University Web-Environment Readiness for Online Learning During COVID-19 Pandemic: Case of Financial University

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Abstract. The paper is devoted to the Financial University experience of transforming the learning process fully online during the COVID-19 pandemic. The architecture and principles of the web-environment were rethought significantly. It is shown that the competence in digital technologies formed in universities creates new challenges and tasks: continuity of digital footprints and technologies for learning process organization and implementation; openness and publicity of learning; professional development of teachers, and ethics in the digital space.

Keywords: Online learning · COVID-19 · Web

1 Introduction

The COVID-19 pandemic, which has covered almost all regions of the globe in a short time, has radically changed society's usual way, relations between people and countries. More than a hundred million people fell ill, several million died. In epidemiologically difficult areas of the world, severe quarantine restrictions have been and are still being introduced, depending on the situation, including the movement and communication of people, their participation in mass culture, sports, and other events. Many concerts and performances, sports competitions, including the 2020 Summer Olympics, world and continental championships in selected sports, have been canceled or postponed indefinitely. Various international and national conferences, scientific forums, and professional meetings have switched to online.

Significant damage has been done to the economies of different countries. The production and sales of numerous goods and services are declining. The standard of living of many people is falling. Transport, tourism, and other sectors of the economy are suffering severe losses. The sphere of education has undergone significant changes, having switched to a distance format. It caused many problems and difficulties that needed to be promptly resolved with the least cost and loss.

According to UNESCO data from March 18, 2020, due to the COVID-19 pandemic, educational institutions in 107 countries of the world were closed, which affected, in

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particular, 862 million schoolchildren, or about half of the school-age population worldwide [1]. A significant number of college and university students were forced to switch to a remote learning format. According to the Minister of Science and Higher Education of Russia Valery Falkov, in Russia, as of mid-December 2020, about 3 million students studied remotely, which was about 64% of the total number of all Russian students [2].

The transition to distance learning was aimed at reducing contacts between people. It contributed to a decrease in the number of cases, reducing the peak of tension due to the shortage in hospital beds, qualified medical personnel, and medicines at the beginning of the pandemic spread.

Nevertheless, this raises reasonable questions. How to measure the efficiency of distance learning? Are there any relevant methodological developments for organizing such training? Are there technological platforms and technical tools that support the remote educational format? Is it possible to quickly deploy them in sufficient numbers? What are the financial costs of the transition? How long will it take to prepare professors and students for remote learning? How effective will online learning be? Will there be a decline in the level of education? How can online learners be identified? Will the remote format contribute to falsifications and substitutions? How should you control the assimilation of educational material? How to assess the competencies acquired by students, theoretical knowledge, practical skills, and abilities? Moreover, many more other questions can probably be formulated when a vital necessity requires an urgent transition to distance learning.

2 Literature Review

Distance learning is a platform that educational institutions use to meet their learners' needs [1, 3, 4]. It has been established that distance learning is quite efficient when used in colleges and universities. Simultaneously, distance learning for elementary school students, when children must stay at home, as in the COVID-19 pandemic, causes some anxiety in many parents and creates many problems for them, including financial ones. Parents should help their primary school children in the most effective use of educational technologies, but not all of them have the appropriate academic and information technology skills [3]. Besides, not every family has computers with multimedia capabilities. Somewhere there is no Internet, or it works slowly or unstably, someone has several children of school age, and their classes are scheduled simultaneously [1].

Many works note that the course on digitalization of education previously adopted at universities played a positive role: by the beginning of the pandemic, most teachers already had digital competencies, and electronic teaching aids were developed in many academic disciplines. At the same time, the arrival of the pandemic in many educational institutions was fraught with many problems, difficulties, and shortcomings, the elimination of which required additional funding, time, the search for new methods and forms of conducting classes, and the improvement of the digital qualifications of individual teachers.

In [5], based on the analysis of the questionnaires of students and teachers of the Faculty of Pedagogical Sciences of the University of Granada (Spain), it was indicated the dissatisfaction of many students with the virtual educational process, to which they

had to switch urgently. Many professors in their questionnaires noted the need to improve and generalize experience in conducting classes in a virtual environment and develop their digital literacy competencies and skills. The requirements were also recorded:

- on building up the bank of e-learning materials, first of all, audiovisual courses and banks of test items for the comprehensive assessment of students' knowledge and competencies;
- on the need to purchase modern multimedia and network equipment and specialized software;
- on teaching students and professors current technological capabilities for video and graphics processing.

