

Emergency Remote Education case study: Students, Educators and Universities

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Abstract. There is no doubt that 2019/2020 has been a time of rethinking approaches in the education system where the main driver became the Covid-19 pandemic. The study looked at several major areas of HEIs: human resource capacity, student development, renewal of educational programs, infrastructure strengthening, a new HEI management model, etc. The study used was carried out both before and during the pandemic, allowing the dynamics and trends to be tracked. To describe the solutions, the authors formed a special framework, which included a fixation on two vectors. The first vector: at what level the decisions should be taken - regulator level. The second vector: the decision-making perspective - operational (short-term) and strategic (long-term). This form of research allows using its text not only as analytical material, but also as a practical framework for development strategy formulation at different levels: federal, regional, and organizational. The study presents a narrow group of selected universities, each of the university - participants of the study was able to involve their own experience and developments gained during several months of remote work in the pandemic. This presented research attempts to systematize the key deficits of the higher education system and identify ways to overcome them. The material is based on several dozen large-scale studies, including surveys, focus groups and students' interviews, teachers, administrators, and a wide overview of open source, public analytical, and reporting materials of universities.

Keywords: Remote education, Educational activities, Digital education technologies, Education transformation,

1 Introduction

The forced mass transition to remote education has revealed a number of key problems, one of which is, on the one hand, the abundance of private online educational platforms, and on the other hand, the lack of generally accepted platform solutions for

online classes and the lack of a unified way of communication between students and teachers from different disciplines at the same university [1]. As a rule, it is up to the teacher to choose the resources for the organisation of the learning process, and much depends on his/her experience and competence in the field of electronic technologies. In Russian practice, remote education presupposed online courses, which resulted in underdeveloped practice of online teaching. However, in the situation of crisis, the previously developed online courses turned out to be critically insufficient for the organization of remote education in universities. As a result, in most cases universities opted for online education rather than ready-made online courses. Indeed, teaching online opens up many new possibilities, primarily related to the multichannel pedagogical communication: video presentation, live speech, and chat with a student group.

However, the general transition to e-learning clearly showed a great lack of unified educational methods in digital pedagogy: university teachers came up with their own methods by trial and error or borrowed them from practitioners from related fields (leading online conferences, business trainers and even teenage streamers). It became clear that the traditional methods of keeping the audience's attention, organizing students' work (including group work), and current control require a radical revision in the conditions of online teaching. It is already clear that the key task of a teacher with a large share of remote education will be to motivate the learner [2]. The quality of the educational process will depend on the teacher's ability to retain learners' attention, determine the student's goals for the course, organise and maintain a high proportion of independent work in a particular learning exercise and throughout the course. It can be said that, at the moment, the tools for systematic work with learner motivation in higher education institutions are lacking.

Another aspect of remote education that strongly influences new didactics is the so-called "digital footprint". By making a study session potentially open (real-time or recorded) to any user, it opens up completely unique opportunities for automated analytics of the educational process [3].

2 Renewing the competences of higher education teachers as a direction for the development of higher education.

Among the many areas of higher education system modernisation, one of the most prominent is human resource renewal. In recent years, a number of universities have updated their development strategies to include programs to strengthen human resource capacity [4, 5]. The development of teachers' competencies has become a task of many academic leadership programs, such as the 5-100 project, projects of core universities and research universities, and programs for modernisation of teacher education. However, many challenges in this area remain relevant, and the weak readiness of teachers to change and work in a digital environment is one of the fundamental ones. Several months of remote work in the context of the coronavirus pandemic showed the existing problem areas with greater acuity [6]. One of the most significant deficits remains the unpreparedness of some university teachers to use modern educational technologies [7].

- 60% of teachers have rarely or never delivered lectures and classes electronically or in a webinar format.

Such technologies include both e-learning tools and new pedagogical practices. At the same time, some teachers have rich academic and research experience, and its integration with modern technologies and educational practices could be an additional resource for solving the tasks of the national projects "Education" and "Science", but so far this resource remains untapped [8].

