The use of distance learning technologies at the university in the new reality

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Abstract. The purpose of the paper is, on the basis of empirical research, to identify problems and growth areas in the field of effective use of distance learning technologies in universities in the context of COVID-19. The authors used theoretical and empirical research methods: literary analysis, generalization, methods of descriptive statistics. The main method for collecting empirical data is to survey students' opinions. The study involved 1578 students from more than 70 Russian universities. The authors substantiated the problems and opportunities for learning with the use of distance learning technologies. The paper shows not only the current difficulties of learning in an online format, but also identifies their main advantages. It presents the change in the attitude of students to the online format of education for a period of 1 year, their vision of the effectiveness of distance learning technologies in higher educational institutions. The authors substantiated the objectivity and reliability of the results obtained through their correlation with the results of similar studies conducted by scientists in various countries. The materials of the article can be useful for university teachers implementing the curriculum of disciplines using distance learning technologies, as well as for all those interested in higher education issues.

1 Introduction

The development and spread of digital technologies opens up the horizons of strategic restructuring of the higher education system, in terms of improving the educational environment of universities, modernizing business processes and revising organizational design, as well as revealing the competence potential of the teaching staff and university students. This is noted in a number of studies aimed at revealing various aspects of the digital transformation of didactics. For example, this fact is revealed in an article by R. Brigstock devoted to the idea of forming a new educational model of university education focused on the development of students' abilities that they need in the present and will need in the future. [1], in the works of C. Brooks et al., S. A. Popenici et al. where the impact of the use of digital technologies on the transfer of knowledge in higher education is studied [2,3], C. Buabeng-Andoh, where the author focuses on the analysis of factors that encourage teachers to use digital technologies in their lessons [4]. The works of L. A. Danchenok [5] and O.I.

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Popova are devoted to the transformation of models for the implementation of educational programs in the digital economy [6]. Scientists note the influence of teachers' abilities to integrate ICT (information and communication technologies) on student satisfaction and keeping them at the university [7].

There is a wide range of terms related to distance learning and education, including: e-learning (e-learning), online learning, blended learning (blended learning). In our work, we will adhere to the S.Guri-Rosenelt approach, which shows that distance learning is all learning, when teaching and learning activities are distributed in time and space, which does not require a teacher and a student to be in the same place at the same time [8, p. 5]. Online learning is one of the distance learning forms implemented using digital educational technologies. Another term characterized by I.E. Allen, S. Jeff, G. Richard is mixed learning which is one of the most important in our study [9]. According to the researcher's, blended learning is a form of organization of the learning environment, in which 30-80% of training is implemented using information and communication technologies via internet [9].

Despite the different social, economic and technological realities, scientists from different countries discuss the problems and opportunities of distance education and education using distance technologies at universities. For example, P. Gregori, V. Martínez, J. J. Moyano-Fernández analyze possible actions that will help reduce the percentage of "dropout" students in distance learning in Spain [10], A. T. Ragusa, A. Crampton explore the feeling of isolation of Australian students [11], critical issues of distance learning in Russia are pointed out in a study by E.N. Zaborova, I.G. Glazkova and T.L. Markova [7].

Studying the problems and opportunities of distance education during the Pandemic on an international scale is important not only from the point of view of national factors, but also for using successful experiences and taking into account mistakes. Currently, the authors are analyzing the consequences of a rapid transition to distance learning, as well as measures that need to be taken to prevent possible problems associated with this transition. For example, M. Rizun and A. Strzelecki demonstrate the results of an empirical study, where they describe the effectiveness of the transition of Polish students to distance learning [12]. Scientists from Indonesia R. Hamid, I. Sentry & S. Hasan, based on the analysis of students' opinions, studied the factors of the effectiveness of online learning during the Pandemic [13]. The study by Y.Nenko, N.Kybalna, Y. Snisarenko reveals the most popular tools used in distance learning for students of Ukrainian universities, as well as the factors of distance learning implementation [14]. M.W.Marek, C.S.Chew, W.C.V.Wu showed that teachers coped with the challenge due to the ability to adapt and plan their activities, while paying special attention to the needs of students [15]. A.V. Pesha and T.A. Kamarova highlighted a number of advantages associated with the transition of universities to online education during the Pandemic - the convenience of studying the material with the student's individual choice of time and place to study, the erasure of geographical boundaries of education, flexibility in terms of material support of the student, age, health status [16]. The authors conducted research focusing on the tools – emotional, technical, social [14,17], described the problems of transition to distance learning [13,18,19], the competence of teachers and the technical readiness of universities to switch to online learning [2, 10, 19]. In the study, the results of which are showed in this article, we focus on changing students' perception of the transition to learning using distance learning technologies over time and depending on their form of study at the university: full-time, part-time, part-time.

