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Background to the development of technology of formation of teachers readiness for distance learning

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Abstract.

The current stage of distance education development demands enhancement of standards for training of teachers working in that area. Only professional teachers are able to provide quality education for people with different abilities, interests and needs, considering their personal characteristics and specifics of distance education. It is critically important to analyse the experience and professional qualities of teachers involved in distance learning given the uniqueness of the current situation and a high probability of transition to distance education. The study was focused on establishing the actual preparedness level of teachers for distance learning and identifying prerequisites for formation of teachers' readiness to provide students distance education.

Key words: teacher, readiness, distance education, distance learning technologies, information and communication technologies.

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Introduction.

Nowadays, the society is developing in the context of viral pandemic, which requires specialists to acquire remote working skills. Pandemic restrictions implemented globally made it necessary to replace traditional classroom education by various forms of distance learning. This unplanned transition caused serious difficulties for all participants of the educational process, especially teachers. Inadequate developed knowledge in the sphere of information technologies, lack of methodological skills in organizing distance learning for children, and psychological unpreparedness led to insufficiently coordinated and even chaotic actions by teachers in the initial few months of distance learning.

Realities of today, however, demonstrate the relevance of distance learning beyond pandemic or other emergencies. Distance education has certain advantages and every year becomes increasingly more popular providing a high degree of accessibility to educational sources, and additional opportunities for the modern professionals' formation. Highly qualified teachers, information technology equipment, software, and availability of professionally developed didactic and technological materials made a range of educational services available to the general public.

The current stage of distance learning development demands enhancement of standards for training of teachers working in that area. Only professional teachers are able to provide quality education for people with different abilities, interests and needs, considering their personal characteristics and specifics of distance learning.

The modern distance education teacher is no longer a traditional "transmitter" of knowledge, but a partner of the distance learning student, building the process of educational interaction. Therefore, special attention should be paid to the development of certain professional skills in the future distance education teachers.

The issues of organization and methodological support of quality distance education for students at all levels, especially at the stage of school education, are actively discussed in the Republic of Kazakhstan, as well as other parts of the world. One of the most urgent issues to date is provision of training and retraining of distance education professionals.

The necessity of resolving this issue stems primarily from the requirements of actual educational practice and certain difficulties that teachers experience in the practical organization and implementation of distance learning. These difficulties are largely due to a lack of general information and didactic competence among teachers, as well as fragmented and unsystematic readiness of teachers to implement distance learning education. The lack of public confidence in distance learning, and often its poor effectiveness, is due to the fact that teachers involved in distance learning do not have the necessary level of professional competence.

Consequently, there is a need for serious theoretical and practical training of teachers to implement the learning process in the context of distance learning. This necessitates the revision of the content of educational programs for teachers training, modernization of methodological approaches and pedagogical technologies aimed at implementation of effective distance learning.

Actually, the problems in this area may include technology for teachers preparation for distance education and mechanisms for its implementation in accordance with the normative and legal documents in the field of education of the Republic of Kazakhstan.

It is critically important to analyse the experience and professional qualities of teachers involved in distance learning given the uniqueness of the current situation and a high probability of transition to distance education.

Therefore, the purpose of this work was to identify the background for the development of technology for the formation of teachers' readiness for distance learning.

To achieve the goal the following tasks were determined:

–to study and analyse the current state of teachers' readiness for distance education;

–to study normative and legal documents in the field of education, psychological and pedagogical research, experience in preparing teachers for distance learning.

Thus, the study is an attempt to identify the problems that teachers had due to urgent transition to distance education, and the knowledge and skills they needed to effectively implement distance learning, to determine the structure and content of technology of formation of future teachers' readiness for distance education.

Literature review.

Distance education development is one of its priorities in the field of education of the state policy of the Republic of Kazakhstan. Introduction and effective use of distance learning technologies are reflected in the Law of the Republic of Kazakhstan "On education" (Ch.3, Art.11, subclause 9) [1]; in the 2020-2025 State Program of Education and Science Development of the Republic of Kazakhstan [2] "infrastructure development and digitalization of education and science" is determined as one of the main directions, in subclause 5.1.5 planning of phased implementation of "online learning with elements of proctoring and distance technologies with development of quality assurance mechanisms", also in the plan of measures on Program realization is specified "introduction of changes in the Law of the Republic of Kazakhstan of July 27, 2007 "On education" on distance learning at the stage of secondary education" [2]; amendments and additions are made in the Order of the Minister of Education and Science of the Republic of Kazakhstan No. 137 of March 20, 2015 "On approval of the regulations of educational process organization by the means of distance learning technologies" (Order No. 141 of April 13, 2020) [3].The clause 26-1 of the current edition of the Order indicates "Obligations of educational process participants by the means of DLT in organizations of secondary, technical and vocational, and post-secondary education":…

Teachers: 1) develop electronic educational and methodical packages with the necessary educational and methodical materials in electronic form; 2) develop knowledge monitoring tools; 3) develop and send students a thematic schedule for mastering the relevant sections specifying the time of work on each topic and the deadlines for assignments completion; 4) carry out synchronous and asynchronous consultations with students; 5) apply optimal and diverse types of work, as well as accessible information and communication technologies; 6) timely inform students and their parents (legal representatives) about the types of work applied, the form and timing of online classes, participation in offline classes, and deadlines for homework; 7) ensure regular updating of educational and methodological resources; 8) assess students' performance in accordance with the assessment criteria provided for each discipline or module; 9) receive professional development in the use of DLT in the educational process; 10) maintain documentation related to distance education" [3].

