Digital Transformation of Educational Services in COVID-19 Pandemia: Social and Technological Aspects

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Abstract

This article focuses on the socio-technological aspects of the digital transformation of education as the most critical and relevant subject in the context of a pandemic COVID-19. The purpose of this study is to identify the problems of digital transformation of educational services and the factors that determine its prospects based on an analysis of the technological and social aspects of digital education during the emergency transition of the higher education system to distance and online education in the context of the COVID-19 pandemic. The methodological basis of the study was the theory of marketing, information technology, educational sciences, sociology, as well as desk and field marketing research of the behavior of international and Russian digital consumers of educational services. The main findings of the study were: presentation of the author's definition of the category "digital consumer" and updating the definition of "consumer behavior" in the context of digital consumption; systematization of digital resources for online learning, based on the involvement of universities in the academic and research multi-gigabit Internet network; setting the global social and technological problems based on the "digital divide" (digital gap), insufficient security and protection of personal data of students and teachers, and the social well-being of digital consumers; the features of the behavior of the digital consumer of educational services were revealed; the socio-technological factors influencing the prospects for the digital transformation of educational services have been identified.

Key-words: Digital Consumer Behavior, Technological Infrastructure, Digital Divide, Digital Gap, Social Well-being, Digital Transformation Challenges, Digital Education Prospects.

1. Introduction

The digital transformation of education and learning models, which dates back to the 50-60s of the last century, has been accelerated in the context of the COVID-19 pandemic. Before the pandemic, online education in the higher education system accounted for a very small share - less than 3% of the total volume of educational services. This also determined the low share of Internet use for distance learning by Russian students - only 4%. Meanwhile, in countries with a developed economy, this percentage was 14-20% [28]. The pandemic has forced the global academic community to explore new ways of teaching and learning of principal of distant and online education in extreme conditions. That turned to be a tough task for both students and educators, who have had to deal with emotional, technical, social, and economic challenges while dealing with the virus threat.

In the context of the COVID-19, higher educational institutions of all countries were urgently forced to transform traditional learning models and switch to the distance learning mode through online platforms. In such conditions, the concept of digital education and digital consumer of educational services has become not just a fashionable trend in education, but an urgent need.

Since the essence of the digital transformation of educational services is the achievement of high educational results together with the movement towards personalization of the educational process through the use of digital technologies, it becomes extremely important to study and understand thedigital consumer and his behavior in the decision-making process.

There are no certain definitions of the phenomenon of "digital consumer" in the available scientific and practical literature on marketing, information technology, and educational sciences. Due to the analysis of various approaches to the definitions of the concepts of "consumer", "digital literacy" and "digital consumption" [14,20,28], we can assume that a digital consumer becomes the subject of exchange relations with knowledge, skills, and abilities that are necessary for the safe and effective use of digital technologies, as well as Internet resources for the purchase of goods and services to meet needs, gain benefits and values.

From our point of view, the definition of the "consumer behavior" concept developed by John Howard and Jagish Sheth in 1969 [7] and defines the behavior of a digital consumer nowadays, is still very relevant today - it is "a decision-making process associated not only with an abstract activity, or its physical manifestation but also with intellectual efforts." The intellectual efforts of the digital consumer are expressed in the search for information using digital devices, social networks,

and media, the performance of financial transactions, online shopping, the storage of information, as well as its critical perception. The decision-making process for the modern digital consumer is characterized by appealing up to the 9 digital channels average.

The digital transformation of educational services in the context of an emergency transition of the higher education system to distance and online learning can be considered in different aspects: technological, social, cultural, economic, psycho-emotional, personal, etc. In this article, the authors focus on the technological and social aspects of digital transformation training as the most critical and relevant in the context of a pandemic.

The purpose of the study is to identify the problems of digital transformation of educational services and the factors that determine its prospects based on an analysis of the technological and social aspects of digital education during the emergency transition of the higher education system to distance and online education mode in the context of the COVID-19 pandemic.

Research objectives:

1. Conduct a literature review on the problems of emergency inrollment of online platforms into the educational environment, identifying the possible socio-technological consequences for the main participants in the educational process.

2. To systematize digital resources for online learning based on the involvement of universities in the academic and research multi-gigabit Internet network.

3. Analyze the phenomena of the digital gap and the social well-being of consumers of educational services.

4. Analyze the results of desk and field marketing research of digital consumer behavior in the context of the transition to digital learning.

The scientific novelty of the study is expressed in the socio-technological approach to analyzing the problems of digital transformation of educational services in the context of the COVID-19 pandemic and identifying factors that determine the prospects for digital education.

The authors formulate the following research question: what social and technological phenomena accompany the process of digital transformation of educational services?

2. Brief Literature Review

The current research results and literature on the topic of digitalization of education is full of promises of rapid development of "self-directed" and "independent" e-learning. Many problems in higher education are associated not only with the fact that students have unlimited access to the growing Internet resources but also with the actual digital competence of students [25,28, 29,33].

There are many studies devoted to the issues of digital multitasking in the theory of decision-making in the educational process [4,5,21]. Most often, economists proceed from the following idea: each person solves the problem of switching attention and determines the method and speed of information transmission at the moment when he is forced to make a quick decision or prioritize actions [29]. With the concept of "multitasking" in such studies, the concepts of "information overload", "switching attention" [22], "interruption of attention", "cognitive overload" [12] are also used. While arguing that digital technologies are changing the traditional roles of the teacher and student, it is necessary to clearly understand what effects arise when digital technologies are applied in the classroom [25,32].

