Teacher Readiness for Distance Learning

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Abstract. The article is devoted to the study of the readiness of teachers and students of an engineering university to implement distance learning in modern conditions. The study of the phenomenon of preparedness involves focusing on a number of problems, which are simultaneously factors that impede the formation of readiness. Both positive and negative aspects of the use of distance technologies were identified.

Keywords: Readiness · Distance learning · Teacher

1 Context

Informatization, as the leading trend in the socio-economic progress of developed countries, is an objective process in all spheres of human activity, including education. Computerization of education is a system of methods, processes and software and hardware integrated with the goal of collecting, processing, storage, dissemination and use of information in the interests of its consumers. The goal of informatization of education is the global intensification of intellectual activity through the use of new information technologies [1].

Modern conditions of the information society, the development of information infrastructure of universities require the inclusion of new approaches, methods and technologies in the educational process. The most important in this case is the development of cooperation - the most important component of the educational process - “teacher – student” - based on non-standard forms and methods of interaction, creating a scientific and methodological system of continuing education (both teacher and student) within a single educational space. The success of student training and education largely depends on how this tandem of cooperation develops, what forms and methods will be used in this case, on the basis of what modern technologies they will be built [2]. Accordingly, the use of distance education technology expands the possibilities of the teacher in terms of the humanization of education, modernizes the educational process, and makes it attractive to students.

Distance learning is recognized as a promising direction in the development of the modern education system, capable of solving a number of urgent problems of higher education. It does not deny existing educational trends and technologies, forms of
training; it is designed to integrate into these systems, complementing and developing them.

The use of distance educational technologies, the practice of training on various online platforms within the framework of formal and non-formal education, the use of the Internet, e-mail and WhatsApp have long become commonplace in the process of obtaining knowledge when organizing the interaction of all subjects of educational activity [3].

However, the new reality that has hit the world in connection with the pandemic and the threat of the spread of COVID-19 has made it necessary to reconsider the potential of the distance learning technologies and electronic resources available to the educational community.

Life in a pandemic has made significant adjustments to education at all levels around the world. The educational process has completely switched to on-line format. The Russian educational system was no exception. Kazan National Research Technological University organized training using distance learning technologies and e-learning, using the MOODLE, ZOOM, Microsoft team, Skype, etc. platforms for this purpose. However, an analysis of the activities of teachers in the first week of the so-called distance learning showed that many teachers turned out to be they are not ready to fully utilize information technology training, despite the fact that they regularly improve their qualifications in this area. Teachers of engineering and humanitarian disciplines have differently assessed and responded to the difficulties of organizing the educational process in the new conditions. The electronic information educational environment, created taking into account the formal requirements of federal state educational standards, also turned out to be very weak help for promptly solving the issues of interaction between teachers, students and the university administration due to the inefficiency of this resource by objective and subjective standards.

Many Russian students were not prepared for such extraordinary innovations. The traditional paternalistic model of teacher-student relations in Russian universities, different from the Western highly individualized model, accustomed them to regular direct communication not only with teachers, but also with representatives of the administration. They have largely lost this opportunity. The educational process outside the framework of training has become almost impossible.

Finally, if online communication with friends for students has long become the norm, then to see a teacher in a home environment with a cat or a child, to show himself in the interior of his room and at the same time to watch a presentation on discipline on the screen of a gadget was often a very difficult task from the point of view view perception of information.

Distance learning is a revolutionary way to equip a student with the skills and knowledge necessary to turn changes in cognition into an advantage. Many teachers note that distance learning can be used as a knowledge management tool. It is suggested that synchronous tools need to be integrated into asynchronous environments to provide a learning model “anytime”. This environment will be primarily asynchronous with background discussion, appointments, and evaluation occurring and managed with synchronous tools.

From the point of view of the engineering areas of training - distance education was a discovery - on the one hand, it was an opportunity to offload the teacher from
intermediate tests of knowledge - by conducting testing on educational platforms. On the other hand, there is an urgent need for full-scale experiments, the absence of which leads to one-sided knowledge, since in the framework of engineering, chemical and chemical-technological areas of preparation it is impossible to do without theoretical knowledge, such as in the framework of fundamental disciplines (physics, mathematics) and general engineering disciplines (processes and apparatuses of chemical technology, engineering graphics).