The nature of distance education during the emergence and course of COVID-19 accelerated the processes of digital modernization of higher education and revealed a number of problems that hinder the effective translation of knowledge, the development of skills and abilities of students. Scientists all over the world are implementing a large number of studies in which they present the results of studying the problems that have arisen in the new reality of COVID-19, the speed and results of the adaptation of universities in general and teaching

staff to learning using distance learning technologies [13, 14, 15]. At the same time, the issue of students' adaptation of various education forms to new conditions of educational activity with a certain time interval is insufficiently presented.

The purpose of the article is based on empirical research to identify problems and growth areas in the field of effective use of distance learning technologies at universities in the new reality of COVID-19.

2 Materials and methods

The methodological basis of the study was personality-oriented and environmental approaches in education, theoretical and empirical research methods.

The data were collected among undergraduate and graduate students of various forms of education. The sample population of the first stage was 249 students from 28 universities in Russia. There were 1,350 responses in the second stage of the study. After checking the results of the second stage of the study, 21 responses were rejected (20 students of secondary specialized educational institutions and one of a Chinese university). Total 1,578 students took part in the study (according to the stages of the study: n1=249, n2 = 1,329).
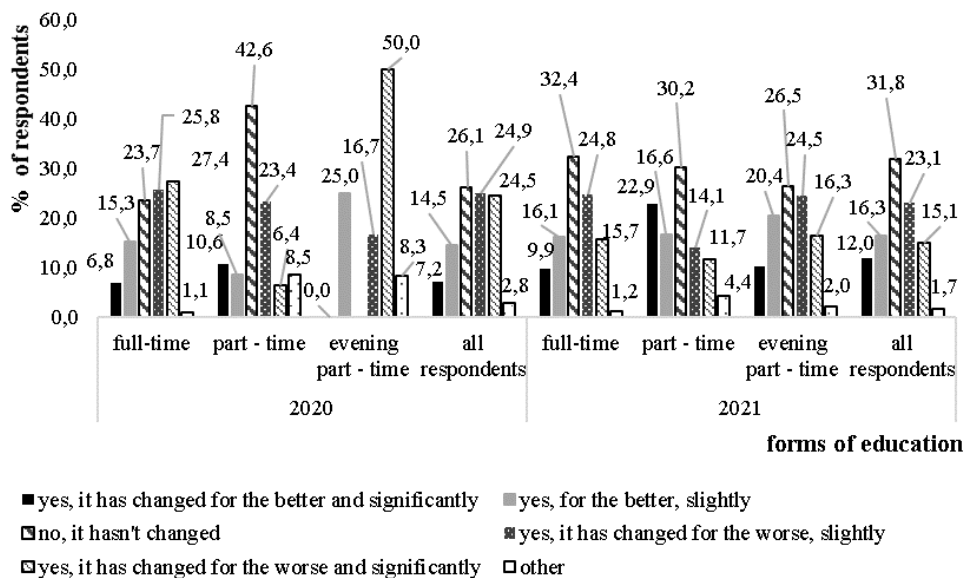
484 questionnaires of the second stage were included in the data analysis and corresponded to the number of responses required for efficiency in relation to the total number of Russian university students 4049333 people. The confidence level of the exact sample was 95% (p <0.05), and based on the total number of students 4049333 and the sample size of 384 people, the margin of error was determined as 5%. In order to include a larger number of respondents in the end, the final sample was formed from the calculation nfinal = nnessessary*coefficient 1.25, which amounted to 484 people. To ensure the reliability of the sample, the number of respondents in federal districts was determined based on the percentage ratio of the number of students in the district to the total number of students in the Russian Federation. We did not set out to compare the opinions of students from different regions, our task is to gather the general opinion of students depend on the forms of education. The distribution of participants by form of study was representative of the total number of students at the time of data collection. Based on the appropriate responses, a representative profile of the participants in the second stage of the study is presented in Table 1.