D. Willingham argues that the use of digital technologies by an educator does not mean that students will do better [33]. Moreover, the influence of digital technologies and how they may be used to benefit students' academic performance are not always self-evident to the educator. Sometimes, different learning outcomes are rooted not in the strengths or weaknesses of digitalization, but as differences between students. In a multimedia environment, understanding and interpretation of content occur differently than in traditional conditions [1]. The transition from a two-dimensional picture to a three-dimensional and moving video sequence can also create problems of perception of content for some students [33].

Most of the research is carried out from the standpoint of the methodological dogma of "operationalism" which is a common setting in anthropology, psychology, pedagogy, widespread in the XX century and consisting in the fact that the researcher fixes the actions of people in different ways (photo, audio, video), and then analyzes them, applying certain approaches [8,12]. Operationalism has a strong side: it is impossible to imagine the consequences of applying digital technologies in the classroom without analyzing the actions of students. Automatic use of a certain set of old and boring concepts, sounding banal thoughts, formed almost a century ago [24]. In these conditions, the real picture of digital multitasking is simplified or distorted. There is a feeling of the unimportance of observations and conclusions [21]. It is no coincidence that digital multitasking

appears in articles in the paradigm of collecting exotic technologies and devices: "laptop in the classroom ...", "smartphone in the classroom ...", "interactive whiteboard in the classroom ..." ... "[32].

The nervous tension is aggravated if the student uses various digital technologies and mobile devices in the classroom. K. Jones [8, 11], in addition, digital multitasking is potentially destructive for students [3,32].

Actual research presents the results of empirical studies of the education system in the context of ensuring the global competitiveness of Russian education through comparative statistics and analysis of the world practice of education development [4,15,20]; summarizes data on the use of digital technologies in education, on the difficulties and prospects of its digital transformation [21,24]. It also notes a significant contribution to the digital transformation of education by leading high-tech companies: Microsoft, Google, Facebook, Netflix, etc. which have called for the spread of new approaches to learning lately, and the funds they manage allocated significant funds to support such projects [1].

The Marketing Department of the PRUE G.V. Plekhanov has been conducting a scientific discussion about the changes that have recently taken place in the higher education system for a long time [17,18,25,28,31]. In particular, the practice of training and advanced training of personnel for innovative educational activities is being studied [17, 18]. Integration into a regional educational cluster is not only seen as a kind of formal unification of various structures of the well-known triad "education-science-production" but also as an innovative form of combining their potentials to achieve a synergistic effect in solving strategic goals and objectives [25].

Along with this Irina Skorobogatykh who represents the first Russian department of marketing at the Plekhanov Russian University of Economics and its 30 years of marketing education experience, points the implementation of modern challenges by improving the educational process by the tasks of the current time, she considers increasing practice-oriented teaching at universities, the introduction of modern practical methods in the process of mastering special disciplines [28]. Her colleague T. Murtuzalieva analyzes the optimization model of creating an educational and methodological center at the university, providing training for students with special educational needs [17].

Murtuzalieva and Pogorilyak (PRUE) also raise issues of the quality of work of the teaching staff, offer the results of quantitative and qualitative indicators study of the activities of university

teachers, reforming the education system, the consequences of the crisis associated with the difficulties of adapting scientific and pedagogical personnel to the conditions and requirements of ongoing educational reforms, as well as issues of professionalization, autonomy, and responsibility of the teaching staff of the university [17,18]. The authors identify the most acute external and internal problems of the education system: the reasons for the emergence of a personnel crisis and ways to overcome the negative consequences of the globalization process in higher education; the introduction of a digital information environment in all areas of activity and the application of a strategy for the transition to a digital university; implementation of an independent assessment of the results of each scientific and pedagogical employee and his contribution to the development of the university. [17.18].

However, despite such a variety of educational issues discussed in the scientific community, the social and technological aspects of the digital transformation of educational services in the context of the forced transition of universities to the distance remain insufficiently studied, which actualizes the need for such research.

3. Methodology

The methodological basis of the study was the theory of marketing, information technology, educational sciences, sociology, as well as desk and field marketing research of the behavior of international and Russian digital consumers of educational services.

A conceptual research model for studying the problems of digital transformation in educational services and factors that determine its prospects during the emergency transition of the higher education system to distance and online education mode in the context of the COVID-19 pandemic is shown in Fig. 1.