In the future, the training, which will be carried out by classical methods and methods, will need to use the gained experience of distance educational technologies - conducting tests, creating electronic educational resources, conducting and recording copyright lectures, to advise students of distance learning and with disabilities on Moodle platforms, Google Meet, MS Teams, Zoom.

2 Purpose or Goal

In the last century, we moved from the industrial era through the information age, and now into the knowledge age. Today, the effective acquisition, storage of knowledge and its effective management are the key to success and survival for organizations in a very dynamic and competitive world. The ability to acquire, absorb and apply knowledge effectively will become a key skill in the 21st century. Learning is the key to unlocking a person’s full potential.

Our life in the XXI century as an individual, a specialist, will depend on our ability to learn and apply what we know in our professional life. Training will become more integrated with work and will use a shorter, more modular, timely delivery of knowledge. Distance learning delivers knowledge through electronic information and communication technologies.

Information and communication technologies include various methods - a systematic feedback system, computer network operation, video conferencing and audio conferencing, global Internet sites and computer training. This way of delivering knowledge increases the possibilities of how, where and when students can engage in lifelong learning.

Distance learning is not only training and instruction, but it is focused on individuals, it is individual. A single definition for distance learning has not yet been identified. This includes online learning, including e-learning, online learning, distributed learning, online learning, virtual learning, computer learning.

Distance learning refers to the use of information and communication technology to improve and/or support learning in higher education.

Education systems around the world have taken steps to reduce the negative impact of the coronavirus pandemic (COVID-19) on education. An interactive mapping “Global monitoring of school closure in connection with the COVID-19 pandemic” is presented on the UNESCO website, which displays the development of the situation of closure of educational institutions in various countries, from February 8 to April 20, 2020. On April 20, 2020, 1,575,270,054 people studied remotely, which is 91.3% of the total number of students worldwide [4].
Therefore, distance learning is gaining more and more popularity. And this is not surprising, because you can remotely study in almost any subject.

By the term “distance learning” we mean learning, in which all or most of the training procedures are carried out using modern information and telecommunication technologies with the territorial disunity of the teacher and student [5]. It is important that the basis of distance learning is based on pedagogical technologies of different learning, independence in self-education of students in various educational fields, the possibility of choice, a combination of various forms and methods of interaction between the teacher and the student. It should be borne in mind that distance learning involves careful selection of educational material, its coordination with the educational standard of the educational content, and the multilevel structural organization of educational material. Distance learning as a system for organizing a focused process of interactive interaction between educators, students and teaching aids is presented in the aggregate of two basic subsystems, each of which consists of certain elements. The first and main is the didactic subsystem. It includes components typical of traditional learning. Its functioning is based on an ordered set of goals, functions, methods and techniques, principles, requirements and conditions for the effectiveness of their interaction, factors of influence on its effectiveness. The technologies prevailing in distance learning impose their restrictions on the selection, sequence and method of presenting fragments of the content of training. Each of these components in the distance learning system has its own specifics. It is distinguished by both the content of each of these components and the redistribution of their role and frequency of use in the educational process. In remote form, teaching by technical means becomes predominant, and the role of the teacher as a source of information is represented by the content of the options for training courses developed by him, as well as in informing the learner of information that goes beyond the scope of this course, or explaining fragments of texts and assignments that are not understood by the learner. The teacher’s activity in the educational process is transformed from the main to auxiliary, and the content of his activity is determined by the content of the student’s orders, formulated in the form of questions posed by him. This violates the integrity of the teacher’s activities, and the way the implementation of the analysis and planning functions characteristic of traditional teaching is fundamentally changed. Another task is subordinate to the planning of interaction with students in distance learning. For a relatively short time of telecommunication with the student, you need to answer his questions. The teacher’s activities are impromptu, which not every teacher can do and requires special training. The second component of the distance learning system is a technical system for ensuring the transmission of information, the implementation of monitoring and consulting functions. Unlike traditional learning, this subsystem is not auxiliary, but one of the central ones. It is represented by teaching aids specific to this didactic system, which, on the one hand, are printed materials and computer programs, and on the other, telecommunications. All these subsystems and their elements interact in the educational process in various ways, the choice of which depends on the goal set by the teacher and the learner, the technical means used and the model of training chosen by the teacher. This choice depends on the level and pace of progress of the student and can be offered to the teacher and the student himself. In this interaction, the functional purpose of the distance learning system is realized, interactive interaction of students and teachers in
the learning process is provided, and students can work independently, evaluate their knowledge and skills. When in practice, the whole world began to use the Internet everywhere, disruptions in its functioning began, especially the students who live quite far from large cities.