Some university courses, in principle, cannot be entirely carried out in a distance form. In [6], the experience of using a mixed five-component online teaching strategy for first-year chemistry students at the University of Santo Tomas (Philippines) during a pandemic is presented. The strategy is called DLPCA (Discover, Learn, Practice, Collaborate, Evaluate). The asynchronous part of this hybrid strategy involves pre-recording lectures on video and posting on YouTube so that students can master the material at their own pace, as needed – repeatedly. The synchronous part of the training is conducted online using Zoom or Google Meetings video conferencing platforms. In the laboratory, students' knowledge and skills are assessed based on studying the lecture material. Practical experiments are carried out under a teacher's guidance by invited instructors – senior students, implementing actions proposed by a student at home, outside the laboratory, and answering the teacher's question. Questionnaires assessed the mixed learning strategy. Both students and teachers rated it positively. Among the negative points were the instability of the Internet and some students' constraint to turn on the video camera if other people nearby, such as parents.

In [7], it is noted that knowledge is a crucial resource of production, a source of sustainable competitive advantage in the creation of values and wealth. Consequently, knowledge must be effectively managed using intelligent methods of analysis and processing of various indicators that directly or indirectly affect the result: the knowledge and competencies of university graduates, in other words, their human capital. Using various models, approaches, and methods of knowledge formation in an educational organization, for example, in the period before and during the COVID-19 pandemic, it is possible, by use of machine learning, to obtain effective models of an individual, defining indicators, positively influencing the learning results [8, 9].

In [10], the teachers' and students' perception of the use of open digital innovations in leading universities in Spain, Italy, and Ecuador, which were severely affected by the pandemic in the spring of 2020, was assessed. It is noted that the digital environment has given rise to new learning paradigms associated with IT advances – multimedia, cloud services, wireless communications. Depending on the digital platforms and technological methods used, different learning approaches are used: online, mixed, and face-to-face. Thanks to the Internet, many educational processes are implemented online. The pandemic also contributed to this. The educational process is actively moving into online mode.

Moreover, there is no need to be afraid of possible deception on the part of careless students. Modern technological platforms used in online learning, for example, Teams, Skype, Zoom, in conjunction with video stream analysis modules based on intelligent machine learning methods, allow real-time tracking of students' emotions [11, 12] and their behavior when preparing for exams [13]. It all depends on the student's technical equipment, teacher's location during the exam, and organizational issues.

Further, if we want to prepare competitive graduates that meet the realities and needs of the 21st century, we, teachers, as noted in [14], need to better assess our students, not just by exam marks associated with answers to individual questions and solutions of specific, narrowly focused tasks. It is necessary to evaluate the student comprehensively, based on the results of solving urgent, complex tasks related to real-world problems and practical needs, requiring research and experiments, based on knowledge and competencies in several courses.

3 Online Learning in the Context of COVID-19 Pandemic

Many educational institutions in the world, including the Financial University, have switched to distance learning, both when conducting lectures and seminars and when taking tests and exams, coursework, and final qualification works. Such a transition is a forced measure aimed at reducing coronavirus spread, preserving students' and their teachers' health and lives.

According to many testimonies of teachers, students, and their parents in Russia, the learning process transfer to a distance format was painless. However, it was not devoid of some roughnesses and overlaps. Educational institutions had to quickly ensure the availability of information technology resources that allow working remotely. It was required to purchase licenses for specialized software for all participants in the educational process, purchase and update network equipment, multimedia tools, and increase network bandwidth. It was necessary to provide teachers and students with visual presentation materials and video instructions to master the technology of online training sessions independently or with the help of volunteers or participate in them.

It was also required to organize in a pandemic the uninterrupted functioning and interconnection of the university's structural units, their well-coordinated and efficient work, and operational availability to solve emerging urgent problems, when most of the employees were forced to be outside the university, in isolation. The generalized IT landscape supporting the educational process is shown in Fig. 1.

For the teaching staff, distance learning technologies are characterized by some more features. Changes in pedagogical methods of presenting educational material are required. Compared with traditional teaching technologies, it is necessary to work out new ways of organizing feedback with students and monitoring the assimilation of the teacher's questions. The forms of consultations, acceptance of tests and examinations, and other control means should be improved.

The quality of conducting distance learning largely depends not only on the teacher's professional and methodological skill and the students' activity but also on the capabilities of specialized packages that provide remote work, from stationary computers and mobile devices operating on various operating systems on the Internet.

At the Financial University, most lectures, seminars, and other classes are conducted on the Microsoft Teams platform (Fig. 2).