Figure 1. The conceptual research model of studying the digital transformation of educational services in the context of the COVID-19 pandemic.
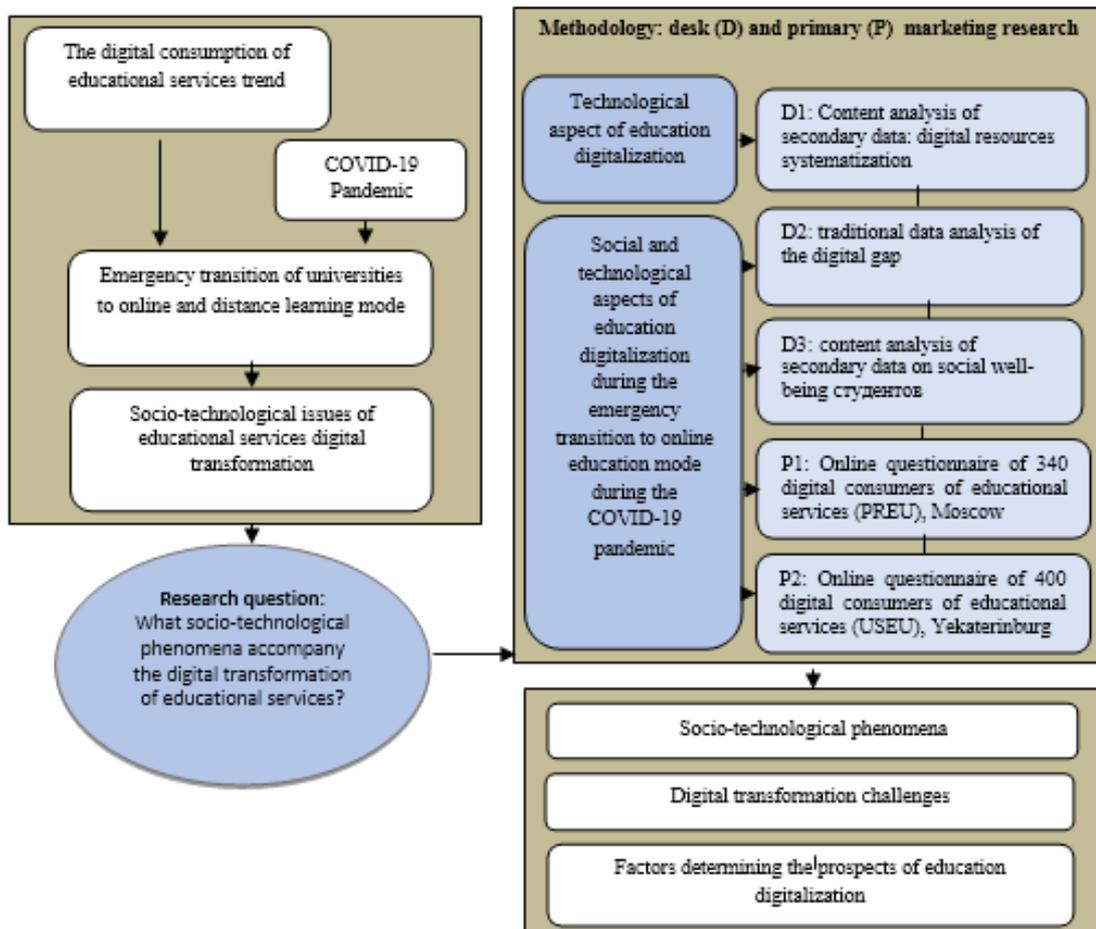
In the desk research, there were obtained secondary data on the state of the digital education infrastructure, social phenomena, and characteristics of the digital consumer behavior during the period of the extreme transition of higher educational institutions to distance and online education mode, which included three data blocks (Fig. 1.):

- the first block of secondary data on digital education resources: connecting higher education institutions to highspeed Internet, expanding wireless access zones, developing network services, using modern digital tools by all participants of the educational process;

- the second block of secondary data on the social phenomenon of the "digital divide" - the inequality of consumers of educational services in access to digital technologies;

- the third block of secondary data on the degree of satisfaction with educational services during the pandemic by international and local students. Secondary data were obtained in the process of analyzing the results of an online survey of international students conducted by Romanian

universities: Transylvania University of Brasov (sample size 405) and West University of Timisoara (sample size 357); the structure of the improbable (non-random) sample were: 89.9% - undergraduate students, 10.1% - graduate students. Other data were obtained in the process of analyzing the results of an online survey of Russian students by the RAEX rating agency on the sample of 6,000 students from 153 Russian universities in 2020; HSE and TSU on the sample of 35 thousand students from more than 400 universities in Russia in 2020.

In the process of the field study, primary data were obtained on the behavior of the digital consumer during the period of the extreme transition of higher education institutions to online and distance learning model (Fig. 1.).

The primary data were obtained by us based on an online survey of students of two Russian universities: the Plekhanov Russian University of Economics in Moscow (sample size 340) and Ural State Economic University in Yekaterinburg (sample size 400). The structure of the non-random sample were: 70% - undergraduate students, 30% - graduate students.

4. Results

4.1. Results of desk research: the first data block

According to UNESCO estimates, more than 1.5 billion students in 165 countries did not attend university due to the COVID-19 pandemic in 2020 [5]. The speed of transition to online education of universities in this period was determined by the level of government investments in digital technologies and their inclusion in the academic and research multi-gigabit Internet network, which connects hundreds of thousands of educational and scientific organizations around the world.

The National Science and Education Networks for Science and Education (NREN), as part of the global academic and research Internet network, are special Internet service providers and were designed to support the research and educational communities. National science and education networks around the world are linked to the global network through regional networks such as GÉANT - European Academic and Research Network, NORDUnet - Scandinavian Backbone Network, APAN - Asia-Pacific Expanded Network, ASREN - Arab States Research and Education Network, etc. [5]. In addition to being able to connect to the national network of science and education, higher education institutions can use the services of digital libraries, free or paid software, cloud services — for example, the ability to conduct video conferencing, information storage.

The Russian national network of science and education is represented by the research computer network (NIKS) is based on the integration of existing and traditional scientific and industrial educational telecommunication networks that have functioned for 25 years now. These network systems are The federal university computer network RUNNet (Russian University Network) and the network of organizations of the Russian Academy of Sciences RASNet (Russian Academy of Science Network). NIKS provides permanent, highly reliable access to the infrastructure of a network of more than 300 leading scientific organizations and higher education organizations for more than three million people. Due to this communication opportunity, Russian universities had switched to distance learning with fewer efforts [28]. National Networks for Science and Education (NREN) also plays the leading role in the development of international standards and systems to support online and offline learning.

