

Digital Education Toolkit and an Overview of Distance Learning Resources *

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Abstract. The article discusses the main types and methods of teaching distance learning. An overview of modern services and platforms for organizing the process of distance learning and remote interaction in the context of digitalization of the modern educational process has been translated. The classification of software solutions for remote interaction is presented. The issues of the transition from informatization to digitalization in education are considered, some basic regulatory documents regulating the issues under consideration are given. Services for online learning are given and the level of their application in the educational process is analyzed. We also compared services for the exchange and storage of big data and carried out classification and grouping of tools for distance learning in a pandemic and quarantine. The types and methods of distance learning are considered. After a detailed analysis of the results obtained, we concluded that the variety of software and technical solutions allows you to fully organize a high-quality learning process in a distance format.

Keywords: Systems of Distance Education, Digitalization of Education, Digital and Information Technologies.

1 Introduction

Scientific and technological progress and new scientific directions enter all life processes with maximum speed. The large-scale spread of digital technologies has led to significant changes in the life of the population, in management and production, in the

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service sector, and sphere of education, of course. The education system has undergone dramatic changes over the past year, teaching has become partly distance learning.

Besides, there was an unplanned forced widespread transition to distance learning and remote work at the end of March 2020. It was this transition that gave impetus to the development of this direction and drew attention at the government level to distance education. Although distance learning systems have entered Russian education and have been successfully used everywhere for more than 12 years, there are still not enough specialists in this field [1-6], which became especially evident during the pandemic and made us look at this problem in more detail.

Distance learning technologies in educational activities help to form a new educational space. These technologies form the student's independence, his cognitive activity and help in the development of critical thinking. Distance learning requires from the student a sufficiently high level of self-discipline, the ability to optimally allocate his time for the successful mastering of a topic, a whole discipline or module, for repetition of the material received during an online lesson. This determines the need for modernization of teaching technologies, as well as a significant change in approaches to the educational, methodological, organizational, and technical support of the educational process. To organize a high-quality distance learning process, a set of software and hardware tools is required.

Today, every schoolchild owns the skills of online communication using social networks and various gadgets and devices. To use these skills is the task of a modern teacher [9].

The purpose of this article is to summarize the experience of using distance learning technologies and analyze special Internet services intended for use in online training.

2 Types and methods of distance learning

In the digital age, distance learning has easily blended into the educational process. Distance learning widely uses flexible hours and individual training programs that meet the requirements of modern education in the preparation of highly demanded specialists.

Distance learning technologies are information technologies that provide students with interaction with the teacher at a distance, provide students with electronic content of the courses being studied. Distance learning is based on the interactive interaction of students and teachers in the learning process. In our opinion, this technology provides trainees with more opportunities for independent work in mastering the educational material.

The development and formation of the process of digitalization of education are regulated by regulatory legal acts and enshrined in the legislative framework of the Russian Federation. The main provisions are presented in

- the Decree of the President of the Russian Federation No. 203 dated 09.05.2017 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030";

- Decree of the Government of the Russian Federation No. 317 dated April 18, 2016 "On the implementation of the national technological initiative";
- Order of the Government of the Russian Federation dated July 28, 2017, No. 1632-r "On approval of the program "Digital Economy of the Russian Federation" in the section "Personnel and Education", etc.

Distance learning courses have become very popular lately. This is primarily because they allow solving the problems of student training, retraining, and especially additional professional training of students due to the possibility of building an individual educational trajectory and at a convenient time for students. Besides, distance courses form the ability for self-organization and self-education, which is a prerequisite for the implementation of the concept of lifelong learning [6].

Modern distance learning is based on the use of the following basic elements:

- information transmission medium (radio, television, mail, information communication networks);
- tools for organizing remote interaction and storage of remote content (distance learning systems, webinars, cloud storage, etc.);
- methods and technologies of distance learning, depending on the technical environment for information exchange.