In the distance learning model, the learner is at the center of the learning process; the essence of training is independent work developing self-learning abilities; the basis of educational activity is cooperation, and the role of students in learning is more active than the role of a teacher. In distance learning, the dominant tasks are the organization of an independent cognitive activity of a student, arming him with independent work skills to acquire new knowledge and their practical application.

Indeed, at present, in the informatization of education, it is becoming more and more relevant not so much the technical equipment of education as the readiness of all subjects of the educational process (in particular, teachers) to use distance educational technologies in their professional pedagogical activity [6].

The development of distance learning is hindered not because of an insufficient material and technical base or lack and imperfection of software, but because of the mismatch between the competences of using networks in students and the competencies of teachers, who use them to a lesser extent. Changed learning goals, living conditions and needs of the individual require the application in the shortest possible time of the entire set of tools for the full organization of the educational process. Therefore, it is necessary to determine the readiness of both teachers and students for a new type of training for them. Will it be able to realize all the didactic components of the educational process, will the methodology chosen by the teacher lead to the planned learning objectives?

A comprehensive analysis of the state of formation of the teacher’s readiness for the use of distance educational technologies, as well as modern research on this topic allowed us to highlight a number of contradictions:

- between the presence of scientifically based approaches to the application of these technologies and the special educational needs of society during the pandemic (E. Segen, V.P. Kashchenko, T. Helbrügge, A.Yu. Yusupov, etc.) and the insufficient awareness of teachers about all the possibilities her tools;
- between the accelerating process of development and implementation of distance technologies in education and the insufficient willingness of subjects of the educational process to constantly apply these technologies in their activities;

It must be borne in mind that the willingness to use distance technologies is formed in the process of professional and personal development of a teacher and it can be considered as a process and the result of becoming a person as a subject of professional activity. By readiness for the implementation of distance learning, we mean the stable integral dynamic quality of the teacher’s personality, which determines the content, orientation and nature of her professional and pedagogical activity, as well as self-determination and self-realization.
3 Approach

Mankind has entered a new - information stage of its development, when information processes become one of the most important components of the life of a person and society.

The basis of the open education system is distance learning, the universality of which ensures the realization of the idea of lifelong education aimed at creating a personality with the necessary initial supply of intellectual forces and the ability to replenish them throughout the life course. Broad development only distance learning system will allow you to move from the concept of “education - for life” to the concept of “education - through life”.

The basis of distance education is e-learning - the most important mechanism and consequence of the transformation of the Internet. This training allows students to fruitfully collect information using both synchronous and asynchronous methodologies in order to efficiently and quickly acquire the latest knowledge.

Many authors (A.A. Andreev, V.P. Demkin, A.V. Khutorskoy et al.) Consider distance learning as a form (principle of organization) of education: a focused, organized learning process, focused on the formation of knowledge, skills defined by the curriculum and teacher. Many researchers identify distance learning as a means of learning management and the implementation of the learning process.

The questions of determining the essence of distance learning and distance learning technologies are the work of A. A. Andreev, E. S. Polat, I. V. Robert and others.

A. A. Andreev in his work as distance learning understands “a purposeful process of interactive interaction between learners and students with each other and with learning tools, invariant to their location in space and time, which is implemented in a specific didactic system.”

E. Polat gives the following definition of distance learning: “by distance learning we mean the interaction of teachers and students, students at a distance, reflecting all the components present in the educational process (goals, content, methods, organizational forms, teaching aids) using specific Internet tools - technologies or other interactive technologies” [7]. V.I. Ovsyannikov identifies distance learning with electronic (elearning), while the fastest implementation of proven technologies abroad is put in the first place.