Theoretical and practical research has shown that distance education in the United States, Canada and Western Europe is highly developed, although its importance and prevalence vary from country to country [4, 5]. In South Asian countries, particularly in Singapore, development of distance education is aimed at creating a common favorable unified educational environment providing a lifelong process of learning and retraining [6, 7]. Dynamic development of distance education in these states shows that it is a never-ending process associated with technological advances. Technological development will bring relevant innovations to education. Consequently, distance education will constantly develop and improve.

Foreign researchers, considering different models of distance learning organization, focus on improving its quality and efficiency [8, 9, 10, 11, etc.], on the study of selected psychological aspects of distance education [12, etc.], on the search for patterns and ways of using distance learning

technologies in teaching practice [8, 9, 10, 12, 13, 14, etc.], give recommendations for teachers without sufficient experience in the distance education system on delivery, monitoring and evaluation in distance learning, propose means of providing students with free access to libraries and other facilities available to students [14, 15, etc.].

It has been noted that development of information technology places new demands on teacher qualifications, and draws attention to training new teachers with the skills in latest information and communication technology (ICT), and providing aspiring teachers with relevant practice [16, 17, 18].

Therefore, the main objective in recent decades has been teaching future teachers to face not only the changes that have already occurred in the field of education, but also those that may arise in the future, regardless of their professional field. In addition, professionals must be able to structure their teaching methods considering changes in educational content, educational technologies, and students' development.

The problem of preparing both future teachers and working teachers for professional activities in the context of informatization of education is also actively studied in the CIS countries. The conceptual foundations and problems of preparing future teachers to use ICT tools in professional activities are presented in the works of M.P. Lapchik [19], Ye.Y. Bidaibekov [20], V.V. Grinshkun [21], M.I. Ragulina [22], S.R. Udalov [23], et al.

In recent years, there have been studies devoted to the theoretical and methodological aspects of preparing teachers for distance learning system (Fedorova G.A. [24], Medvedeva M.S. [25]), to the process of preparing future teachers for distance learning in individual disciplines (Kulagina Y.A. [26], Andreyeva T.Y. [27]), formation of teachers' readiness to use ICT in the educational process in the professional development system (Nikulicheva N.V. [28], GrabkoYe.Yu. [29]).

Despite the value of the research, it should be noted that many important issues remain poorly developed; a holistic approach is being developed to prepare teachers for distance learning.

In Kazakhstan, the problems of distance learning and didactic and methodological aspects of ICT use in education have been studied in the works of G.K. Nurgaliyeva [30], D.M. Jussubaliyeva [31], Ye.Y. Bidaibekov [20], D.D. Jantassova [32], Zh.A. Makatova [33], Z.Z. Orazalina [34],et al.

Analysis of the studied works showed that both foreign and domestic researchers recognize the importance of special training of teachers for distance learning.

Literature research has shown that one of the possible strategies for organizing and building a system for preparing future teachers for distance learning is the need for interdisciplinary interaction, and integration of disciplines in teacher training programmes. It is expected that integration of disciplines will enable future teachers to acquire the necessary competencies that will allow them to perform their professional activities successfully in the context of distance education.

Methods.

In order to identify the prerequisites for developing a technology for formation teachers' readiness for distance learning, the study was carried out in the following sequence:

- carrying out search and analytical work, during which the state of the problem was studied, the analysis of regulatory documents in the field of education and psychological and pedagogical literature was carried out, the research methodology was determined;

- conducting a survey in order to establish the actual state of readiness of teachers for students distance learning and search for the stages and formation of readiness of teachers for

distance learning, during which the prerequisites for formation of readiness of teachers to implement distance learning of students were identified;

- study the research results, processing of the received materials; systematization and generalization of the research results.

In the course of the research, the study and analysis of the regulatory legal acts of the Republic of Kazakhstan regulating the education system were carried out in order to identify the compliance of the content of pedagogical education with the requirements of social order in the context of distance learning; structural and functional analysis of professional and pedagogical activity in the context of distance education, which made it possible to establish its component composition, the way of organizing and interconnecting the components for designing the technology for forming teachers' readiness for distance learning.

The results of the study and analysis of the materials showed the topicality of the issue under study.

To get an idea of the current state of distance learning organization in educational institutions and readiness of teaching staff to work in distance learning conditions, an anonymous survey (survey) of teachers of educational institutions of the Almaty Region of the Republic of Kazakhstan and students of pedagogical specialties of Zhetysu University named after I. Zhansugurov and Abai Kazakh National Pedagogical University was carried out. The following tasks were assigned:

– determine the level of readiness for the use of distance educational technologies in teaching;

– to identify the problems and difficulties in using distance learning technologies, the types of assistance required for conducting distance learning;

– identify types of competence improvement for successful implementation of distance learning.

The survey involved 213 people, including 32 university teachers, 103 college teachers, 55 teachers of secondary schools, 23 undergraduates and doctoral students.

The survey was carried out with the support of the Municipal State Institution "Regional Educational and Methodological Center for Education Development" of the State Institution "Department of Education of the Almaty Region" and was conducted among teachers directly involved in the process of distance learning.

Table 1 - The quantitative composition of respondents

Total	School teachers	College teachers	University teachers	Students (undergraduates and doctoral students)
213	55	103	32	23

The age composition of the survey participants was quite wide. The largest and almost equal shares of the survey were attended by respondents-teachers of two age groups - 30 and less than 30 years old (29.3%) and 31-40 years old (31.7%). 22% - 41-50 years old, 14.6% - 51-60 years old and over 60 years old - 2.4%.

The structure of the respondents-students was represented by students of two levels of the higher education system, distributed according to the level of education: master degree students - 69.6%; doctoral students - 30.4%. At the same time, the majority of respondents were the students of Zhetysu University named after I. Zhansugurov (69.6%).

