of the material;
  - study of the investigated processes from the inside through various simulations;
  - study of impossible, life-threatening or expensive scenarios and situations, such as radiation equipment, operations, parallel worlds, etc .;
  - use of video materials. While there are obvious advantages of using video courses, such as a variety of teaching materials, demonstration of production processes, control of learning, there are also disadvantages: a decrease in the active role of students in learning; possible technical problems with software or hardware. The introduction of a blended form of education is associated with the need to amend the regulatory framework, requires investment in the development of the necessary educational content, retraining of personnel.

## 6 CONCLUSIONS

Taking the above into consideration, the main guidelines for blended making learning effective are as follows.

- 1) Blended learning must be focused. A blended learning program should have a well-thought-out architecture with sequential transitions between different types and types of learning activities.

- 2) The development of blended learning should be based on a systematic approach, including learning objectives, target audience, learning needs, schedule, technology, learning architecture.
- 3) A system of intermediate and final control of the assimilation of knowledge, the acquisition of skills and abilities are needed; development of online tests, project topics.
- 4) Conducting an analysis of the training needs of the target audience, basic knowledge and skills, experience, preferred learning styles.
- 5) Choosing one of the typical goals of blended learning programs: to reach a larger number of trainees (e-courses, virtual classrooms, on-the-job training), to increase the effectiveness of the practical application of the knowledge gained (coaching, practical face-to-face workshops, online simulations, exchange of best practices, collaborative work), reduce training costs.
- 6) The optimal ratio of educational activities types: 10% - formal training and independent work (virtual classrooms, classrooms, webinars, asynchronous e-learning, tests); 20% - mentoring and tutoring; 70% - informal training and practical tasks (practical training, joint projects, practical tasks, laboratory work).
- 7) Construction of different trajectories and training scenarios for different groups of trainees.
- 8) Preparation of documentation, including: the main objectives of the training; hierarchy of required learning outcomes; a description of all teaching methods used; the time frame for each component of blended learning; learning support tools; budget and staffing requirements.

Thus, blended learning is characterized by the preservation of the general traditional principles of building the educational process with the inclusion of elements of Internet learning. The ratio of these two forms of education is determined by the readiness of the educational institution for such a structure of the educational process, as well as the desire and technical capabilities of the students. Technology is transforming education, and its influence is constantly growing. Blended learning is a promising learning system that combines the benefits of traditional and interactive learning. In our opinion, the development of a blended form of education can become one of the key areas of modernization of the entire educational sphere.

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