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# Digital universities in Russia: digitization with extra speed

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**Abstract.** The education sector is subject to significant changes due to the increasingly active spread of digital technologies. Usually, the trends in the implementation of digital technologies in educational and research activities are set by commercial organizations – private universities, business schools, corporate universities. But public universities and institutions start to think more and more about digital transformation. However, evolutionary path of universities' digitization was destroyed by the spread of Coronavirus (COVID-19). It was decided to completely close universities, all students started to study from home. In this paper, we aimed to start a discussion about distance learning satisfaction among professors and lecturers; understand their vision about e-learning and the current stage of universities' digitization. After examination of the current state of university digitization, we have identified major problems which become an obstacle during pandemic.

**Keywords:** Digital technologies, digitization, digital university.

## 1. Introduction

The modern world is constantly changing. Innovations are being introduced into various spheres of human activity, which, on the one hand, directs people to continuous development, enhancement their knowledge, skills, competencies, acquirement new types of activities in related sectors of economy. On the other hand, routine work is increasingly transferred to machines, and a person is required to be creative, actively collaborate with colleagues in a search for new solutions, and most importantly have an ability to evaluate information offered, both for its reliability and for logical embedding in current task.

International studies show the lack of highly qualified specialists in most countries. According to Korn Ferry, global human talent shortage will amount to 85.2 million people by 2030. Most (74 percent) of leaders of largest organizations in the world believe that technologies will make a greater contribution to creating business value than the human factor in the future. At the same time, highly qualified personnel are going to be in a high demand [1].

Certainly, innovative methods and technologies are increasingly being introduced into the modern education system, allowing to strength the practical orientation [2]; as well as the emergence of a global knowledge system and information and communication technology represent global forces affecting the higher education [3]. At the same time, it can be noted that the informatization stage is at the final step, since all educational institutions are equipped with computer technology, and teachers and students use information technologies in the educational process (computer classes, internet, mobile applications) [4].

In early March, UNESCO published a report on the rapid transition to distance learning during the active spread of the coronavirus. At that time, in 22 countries around the world, it was decided to partially or completely close schools and universities, about 290 million children studied from home. Absolutely, this is a huge challenge for the entire education system. The People's Republic of China was the first country switched abruptly to online education. The Ministry of Education of the country issued a Guide to the organization and management of online education in colleges and universities. It dealt with free online courses, measures to ensure the quality of education, the rapid opening of a national online learning platform, and the translation of paid educational services platforms into a free format.

From 16 March 2020 the largest Russian higher education institutions switched to a distance education and training in order to prevent the spread of a new type of coronavirus (COVID-19) in the Russian Federation. Undoubtedly, this was a revolutionary step that changed the situation in the industry, what is called "in one day". On 23 April 2020 online lectures are held throughout the country, more than 80% of universities have implemented distance learning.

Our aim in this study was to start a discussion about distance learning satisfaction among professors and lecturers, understand their vision about e-learning and the current stage of universities' digitization. To our understanding, students have long ago been ready for the transition to distance education. But some teachers lack experience in a virtual environment, as well as relevant teaching materials.

The paper proceeds as follows. Section 2 reviews model of digital university, states main principles. Section 3 provides information about data and methodology; we based our research using experience of the Financial University under the government of the Russian Federation and the State University of Management. In Section 4 we made an attempt to evaluate results, summarize main problems and brief conclusions.

## 2. Literature Review

In our opinion, it would be a mistake to call any university digital only if it has introduced any digital technologies, or a university that trains personnel for the digital economy. Digital University involves the restructuring of internal business processes based on the introduction of modern digital technologies.

Since today in Russia there is no conceptual model of a digital university, we have formed a conceptual model of a digital. Digital University Conceptual Model consists of five levels and a supporting platform [5].

The first level is the most important; it is represented by scientific and pedagogical staff, students, industry and academic partners of university, graduates and applicants. The first level is, in fact, internal and external stakeholders of a university.