According to L.I. Doliner, distance learning is a form of education (full-time, part-time, external), based on the use of new information technologies (computers, telecommunications, multimedia) and scientifically based methods learning.

The problem of the activities of distance learning teachers was highlighted in their works by E. Gavrilova, E. Haustova, L. Vasilchenko, N. Mulin and others. Foreign researchers Michael G. More, William G. Anderson, Gregory S. Sales and others also pay attention to this problem. Acquaintance with scientific research shows that the writers reflect the specifics of teaching activities, individual requirements for distance learning teachers. Despite the significant results of research in these areas, important aspects of the problem of the formation of professional readiness of higher school teachers to introduce distance educational technologies remain outside the field of view of scientists.
The success of the entire distance learning system ensures not only the teacher’s readiness for professional and pedagogical activity in it, but also the building of different groups of relationships and interactions with subjects of educational relations in the new conditions of distance learning environment.

In the federal state educational standards 3+, the electronic information and educational environment is considered as a key element of the educational process, therefore, each student throughout the entire period of study should have individual unlimited access to these resources. For knowledge and information to be effective, it is necessary to constantly increase and modify it in continuous educational activity [8]. All these ideas can be implemented in a modern university, which is the Kazan National Research Technological University: innovative and commercial attractiveness, manifested in the fact that the university implements socially significant educational and research projects; research and fundamental orientation, involving the dissemination of scientific knowledge as an integral part of world culture; informational saturation of the educational process, the driving force of which is the electronic informational and educational environment of the university [9]. The training of a modern highly educated specialist is aimed not only at mastering knowledge, skills, but also at adapting to the conditions of future professional activity in society, including in a virtual environment.

However, the real permanent use of distance learning in the Russian educational system is practically absent. What is the reason? Distance learning consists of three main components: the technical aspect (computer technology), the teaching and methodological aspect (multimedia courses in disciplines) and the teachers who conduct activities in the distance learning mode.

There are more than a thousand computers at the university; electronic information and training programs in various disciplines have been developed (and continue to be developed), but the third element is practically absent, i.e. teachers who are able and ready to work professionally, psychologically and technically in the distance learning system.

According to the recommendations of UNESCO, a modern teacher should be able to select and use in their work software products and web resources in their subject; use search engines. Students’ participation in e-learning courses involves diverse and intense conversational communication.

1. The design of educational programs in the distance learning system should be based on the principles and distinctive features of distance learning. The most important of them is the principle of distributed learning, when an open information system makes it possible to obtain knowledge from various information resources. Thus, distributed learning is a necessary element. The construction of distributed information systems is associated with the solution of a number of technical and technological problems and the availability of relevant specialists in the field of information and educational technologies.

2. The organization and implementation of the educational process of distance learning is based on the use of an information model in which means of remote access to information resources make it possible to build an individual educational trajectory based on independent work of students. You must be familiar with the
methods of developing and creating interactive training programs, implementing distance learning technologies and forms of organization of the educational process.

3. Achievement of educational goals is a necessary condition for the quality of education. The development of personal characteristics, professional knowledge and skills is determined by a number of indicators that make up the general level of educational effects. Achieving such indicators requires knowledge and consideration of the psychophysiological and biomedical features of distance learning, the ability to use modern tools and methods for monitoring the quality of education.

In the process of distance learning, the role of the teacher changes: he designs not only the educational process, but also the network interaction with students; forms the environment of distance learning, developing teaching materials, manages joint distance learning activities, mobile adjusting it to the changing educational needs of students. His activity is multidimensional, different in the implementation of traditional training.

In the face of the threat of the spread of coronavirus infection, most universities and colleges, on the recommendation of the Ministry of Science and Higher Education of the Russian Federation, decided to switch to distance learning.

In this regard, all full-time classes, including lectures, practical and even laboratory ones with virtual analogues, were transferred to the online environment.

Teachers are forced to organize the educational process through distance learning technologies based on various methods of delivering electronic content and accessible communication tools for students and teachers in the electronic information and educational environment.

The transition to distance learning was not a planned action, but a necessary measure, so the teachers did not have special training. The teachers did not have enough skills in the digital environment, time to master new tools and restructure the educational process and support from the technical services of the university, which play an important role in the implementation of new technologies.