The organization of distance learning requires the teacher to know distance tools and the ability to apply distance and online learning tools in practice. The IT industry is characterizing by the rapid change of technologies, solutions, and products used [8]. Therefore, the study of remote interaction tools is currently an urgent task, and in the study, we would like to review these tools and consider in detail the possibilities of distance learning.

Nowadays, one of the most promising ways of communication between a student and a teacher is interactive interaction through information communication networks, in which the environment of Internet users can be distinguished. Such interaction is one of the main parts of the distance learning process since it involves a wide range of classes. Consider the possible types and methods of distance learning.

1. Lectures are possible in the online conference mode, or with the use of multimedia content prepared in advance and placed on a remote platform. These can be video lectures, lectures-presentations, text materials of lectures, presentations accompanying text material, links to Internet sources, etc. To effectively study the theoretical part of the discipline, educational material is usually presented in blocks or separate topics.

2. Seminars are an active form of training, which is widely used in teaching practice during the study of academic disciplines. The seminar, as a form of control in a distance course, is built based on a lively creative discussion on a previously announced topic. According to the teachers, the main problem of the distance seminar is the lack of time. Seminars can be held in webinars, inviting students there, or as teleconferences.

3. Consultation is one of the forms of management of the work of students and assistance by teachers in the study of educational material. Distance learning consultations can be conducted using e-mail, telephone, video, audio, and teleconference.

4. Laboratory work - this type of training is mainly carried out for technical specialties. When using this form of training, it is necessary to have remote access via computer networks, to laboratory facilities, or to a central computer that simulates the experiment. Each laboratory work is accompanied by methodological material and standard solutions for the assigned tasks. Such work contains special training exercises to practice educational skills. Each student works at an individual pace and at a time convenient for him.

5. Independent work in the distance learning system expands the informative field in which the student works. Firstly, the student has more time to complete tasks, secondly, more opportunities in terms of using various educational Internet resources.

6. Control works, computer tests help to check the acquired competencies, to consolidate and work out the skills obtained in the course of distance learning.

Distance learning technologies in educational activities help to form a new educational space. These technologies form the student's independence, his cognitive activity and help in the development of critical thinking, as well as help to choose an individual pace of learning the material.

3 Overview of Educational Platforms and Distance Learning Services

In the course of studying this issue, we carried out a detailed analysis of existing technology and software solutions, educational platforms, and services that were involved in the implementation of educational programs employing distance technologies (see Fig. 1).



Fig. 1. Online resources for remote interaction.

We have identified five main categories of services and applications (see Fig. 2).

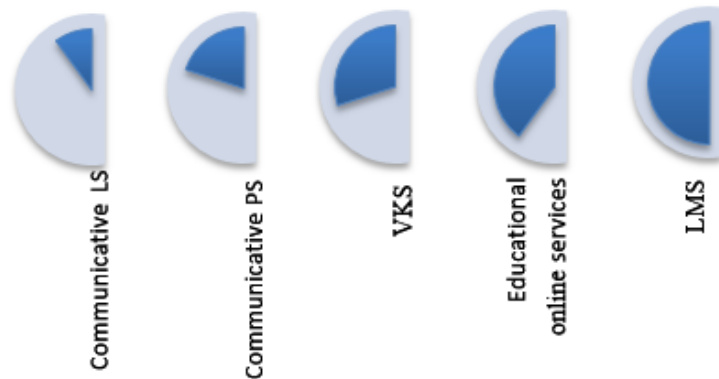


Fig. 2. Main categories of remote communication services and applications.

The diagram shows the enlarged groups of services.

