Solving the Problem of Adaptation to Online Learning: The Path to Sustainable Development of Education

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Abstract: The article attempts to summarize the most common difficulties in the transition of students and teachers to online education in higher educational institutions and outline ways to solve them in the light of sustainable development of digital education. In the context of an emergency transition to exclusively distance learning, students have developed problems associated with a decrease in motivation to learn, deterioration of health, with the disfunction of the relationship with the teacher, an insufficient level of material and technical equipment of workplaces, the lack of a stable Internet connection and the inability to self-organize. The teachers noted the shortcomings of online learning associated with an increase in the time to prepare for classes, a decrease in the level of feedback from students, a decrease in the quality of education of students, etc. The teaching community got the opportunity to rethink the organization of the educational process in new conditions and find approaches to solving the problems that arose in connection with the transition to online learning. Educational institutions must solve problems related to organizational, legal, economic, psychological issues that arose when organizing distance learning in a pandemic: ensuring the availability of educational content, using high-level digital developments, creating high-quality control and measuring materials to check the formation of competencies, accounting for additional labor costs of teachers during online training implementation, etc. Sustainable development of education, including its digital transformation, are priority areas in the strategy of the state development.

1 INTRODUCTION

During the pandemic, heads of universities and other educational organizations organized the work of the teaching staff and students exclusively in the electronic information and educational environment. Most of the universities were ready for such a quick transition to distance education of students due to the timely created or adapted support base for distance learning (Abramyan and Katasonova, 2020). Since the abrupt transition to online learning was a forced and urgent measure, not all educational institutions and individual teachers were ready for a radical restructuring of the educational process. The reason for this is the different level of development of the information infrastructure, the provision of disciplines with educational resources, the readiness of teachers to use platforms and services in the educational process. Each educational institution has its own set of tools and scenarios for the implementation of distance learning: LMS platforms for posting content and testing students' knowledge, video conferences for online lectures, messengers for communication between teachers and students, and sending information by e-mail. The media have repeatedly raised questions about the possible replacement of traditional forms of education with online education without losing quality. At the same time, the economic benefits of such a transition were mentioned. In the articles there was a substitution of the concepts of "online learning" and "educational technologies" used in the context of an emergency transition to distance learning. This caused a heated discussion in the parental environment and the

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teaching community, which was reflected in numerous publications (Kiselev, 2020; Kutsenko and Malatsion, 2020.; Frolova, Rogach and Ryabova, 2020; Neborsky, Boguslavsky, Ladyzhets, Naumova and Anisimov, 2020.; Dozhdikov, 2021).

2 MATERIALS AND METHODS

At Kazan State Power Engineering University, in the context of preventing coronavirus infection, students of all courses and all forms of education were transferred to the distance format in a short time. This was facilitated by the presence of an electronic educational environment at the university. Students and teachers, using their login and password, had access to their personal accounts around the clock. From personal accounts, teachers and students had access to information resources of KSPEU.

To stimulate the filling of the platform with copyright electronic educational resources (EER), the KSPEU annually held the “Best EER” competition, the winners of which received monetary rewards. Most of the teachers of KSPEU underwent advanced training under the program "Electronic educational environment of the university" and created author's courses on the subjects taught, including the main elements: 1) lecture material; 2) guidelines for the implementation of coursework, laboratory, practical work; 3) glossary; 4) questions for a test or exam; 5) tests; 8) forum, etc.

Thus, by the time of the transition to remote learning, thanks to the LMS Moodle platform, the university had a sufficient number of courses in various disciplines. These courses have passed an internal examination and were approved by the educational and methodological department of the university. With the urgent transition to distance learning, a number of teachers, with the permission of the authors, were able to become co-organizers of these courses, creating their own section in them. Thus, time was gained, which is necessary to create a separate course. Other teachers urgently began to fill their own developments with content in order to be able to work with students during the semester. Since the teachers did not have experience in conducting current and intermediate certification on the basis of the LMS Moodle platform, the educational and methodological department conducted training on organizing tests, examinations, defense of internships and final qualification works.

To conduct classes in the mode of video conferences, Kazan State Power Engineering University at the beginning of the coronavirus pandemic purchased a commercial version of the Zoom service, due to which streaming lectures were organized with a large number of participants and without time limits. For group sessions, educators used Zoom's 40-minute free trial. To continue the lesson, students connected to the conference again.

Teachers and students quickly mastered the work in this Zoom service.

Teachers and students could take advantage of free access to online courses from leading Russian and foreign universities hosted on online platforms. A number of teachers used this opportunity as additional information on the discipline.