The methodological deficit covers the lack of knowledge and practice of incorporating online formats and tools in the delivery of educational courses and programs, the demand for new digital didactics, and working methods. The past months of the pandemic have shown that the most effective model of educational activity is a mixed (hybrid) model, where face-to-face and online formats are combined.

- 53% of the students surveyed say that all or some lecturers at their universities have transferred their class materials to the university's LMS

This integrated approach requires teachers to master both new technical tools and instruments and new professional attitudes among them are:

1. readiness to regularly and systematically update the content of educational programs: increasing availability of new research publications and materials in open Internet sources also requires teachers to keep course materials up-to-date;
2. the use of active learning strategies that focus on students' practical activities as well as mastery of fundamental knowledge to optimize the number of passive interaction formats that focus on "reading out" of course material;
3. willingness to engage students in interactive activities during online classes, attention management;
4. ability to organize regular feedback both during online lessons and throughout the course;
5. the ability to apply modern online assessment techniques for midterm and final assessments.

Technical and technological deficits are related primarily to the low level of digital literacy. Some teachers do not know (or have insufficient knowledge of) modern information technologies for implementing courses and programs using up-to-date electronic services and tools [9, 10]. A clear manifestation of this lack of readiness can be a lack of knowledge and use of technology in the following areas:

1. technologies for organizing and delivering online classes using both university LMSs and third-party e-services;
2. communication, support and follow-up of students using messengers, social networks, and collaborative document services;
3. digital tools for designing and preparing electronic content for interactive online classes and students' independent work.

Such deficits are reinforced by related factors: "obsolescence" [11] of course content, discontinuity of research, and educational activities - and become the reasons for the reduced motivation of teachers to integrate online tools into their educational programs. Teachers' technical and technological unpreparedness leads to months of professional fatigue.

- 88.2% of teachers are skeptical about the distance learning format;
- 42.7% consider that e-format will lead to the deterioration of higher education;

- 67% of teachers do not agree that the majority of classes in a year will be in the online format.

However, the experience of the past few months has shown that the HEI system can still function in a new way, both in terms of the organization of HEI management and in terms of the implementation of the educational process. The competence shortcomings described above are recognized by administrators and teachers. The HEIs have made serious efforts to adapt the teaching staff.

- 53.2% of teachers have undergone training in the last months to teach online;
- although 87.8% of teachers say that they would rather teach face-to-face.

These efforts have had a positive impact. Research carried out during the period of transition to e-learning shows that many higher education institutions had set up a special support system for teachers. Websites or sections of official websites were created to inform and help teachers, online communication with them via messengers was organized.

- 98.2% of teachers say they were able to convert to e-work during the pandemic;
- 91% say the measures taken in their institutions were sufficient to make the switch.

Thus, despite the general constructive mood and the actual possibility of mobilization and implementation of digital technologies in the educational process, most teachers remain cautious and partly pessimistic. A noticeable part of the teaching staff, although moving online, remains unprepared to integrate online tools and technologies into educational programs in the long term. The forced "surge" [12] in the use of e-learning, on the one hand, expands opportunities for renewal of the higher education system, but, on the other hand, if the regulator and university management become less active, creates risks of rapid system rollback or even increased resistance to the uptake of digital tools and practices.

3 **Students' attitudes towards universities' actions during the pandemic.**

In the context of the coronavirus epidemic, there have been significant changes in the lives and educational process of students due to the transfer of the educational process (including project and research work, examinations) to electronic formats, a sharp reduction in extracurricular workload and extracurricular interaction with other students and teachers, aggravation of social problems, actualisation of issues of access to necessary technologies [13, 14].

- 46% of students at the beginning of the pandemic considered e-learning to be less effective.

These changes have shaped student attitudes towards the current situation (see Fig.1).