1. Communicative services of general use (not intended for educational purposes):
 - social networks (VKontakte, Instagram and Odnoklassniki);
 - messengers (WhatsApp, Viber, Telegram).
2. Communication services for professional use:
 - electronic mail services (e-mail);
 - messengers (Skype, Google Duo, Discord);
 - web services (Google Class, Trello), allow you to organize educational activities and manage projects in small groups; - cloud storage (Yandex Drive, GoogleDisk, Mail Cloud, etc.)
3. Platforms for online video conferencing and web rooms (Zoom, VideoMost, Mind, Google Meet, WebEx, Polycom, BigBlueButton, Mirapolis Virtual Room, etc.). These services help to conduct a video conference. In addition to the standard video communication between two or more subscribers, the tools allow you to send messages in real-time, exchange files and collaborate with documents. It is possible to quickly organize a text chat. Products are presented in the form of web services as well as local applications. The tools work under different operating systems. They can be installed in the cloud or on a local PC or mobile gadget.
4. Educational online resources (YaKlass, Diskurs, Intuit, InternetUrok, etc.). Online resources that can be used for both remote and face-to-face training.
5. Distance learning systems (LMS Moodle, LMS Mirapolis, Web Tutor, iSpring Learn, etc.). Software platforms allow to competently organize and automate most of the processes associated with training. The systems can provide training materials, organize user interactions, generate reports, and much more.

4 Research results

In the course of the study, we surveyed more than 450 respondents - teachers and students of three universities in different regions of the Russian Federation: North Caucasus Federal University (Stavropol), Chechen State Pedagogical University (Grozny, Chechen Republic), and Humanitarian and Pedagogical Academy (branch) of V.I. Vernadsky Crimean Federal University (Yalta, Republic of Crimea) on the use of teleworking services and remote interaction during the COVID-19 pandemic.

The method of situational modeling, which allows considering chat-communication as a process of new social interaction, requiring the leading role of the teacher-organizer, ensuring the maximum involvement of all participants-communicators in this process in order to assimilate new knowledge by the perceiver (learners) [15].

The survey showed the use of 15 main services during the transition to remote learning, such as VKontakte, WhatsApp, Viber, e-mail, Skype, Discord, Google-Class, Yandex Disk, GoogleDisk, Zoom, CiscoWebEx, Microsoft Teams, BigBlueButton, LMS Moodle, and separately - in NCFU, an internal learning management system - Ecampus was indicated.

For notification and transmission of urgent information such services were used as Social network VKontakte; messengers WhatsApp and Viber; and various electronic mailboxes (see Fig. 3).

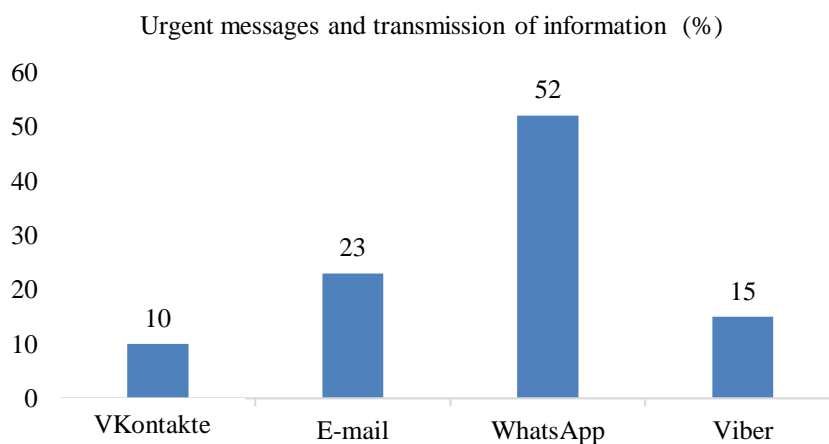


Fig. 3. Messaging services.

Yandex Drive and GoogleDisk are used to exchange large amounts of information (see Fig. 4).

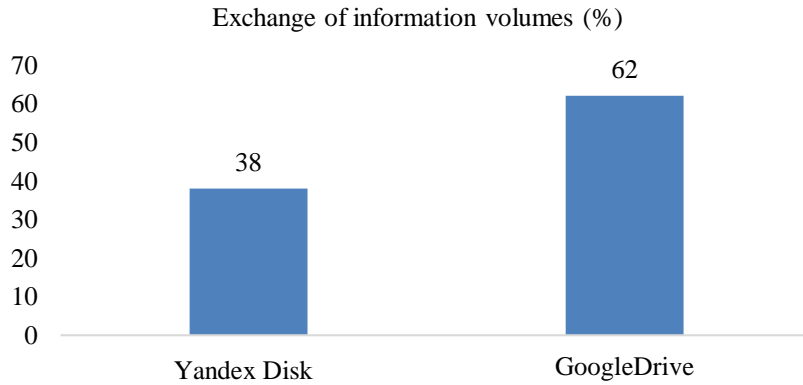


Fig. 4. File provision.