Long before the pandemic, various elements and forms of distance education were used by the university to organize the independent work of full-time and part-time students. This form of education was limited, because the traditional form of education was predominant (Zainasheva and Malatsion, 2014).

However, since the beginning of work exclusively in online mode, problems began to appear associated with the adaptation of students and teachers to the new format of education. The stressful situation for all participants could not but affect the attitude towards online learning and other distance educational technologies. To study the problems of adaptation, a study was carried out from September to October 2020 in the form of an anonymous survey of the first and the second year full-time students, as well as teachers of Kazan State Power Engineering University. The survey involved 307 technical students and 67 teachers. Questionnaires were developed to identify the problems of adaptation of students to online learning, which contained the following questions:

1. Is there a computer equipped with video communication?
2. Is there a stable internet connection?
3. Did the study load increase during the online learning period?
4. Did the motivation for learning decrease during the period of online learning?
5. Does the quality of education suffer from distance learning?
6. Is the distance form convenient for laboratory studies?
7. Is the distance form convenient for practical training?
8. Has distance learning had an impact on your health (for the worse)?
9. Did you quickly adapt to online learning?
10. Can you work independently without a teacher?

11. Is the teacher's assessment of your learning activity objective in online learning?

The questionnaire for identifying the problems of adaptation of teachers to online learning contained questions (from the first to the ninth) from the students' questionnaire and was supplemented with the following questions:

1. Are you satisfied with the level of test items for the current and intermediate certification of students?
2. Does the educational process of online learning suffer?
3. Is it difficult to assess the learning outcomes of distance learning?
4. Is it difficult to organize feedback with students?
5. Have you met while conducting classes in an online conference with an unauthorized connection in order to disrupt the class?
6. For what forms of training and in what disciplines would you recommend using online training?
7. Have you used open online courses from other universities in your work?
8. Specify your specialization.
9. Specify your age.

At the end of the questionnaire, statistical processing of the results was carried out.

3 RESULTS

The results of the study indicate that in the conditions of online learning, students have problems associated with a decrease in motivation to learn (48%), deterioration in health (34%), with a disfunction of the relationship with the teacher (lack of "live" communication) (75%), insufficient level of material and technical equipment (21%), with the lack of a stable Internet connection (15%). Some of the respondents noted their inability to work independently without a teacher (31%) and the lack of objectivity in the teachers' assessment of their educational activities (27%). Nevertheless, the majority of students quickly adapted to distance learning (77%).

The results of the survey of teachers showed that the period of adaptation of teachers to online learning depended on the age of the respondents, the level of material and technical equipment of the workplace, and professional specialization. Many problems of adaptation of teachers coincided with the problems of students: deterioration of health (89%), an increase in labor costs in preparation for classes (85%), a decrease in the quality of feedback from students (88%), insufficient quality level of test tasks created by teachers in a short time during the pandemic (49%), the occurrence of psychological problems (15%).

4 THE DISCUSSION OF THE RESULTS

In the process of analyzing the survey results, the features and disadvantages of online education were identified, which were especially pronounced in the context of the pandemic.

1) Distance learning systems periodically freeze due to the lack of high-speed communication channels and the low speed of computers of students and teachers. A number of students at home and in dormitories do not have modern and reliable computers equipped with video communication systems and Internet access. This problem is still difficult to solve, since it depends on the income of the educational process participants.

2) Students enrolled in engineering and natural science educational programs without classes in subject laboratories with special laboratory installations cannot fully acquire subject skills and competencies obtained in the course of traditional classroom studies, because ordinary viewing of video materials will never replace live communication with the teacher and independently conducted experiment.

3) The labor costs of teachers working remotely increased many times, since work with students was carried out not only in a group, but also individually.

4) A number of students were found to have low motivation and interest in independent subject, research, search activities in the process of online learning.

5) During online learning, communication suffered from the remoteness of the teacher and the student, students did not have quick feedback, because there were no prompt answers from teachers to current questions arising in the process of solving an educational problem.

6) There was a lack of objectivity in assessing the educational activities of students (the results of practical classes, laboratory work, etc.), associated with the problem of independence in the implementation of individual tasks. Successful students independently completed assignments and, as a rule, shared their results with classmates, and the teacher did not have the opportunity to identify the true author of the completed assignments and was

forced to evaluate almost the entire group with the same scores.

7) The educational process has suffered, since it is formed with direct classroom contact between students and teachers. Nothing can replace live communication between a teacher and a student.

8) The complexity of the transition of teachers of the older generation to remote work was revealed, since these teachers are accustomed to traditional classroom teaching. The assimilation of new technologies, and in a short time, led to the fact that teachers were in a stressful state.

9) Not all educational and methodological complexes (lectures, laboratory classes, workshops, assessment tools, etc.) have been converted to digital format for organizing distance learning.