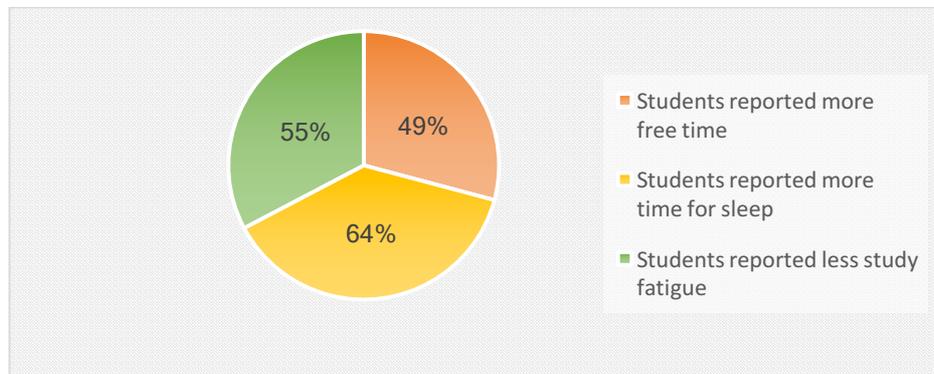


Fig. 1. A study of how students assess the effectiveness of remote education (first wave of the survey, April 2020).

One of the first problems in the organisation of the educational process was the problem of informing students about the new rules of remote education about the tools of communication.

- 62% of students said that their university provides the information they need;
- 5% of students report a complete lack of information from the HEI

This problem was especially acute in the run-up to the exams: the data of the survey conducted in May 2020 showed the emergence of problems with students' awareness of the issues of the session in an electronic format [13]. A comparatively higher share of students who reported problems with awareness is observed in medicine, technical sciences, art, and culture.

- 40% were not aware of how the defence of coursework and diploma theses would be organised.

The second wave of the survey revealed a decrease in the evaluation of information support from the HEI to 33%. It is assumed that these changes are related to the upcoming session.

- 72% of the students are completely or rather unclear about the further organisation of their studies;
- 25% of students are not clear how the education will be organised.

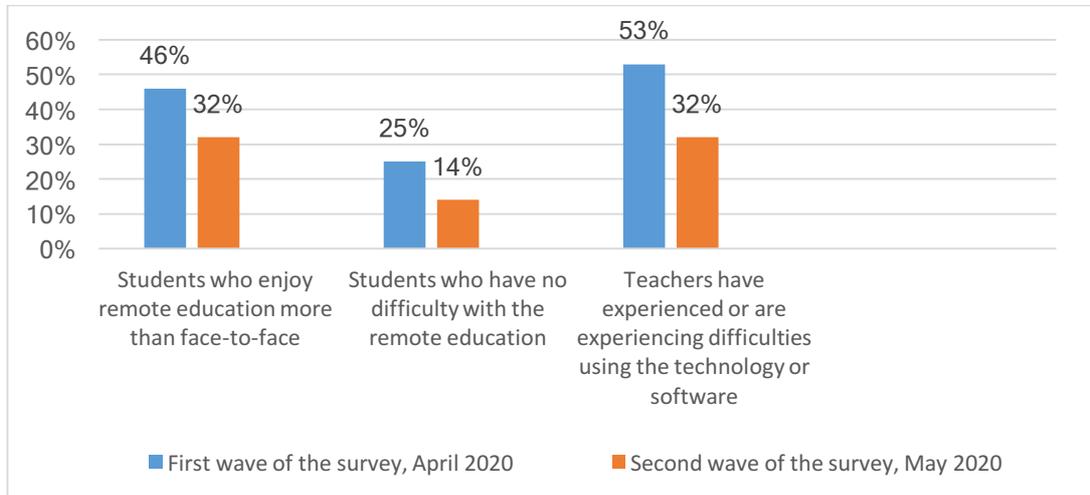


Fig. 2. A study of assess the information support from the HEI during remote education.

4 Socio-psychological factors caused by the unfamiliar format of remote education.

First wave of the survey.

- 34% lack of face-to-face discussion with teachers;
- 29% of students say it is difficult to concentrate when studying the material on one's own,
- 28% of students say it is difficult to study at home;
- 27% of students say it is more difficult to ask the teacher questions;
- 25% of students say there is a feeling of loneliness and isolation;
- 50% of students say they feel embarrassed and uncomfortable when an instructor asks to switch on a webcam;
- 35% of students find it difficult to ask questions of the instructor online.

