OUTLOOKS OF BLENDED LEARNING IN THE TRANSPORT UNIVERSITY

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Abstract. *The issues of normative regulation and organization of blended learning of students in the Russian Federation, the analysis of the main difficulties of blended learning implementation and prospect of its development are presented in the article. The conclusions about the demand for this form of learning are based on the results of questioning in the University; the recommendations for combining technologies of full-time and e-learning for different kinds of educational work are given as well.*

Keywords: *Innovative Educational Technologies, Blended Learning, E-learning, Distance Learning, Digital Learning Resources.*

Introduction

When considering innovative educational technologies, one model can be singled out - the blended learning model, which appeared in the late 90s of the XX century. A little later, in 2006, the book by C.J. Bonk and C.R. Graham "The Handbook of Blended Learning: Global Perspectives, Local Designs" described in detail the essence of this technology as a combination of face-to-face learning and e-learning methods [1]. Since then, blended learning has become more and more popular in modern Russian and foreign education [2, 3].

Materials and methods

This study was based on the example of learning technical and social sciences within major/minor specialties/areas of study at the Industry (Transport) Technical University of the Russian Federation.

The study was carried out using a questionnaire method. Questionnaires were developed for the students of one technical and one social areas of study (online survey) and for teachers (in-person survey). The survey involved 54% of the general population of the selected students and 95% of the teachers of various university departments. The study included an assessment of the advantages and disadvantages of each of the forms of education, obtaining expert assessments of the possibility of using these forms, making suggestions concerning the blended learning method.

Literature Review

Some Russian researchers believe that "face-to-face learning and e-learning are combined and interpenetrated in the blended learning, providing a student with the possibility of independently choosing time, place, rate and path of learning" [4]. However, there are options for interpreting blended learning as a combination of face-to-face and e-learning with the use of distance technologies in an approximate proportion of 30-79% of the total course volume [5].

Many years of experience in the use of blended learning in the higher education system allows us to highlight its advantages such as flexibility, individual approach to the student, use of innovative educational technologies, including digital educational resources, stimulation of independence and increased learning motivation [6].

Technological progress, computerization, the emergence of global information network and high-speed communication channels have paved the way for the further development of e-

learning, and the need to adapt the educational process due to the spread of COVID-19 has made the transition to blended learning more relevant.

There is a world's experience in specialized studies that consider the effectiveness of blended learning in certain areas of scientific knowledge: for example, in the study of foreign languages [7, 8], medicine [9], IT technologies [10], etc.

In Russia, e-learning is normatively enshrined in the Law of the Russian Federation on Education as the organization of educational activities using information technologies, technical means, information and telecommunication networks that enable the transfer of information used in the implementation of educational programs. The same article of the law defines distance learning technologies as technologies "implemented mainly with the use of information and telecommunication networks with indirect (distanced) interaction between students and teachers" [11].

Taking into account the specifics of the areas of training in a transport university, it can be assumed that complete switch to e-learning using distance technologies is impossible. This is due to the fact that the development of educational programs in many areas of training implies the mastery of skills and abilities directly when interacting with the subject of study in the training center or during practical training and/or on-the-job training at the enterprises of the industry.

The authors of the paper believe that both the age-old traditions of face-to-face learning, and the vast experience of distance learning that humanity has gained over the past few years must not be ignored. Both forms have advantages and disadvantages, and the task is to combine them, to find the optimal combination in teaching different disciplines based on the learning performance criterion. The scope of knowledge and skills acquired by students should not be less than that acquired during face-to-face learning, moreover, a reduction in material costs for the distance form is predicted, especially in a strategic perspective.

The introduction of blended learning may imply the following barriers:

- additional costs for the implementation of digital educational technologies, including the purchase and operation of LMS platforms (LMS - Learning Management System) [12];
- requirements for a high level of high-quality broadband Internet connectedness in all regions of the country;
- additional costs for advanced training of teachers and processing of didactic methodological materials;
- infrastructure development costs to meet learning needs [13], etc.