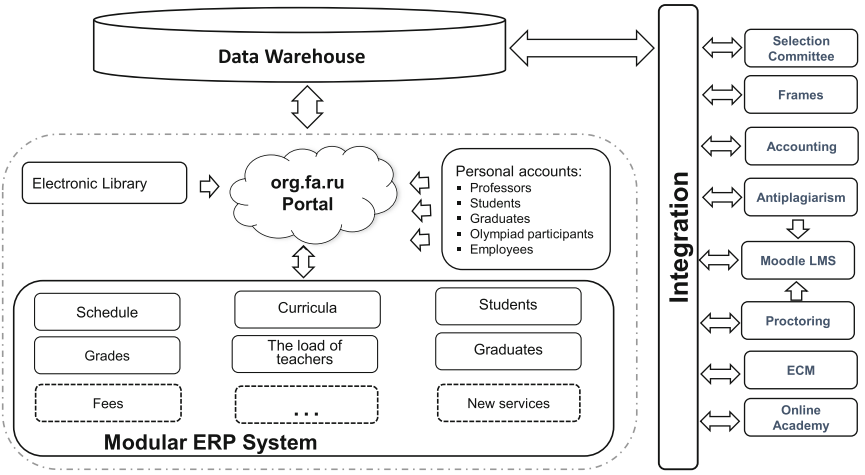

Fig. 1. Generalized IT landscape supporting the educational process.

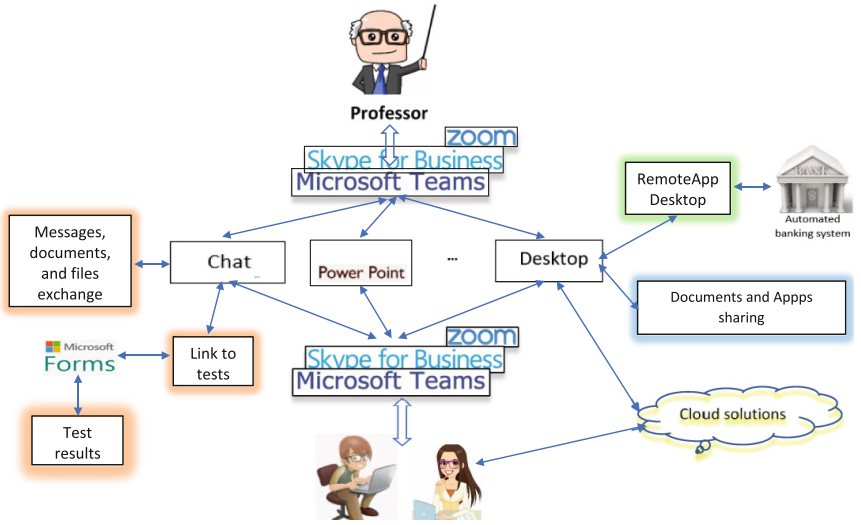

Fig. 2. General scheme of online learning at the Financial University.

Microsoft Teams allows professors and students to demonstrate presentations and different software during meetings and videoconferences. While all the standard classes in the Financial University during the pandemic were conducted on the Microsoft Teams, we also used Skype for business for staff internal meetings and Zoom for some research conferences.

Assignments to students can be issued during classes using standard LMS tools or OneNote Class notebooks. The use of videoconferencing in some cases requires an addition. Thus, studying Banking information systems, or Accounting, involves using an automated banking system or accounting software. We use Microsoft RemoteApp technology to give each student the ability to use remote applications with the same look and feel as local applications.

4 Discussion

The forced transition to the widespread use of online learning tools and distance educational technologies in 2020 caused a profound and complete rethinking of the university digitalization agenda issues. Understanding the strengths, weaknesses, opportunities, and threats associated with digital transformation at the present stage has radically changed.

Many challenging questions that had previously been heatedly discussed faded into the background or changed their meaning:

- the required level of IT competencies of teachers and students to participate in the educational process using distance learning technologies;
- equipping teachers and students with technical means and communication channels;
- choosing a platform for conducting the educational process, etc.

In the context of a real uncontested transition to the use of distance learning technologies, all these issues turned out to be solvable and not crucial.

At the same time, there was a rethinking of the value of distance learning technologies' widespread introduction. We can state that, contrary to the forecasts of ardent supporters of the use of digital tools, such a general use of distance educational technologies did not entail revolutionary changes in the university process management system. The formed competence in the field of digital technologies creates new challenges and tasks.

4.1 Digital Footprint Continuity

During the period of widespread use of distance technologies, the practice of forming a digital footprint about training has developed. Data about all classes conducted using Microsoft Teams fell into a single registry. Now you can set the time of the classes, the participants, the end time. Video materials have been generated for many lessons. Operationally, the management staff of departments and faculties could connect to classes and control the conduct.

Obviously, it is required, on the one hand, to maintain the level of managerial accessibility of the educational process and continue the accumulation of factual data on the educational process. On the other hand, we need to organize systematic analytical work aimed at finding hidden growth points. Thus it is necessary to preserve and expand digital tools for managing the educational process.