Second wave of the survey. There was an increase of around 10% in the reported problems: “it is difficult to keep attention while watching video lectures”, “it is difficult to concentrate while studying the material independently”, “it is difficult to answer and ask questions”, “it is difficult to find a place to study”, “lack of communication with classmates”. 40% were more likely to postpone their study for later. This problem is most common among freshmen [13]. The results of the surveys indicate the difficulties of adaptation to the change of the format of education and communication in the educational process, psychological difficulties associated with the introduction of self-isolation mode; this problem is especially acute for those students who stayed in the dormitories and were deprived of personal contact with friends.

- More than 40% note the lack of face-to-face communication with teachers and fellow students as the main difficulty of remote learning;
- an increase in 17% of students reporting discomfort with having to switch to the webcam at the request of the teacher

Separately, we should note the difficulty of having to demonstrate a higher level of self-organisation. Many students report a lack of self-organisation skills, with younger students being the most concerned. There is an increase in specific fatigue and a significant increase in workload among students due to, among other things, an increase in the proportion of self-study. At the end of May 2020, a third of students say they find it difficult to concentrate in an independent study, which is a negative change from only 27% in March. To this must be added such negative factors as the loss of jobs and other sources of income, the problems encountered with tuition fees, and the exacerbation of wealth inequalities, including in relation to digital learning tools. At the same time, most HEIs have not implemented effective psychological support programmes for students in difficult learning and socio-psychological situations [12].

5 Result: Barriers and limitations of existing models of educational programmes, methodological and didactic approaches applied in universities.

Therefore, universities are unable to respond quickly to the changing external environment and are not flexible enough to work with the individual needs of students. The rapid obsolescence of educational models, oriented more on the transfer of knowledge than on the development of competence and thinking, the critical lack of quality content, and its archaic nature - all this leads to a serious decline in the quality of education. One of the urgent problems of the modern educational process is the constant increase in the volume of information and, at the same time, the rapid obsolescence of knowledge.

According to researchers, the "life cycle" of knowledge and skills in the modern world is very short. The problem of outdated educational methods is particularly acute in the field of IT: being rather conservative structures, educational institutions are unable to keep up with the fast-growing IT sector and provide students with relevant qualifications [12]. The urgency of prompt resolution of these problems increases dramatically in the context of forced transformation of the entire system of higher education. A comprehensive solution to these problems is the introduction of new models of educational programmes in line with the pace of digitalisation of modern society, the creation and promotion of a "new pedagogy" based on current methodological and didactic principles.

The implementation of this solution requires a systematic approach and includes three main tracks.

The first track is the educational process digitalisation. The rapid digitalisation pace in various sectors has caused the world's leading universities to switch to e-learning, where technology, platforms, and software with a centralised management process and technical support play a key role, enabling a detailed focus on the educational process and improving its efficiency [13].

Most higher education institutions either have a formal system in place or use LMS-platforms in a fragmented or experimental way. However, it is obvious that today the use of digital learning environments in higher education institutions should become an everyday practice, and teaching activity is no longer conceivable without the use of automated learning management systems.

- 88% of universities stated that they have LMS-platforms;

- 45% of them actually use LMS to organise educational activities

In this context, various university practices in the transition to e-learning are important. For example, the feedback-gathering module in the base of common software platforms has shown to be effective. The feedback and its subsequent analysis allows a rapid response to emerging problems, which greatly facilitates the management process of the university as a whole [14].

The increasingly popular BYOD (Bring Your Own Device) technology, which enables the use of personal mobile devices in the working process, is attracting attention. In today's educational context, this technology provides teachers and students with quick access to electronic educational resources (EERs) and online interaction tools, which dramatically increases the efficiency of the organisation of work.

- 49% of HEIs are fully provided with digital library resources for all educational programmes.

Another area of education digitalization is virtual technologies, which increase the interactivity of training courses, including, for instance, Scenario-Based Learning (SBL), the use of virtual (VR) and augmented reality (AR) technologies. For example, the use of Virtual Work Environment (VDI) technology makes it possible to eliminate the dependence of study groups on specific classrooms. In addition, educators can use online tools that mimic the familiar environment of a university classroom, such as the AWW (A Web Whiteboard) online board. By creating a “presence effect”, such technologies minimise psychological discomfort, simplify the process of administration and support, and generally make the learning process modern and convenient.