Discussion

The list of advantages and disadvantages of each type of blended learning for the purposes of the questionnaire has been made closed, which narrows the field of research, but gives more opportunities for formalizing data processing. The questions have several answer options, therefore, when calculating the results, the total score does not necessarily equal 100%.

The advantages of face-to-face learning include the following peculiarities:

- possibility of direct contact in the classroom (teacher - student);
- constructive communication of students with each other, as a result - collective mastering of material;
- variability of the forms of classes, depending on the academic progress of the group and its cognitive indicators;
- effectiveness of teaching control during classes;

– preparation of educational materials in a traditional form.
– The disadvantages of face-to-face learning are:
– the need to attend an educational institution (time and money consumption, exposure to diseases);
– communication of students with each other as a distraction;
– high labor intensity when administering exams/tests.

Distance learning with the use of electronic technologies involves the following advantages:

– no need to visit university, which saves time and money for both students and teachers;
– easier to master educational material;
– lack of distractions in the learning/teaching process;
– strengthening of teaching control over the students' results.

However, when organizing blended learning, the following disadvantages of distance learning using electronic technologies must be taken into account and reduced:

– lack of direct communication with the teacher and direct communication between students;
– lack of variety in the conduct of practice;
– weakening of teaching control;
– barriers related to the complexity of coordinating attention during classes, mastering material in some disciplines, passing exams/tests;
– the need for own technical means, workplace and communication channel;
– the need to prepare educational materials in a new format;
– the need to improve the qualifications of teachers.
– The respondents were asked to choose the advantages and disadvantages of each form of education. The most interesting is the analysis of responses related to e-learning with the use of distance technologies (Tables 1-2).

Table 1.

Most Significant Advantages of the Distance Learning

	Students in technical areas	Students in social areas	Students in total	Teachers
No need to visit university. Saving time.	65%	62%	63%	85%
Easier material digesting	15%	18%	16%	0%
Nothing distracts during the learning process	17%	18%	17%	0%
Effectiveness of teaching control	17%	20%	19%	22%

According to the results of the analysis of the advantages of distance learning, it can be noted that there is a general reluctance for students and teachers to attend classes in person (63% and 85%, respectively). This opinion is explained both by the logistical challenges of a megapolis and the global trend towards reducing the time spent for face-to-face learning. All other advantages are selected by students in approximately equal proportions. Teachers did not choose such advantages as easier mastering of material and the absence of distractions (most likely, these factors aggravate transfer to distance learning), and only 22% of teachers believe that this form of teaching provides more effective control over the students' work.

The disadvantages of distance learning, which were noted by both groups of respondents at the same time, are: lack of direct teacher-student communication (almost all teachers and a third of students), the need to have own technical means and related communication problems (a third of teachers and 11% of students), as well as a variety of practice and teaching control. Among other disadvantages for students, there is not enough communication with each other and it is more difficult to master material, which, in our opinion, is due to the lack of communication in the working group. Both groups of respondents believe that it is not more difficult to pass / administer exams and tests in the distance form.

Table 2.

Most Significant Disadvantages of the Distance Learning

	Students in technical areas	Students in social areas	Students in total	Teachers
No direct “teacher - student” communication, no feeling of the audience.	27%	32%	29%	95%
No direct communication with other students	30%	26%	28%	0%
No variety in the conduct of practice	10%	12%	11%	12%
Weakened teaching control. Harder to focus.	8%	10%	9%	14%
Hard to master / present material	14%	13%	13%	6%
Hard to pass exams/tests	2%	5%	4%	8%
Own technical means required / technical problems	13%	10%	11%	31%

Thus, the main barrier to the massive introduction of distance learning in the absence of force majeure (for example, a pandemic) is the lack of communication both between the teacher and the student and with other students. Other disadvantages are of a technical nature and can be overcome during the organizational period of preparation for learning. Removing the main barrier also seems quite feasible, but this topic is beyond the scope of this study.

Further, the study considered the possibility of transferring certain types of classes (lectures, practice, seminars, laboratory classes and forms of interim assessment) to a distance format and determining the optimal ratio of the two forms by types of classes. The study results are presented in Tables 3-4 below.