Table 1. Profile of research participants at the second stage (people)

Federal District	Required number of respondents	Number of participants (total)	Sample population (coefficient 1.25)	Number of respondents by forms of training		
				full-time	part-time	evening part-time
South	38	48	48	Required sample size		
Central	122	198	152	230	134	20
Far Eastern	17	41	22			
Uralsky	28	726	35	Number of participants (total)		
Northwest	40	53	50	1068	207	54
Siberian	45	138	57	Sample population (coefficient 1.25)		
North Caucasian	20	29	25			
Privolzhsky	76	96	95	290	169	25
Total	384	1329	484			

3 Results

There are the data in comparison of respondents' opinions on the 5 questions asked in the second part of the questionnaire, depending on the stage of the survey in Fig. 1.
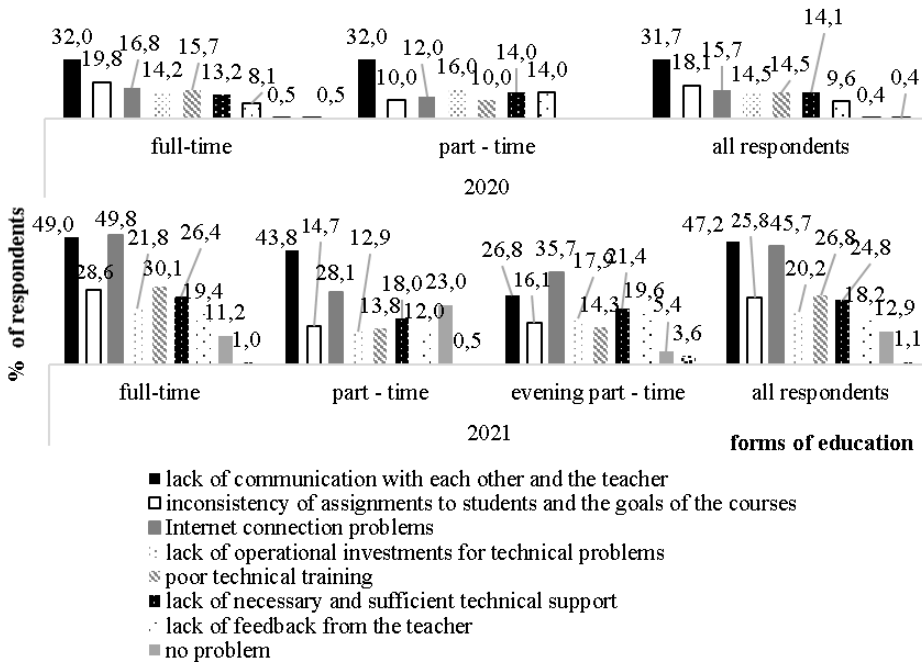

Fig. 1. Respondents' answers to the question "Has the quality of university education changed in your opinion during the pandemic?" (in % of the total number of respondents, according to two stages of the survey).

We can see that respondents' opinions on the impact of the pandemic on the quality of education at the university were divided. At the very beginning of the Pandemic and the transition to a distance learning format, students of all forms of education tended to have a negative impact of changes on the quality of education. The negative impact was noted by more than half of the full-time survey participants (54.3%) and a third of part-time respondents (30.7%), as well as 66.7% of evening part-time students. A high percentage of negative opinions may be associated with the first reaction to changes, as well as with a sense of the unfair cost of this training format. Students noted the convenience of offline learning. 42.6% of part-time students say that there is no impact of the transition to online learning on its quality, commenting that not much has changed for part-time students, most of the technologies of the digital educational environment have been used by them before to prepare assignments and receive feedback from teachers. At the same time, the absence of changes was noted by 23.7% of full-time respondents, for whom the majority of the technologies and tools were new. About 20% of part-time students spoke about the positive impact of the transition on the quality of education, while evening part-time students unanimously did not choose these answers.