The introduction of personalisation processes using adaptive methods based on artificial intelligence contributes to improving the education quality. Such an adaptive methodology is a virtual tutor, which levels the knowledge of students without the participation of the teacher [15,16].

Another track is the development and application of simulators in the teaching process, which simulate business scenarios and enable decision-making, development of business strategies, and practicing universal and professional competencies. The decrease in demand for paid educational services, caused by the economic consequences of the pandemic, entails a reduction in universities' resources and is an additional factor for universities to intensify the process of replacing some courses with high-quality online resources and maximising the effectiveness of traditional face-to-face teaching in order not to allow the quality of education to decline. One of the biggest challenges, however, is the lack of affordable and effective national online platforms for learning in the face of the constraints posed by the coronavirus epidemic.

Undoubtedly, supporting the diversification process of large interuniversity study platforms of various orientations, filling them with open online courses from different universities, is essential in this track. There is also a need for federal support for electronic libraries accessible to higher education institutions and the development of an assessment of the demand for their use.

The most important element of e-learning didactics is the proctoring procedure - organisation of control and supervision of a distance examination. The use of Artificial Intelligence (AI) capabilities plays an increasing role in the work of proctoring platforms. For example, the Examity proctoring platform uses AI to identify students and

analyse keystrokes on their computers; the Proctorio platform uses AI technology to determine the direction of students' gaze. Proctoring is beginning to be used successfully in higher education institutions.

The second track under consideration is the creation and promotion of a 'new pedagogy' consisting of educational methodologies in line with modern technological capabilities and reflective of current socio-economic challenges. The mass conversion of the country's universities into a remote education format has revealed a number of contradictory trends.

- On the one hand, it has shown the unpreparedness of universities to massively use the existing tools of the online teaching format. Universities and other educational organisations had previously used these technologies, but mostly only for the most motivated students.
- On the other hand, the mass practice of using online teaching tools has stimulated a variety of communication among teachers, methodologists, technologists regarding the renewal of content, didactics and teaching methods.

The inefficiency of direct transfer of didactic approaches and methods used for traditional classroom work into electronic format is revealed. At the same time, the enormous potential of many tools and practices of online formats remains untapped due to the lack of systematic developments in the field of e-learning didactics.

- 38% of students expressed the opinion that their HEI and teachers are completely (11%) or rather unprepared (27%) for the transition to remote education;
- 32% of students at the time of the survey are not satisfied with the organisation of remote education at their HEI.

In the world practice, the way to solve the above-mentioned problems is the active development of blended learning, which already shows its effectiveness in those areas of education where close cooperation of a teacher and a student is important [15].

It allows learning by personally communicating with an expert in a group or one-to-one, by carrying out practical work in training sessions and seminars and, at the same time, by studying at online venues without losing the quality and dynamics of the educational process. A correctly applied blended learning format can be just as effective as a traditional form. It should be noted that the use of the blended learning model implies the redistribution of the teacher's workload from the classroom to support students' independent work, as well as the development of approaches to determine the workload of students' independent work in the electronic environment to avoid overloading the student.

Along with the traditional principles of knowledge evaluation, opportunities for alternative assessments arise. Big data technologies allow for the current assessment of student's competence, for example, when analysing data on students' interaction with e-learning systems and with each other, the efficiency of mastering learning materials in the e-learning environment. The introduction of various forms of knowledge assessment promotes more effective immersion, engagement, and active processing of information, developing students' research skills and critical thinking.

The third track, closely related to the previous ones, ***is the introduction of new models of educational programmes, updating the structure and content of existing programmes.*** In the rapidly developing modern high-tech economy, the model of mass training of specialists with standardised qualifications shows its inefficiency. Universities lack

the necessary resources to significantly change educational models and create their own educational programmes: such transformations are associated with serious administrative costs, so they are rarely implemented. As a result, higher education is dominated by standardised, rapidly outdated, and closed educational programmes for external learners. Successful solutions within individual courses and programmes do not extend to the rest of the educational space. The structure and content of existing educational programmes needs to be updated, and systematic work is required to create new educational programmes whose graduates are qualified to meet the growing needs of the labour market.