One of the most famous systems is the service of safe and free international roaming in Wi-Fi networks for the scientific and educational community — "eduroam" (education roaming). This source allows students to connect to the Internet for free while using scientific, educational resources, and university services with seamless authentication anywhere. Now, eduroam access zones are deployed in more than 10,000 locations located in more than 100 countries around the world [5].

EduGAIN is another NREN's key service within the framework of an international project dedicated to the implementation of access to content, services, and resources of the global community of education and science. Out of the entire range of EduGAIN resources, the most popular are bibliographic and abstract databases of scientific publications Scopus, Web of Science, full-text databases of Springer, Oxford University Press, etc.

The COVID-19 pandemic has accelerated the digital tools and services integration in the education system. Up2U ecosystem includes a series of projects on the digital platforms used in the educational environment, launched by GEANT in 2017 [9,10]. The innovative ecosystem Up2U allows universities to implement LMS — a learning management system or distance learning system (DLS) in Russia. Learning Management System promotes more open, effective, user-friendly, and collaborative design, developing and consumption of digital content, and services specifically tailored for personalized or group learning of students.

Learning management systems (LMS) are characterized by a wide variety of platforms that can be classified according to some characteristics [9,11,15,21].

Table 1: Classification of LMS (Learning Management Systems)

Characteristics	Varieties of LMS (Learning Management Systems)		
	Cloud platforms	Server LMS	LMS and CMS (content management system) integration
How it works	It works on the principle of any web service - registering and gaining access to the services and information on the training portal. All information is stored on third-party servers	The LMS is installed out of the box on the organization's server. Employees enter the training portal using their corporate login and password. All data stored internally	When integrating, services become integrated into the CMS
Features	No need to install it on the company's server.	For installation, you need to register a detailed technical task, check the compatibility of the system with the organization's software, etc.	Focused on content developers, course layouts, and training project managers
Examples	iSpring Online, TeachBase, Loop, Learn Amp, Matrix, and others	Moodle, RedClass, Eliademy, Schoology, GetCourse, Stepik, and others	WordPress, Joomla, Drupal, Wix, and others

Source: Composed by authors

For distance learning, universities are using services for video conferencing and online meetings. The steady growth in video conferencing use over the past decade has been replaced by an avalanche of demand from universities for such services during the COVID-19 pandemic. For example, the largest growth in demand for video conferencing was observed from March 2019 to March 2020 in the following countries: Poland - 1,156%, Greece - 868%, Germany - 519%, France - 423% [15,21]. Table 2 provides a brief description of the most applicable videoconferencing systems in higher professional education characteristics [2,15,21].

Table 2: Video conferencing systems

Video conference system	Features
Zoom	Cloud platform for video conferencing, web conferencing, webinars, unified communications. It has several service plans, including a free option, which allows meetings with up to 1000 participants at the same time, a wide selection of tools.
Microsoft Teams	Supports up to 300 attendees with guest access, one-to-one or group video and audio calls, file sharing (2GB per user and 10GB per team), screen sharing, and document coloring using online Office apps. Integrated with Skype, Word, SharePoint, OneNote, Power BI.
BlueJeans Meetings	Video conferencing solution focused on instant connections using a mobile, desktop, or directly from the browser. It offers background noise suppression, integrates with conference room hardware systems, as well as enterprise applications such as Microsoft Teams, Slack, and Facebook Workplace.
GoToMeeting	An online web conferencing service that allows you to hold an unlimited number of meetings for a fixed monthly fee. It integrates with solutions and platforms from Office 365, G Suite, Salesforce, Zoho, and Slack. In addition to the option of saving video, you can save presentation slides and share them in PDF format.
WebEx	Full-featured HD video, desktop, and mobile screen sharing system. Provides access for up to 50 participants to the conference, meeting time is limited to 40 minutes. Works with all popular smartphones — iPhone, Android, Nokia, Blackberry
Join.me	Convenient video conferencing software for organizations on a budget. A unique interface, a possible number of participants up to 250 people, 50 GB of cloud storage, and recording capabilities.
Linkchat	Cloud service of Russian developers that does not require installation, registration, and settings. Works on mobile, desktop applications, or directly from the browser. Online meetings are held in virtual rooms, meetings are recorded, data is encrypted, and access is controlled. Cellular access is possible in the absence of Internet access.
Webinar.ru	Russian platform for webinars for training, presentations, or online meetings. It assumes a large number of participants, the subscription price is higher than that of analogs, a very limited functionality is offered at a free tariff. The platform can host meetings, interactive training in groups, in which each participant can be on the air. There is an interactive drawing board.

Source: Composed by authors

In addition to the growing demand for video conferencing systems and online meetings during the period of emergency transition to distance learning, the demand for some software functions has increased:

- presentation tools - 546% growth;

- tools of user interaction with the system - 600% increasing;

- automation tools - 1,310 growth% [2,15].

The IT infrastructure existing in universities and the activity in online learning also determine the degree and effectiveness of the mass-market open online courses (MEP) during the pandemic, the most popular are Coursera, Udacity, EdX [26].

It should be noted that the urgent transfer of education and learning system to a distance format in the context of a pandemic differs from a properly planned online and distance learning. The emergency transition of students to online education in the middle of the academic year without preliminary organizational training, proper technical support did not allow students of many universities to experience the advantages of online learning based on the learning management systems (LMS) described by us, video conferencing systems and other online services [2].

The effectiveness of domestic and international universities' transition to distance learning in extreme conditions during a pandemic is determined by the level of the university's will for a radical restructuring of the entire educational process. The universities' will to transform the educational process is directly proportional to the level of development of the information infrastructure, the provision of disciplines with electronic educational resources, the skills, and abilities of the teaching staff of universities in using digital platforms and services in the educational process.