A year later, fewer students talked about the negative impact. In particular, 40.5% of full-time students noted a negative impact, but, in comparison with the 1st stage of research, the vast majority of negative responses are associated with a slight negative impact on the quality of education by switching to an online format. The percentage of part-time students who gave negative feedback of the impact of the transition to online learning has also decreased (25.8%). As for the evening part-time respondents, the number of responses with a minus sign also decreased significantly and amounted to 40.8% of the number of survey participants. The percentage of responses "no, it has not changed" increased from 26.1% to

31.8%. A significant decrease in negative responses and an increase in the number of opinions regarding the positive impact of changes on the quality of education during the Pandemic may indicate the adaptation of students in the learning process to digital technologies.

The second question was asked to clarify the students' opinions regarding the problems they had to face during the transition to learning using distance technologies. In this question, respondents could choose several answers. The main problems identified by students at the very beginning and a year later are presented in Fig. 2. Evening part-time students (n=2, 2020) noted the lack of necessary and sufficient technical support, the number of tasks to disciplines and the lack of feedback from the teacher. The key problem noted by students of all education forms at both stages of the study is related to the lack of communication with each other and with the teacher (32% at the first stage and 26.8-49% at the second one). At the second stage of the study, an increase in participants indicating a lack of communication is visible, especially among full-time students (from 32% to 49%). Evening part-time students are less likely than others to highlight the problem of communication lack. The second problem, which is noted many students of all forms of education, concerns problems with Internet communication. Students stress the presence of such problems, both on the part of teachers and problems with home Internet.
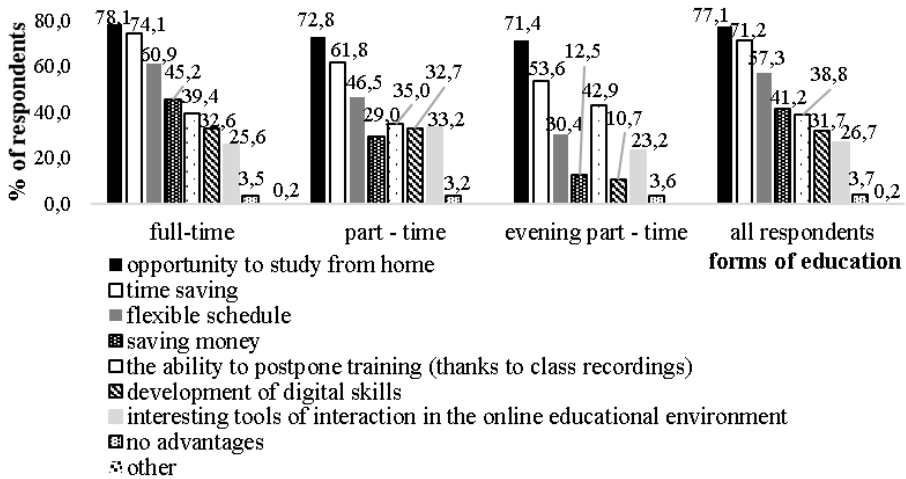

Fig. 2. Answers of respondents to the question "What problems have you faced in working in a digital educational environment?" (in% of the total number of respondents, according to two stages of the survey).

The abrupt transition of all active life to an online environment has put Internet service providers in a difficult position, which has also affected the learning process using distance learning technologies, especially with synchronous interaction. A large number of full-time students, both at the first and second stages of the survey, express their opinion about the poor technical training of teachers, which has become one of the key problems of the qualitative organization of the educational process in the circumstances. Evening part-time students also mention this problem, but not so often. At the second stage, part-time students more often than other groups of respondents chose the option "there were no problems"