The survey contained the following items:

1. Do you consider yourself ready to implement distance education?

2. How would you assess your own method readiness at switching to use DLT in teaching?

3. What electronic resources and systems did you use prior to the transition to exclusive use of DLT?

4. What electronic resources and systems of DLT do you currently use in the educational process?

5. Do you feel the need for help while working in the conditions of distance learning?

6. What problems and difficulties obstruct you the most when using DLT?

7. What difficulties do you often encounter when working with the students in the process of distance learning ?

8. What help do you need for conducting distance learning?

9. Please point out, what kind of assistance you need first of all for DL implementation in the educational institution.

10. In your opinion, what kind of assistance should be provided to teachers who, for various reasons, were not quite ready for transition to distance learning?

11. Do you need special training to implement distance learning?

12. What type of competence improvement is preferable for You?

13. Your opinions and recommendations on teachers preparation for distance learning

Also, to define the information competence of undergraduate students in the survey conducted as part of the diagnosis of adaptation of first-year students of the 2020-2021 academic year at Zhetysu University named after I. Zhansugurov, the item “I had no problems using modern educational technologies (online platform of the university, WebEx , Google Meet, Google classroom, Zoom, Team, Bilimland, iMektep, etc.)” was included in the survey.

- ☐ Totally disagree
- ☐ Disagree
- ☐ Partly agree, partly not
- ☐ I agree
- ☐ I completely agree
- ☐ Other

588 students took part in the survey.

Results and Discussion.

As a result of the first survey, it was revealed that teachers have a focus of their consciousness on implementation of their professional activities in the distance learning mode. For this purpose, the question was as follows: “Do you consider yourself ready to implement distance education?”

More than half of the respondents (57.6%) answered this question positively, a significant part (40.5%) answered that they are ready “to some extent” and 1.9% answered negatively, which indicates a generally positive attitude towards distance learning (picture 1).

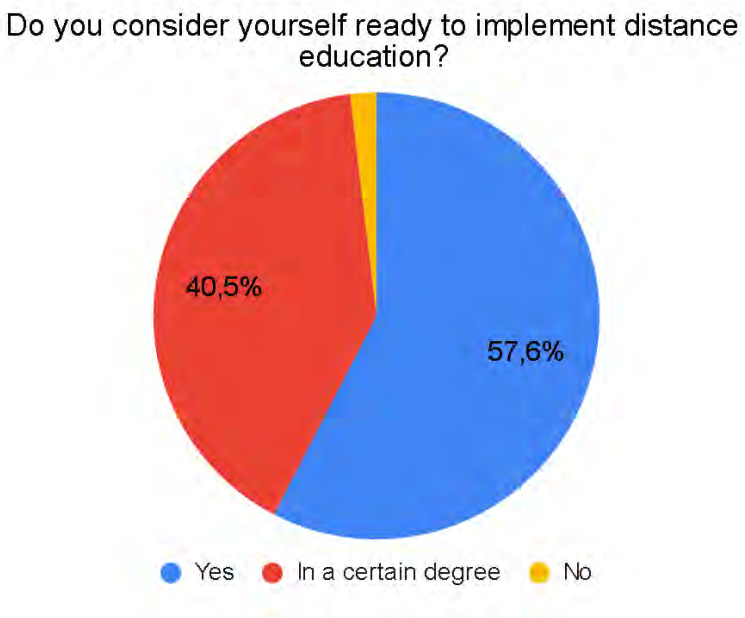

Figure 1 - Readiness for distance learning implementation

When analyzing the results of the survey, it was important to establish the degree of professional readiness of the teaching staff to organize the educational process in the distance learning mode in the conditions of the measures taken to prevent spread of infection. Readiness was assessed according to the following criteria:

- methodical readiness;

- information and communication readiness.

Assessment of the methodological readiness of teachers

One of the defining conditions for the readiness of teachers to implement distance education is methodological readiness, including methods, techniques for organizing video lectures, video conferences, organizing practical, laboratory classes, providing feedback with students and monitoring their study mastery of the academic discipline, development and use of electronic resources, etc.

As shown by the results of the survey, 19.9% of respondents believe that they have sufficient knowledge to conduct distance learning; 54.2% indicate insufficient readiness, 17.8% say about poor preparedness and 8.1% point out their methodical unpreparedness for distance learning implementation (Figure 3). In other words, most of the interviewed teachers say that a lot of things they have to learn “on the go”, that is on the need for preliminary special methodological training for distance learning implementation.