Analysis of secondary data shows that the complete transition of universities to online education during self-isolation went almost seamlessly in Finland, France, and China, where this transition was overseen by the authorities [6]. The government's online learning support system included mobilizing all major telecommunications service providers to expand internet connectivity for online education, upgrading the bandwidth of major online education platforms, mobilizing community-wide resources to provide online courses, etc.

4.2. Results of desk research: the second data block

Based on the traditional and content analysis of secondary information, the authors obtained data on the social phenomenon of the "digital divide" or "digital gap", which allowed to reveal the

social aspect of the digital transformation of educational services in the context of an emergency transition to online and distance learning mode.

Simple switching the educational system of universities to the use of technologies and services for online learning does not guarantee a result adequate to the efforts of educational organizations, since online learning is primarily a cognitive and social process and not just the process of transferring information via the Internet on a variety of digital learning platforms.

Research conducted by international scholars confirms that access to online information has nothing to do with the Internet, but also deals with the cultural, social, economic, political, and linguistic contexts that determine the importance of the Internet in people's lives. Inequality does not exist in the digital world, but it does exist in society [13,16,23].

In a global context, the contradiction between the introduction of digital learning in developed and developing countries is growing [6,10]. Online learning requires long hours of work on the Internet, an autonomous and quiet place, a separate device intended for each student in the family, which is not available to everyone. For example, according to a study by the University of Hyderabad in India on a sample of 2,500 students, 90% of respondents have a mobile phone, but only 37% of respondents have access to online classes [9,14]. In many countries, including developed countries, students are involved in the educational process at their own expense or borrow devices from others.

Also, in many developing countries, students with different socio-economic backgrounds have to take care of their household, family members, and children while participating in online educational classes [11]. Today, scientists in many countries are paying attention to the catastrophic consequences of sudden mass online education due to exacerbated gender and caste discrimination. Female students continue to have to do most of the household chores in their homes, together with school assignments and preparation for academic qualifications, and isolation has increased this burden. This is confirmed by the report of the West Bengal State Women's Commission on the sharp rise in domestic violence during isolation [24].

Online learning allows the teaching staff and the student audience to look into the "capsule" of personal space, which students from low-income families may be ashamed of. Participation in online classes for students from poor strata of the population is accompanied by feelings of disappointment, shame, and discomfort. According to a study by Sarkar [24], the sudden shift to distance learning has heightened a sense of social inequality and vulnerability among learners. The pandemic has added

another reason to the number of reasons leading young people to commit suicide: the inability to attend online classes and continue their education [12].

Another social problem in the provision of educational services through online platforms is the poor security and protection level of students' and teachers' personal data during training [8]. A large number of students and teachers have encountered the presence of outsiders during online classes, insulting the audience and submitting obscene material. Moreover, students practically do not have the opportunity to complain about sexual violence, cyberbullying, inappropriate behavior, harassment, and abuse of their right to freedom of speech by third parties in the process of conducting online classes [24].

The pandemic has exposed deep-seated inequalities, hierarchies, and stratification between the wealthy and fewer resources provided in the education system. Public higher education policies must ensure that all students, especially those from the marginalized and poverty clusters, have access to higher education opportunities. However, the unforeseen, rapid spread of the pandemic did not allow most countries and universities to create an infrastructure of online education adequate to the tasks were set. The digital gap, exacerbated by the pandemic, is also negatively affecting higher education enrollment, and the lack of digital access further excludes low-income students from higher education in developing countries.

A marker of the effectiveness of the universities' transition to online education in a pandemic is the phenomenon of social well-being, characterized by diversity, complexity, and dynamism. One of the components of the integral assessment of social well-being is student satisfaction with the educational process. The authors of the article analyzed secondary and primary data on the satisfaction of international and Russian students with the educational process during the emergency transition to distance and online education.

4.3. Results of desk research: the third data block

Secondary data were obtained in the process of analyzing the results of an online survey of international and Russian students on a global and local university level. The analysis of these data expands the idea of the phenomenon of social well-being in the process of digital transformation of educational services in the context of an emergency transition to online and distance learning mode.

The main problems of online learning faced by Romanian undergraduate and graduate students [4] during the emergency transition to distance learning are technical problems and weak

Internet (69.4%), teachers' use of a limited number of tools provided by e-learning platforms (86.4 %), lack of adaptation of the teaching style to the online environment (22.5%), non-compliance by teachers with the training regime (32.8%), lack of balance between theoretical and practical classes (71.4%), high workload, which leads to a sharp reduction in free time (74.6%), the complexity of information processing in the e-learning system (60.5%) [4].

Graduate students (47%) were more open to using the online environment in the learning process and more satisfied with their online experience than undergraduate students (39.1%). Slightly more than a third of undergraduate students (37.4%) consider online learning a suitable environment for obtaining a quality education. However, most undergraduate and graduate students noted that learning online is more challenging than learning offline [4].

The study of the satisfaction degree of Russian students revealed, on the one hand, that the students' satisfaction with the organization of an emergency transition to distance learning both at the beginning of the pandemic and during the lifting of restrictions - 69% and 64%, respectively, on the other hand, students tired of the online format and problems related to this process [30].

The main problems of online learning that students faced during the period of emergency transition to distance learning are technical problems and interruptions to the Internet (52%), lack of communication with classmates (43%), lack of face-to-face discussions with teachers (41%). More than a third of students complained about the difficulty of learning at home (39%) and problems with concentration while studying the material on their own (36%). Another 34% of respondents encountered difficulty in answering the questions in the online format [30].