10) During the midterm and current certification online, the teacher was limited in assessment tools. The experience of conducting current and intermediate attestation in remote access conditions showed that teachers mainly used tests as assessment tools, which did not sufficiently reflect the formation of the necessary competencies. Tests that had to be constructed urgently did not always meet the methodological requirements for such evaluative tools. If the teacher used an oral conversation or a written survey as an assessment tool, then it was difficult to control the independence of the task, because there could be various sources of information in front of the student that were out of sight of the teacher.

11) Working for many hours in front of a computer screen negatively affected the health of students and teachers.

12) The work experience has shown the insecurity of online conferences conducted by the teacher from unauthorized connection of intruders trying to disrupt the lesson. The teacher spent time solving this problem.

13) There were psychological problems associated with the fact that new formats of education cause a feeling of rejection, both among teachers and students.

14) The wide range of applications used made the work of teachers and students difficult, as they had to learn the basics of working in each of them. The teachers lacked the skills to work in a digital environment, time to master new tools and restructure the educational process.

15) The provided opportunities for access to open online courses could not ensure their full-fledged development by students, since free access to course content did not imply methodological support for students and teachers from universities - holders of online courses.

5 CONCLUSIONS

As a result of the pandemic, education has received a unique chance to conduct a global online experiment, the results of which should determine the problems of modern education and ways to solve them. The teaching community got the opportunity to rethink the organization of the educational process in new conditions and find approaches to solving the problems that arose in connection with the transition to online education.

First of all, this is the problem of ensuring the availability of educational content for students and teachers, since all of them should have a workplace equipped with a personal computer with access to the Internet. This requires social support for students. Online learning is impossible without an IT infrastructure that requires significant investment.

To conduct laboratory exercises, it is necessary to develop or purchase virtual laboratories. Moreover, only the use of high-level digital developments can bring virtual laboratory work closer to the traditional format and form the necessary competencies (Torkunova, Korosteleva and Krivonogova, 2020).

To carry out the current and intermediate certification, it is necessary to systematically work on the creation of certified tests in disciplines containing case problems and practical tasks of various levels of complexity. With such assessment tools, the teacher will be confident in the formation of the necessary competencies in their discipline (Kutsenko and Malatsion, 2019).

In addition, it is necessary to carefully monitor technological tools for distance education and choose the most appropriate for the teacher and students. Taking into account the existing variety of technical solutions available on the market, this should be an independent choice of the teacher. Universities need to purchase software products that support a large number of users working at the same time, allow downloading and receiving large files, keep track of attendance and evaluate the work of students. At the same time, it is necessary to protect the used services from unauthorized connections in order to disrupt classe.

It takes a lot of time to develop a high-quality online course in the discipline and to test it. Experience has shown that it is not enough to transfer text materials of lectures, practical and laboratory classes, as well as tests to an electronic platform. An

online course must meet the following requirements: the presence of a flexible interactive online environment, an attractive pedagogical design for involving students in the learning process, a large number of high-quality control and measuring materials of various levels of complexity to control the formation of the necessary competencies; elimination of the influence on learning outcomes of external factors that reduce the validity of the assessment, the individual pace of mastering the course, etc. (Means, Bakia and Murphy, 2014). Online learning is not just a process of transferring information via the Internet, but, above all, cognitive and social interaction of participants in the educational process.

The best result can be obtained when implementing a blended learning format, using elements of distance education to obtain additional information on the studied disciplines when conducting all types of classes online. Distance learning is more suitable for the implementation of inclusive education, as well as for advanced training, obtaining a second higher education, and the implementation of distance learning.

The workload of teachers should reflect the time spent preparing content for the educational platforms used, as well as the time to check the work uploaded by students.

To solve the psychological problems associated with the transition from traditional forms of education to digital, it is necessary to conduct training courses and advanced training for working in new services and platforms (Avdeeva, Zaichkina, Nikulicheva and Khapaeva, 2016; Nikulicheva, 2019).

It is necessary to develop a legal framework for the provision of educational services in the context of a forced transition to training in remote access mode.

The pandemic that has engulfed the entire world is not over yet, and in the future, perhaps, humanity will face similar threats. Therefore, educational institutions should look for ways to solve problems related to organizational, legal, economic, psychological issues that arise when organizing distance learning in self-isolation in order to provide the consumers of educational services with education of high quality. The university community should exchange best practices in the interaction of participants in the educational process and their adaptation to online learning, since scientific discussions are often closed, and research results do not go beyond the scientific community (Kuznetsova, 2015).

All this will contribute to the sustainable development of education, including its digital transformation, which is a priority in the strategy of the state development.

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