The second level is represented by basic information services. Their task is to create a single information space for digital interaction within university using flexible tools. Examples of such services are video screens for lectures and seminars, wireless communications throughout the university (including dormitory), cloud storage for keeping and exchanging data, professional printing etc.

The third level includes services that greatly facilitate the lives of students and teachers in a modern university. For example, a digital library, international databases, etc.

The fourth level is the most resource-intensive in terms of implementation, but at the same time it allows a university to get the highest added value. It consists of services such as digital marketing, research project management, procurement management, interaction with applicants and students.

Digital marketing is a new field for Russian universities aimed at solving the following problems:

- organization of interaction with the teaching support staff, students, applicants, graduates using the entire modern spectrum of digital communication channels;
- monitoring changes in the perception of the university brand in the target markets based on the results of research and monitoring of social networks; conducting preventive and reactive measures to form a positive image of the university;
- stimulating the creation of new digital communities and innovations at all stages of the educational cycle, as well as communication of the content of educational programs and features of student activities for applicants;
- development of personalized marketing materials for target audiences based on analysis of data from various sources.

Interaction with applicants and students includes the following tasks:

- use of digital technologies to interact with applicants and inform them about the stage of processing applications for admission;
- usage of analytics to determine the most promising applicants and increase their enrollment rate;
- use of various communication channels both digital and traditional in order to provide applicants with the most complete information about the university. This task is most relevant for foreign applicants who cannot visit the university and want to form an idea of it using information from the Internet;
- using analytics to identify the most successful and least successful students;
- automation of work, for example, the creation of a “digital student office”.

The fifth level consists of digital technologies, which are highly likely to be widely used in the university environment. Such technologies, for example, include drones (unmanned aerial vehicles). In this context, as a first step, universities will actively introduce drone technology into the internal educational and research space, purchasing equipment, setting up laboratories, encouraging students and researchers to test and work with new technology.

A transition to a digital university is impossible without supporting activities aimed at introducing changes at the university. Such events may include:

- development of an optional or compulsory module in the framework of training programs aimed at improving digital literacy among students;
- providing support to scientific and pedagogical workers who set trends in the development of digital skills and are engaged in the development of innovative teaching methods;
- encouraging the advanced use of learning platforms to ensure better student learning outcomes and improve the overall performance of the university;
- assisting teachers with less advanced digital skills.

In our opinion, a university should adequately work with all levels of the digital university model described before and constantly maintain feedback with key stakeholders - students, teachers, industry and academic partners, graduates, and applicants. We emphasize that while creating a “digital university” it is necessary to create a new digital environment that provides learning mobility and new format for students to communicate with teachers and potential employers, university management. The main goal is to make this environment comfortable for everyone, to take into account the individual learning path.

The principles of digital university should be:

1. Educational trajectory. Online courses, blended learning, flexible educational paths.
2. Information content. Creation of services – an online schedule, a single authorization system, a digital portfolio, the integration of information systems into a single space; system of personal accounts, full automation of the university.
3. A new system for assessing achievements. Multivariate assessment based not only on traditional performance indicators such as the total number of teaching staff, Scopus publications per 100 teachers etc., but also on data on training, knowledge of foreign languages, as well as soft and digital skills [6].

The components of a digital university should be:

- An electronic educational environment, including online courses, blended learning courses for the main educational programs of students, as well as a digital portfolio, electronic ordering of books, electronic individual curriculum, etc.
- Online courses for various categories: applicants, students, managers and teachers of educational organizations.
- Creation of the portal "Open educational space".
- Creation of an effective electronic university management system.

In general, it is necessary to create: a single educational ecosystem in which a system for assessing the quality of education will be created; personal educational portfolio based on blockchain technology, a system for assessing people's cognitive skills; service for building a personal development path taking into account professional orientation.