More than half of the students of the survey (65%) noted that distance learning is less effective than classic learning. Another 58% of respondents noted that they began to postpone tasks for later, and a third (34%) experienced trouble sleeping. At the same time, more than a third (43%) became less tired of studying after going online [30]. These results correlate with experimental studies carried out in Russian and international universities, showed that the effectiveness of online education in some point even more effective than traditional full-time education mode in terms of educational results [30].

4.4. Results of the Field Study

The primary data analysis of the consumer behavior and their satisfaction by the educational services allows us to reveal both social and technological aspects of digital transformation of

educational services in extreme conditions. The results of the study were expressed in the following data.

The main digital technologies used by university students are personal accounts (88,5%), searching for the schedule at the university's website (85,2%), uploading work to the electronic portfolio (77,0%), using the website (73,8%), and distant learning platforms (75,4%) (fig.2).

Figure 2: The digital technologies, used in the process of studying, %
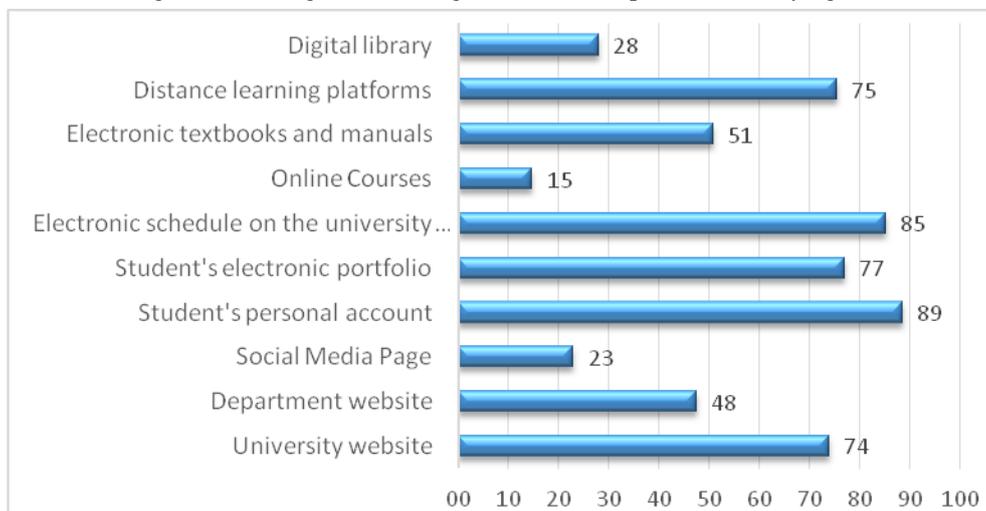
Taking advantage of digital technology students track their academic performance – that's the most important information for them (95,5%). Then, they look for the task given by their teachers (83,6%). Third, they track schedule changes (77,0%). Around one-fifth of the students are interested in the information about future professions published on the university's website (18,0%). (Fig. 3).

Figure 3 The most relevant information for students while using digital technologies of a university, %
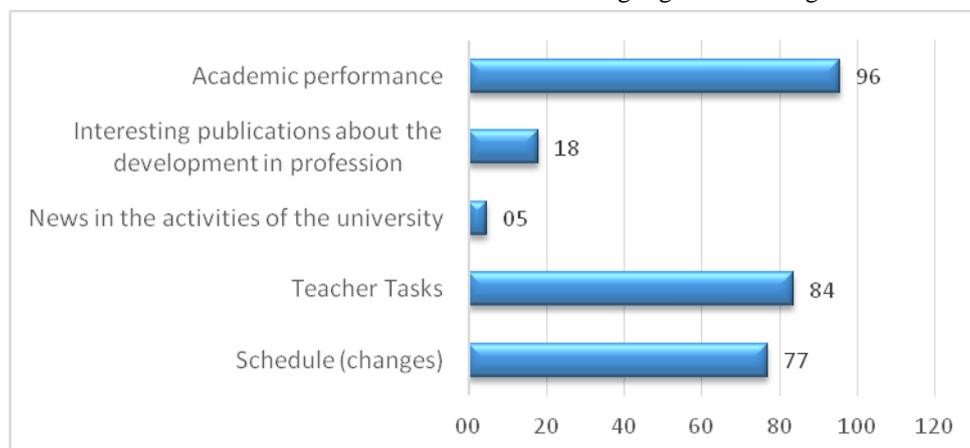
Students' assessment of the degree of satisfaction with the use of digital technologies in universities showed that the digital technologies that satisfy more than 50% of respondent students are university's website (72.1%), a website of the graduating department (67.2%), electronic schedule (75.4%), electronic textbooks and manuals (57.4%), and student's electronic portfolio (55.7%) (Table 3).

Table 3: Rate the quality of using digital technologies in the educational process of REU and USEU, %

Index	Completely satisfied, %	Partially satisfied, %	Does not satisfy, %
University website	72,1	26,2	1,6
Department website (graduating)	67,2	29,5	3,3
Student's personal account	47,5	47,5	4,9
Student's electronic portfolio	55,7	37,7	6,6
Electronic schedule (university website)	75,4	19,7	4,9
Distance learning classes (general)	39,3	37,7	23,0
The work of portals (when distant learning)	45,9	34,4	19,7
Electronic textbooks and manuals	57,4	39,3	3,3
Online Information	49,2	42,6	8,2

Students were unsatisfied with: online information (49.2%), student's personal accounts (47.5%), the general portals work in a period of distant learning (45.9%), and distant learning itself (39.3%). But students most unsatisfied with the general quality of distant learning classes (23%) and this related to the professors participating in the digital process as well as their unsatisfaction with the technical issues while distant learning process (19.7%).