To organize and conduct video conferencing (lectures and practical classes online), the surveyed universities used: Skype, Discord, Zoom, CiscoWebEx, Microsoft Teams, and BigBlueButton (see Fig. 5).

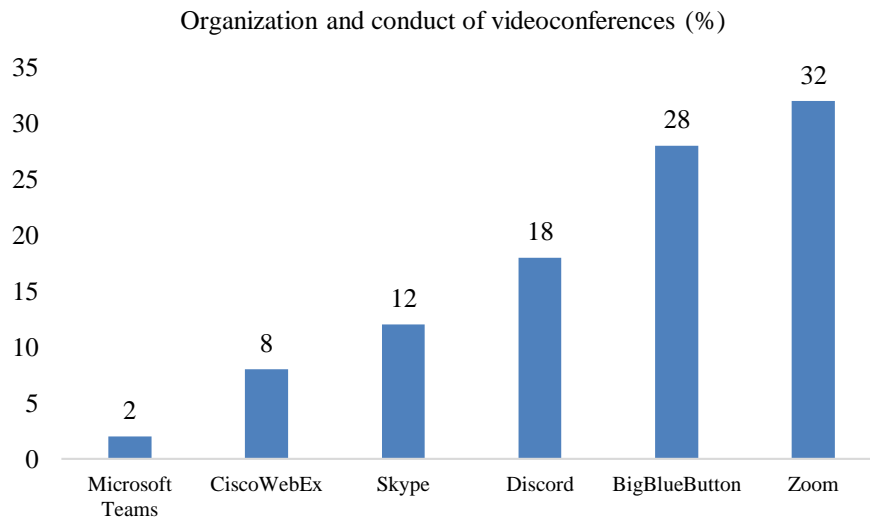


Fig. 5. Videoconferencing systems.

For the organization of distance learning, in general, LMS Moodle was used in all surveyed universities, the Ecampus system was used in NCFU. After a detailed analysis of the results obtained, we concluded that the variety of software and technical solutions allows you to fully organize a high-quality learning process in a distance format.

However, the most productive is the use of a single system, such as LMS Moodle, into which the BigBlueButton videoconferencing system is currently integrated, and each participant receives notifications via email. There is no doubt that each university

should have a system of support for the educational process for students and teachers to organize the electronic educational environment of the university. Following the example of NCFU, the Ecampus system allows a student and a teacher to switch to LMS Moodle online educational courses under one username and password.

5 Conclusion

In conclusion, we note that the new tasks set for the Russian education system to transfer part of the educational process to a distance format can be realized only by improving modern educational technologies, including e-learning technologies [9-13]. Even though the e-learning environment today provides a wide range of technologies, methods, and tools that can be applied to conduct a full-fledged educational process, there are still some visible problems that need to be addressed step by step.

The qualified use of the tools of the technology of remote interaction and distance education considered by us is possible only in the conditions of training all participants in the interaction process, but first of all teachers. It follows from this that it is necessary to organize a system of advanced training, in which the teaching staff will receive the appropriate competencies.

Improving the qualifications of teaching staff, developing scientific research, networking with leading universities and employers, holding conferences, seminars, schools - all this will help to raise the professionalism of a university teacher to a higher level, which will invariably improve the quality of training [8].

Taking into consideration social pedagogical, technical equipment, program-ensuring point of view, the observation of this issue reveals that during the force majeure conditions distance learning is so far the best alternative learning method, but it can never fully replace the traditional classroom learning system [14].

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