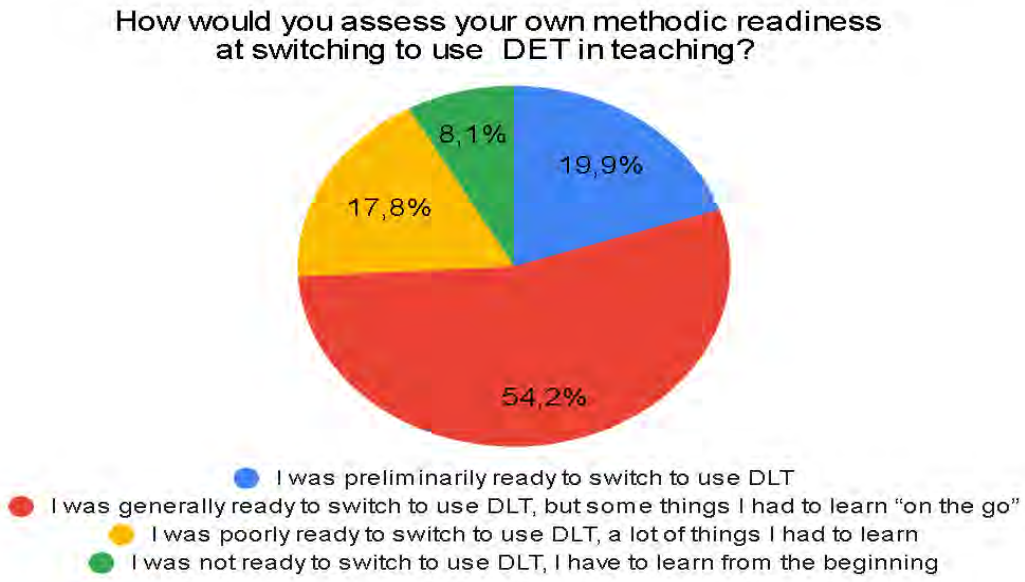

Figure 2 - Methodical readiness to use distance learning

technologies in teaching

Assessment of information and communication readiness of participants

of the educational process

Another important aspect of the effective implementation of distance learning is online material and technical support of the educational process, in particular, digital educational resources.

The survey showed that 18.4% of the respondents had developed full-fledged courses in the e-learning system before switching to the exclusive use of distance learning technologies, 22.2% partially used the capacities of the e-learning system of the educational institution, 50.7% - used the social network in the educational process, 12.5% - used services for video conferences, webinars, 6.9%. - used educational online resources of other organizations in their teaching activities, 32.2% - used e-mail (Figure 3).

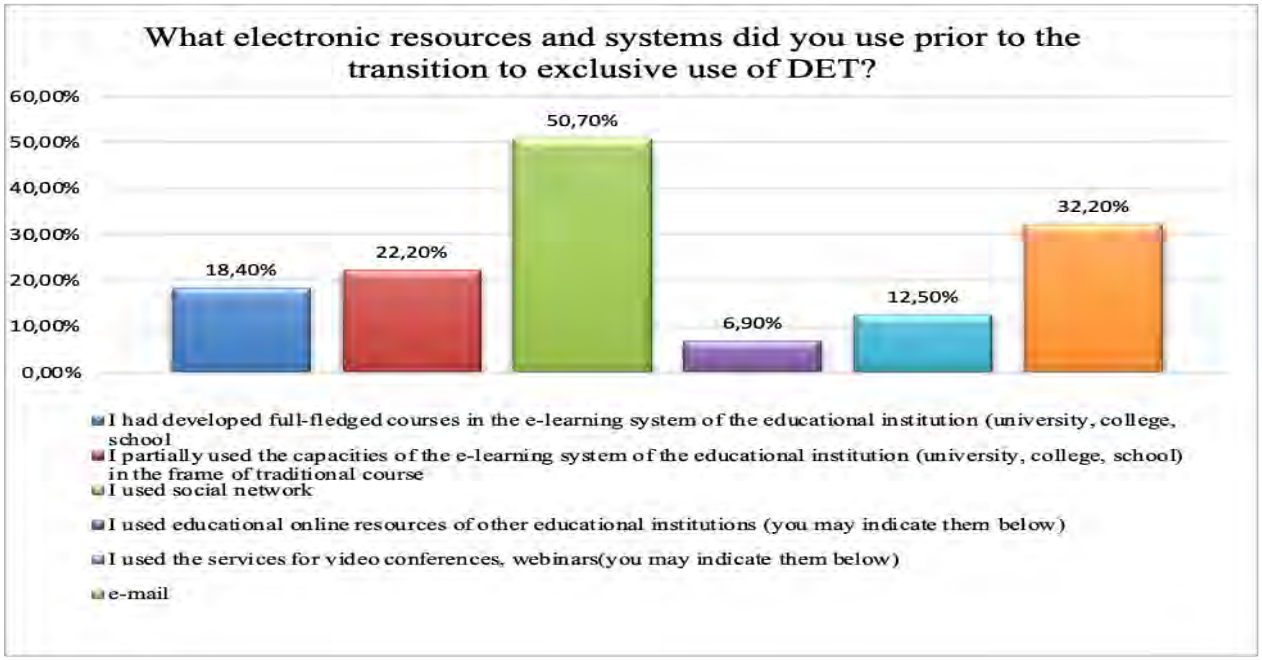

Figure 3 - Use of electronic resources and systems prior to transition to the exclusive use of distance educational technologies

The survey showed that more than half of the respondents had experience in using electronic resources in the educational process.

With the transition to distance learning, 68.8% of respondents use in the educational process the e-learning system of their educational institution; social networks - 31.9%; integrated system - 5.5%; educational online resources of other organizations-8.3%; services for video conferences, webinars - 21.5%; Viber, WhatsApp messengers, Skype or others - 36; e-mail - 38.0% (Figure 4).