Table 3.

Most Efficient Type of Classes in the Distance Learning

	Students in technical areas	Students in social areas	Students in total	Teachers
Lecture	31%	25%	28%	52%
Practice and seminars	27%	32%	30%	28%
Laboratory classes	10%	6%	8%	0%
Exam/test	35%	42%	39%	26%

Table 4.

Least Efficient Type of Classes in the Distance Learning

	Students in technical areas	Students in social areas	Students in total	Teachers
Lecture	27%	29%	28%	21%
Practice and seminars	18%	28%	23%	32%
Laboratory classes	52%	38%	44%	36%
Exam/test	11%	8%	10%	35%

The comparative efficiency of distance learning shows clear priorities for teachers (lectures) and students (exam/test). In the authors' opinion, taking into account the emotional aspects of conducting lectures, the teachers need to change the scheme of conducting lectures. It is recommended to add more clarity, practical examples, feedback from students for more comfortable work and easier mastering of material in a distance learning. The least efficient type, from the point of view of students and teachers, is laboratory classes. This is due to the requirement to have a material base for laboratory work, which can only be provided permanently at the university.

The results of answers to the question about the possibility of full/partial transition to the distance learning are presented in Tables 5-6.

The analysis shows that about 45% of respondents want to completely transfer lectures to a distance format and about 20-25% of respondents believe that this is partially possible, respectively, 33% and about 30% of respondents offer the same about exams and tests. The data are stable both for students, in both areas, and for teachers.

Table 5.

Type of Classes that the Respondents Would Like to Transfer from Face-To-Face to Distance Learning

	Students in technical areas	Students in social areas	Students in total	Teachers
Lecture	50%	43%	45%	44%
Practice and seminars	13%	14%	13%	22%
Laboratory classes	5%	11%	9%	0%
Exam/test	32%	33%	33%	33%

Table 6.

Type of Classes that Can Be Partially Transferred into Distance Format

	Students in technical areas	Students in social areas	Students in total	Teachers
Lecture	19%	22%	21%	25%
Practice and seminars	36%	33%	34%	50%
Laboratory classes	13%	16%	15%	0%

Exam/test	32%	30%	30%	26%

Results

The study conducted allows drawing the following conclusions:

1. According to the respondents, the main advantage of electronic (distance) learning is that there is no need to visit university, the main disadvantage is the lack of communication in the learning process. According to the authors, this disadvantage can be significantly reduced by using modern technical means, and the opportunity to study without even partially attending a university gives significant savings in material and other costs both for the university (classroom fund) and for society (reducing the load on the transport system, reducing the incidence, etc.).
2. Different types of classes have different effectiveness within distance learning. In this respect, the most attractive types of classes are lectures and exams/tests. The least attractive are laboratory classes. The scores are similar for technical and social areas of study.
3. Blended learning as a combination of face-to-face and distance learning is currently optimal, since it allows using the advantages of both formats and partially neutralize their disadvantages.
4. For transferring to distance learning, the most suitable types of classes are lectures and partly administering exams/tests. Other types of classes are best done in face-to-face form.
5. According to the survey, the optimal ratio of face-to-face / distance lecturing is 50/50, administering exams and tests - 70/30 in favor of face-to-face learning, for example, non-graded test can be carried out remotely with recording the presence of students by electronic means and automatically generating a statement. It is better to conduct laboratory classes, practice and seminars face-to-face and transfer them into a distance form only in case of absolute necessity.
6. To clarify the data obtained, it is advisable to conduct an experiment on teaching several disciplines in a blended format throughout the year with an assessment of the results according to the selected learning performance criterion.

The issues considered in this paper require their continued study in such aspects as the development of learning performance criteria for an objective assessment of results, the creation of a methodology facilitating the use of advantages of blended learning - the formation of individual educational paths for students and increasing their involvement in the educational process. It is also important to improve the methods of conducting different types of classes, which would make it possible to fully use the advantages and disadvantages of face-to-face learning and e-learning in a transport higher institution.

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