The transition processes to a modular system of training and organization of access to individual modules for external learners are crucial in this direction. Training courses should consist of short-term educational modules and intensives, which will ensure curriculum synchronisation with partner universities, attract leading teachers from other universities and representatives of the real economy to implement academic disciplines (including the use of online learning formats). The modular system of education will also allow HEIs to attract external learners wishing to gain additional competences for individual modules and intensives. In this way, universities will be able to meet the increased demand for training from the mass of people left unemployed as a result of the pandemic crisis. This arrangement gives universities an incentive to improve the relevance and quality of their courses and allows the concept of “lifelong learning” to become the national norm [16].

The variety use of resources, not only included in approved curricula, but also outside of them and most relevant to the market, enhances the implementation of learning objectives and targets. Moreover, the development of modern digital technologies requires the educational system to make an organic transition from the traditional to the integrated model of learning with the use of electronic media and resources (MOOC, blended learning technologies, etc.). Such an integrated model of learning increases the motivation of students and shapes their ability to learn and search for knowledge. Every year, the number of universities offering a form of online learning continues to grow and by 2019 half of tertiary courses will be delivered in an online form. The pandemic situation only reinforces this trend.

Higher education programmes and curricula should become more flexible, focusing on the choice of educational content mastered through a variety of internal elective courses as well as external online courses outside the educational resources of a particular higher education institution. This model of educational programmes implies the personalisation of education, which will allow students to obtain unique sets of competencies that are in demand in the labour market. Personalisation of education, in its turn, implies the introduction of a system of individual educational trajectories based on tutor support and individual grant support, as well as changes in relevant regulations. This will make it possible to create a unified educational space in HEIs instead of the existing rigid division into institutes (faculties) and training areas [17, 18].

This organisation of the educational process gives more freedom of choice, which at first may cause difficulties in navigating diverse educational environments. A number of leading HEIs already have experience in solving these difficulties. For example, on the basis of the Global Universities Association, a website of methodological support has been created, on which the largest universities provide assistance to students and teachers in organising education in the new environment.

The concept of unified educational space actualises the concept of integrated educational space actualises the student-student communication model (peer -to-peer): horizontal network learning promotes the development of communities of students capable of research and innovation activities.

Another aspect of activities contributing to the creation of a unified educational space is the functionalization of educational levels, revision of the structure of educational programmes according to the "2 + 2" model with the possibility to specify the direction of training after the second year while maintaining the budget financing of the student's education. The functions of different levels of education should be clearly defined and not duplicate each other to effectively build a student's individual educational trajectory. The first two years of study are the basic bachelor degree, after which the student should have the opportunity to change specialisation and even university. The Bachelor's degree provides a broad fundamental education, with STEM and HASS blocks of science, social sciences, and humanities. The next two years of study are concentrations. The function of this stage is to deepen into a disciplinary and/or thematic area. The main function of the Master's programme is professionalization. Master's programmes should be developed within the framework of higher professional schools, which are established at the intersection of theoretical and practical expertise. The former is provided by research conducted at the university, the latter by the professional community and associations. Professional schools should be oriented towards world-class research and practice.

6 Conclusions

The past few months have been an opportunity for university teachers to gain direct experience of the remote education format. The situation on the transition to remote education has become a window of opportunity. New experiences, backed up by systemic solutions, can be one of the resources for overcoming the deficits described. Importantly, the proposed solutions should not only be prescriptive, but also strategic, changing the system over the long term. The instant universal shift to remote education changes the crucial processes of student life and socialisation. They find themselves out of the usual pace of learning, out of live communication, and face-to-face contact with their classmates and teachers. Consequently, one of the directions of development in nonstandard conditions becomes other forms of student support, different from traditional ones. At the same time, these forms have not only anticrisis nature, but also determine the development of students as an important part of the university corporation.

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