(23%). The positive dynamics of the number of students' opinions about the absence of problems in answering this question, among other things, may indicate a change in attitude to the circumstances, their acceptance and conscious attitude to student learning.
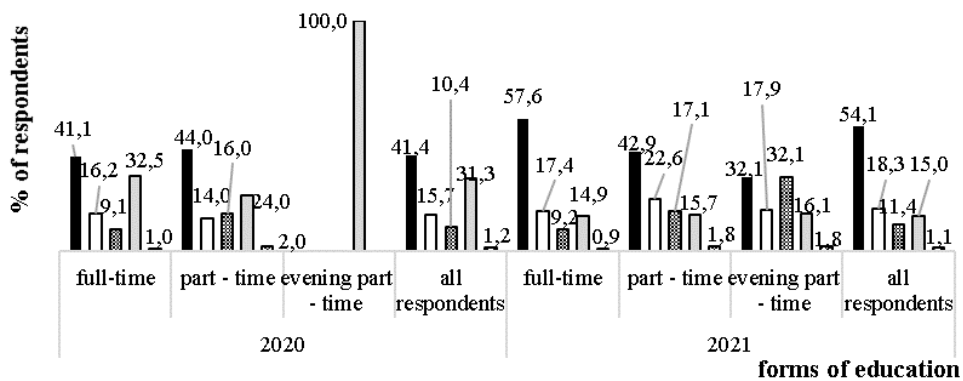
Next, we asked the students about the advantages of learning using distance learning technologies. The question also suggested the possibility of choosing several answers. The results are presented in Fig. 3. The difference in students' perception of the advantages of online learning is well visualized in the figure. The main advantage highlighted by the majority of respondents is the opportunity to study from home (from 71.4% to 78.1% of respondents by forms of education). Also, the students chose one of the main advantages of saving time, which is associated with travel to the place of study and with the speed of switching to various tasks, including non-academic ones. "Having a flexible schedule", as one of the main advantages for full-time and part-time students, is perceived less significantly for evening part-time students, which basically implies flexibility. Also, fewer evening part-time students are interested in the development of digital skills, as a plus of switching to an online learning format. New digital tools attracted 33.2% of part-time students in online education, which is significantly more than the percentage of students of other forms of education who chose this plus.

Fig. 3. Answers of respondents to the question "What are the advantages of online learning?" (in% of the total number of respondents).

The views of students of education various forms on the prospects of learning in the digital educational environment demonstrate a significant increase in the popularity of this format of interaction at the university in 1 year (Fig. 4). The majority of full-time students agree with the statement about the great prospects of online learning in combination with the traditional format of work in the classroom (57.6%), and almost half of the part-time students agree with them (42.9%). An equal approach to all students is important to a greater number of part-time and evening part-time students, in comparison with full-time students, which shows their choice in answering this question. When choosing the "other" options, respondents wrote a year ago that the prospects are great, provided that universities are interested in developing this format of work with students, and also provided that the curriculum is clearly planned. A year later, the number of free-form responses increased, and their degree became more negative. For example, answers were received among part-time students about the lack of prospects for the online format, despite the fact that it is not being canceled, as well as about the low quality of education. Full-time students used the following judgments in their responses: "it's a pity", "a decrease in the level of education", "I really

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hope that they will be canceled soon". Nevertheless, despite the number of negatively colored answers in free form (8, or 0.6% of respondents), the number of choices of the option "no, they will soon be canceled" regarding the prospects of online education in a year decreased more than twice (31.3% in 2020, 15% in 2021). At the first stage of the study, both respondents of the full-time and part-time form chose the lack of prospects and the imminent cancellation of online education.

Fig. 4. Answers of respondents to the question "What, in your opinion, are the prospects for learning in a digital educational environment?" (in% of the total number of respondents, according to two stages of the survey).

Resuming the analysis of the survey's results, we can make a conclusion that there are significant differences in the opinions of students on all the questions asked, received in March 2020 and a year later. In particular, the number of negatively colored comments of students has decreased (22% and 14% of negative comments of full-time and part-time students in 2020, against 3% and 5% of representatives of these aggregates in 2021). Positive dynamics is also observed in the responses of respondents regarding the impact of online learning on the quality of education among all groups of respondents. However, there is a specificity of students' opinions on this issue, according to the form of study. So, at the first stage, 42.6% of correspondence students wrote about the lack of impact of the transition to online learning on its quality, at the same time, only 23.7% of full-time respondents noted the absence of changes, for which the vast majority of the used technologies and tools were new. A year later, the percentage of respondents in all forms of education who noted the absence of changes leveled off and amounted to about a third of students. As for the positive impact of the transition to learning with the use of distance learning technologies, here the opinions of students also have significant differences in the forms of education. 22.1% and 26% of full-time students expressed these points of view; the percentage of evening part-time students who reacted positively to the transition to the online format was about 25% at both stages. At the same time, the share of students who believe that the quality of education has become higher among correspondence students has grown over the year from 19.1% to

39.5%. That is, part-time students, more than others, express satisfaction and readiness to study online.