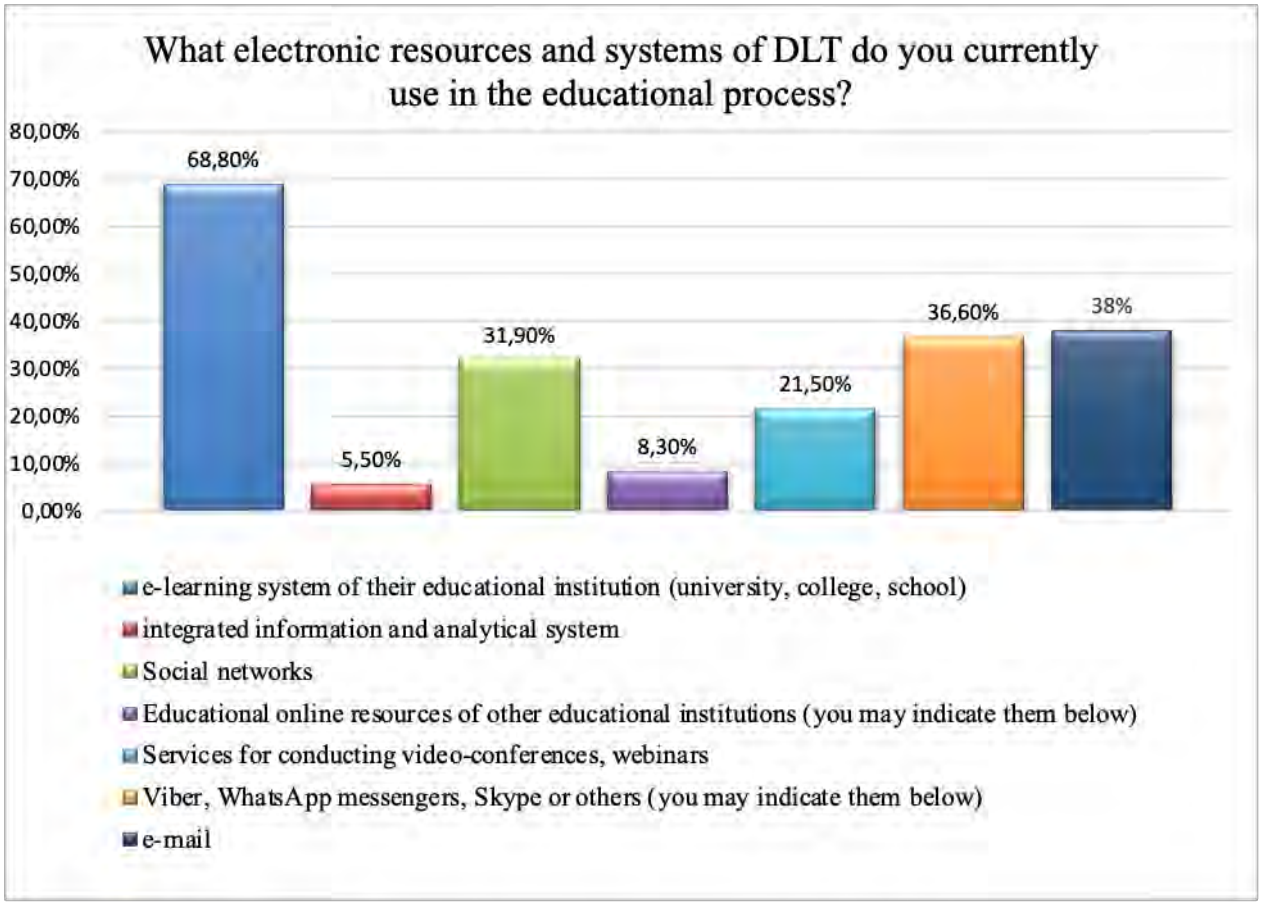

Figure 4 - Use of electronic resources and systems after transition to exclusive use of distance educational technologies

The analysis of the data obtained showed that they were mainly provided with the necessary resources for distance learning: teachers were able to use the most suitable and convenient Internet resources for them; they were introduced to digital educational resources, features and differences in the organization of online classes.

However, it is puzzling that 67.6% of the interviewed teachers experience difficulties, lack of competence in preparing and conducting distance lessons and the need for assistance when working in distance learning conditions (of which 13.4% - often, 54.2% - in some questions).

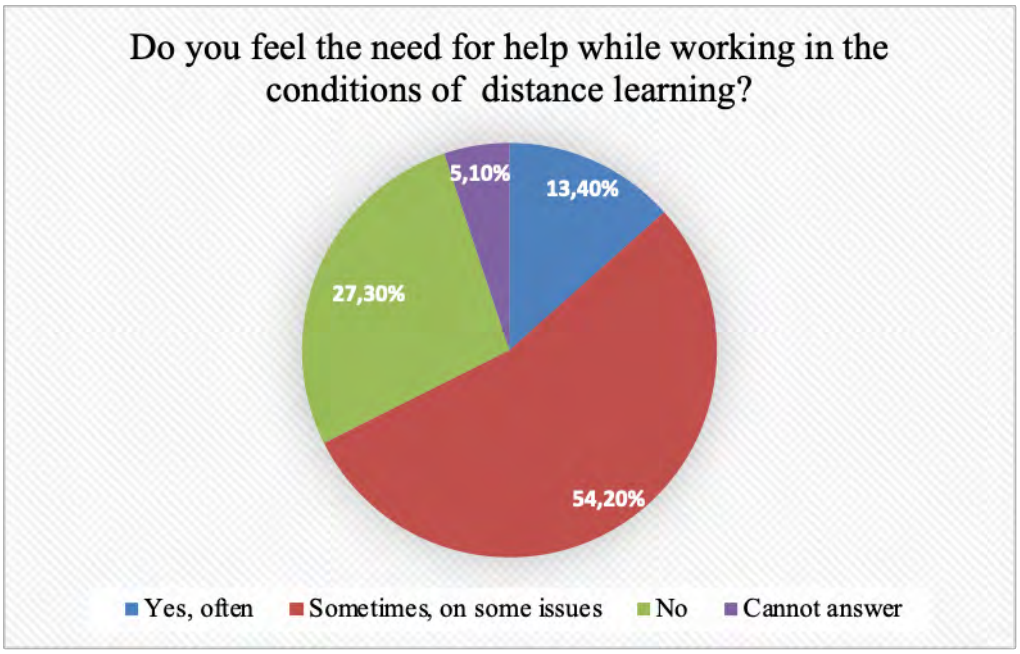

Figure 5 - Experiencing the need for assistance in work in the distance learning conditions

Among the main problems and difficulties in using distance educational technologies, the respondents indicated **:**

- Lack of skills or experience in using distance learning technologies - 17.8%;
- Insufficient methodological or technical capabilities of the e-learning system of an educational institution - 8%
- Difficulty organizing video lectures, video conferences - 20.3%
- Difficulty in organizing practical, laboratory classes - 17.8%
- Technical problems - 36.2%
- Students do not perform tasks properly - 37.5%
- Difficulties in communication with students -24.0%
- Methodological difficulties (methods, teaching techniques, etc.) - 15.5%;
- When implementing personality-oriented and differentiated approaches -14.6%.