The positive aspects of distance learning students see as travel savings (time and money) – (95.0%), the convenience of home studying together with tracking your schedule from home (88.4%), the distance process of work uploading (77.0%), and general interest to the new technologies and modern learning applications and platforms (74.0%) (Table 3).

The main issue for the students is increased study load and tasks (73.1%) that require a lot of computer work (54.1%). Also, unsatisfied technical support was noticed (37.7%) and a lack of professors' computer skills, and their lack of using distant learning platforms skills (36.1%) (Fig. 4).

Figure 4: The main issues of the distance learning on the students' opinion, %
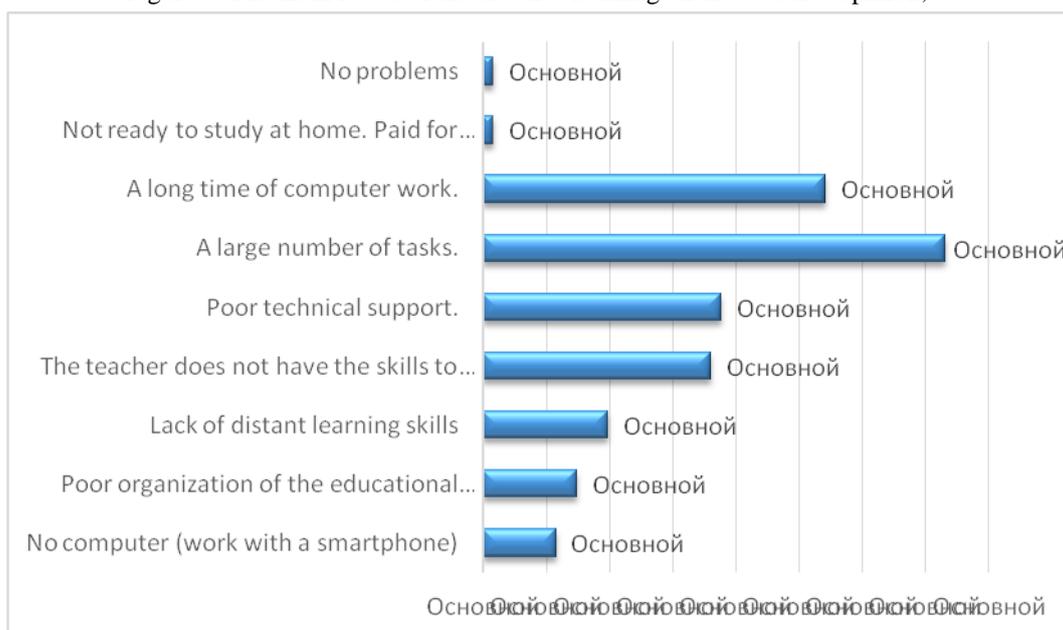
The main criteria of importance within using distant learning technologies for students is usability (93.4%) which is a global trend. Also, these criteria are: getting important learning information (73.1%), interesting and important content (54.1%), getting professional information (45.9%) (Fig. 5).

Figure 5: The main criteria determining the success of the distance learning, %
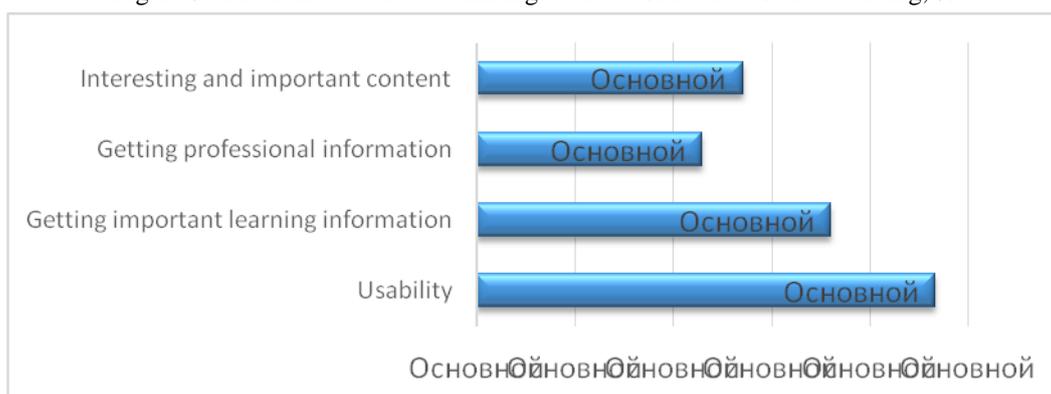
The main benefit from the digital technologies applying at the university on the students' opinions is the usability of studying (84%) (Fig. 6).