Analytical tasks need to be transformed from a narrow function of a small group of people into daily functions of each employee responsible for making any decisions, both in the learning process and in the university as a whole. In the target model, each decision-maker must be provided with independent direct access to the data necessary for analysis and subsequent decision-making and must also have the competencies required to work with such data.

Unfortunately, nowadays, significant amounts of information remain not analyzed yet for technical and organizational reasons. That, of course, is a growth point for the university both in managerial and academic terms.

4.2 Continuity of Technologies for Learning Process Organization and Implementation

Using webinars to conduct teaching during the pandemic has been very often criticized. Undoubtedly, this tool's full use cannot wholly replace the educational process in its classical understanding. At the same time, the infrastructure created at the university already makes it possible to combine webinars and classical classes effectively. The Financial University effectively operates a toolkit that allows you to control the online and hybrid learning process. The use of webinars in the conditions of professors' full methodological readiness for many classes may be preferable. The universities now have all the tools and skills for organizing, coordinating, and monitoring webinars. Now it would be advisable to find a new meaning for the experience gained by such labor.

4.3 Openness and Publicity of Learning

The learning process during the pandemic became public. University leadership, students, faculty, and staff observed training and exams previously limited by the classroom door. It became possible to compare formal educational content and the methodology of its presentation by professors. It creates new requirements for teachers in terms of preparation for online classes.

When classes can be explicitly or hidden recorded, additional work is required to develop and improve the presentation and teaching materials. The openness of online classes can and should be transferred into our classrooms, allowing us to guarantee the educational process's quality and effectively combine distance and classical technologies.

In this regard, the task of total equipping all classrooms with video cameras and sensitive microphones is of particular relevance. Such a solution was developed in the Financial University in 2017 and installed in one of the university buildings [13]. Still, in the last months of the pandemic, it was decided to implement it everywhere. It will also allow, in the event of new episodes of infectious diseases, to organize the learning process with less human and financial costs.

Of course, the learning process's new needs also require activating the teaching staff's advanced training based on digital tools.

4.4 Ethics in the Digital Space

During the pandemic, we also faced problems in terms of ethics of relations in the digital learning environment. We managed to effectively and quickly solve the sensational issues related to pranking in online classes.

However, at the same time, it is necessary to revise the regulations that separate digital freedom from digital hooliganism. We need to develop well-established mechanisms for representing each person in the digital walls of the universities.

Now we are forced to attend to what we previously considered entertainment or irrelevant issues: the image on the "avatars," the rights of access to publishing content in lecture materials. Now, in calm conditions, it is necessary to develop operating mechanisms for years to come.

5 Conclusion

The COVID-19 pandemic has forced educational institutions worldwide to switch to remote education urgently. In many universities, in which the learning process transformation strategy into the digital environment has been actively developing over the past years, this process was almost painless. At least at first, some educational institutions faced specific difficulties and problems – lack of appropriate technical means, insufficiently high IT qualification of individual teachers to work in a virtual environment, lack of audiovisual content in the courses taught, Internet failures, and low bandwidth. Nevertheless, over time, the problems were resolved positively. Ultimately, in most universities worldwide, the learning process in the distance format was assessed positively both by the teaching staff and the students.

There is a need to conduct a serious analysis of what happened to us in 2020, but today we can state the following:

- one of the most important conclusions is that any sane person comes to is the indispensability of personal communication, which is the basis of the university's activities; whatever changes take place, higher education will remain a school of interaction between the professor and the student, students with each other, as well as professors with each other;
- education in the future will be as a complex system that combines artificial intelligence, virtual reality, online courses, and much more; today, students can take all kinds of online classes on different learning platforms, and then they can choose online courses from teachers of their choice; an automatic test system can put assessments;
- universities without online courses will become uncompetitive and may subsequently disappear since they will not be in demand;
- companies and their employees are interested in new technologies to increase profits and, accordingly, bonuses, and employees of educational institutions will not receive any bonuses from the introduction of innovations; the introduction of new technologies in universities, on the contrary, can lead to staff cuts, which does not stimulate the active introduction of those very innovations; hence the unwillingness to take risks and change the methods of work that have been developed over the years;

- the experience of conducting two exam sessions led to the conclusion that the existing assessment system, transferred to existing technologies, showed ineffectiveness; intermediate or final testing is now challenging, if not impossible, so we need to look for new forms of knowledge assessment;
- there will be a reduction in classroom activities, primarily a reduction of lectures, which should lead to an active transition to project work based on real facts.

As a result of the Covid-19 pandemic, there has been a large-scale transition to online learning. As it is mentioned in [15], educational institutions started with establishing the instructional continuity, and then started to develop new instructional design and AI-enabled innovations.

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