### 3. Data and Methodology

For our investigation we have taken the experience of State University of Management (SUM) and The Financial University under the Government of the Russian Federation. From 16 March 2020 both of them have started to work in online regime (including lectures, seminars, consultations, student conferences).

We have created the online survey in order to highlight the main difficulties and obstacles professors have faced with. We intentionally did not conduct a student survey, since we believe that it was the teacher who was unexpectedly assigned an unusual role - to transfer the teaching process to digital tracks in lightning fast periods.

The population in this survey was lecturers and professors of State University of Management (SUM) and The Financial University under the Government of the Russian Federation. This was a study where 64 professors were surveyed from 12.04.2020 to 23.04.2020. They belong to different departments and chairs.

We have created a survey based on research made by Yuen and Ma (2008) with paraments, namely perceived ease of use and computer self-efficacy [7]. Each question was scored using a 7-point Likert scale where 1 = strongly disagree and 7 = strongly agree (1: Completely disagree; 2: Disagree; 3: Somewhat disagree; 4: Neither agree nor disagree; 5: Somewhat agree; 6: Agree; 7: Completely agree), which is more frequently used in different investigations.

We selected a total of 7 items for the constructs that were incorporated in the survey, which are included in the following Table 1:

Table 1. Questions for survey

| <b>Perceived ease of use</b>  |  |
|-------------------------------|--|
| 1.                            | Learning to use internet programmes for online lectures and seminars was easy for me   |
| 2.                            | I find it easy to interact with computer/mobile devices  |
| 3.                            | Generally, I consider that computer/mobile devices are easy to use   |
| <b>Computer self-efficacy</b> |  |
| 4.                            | It was easy to integrate internet programmes for online lectures and seminars  |
| 5.                            | I can design materials and activities for integrate internet programs for online lectures and seminars without external help   |
| 6.                            | In the beginning of the online lectures and seminars I had enough technical facilities (own computer, microphone, camera etc.) |
| 7.                            | In the beginning of the online lectures and seminars I had enough technical support from university staff                      |

As well as we used perception of digitization of lecturers and professors. In terms of the formation of an electronic university in Russia, on the basis of our research and model presented in part 2, we have formed the main eight criteria for the implementation of this concept. Each scale has a range from 0 (not exist at all) through to 100 (maximum level of implementation). Google-form, a web-based survey program, was used to collect data because of simplicity. Later, we performed a

comprehensive analysis of the selected constructs and obtained results. The response rate was 100%.

We did not analyze the data using structural equation modeling as we perceived that not that much time has passed from switching to a distance education and training in order to prevent the spread of a new type of coronavirus (COVID-19) and it would be too early to build reliable statistical model.

#### 4. Results

The mean scores for all variables were generally high, ranging from 5.20 to 6.40. The mean scores for variables «perceived ease of use» were around 6.7. This means that teachers were emotionally prepared to teach online.

As for computer self-efficacy, around 80% of lecturers and professor completely agreed that in the beginning of the online lectures and seminars, the technical support from university staff was effective. They were provided with electronic schedule including links to start process of teaching, free access to different programs (Microsoft Teams, Skype, Zoom etc.), an intranet with chat.

The key problem that we have discovered was the lack of technical equipment. Many teachers did not have devices at home that may be needed to work online. For example, a graphics tablet, microphone or camera. Whereas in normal regime (without carnitine), teaching staff are provided with lecture studios, it was not possible in a pandemic era. Our investigation is consistent with results obtained by previous researchers who found that ease of use were critical factors in the use and adoption of e-learning among educational organizations.

The perception of current stage of digitization of Financial University under the government of the Russian Federation (FU) and State University of management (SUM), assuming the maximum target of 100 per cent is presented in Table 2.