The analysis of the key problems and opportunities of online learning identified by students in 2020 and 2021 showed that the main one for all respondents at both stages was the lack of communication with each other and with the teacher (32% at the first stage and 26.8-49% at the second one). At the second stage of the study, an increase in participants indicating a lack of communication is visible, especially among full-time students (from 32% to 49%). Evening part-time students are less likely than others to highlight the problem of lack of communication. The second problem concerns the difficulties with Internet communication. A large number of full-time students, both at the first and second stages of the survey, express their opinion about the poor technical training of teachers. At the second stage, students of the part-time department to a much greater extent than the other groups of respondents chose the option "there were no problems" (23%). The positive dynamics of the number of students' opinions about the absence of problems in answering this question, among other things, may indicate a change in attitude to the circumstances, their acceptance and conscious attitude to student learning.

3 Discussion

The conducted review of the literature aimed at studying the problems of emergency transition to education using distance learning technologies allowed us to correlate the results obtained with the data of existing studies. Thanks to the analysis, we have formed possible development zones in terms of the organization of the educational process at the university in the online format.

Similar results to our study regarding students' satisfaction with learning during this period in the online format are also noted by other researchers. For example, in the work of Ukraine colleagues Y.Nenko, N.Kybalna, Y. Snisarenko, 59.9% indicated full satisfaction with online education during the Pandemic and self-isolation [14]. About 85% of the surveyed Russian students in the study by I. R. Gafurov noted satisfaction with the transition to online learning [20]. The greatest dissatisfaction with the quality of education during the emergency transition to the online format of interaction was expressed by full-time students in comparison with students of other forms. There is a possibility that this difference in quality and satisfaction ratings is due to the difference in study schedules and the distribution of workload hours for students of various forms of study, as well as higher demands of full-time students for personal interaction with teachers and their dissatisfaction with the high cost of educational services in a distance format.

Among the main problems noted by students, the main ones are a sense of isolation and lack of communication with colleagues and teachers, which is consistent with the results of other works of this period, for example in the work of M. W.Marek, C. S.Chew, W. C. V. Wu [15]. Technical problems, as the key ones, were also highlighted by students who took part in other studies, which is reflected in the works of S. El Firdoussi and her colleagues [19], for students of Ukraine, according to N. Y.enko, N.Kybalna, Y.Snisarenko, technical problems have become the main obstacle to effective learning during quarantine – 44.5% of respondents chose this fact [14], in a large-scale study by I. A. Aleshkovsky and his colleagues, 24.4% of Russian university students also noted these problems [18]. In our study, the choice among the main problems associated with the use of ICT among full-time students significantly exceeds the number of choices by part-time students and evening part-time ones. We can assume that they are more independent, responsible and ready to ensure the effectiveness of their work from a technical point of view, which is due to the socio-economic specifics of most of this group.

Analyzing the respondents' answers about the prospects of online education, we received a positive answer. At the same time, full-time students in this regard show much more confidence compared to part-time (42.9%) and evening part-time students (32.1%). The relevance of this result is found in the article by I. A. Aleshkovsky and his colleagues, where 16.2% of students note high prospects and readiness to fully switch to online learning [18]. These results correlate with the results of surveys among high school teachers conducted by researchers from the USA, Malaysia, Taiwan (Marek M. W., Chew C. S., Wu W. C. V. [15]), which indicate that teachers highly appreciate the potential of using distance learning technologies in traditional education.

The results of our study show a high level of students' readiness to study online, which is confirmed in the works of other authors, for example, M. L. Hung, C. Chou, C. H. Chen, & Z. Y. Own [21], I. A. Aleshkovsky and his colleagues [18]. The respondents' answers obtained in our study coincide with the prevailing point of view of Moroccan students revealed in the work of S. El Firdoussi and her colleagues, that blended learning in the ratio of 50/50% of full-time and online learning can be the best alternative to existing educational formats [19], which is confirmed by the research of I. A. Aleshkovsky and his colleagues [18], as well as in the work of B. Means, Y. Toyama, R. Murphy, M. Baki [22].

We share the point of view of M. Babinčáková, P. Bernard that despite all the shortcomings, the challenge to higher education given by the pandemic served to gain new experience and prospects, and also became a stimulus for its development [23]. Our results show that students have adapted to the online format, learned new tools and identified its advantages for themselves. In addition, over the past year, the efficiency of the system that ensures the quality of education in universities has increased, algorithms have been worked out and work has been done on the errors and shortcomings of the emergency transition to online learning.

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