The adaptation of teachers to the changing conditions of professional activity occurs at different speeds and with different results. But it must be recognized that the possession of competencies in the field of working with information resources helps them more easily switch to a new training format.

New challenges expand and give the university teacher new tasks of professional pedagogical activity:

“See” each student, determine his goals, tasks in a distance educational environment;
build the educational process in an interactive, productive, time and space invariant process of interaction with all subjects.

As a result of the transition to distance learning, organizational, methodological, and psychological difficulties appeared before the university teacher.

Organizational difficulties are associated with taking personal responsibility for the implementation of the learning process in the new conditions, relying on clear and accessible tools for each teacher.
Methodological difficulties include the difficulty of controlling knowledge. Reproductive tasks are not suitable in these conditions. It is necessary to apply creative, productive tasks. It is necessary for the student to create something: a project, a drawing, and complete a creative task. The deficit of feedback can be compensated by a multimedia format, communication in social networks. The authors really like the What’s App network, where you can organize substantive communication and the teacher can be poisoned with completed tasks as well as ask personal questions.

Psychological difficulties are determined by the experience of uncertainty, “digital overload”, anxiety in the situation of video recording, associated with the possibility of posting materials in a collective access. The teacher does not feel the person in the audience, does not see his reaction.

4 Results

The evolution of distance learning offers a large number of tools to help the teacher in the process of analysis, design, implementation and delivery of knowledge via the Internet. In the framework of distance educational technologies, the question arose about the lack of time for both the teacher and students, since everyone is within the framework of the curriculum of the educational program, with a limited time resource. All actions in the framework of educational activities began to take many times more time that was spent on connecting to the network, sending correspondence, checking, updating and sending reports and tasks. The volume and scale of correspondence has increased significantly.

The authors of the article solve these problems in the following way:

Teaching engineering discipline - processes and apparatuses of chemical technology can be constructed as follows. Integration of laboratory work and the introduction of test tests (replacing field experiments with video materials and uniting groups of students not by belonging to the educational program, but by studying the proposed topic if necessary) (Fig. 1).

Fig. 1. Moodle test reporting example
Creation of personal folders of groups on virtual disks within the framework of the course project (Google, Yandex) in order to save time searching for files of the corresponding student, since there are a certain% of students who cannot upload their work to educational platforms due to limited technical capabilities (Fig. 2).

Conducting lectures and practical classes, receiving term papers in the form of webinars on the platform Moodle, Zoom, Google, MsTeams (Fig. 3).

As for the teachers of the humanities, then everything is simpler. In the discipline “Vocational Training Methodology”, lectures using presentations are held at ZOOM, with a predominance of questions, discussion of various problems. This is used to energize students, as it is not always possible to track the presence of students (sometimes a photograph is presented), to determine the degree of ownership of the material. The text of the lecture two days before the lesson is sent to students using various communication sources. In this mode, practical classes are held. To increase motivation, we create colorful positive videos. As a control of knowledge, tasks for the
logical interpretation of information and value judgments, tasks for the practical application of the studied information are used. These tasks in the form of an essay are sent to the teacher by mail.

The willingness of teachers to distance learning is largely determined by the skills of interactive interaction.

The faculty study was organized as a voluntary anonymous online survey. In total, the study involved 45 teachers aged 33–80 years, 34 women and 11 men. 60% of teachers rated the hasty organization of the transition to distance learning satisfactory, another 20% - poorly, and only 20% - good. The results obtained are not related either to gender, nor to age, nor to work experience.

Most university teachers have a diverse experience in interactive interaction, which primarily involves the use of applications for mobile devices (smartphones, tablets) to communicate on the Internet and exchange files that provide digital voice and video communication over the Internet between computers - Skype, WhatsApp, Viber, Telegram (86.6 and 55.5%). And almost 80% of teachers actively use the technology for receiving and transmitting short test messages - SMS (Short Message Service) using a cell phone. The results of this survey are shown in Fig. 4.
The first is communication with friends on social networks or messengers. As a source for searching for specialized information, including in the field of professional interests, the majority of students use search engines on a computer, on YouTube, on mobile phones - 77, 77, 72%, respectively (Fig. 5).