Table 2. Current stage of digitization

| Criteria   | 2019 |     | 2020 |     | Target |
|--|------|-----|------|-----|--------|
|  | FU   | SUM | FU   | SUM |        |
| 1. The use of federal state educational standards or own standards in terms of requirements for the formation of digital economy competencies for higher education                           | 90   | 90  | 95   | 90  | 100    |
| 2. The educational programs of all levels of education have been updated in order to use in educational activities common and professional digital tools                                     | 90   | 80  | 80   | 80  | 100    |
| 3. The legislative and regulatory legal framework has been updated in terms of organizational and methodological conditions, certification forms, subject programs, teaching materials, etc. | 90   | 90  | 60   | 60  | 100    |
| 4. Creating a complementary education system to train competent professionals for the digital economy  | 80   | 70  | 80   | 70  | 100    |
| 5. Development or selection of an information system for supporting an individual student competency profile   | 50   | 30  | 60   | 40  | 100    |
| 6. Using e-learning technologies   | 80   | 70  | 80   | 80  | 100    |
| 7. Development and implementation of education programs, professional retraining, continuous professional development of teaching staff  | 70   | 60  | 50   | 50  | 100    |
| 8. Creating infrastructure for the management and activities of the university in the conditions of digital economy  | 90   | 80  | 70   | 70  | 100    |

The analysis shows that the process of forming an electronic university progressed quite successfully, especially in the field of the legislative and regulatory legal framework, creation of federal state educational standards which include formation of digital economy competencies for higher education (90% for both universities).

At the same time, one of the main problems is the creation of an individual learning path, personnel and technical problems. Level of development or selection of an information system for supporting an individual student competency profile in State University of Management is only 30% (in 2020 this figure is equal to 40). Moreover,

professors' perception of digitization if universities is on average less than our investigation made in 2019 [5].

The effectiveness of distance learning depends on three main parameters: information infrastructure of the university, digital literacy of teachers, online services used by universities. In our opinion, only leading Russian universities possess all three parameters. The main problem in the eyes of the professors was the lack of the necessary technical equipment (especially at the beginning), as well as the lack of training in order to increase skills in teaching online.

As for all others universities there is also the problem of a lack of personnel (both employees and teachers) who are ready and able to carry out an effective digital transformation. In addition, some students demand a proportionate reduction in tuition fees due to the transfer of classes to the online format. Students are unhappy with the fact that initially they paid for full-time or part-time study, and not for the distance format of classes. Therefore, students demand to return half of the amount paid for the current semester or to make a 50% discount for the next semester.

The second major problem is the lack of a single standard for digital solutions and formats - electronic courses, common platforms or requirements for the compatibility of individual services, the lack of harmonized requirements and quality standards for electronic content and online courses, as well as the unresolved issues of digital transformation of the education system. The level of digitization in Russian universities is very different. Universities seek to build these competencies and pool resources to increase competitiveness. However, there are still no unified standards for connecting data and services, and this seriously hinders the development of universities.

## 5. Conclusion

In the context of globalization and the development of information technology, universities are becoming the center of the construction of new economic concepts based on knowledge and associated with the transition from the computerization of individual business processes to the digitization of business models. During the study, we noted that the digitization of education been at the early stages of implementation enhanced its speed due too unpredictable and unexpected reason –virus. It exacerbated existing problems such as an absence of developed universal criteria for assessing the quality of the digital format of teaching various disciplines; lack of understanding of the mechanism for creating a system for implementing a digital environment in an educational institution. Moreover, only leading universities have highly qualified specialists with a sufficient set of competencies to provide the very same quality assessment of these disciplines.

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## **Aims and Objectives**

Published online by ICS two times a year, Journal of Digital Science (JDS) is an international peer-reviewed journal which aims at the latest ideas, innovations, trends, experiences and concerns in the field of digital science covering all areas of the scholarly literature of the sciences, social sciences. The main topics currently covered include: Digital Communications and Network; Digital Economics, Education, Engineering, Finance, Health Care.

The main goal of the journal is the effective dissemination of original incites/results generated by the human brain and presented/reflected in articles using modern information/digital technology.

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