Only 28.7% of the interviewed teachers said that they did not experience serious difficulties in working with students.

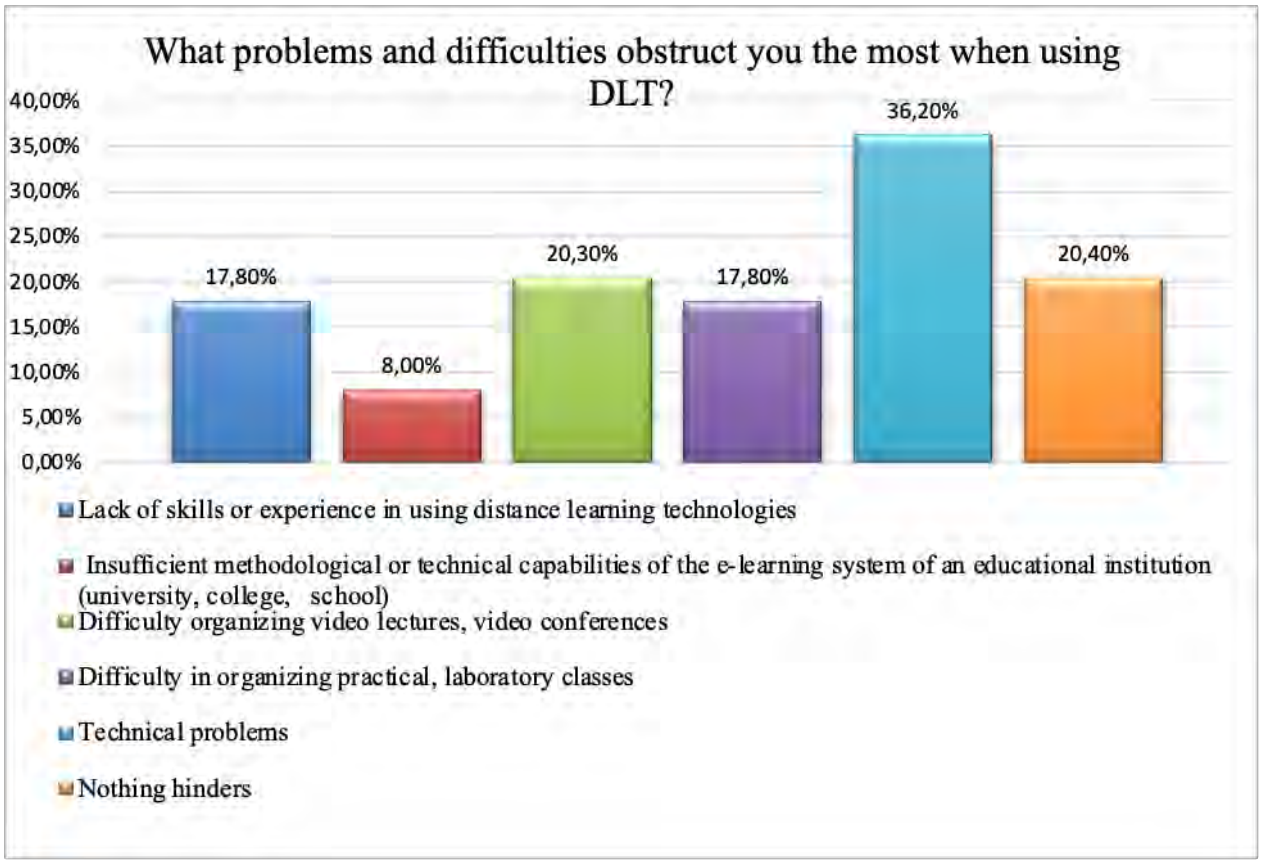

Figure 6 - Problems and difficulties that impede teachers to use distance learning technologies