Fig. 4. Interaction skills %

Fig. 5. Sources of information use, %

The questionnaire included a self-assessment task, according to the results of which teachers were able to assess their level of readiness for using remote technologies using the Likert scale. The results of self-assessment served as the basis for the classification and distribution of students in three groups (clusters). To build clusters, we used the clustering method, which is called the k-means method (k-means). We have identified three clusters that reflect the teachers’ readiness levels for using remote technologies (Table 1).

We present the drawing in the language of instruction.
The first cluster is characterized by teachers having extensive experience in using interactive interaction technologies. Almost all respondents (87.5%) included in this cluster are registered on social networks, exchange files by e-mail, communicate via Skype (online messenger), send text messages or make phone calls. The vast majority (95%) have a tablet. To listen to the lecture, search for the necessary and new information, 80% of the teachers in this cluster use search engines, YouTube, 50% read blogs.

Only 50% of teachers who fell into the second cluster are registered in social networks; they use online instant messengers to exchange information with their colleagues. About 66% of teachers send SMS messages, actively use search engines on the Internet, YouTube to view lectures, use all the capabilities of a mobile phone. More than 66% of respondents use special software applications and sites to search for reviews on the Internet to pay bills or reserve seats. Almost 41% of teachers have a tablet.

Teachers included in the third cluster are characterized by a weak applied application of modern technologies and means of communication. Of all the available means, the ability to send text messages using a mobile phone is most often involved. They don’t have an iPad or another tablet, they don’t use the Internet for personal purposes, such as buying tickets, paying bills. For interactive interaction via the Internet, 67% of the number of listeners of this cluster use the Skype program installed on the computer. 44% of teachers use search engines; 33% of teachers in this cluster share information with friends, colleagues on social networks.

We believe that one of the motivations of teachers to use distance technologies, to develop distance learning modules is the accumulated positive experience, acquired competencies in the process of working with computers, modern gadgets and their applications.

Having been working in remote format for 2 months, the significance of this form of education in the modernization of the educational system is recognized by 93% of respondents, 66.6% - “this will be one of the technologies, but not the leading one”, 4.4% of teachers believe that technology will never replace a person and 55.5% of respondents believe that it is impossible to refuse personal communication between teachers and students.

Teachers (77%) more often complain of high workload and lack of time, 11% - of insufficient skills and knowledge in connection with the transition to distance learning. Least of all, teachers complain about the freezing of educational portals, lack of discipline of students.

| Clusters                                                   | Number of teachers (%) |
|------------------------------------------------------------|------------------------|
| High readiness for online teaching and extensive experience in interactive interaction | 53.3                   |
| Average readiness for online teaching                      | 28.5                   |
| Weak willingness, little experience in interacting         | 18.2                   |

Table 1. Teacher readiness levels for using distance learning
Teachers also note that it is impossible to make high-quality distance courses with the speed now required. In order to transfer a live course to a distance course, it is necessary to use everything that a person uses during communication: facial expressions, tone, look, jokes, transferring spontaneous remarks with students. Today this is not, and this should be compensated by some pictures, infographics, animations, demonstration experiments, or something else. All this requires a lot of work, great effort and time. No one now has the resources to do this. In reality, students receive distance education in the format of a talking head. It is difficult to listen to a talking head for a long time [10]. Some of the teachers have enough artistry, while others do not.

The questionnaire conducted during the training gave the following results. Most students (73%) prefer traditional classroom activities with a teacher. Following the popularity and effectiveness after traditional classes, students noted the format of video lectures (68%), the main advantage for students was that the video can be viewed several times, paused, and rewound. At the same time, they noted a decrease in attention, which is maximum only when in contact with another person. When learning at a computer, the “glass effect” is turned on: the perception of information is reduced, as if the teacher was behind the glass in another room. In addition, during distance learning, students simultaneously include other gadgets. The level of anxiety of students who are taking a distance learning course for the first time is close to high. To the question “Rate your educational growth on a scale of 1 to 10, where 1 is completely unsatisfied, 10 is completely satisfied. Please explain the answer.” 89% of students rate their educational growth above average (approximately equally at 5, 6, 7, 8, 9, 10 points). This is due to the temporary lack of part-time jobs, the lack of direct communication with peers and cultural leisure. Thus, the student was forced to devote more time to study.