Figure 6: The main university's benefits from the applying of digital technologies
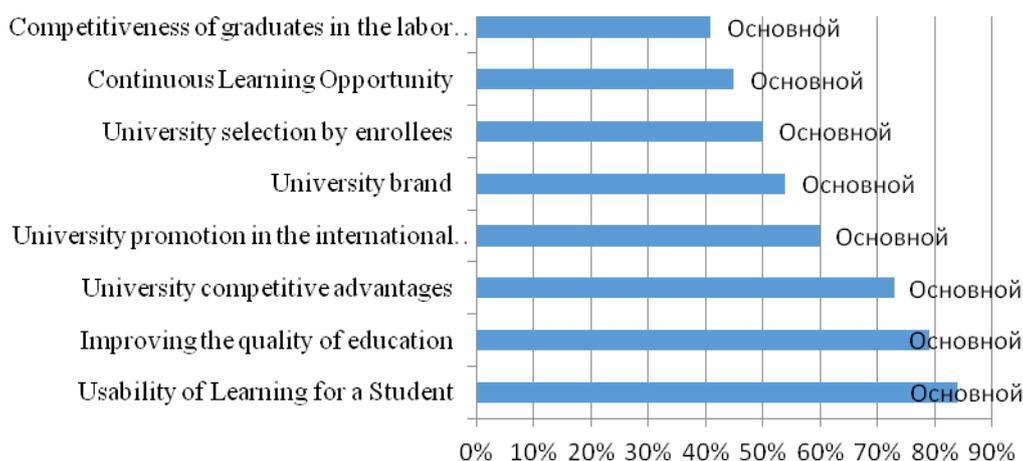
The big share of respondents believes that the quality of education could be increased (79%) as well as the university's competitive advantages (73%). More than half of the participants (60%) think that digital tools would improve the international presence of the university and help with brand promotion and appearance (54%). Half of the students (50%) believe that as a result, more enrollees would choose the university. The continuous learning opportunity is an important digital possibility for less for half of respondents (45%) and some of them think that finally, it would help to increase the competitiveness of the graduates in the labor market (41%) (Fig.6).

5. Discussion

As a social process, the forced online education in the context of the pandemic is accompanied by many problems associated with students' access to technical infrastructure, teaching methods, as well as the digital gap between students with different income levels for many universities and countries. While higher education institutions in developed countries are successfully adopting digital learning, higher education institutions in developing countries have many challenges to overcome before going fully digital.

As we assume there are positive and negative aspects in urgent forced digital transformation in the educational process that need the attention of university marketing management.

Positive aspects include increasing students' self-discipline, attendance, and motivation. Most students and teaching staff like the possibility to develop new skills and competencies in the digital area. Besides that, some problems influence general satisfaction by the educational process for both sides:

1. Most of the time, the distant learning process is just the lecturer's monologue with a computer screen demonstration. There are week opportunities for effective communication and class discussion. Some of the hard and important questions of the subject might be left without proper attention. Students are concerned about the quality and effectiveness of their education.

2. Some people still facing a problem organizing a stable internet connection as well as not everyone has the opportunity to pay for using or subscription fees for some of the good quality e-learning platforms. Free or "pirate" copies might cause technical and even legal issues. Most of the students got used to mobile apps but the mobile version of e-learning platforms is limited with functions.

3. Both students and teaching staff agree, that there is a rise in the volume of self-prepare work and work in general related to online and computer activity.

4. Learning becomes the obligation of the student when the teacher becomes some kind of education administrator and supervisor. That causes problems with understanding the subject materials for some of the students.

5. Another set of problems lay in the psychology area. Most of them related to basic personal communication issues such as the need for physical and eye contact, feedback reactions. Also, the personal space invasion might be a serious problem while a video is needed for class purposes or teacher demand.

A comprehensive study answered the main research question. As we can see, the digital transformation process is accompanied by such socio-technological phenomena as the "digital divide" and "social well-being" of digital consumers. According to the results of the research, we can talk about an ambiguous assessment of their social well-being by international and Russian students during the transition of universities to distance and online education. In the current conditions, society needs to accept that the digital transformation of educational services is the process of acquiring new features by the subjects of this market that meet the requirements of the time, changes in living standards, patterns of behavior, and values.

Due to the many times accelerated transition to digital education in a pandemic, this process was nevertheless associated more with negative than positive emotional manifestations of students: disappointment, tension, pain, dissatisfaction, denial, irritation.

6. Conclusions

The rapid transition of most Russian and abroad universities to distance and online education in extreme conditions has reduced the risk of the spread of coronavirus infection. Along with this, the digital transformation of educational services and learning models in a short time revealed serious problems in the organization of the educational process. Based on the analysis of the technological and social aspects of digital transformation in education in the context of the COVID-19 pandemic, the authors identified the problems and identified the factors that determine the prospects for the digital transformation of educational services. The main global and local problems are:

- different countries' involvement in the academic and research multi-gigabit Internet network, which slows down the speed of transition to online education in some universities;

- the contradiction between the introduction of digital learning in developed and developing countries;

- the digital gap arising from inequality in access to digital technologies for consumers of educational services with different income levels;

- increasing the feeling of social inequality and vulnerability among consumers of educational services;

- insufficient security and protection of the personal data of students and teachers during online learning;

- lack of preliminary organizational training, proper technical support for the transition to digital education, which did not allow students of many universities to fully experience its merits.

From the point of view of the authors, the prospects for the digital transformation of educational services in the socio-technological aspect will be determined by the following factors:

- an increase in public investment in the creation of a digital education ecosystem;

- strengthening the state system of support for online learning to bridge the technological digital gap between countries, universities, and participants of the educational process;

- updating the content, methods, and organizational forms of providing educational services, modernizing educational programs and the transition to a personalized organization of the educational process;

- monitoring the degree of satisfaction of consumers of educational services with the organization of digital learning, on this basis, improving the organization of digital learning to improve the social well-being of students.

In conclusion, we note that the phenomenon of the digital transformation of educational services as a dynamic category in conditions of a high degree of uncertainty in the socio-cultural, economic, technological, natural environment requires systemic research to make decisions to improve the efficiency of higher education.

Acknowledgments

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