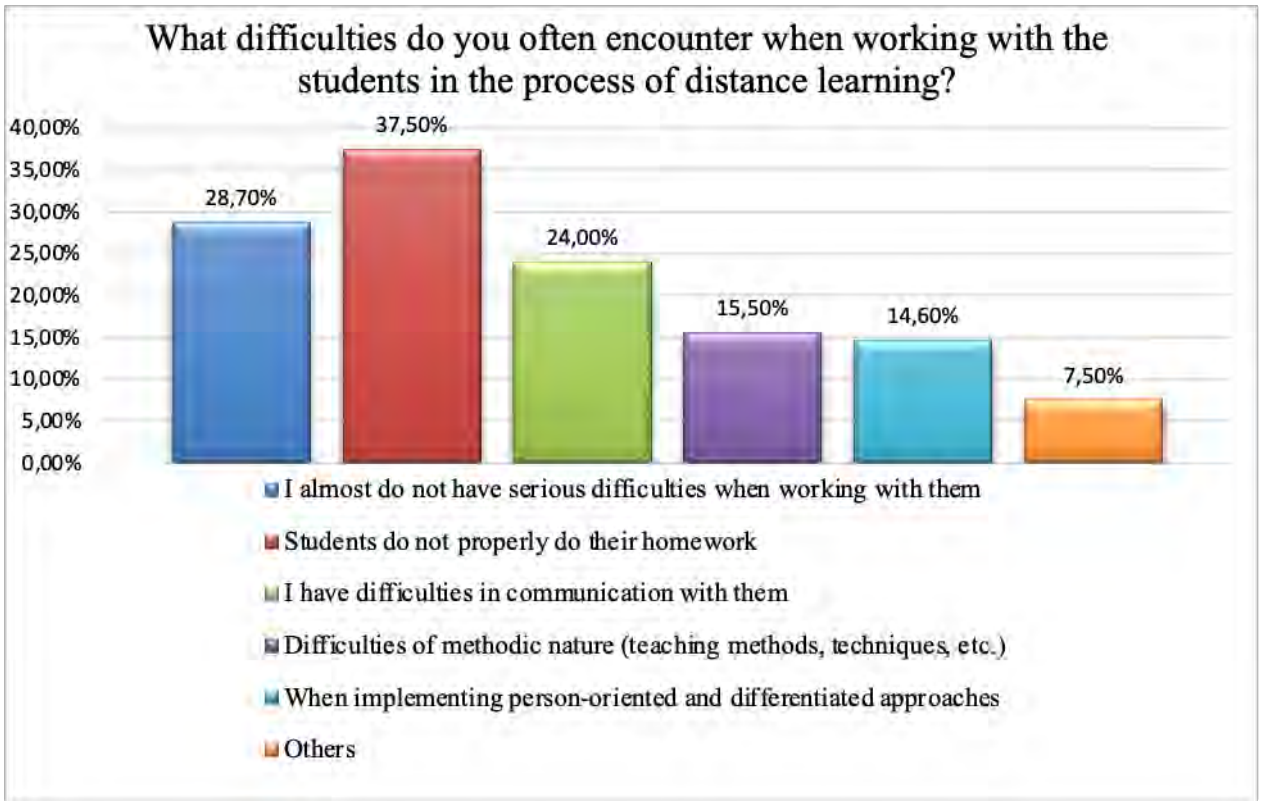

Figure 7 - Types of difficulties when working with students

It should be noted that a significant part of the respondents indicate difficulties in organizing video lectures, video conferences, practical, laboratory classes, as well as the fact that students do not perform tasks properly. In addition, for 36.2% of the respondents, the problems of the technical nature of the learning process were not resolved.

To determine what kind of help teachers need to conduct distance learning, it was necessary in the survey to answer the question "What kind of help do you need to conduct distance learning?" and they should note what kind of assistance they need, first of all, for implementation of distance learning in the educational institution.

The relative majority of respondents indicated the following types of assistance that they need (Figure 9):

– Methodological or technical assistance is required in using the e-learning system (platforms and services for online learning) - 36.8%;

– methodological assistance is required when using video conferencing services - 12.5%;

– methodological or technical assistance is required when using the Adobe Connect video service - 13.2%;

– assistance is required to use the capacities of social networks - 5%;

– assistance is required in development of electronic resources (textbooks, manuals, knowledge control tools, etc.) - 27.8%;

– assistance is required in developing visual aids for distance learning - 16%;

– assistance is required in preparing virtual laboratories - 16.5%.