5 Conclusions

Distance education allows for the individualization of instruction, namely, the student can study the material at a convenient time for him, have the time necessary for him to do this, and interact with the teacher. To ensure involvement in the learning process, it is necessary to determine the learning objectives (they should be clear to the student, discussed with him and accepted by him), content, implementation of feedback, use active working methods, forms of presenting content and monitor changes in the level of knowledge of students. The content of the material should provide a connection with reality (complexity of the material at different levels, options for presenting solutions), be based on the existing knowledge of students (provide additional material for those interested). Feedback should be prompt and formative, ensure participation in the discussion, answer questions, be able to conduct mutual evaluation and self-assessment. The teachers also noted the need to form a system of differentiated psychological, methodological and technical support.
According to teachers, distance learning has its weaknesses. Among them:

- lack of personal interaction;
- the problem of student motivation;
- lack of self-organization of students;
- complexity of quality control of assimilation of material;
- weak feedback;
- difficulty in evaluating results;
- heavy workload of the teacher in the preparation of distance learning courses and monitoring of assignments;
- the difficulty of accounting for the individual characteristics of students.

Among the problems when switching completely to a distance learning system, teachers see the following:

- the computer does not replace the live communication of the student and teacher;
- teacher are not ready for the new;
- poor self-organization of students;
- the complexity of preparing good courses;
- knowledge control problem;
- deterioration in the quality of training.

The teacher during the training should be oriented to a specific audience, available technical resources. Next, you need to build a course strategy, conduct a technology search for the goals and objectives of the course. For the safety of the contingent during distance learning, it is necessary to have high-quality technical resources, quality of content, and exclude unwillingness to self-organization and educational inertia. To build content, you need new instructions and rules for its implementation. These include new approaches to the design and implementation of training sessions, containing new forms and technologies. The function of the teacher is also changing - from the translator of knowledge to the guide along the educational path and the facilitator. There is a need to more often use problem-based training problem-recommendation-tool for implementation-recommendations. In distance learning, as shown by the primary experience of teachers, such full-time pedagogical technologies can be successfully used as: project-based learning technology, critical thinking development technology, research teaching technology, individualized learning technology. However, their specific adaptation to the remote mode is required. It is necessary to ensure unity of requirements for conducting online classes and approaches of teachers to the organization of independent work. Teachers do not have a sufficient level of competence in the use of services to create online tests.

The student must be placed in a tight time frame, indicating urgency and limitations.

The reasons for the student’s unpreparedness for distance learning are the inability to organize their independent work, to optimize workload for all types of activities, to study without external systematic control and stimulation. In general, students are ready for distance learning. Although not everyone had sufficient technical support and
equipment to organize the workplace. Cognitive motives have intensified, reflecting the desire of students to self-education, focus on self-improvement of methods for obtaining knowledge. This is manifested in appeals to the teacher for additional information, clarifications. Students were interested in the resources that the teacher used to prepare the material and asked for links to the programs and services used. It should be noted that well-performing students during distance learning became even more active, while less successful students chose a wait-and-see attitude. Therefore, it is necessary to intensify their activities.

The hypothesis is confirmed that the main factor that impedes the work of teachers with distance educational technologies is anxiety, fear amid the novelty and lack of instrumental skills of the user with Internet technologies. Their readiness increases as organizational, methodological, and psychological difficulties are overcome through the unification of teachers to jointly solve problems and share their experiences. The problem of organizing the practical component of general engineering and special disciplines, which create a lot of problems for students in the absence of virtual laboratories, comes to the fore.

The study showed that most teachers are quite aware of the possibilities and forms of implementing distance learning and are aware of the advantages and prospects of its development. It should be noted that in the future, the integration of traditional and distance learning will be very useful for teachers and students and will achieve the results that the digital economy expects of us.

It is necessary to search for effective technologies of pedagogical interaction with students, a continuous increase in information and communication literacy, the formation of competencies and readiness for the implementation of new models of the educational process, the development of significant professional qualities should be priority areas for improving the activities of a higher education teacher in a digital educational environment.

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