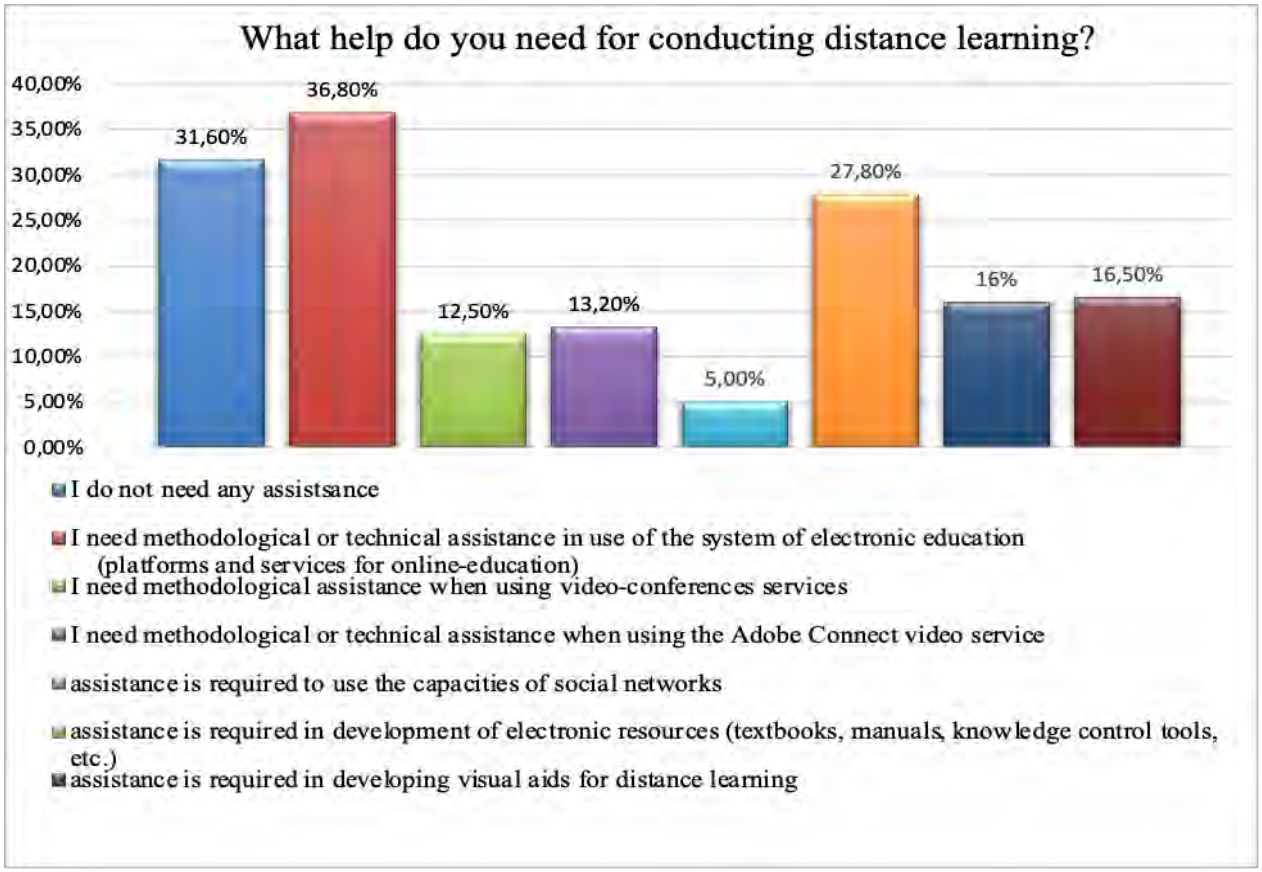

Figure 8 - Types of assistance that teachers need

And they noted the priority types of assistance (Figure 9):

– expansion of competence in the field of ICT and DLT - 37.7%;

– recommendations for teachers on prevention and overcoming of poor academic performance - 22.6%;

– development of systems of objective assessments of the level of knowledge, abilities and skills, assessments of the advancement and development of students - 12.4%;

– development of competencies in the psychological field - 13.2%;

– psychological and pedagogical support of distance education - 14.6%;

– organization of extracurricular activities of students - 27.6%

– formation of students' communicative competencies - 11.7%;

– expanding knowledge in the field of overcoming difficulties in distance learning - 11.7%

– individual consultations of distance education specialists - 5.6%

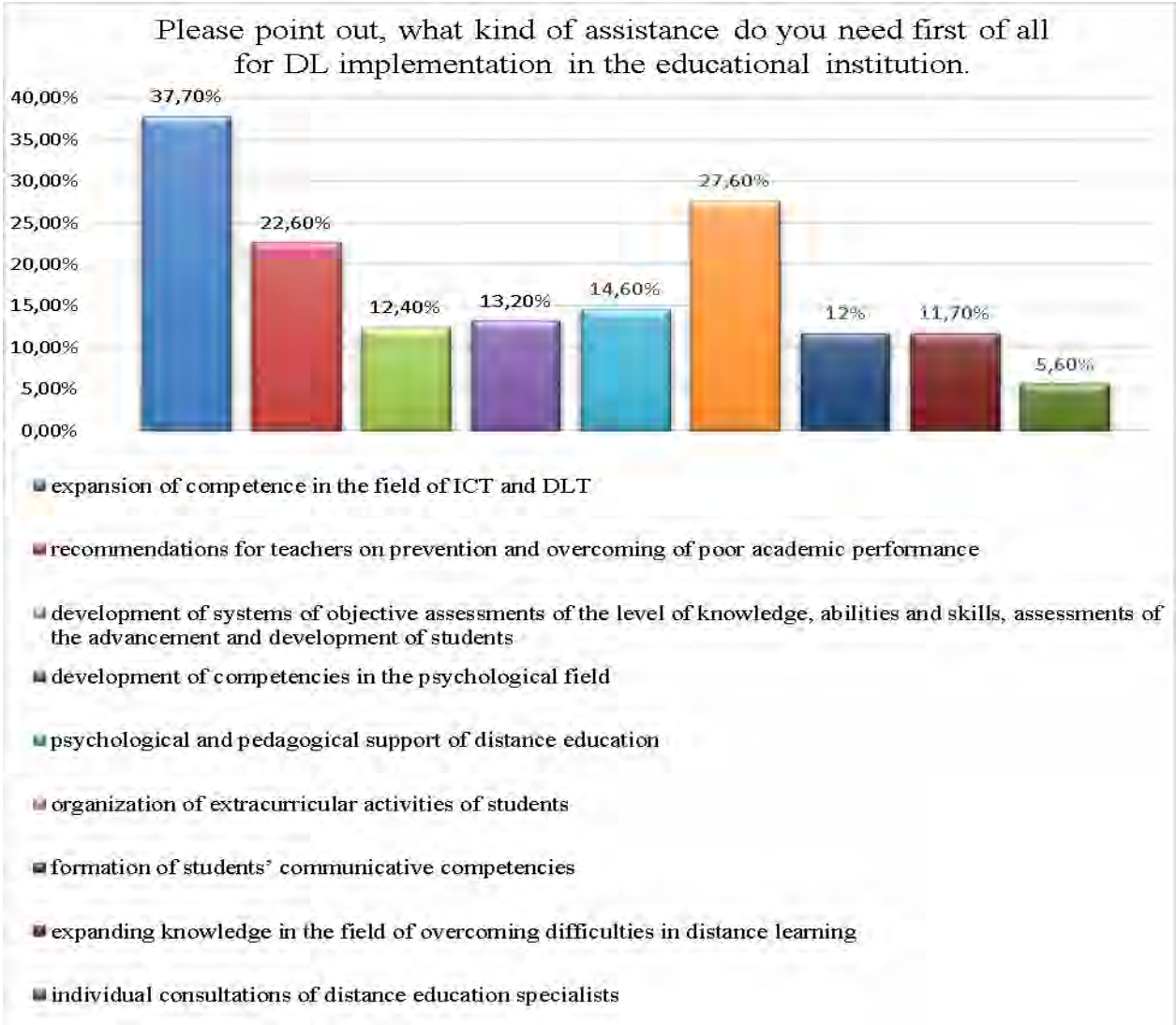

Figure 9 - Types of priority assistance that teachers need for implementation of distance learning in an educational institution

To determine the degree of need for special training of teachers for implementation of distance learning and the content of the training program, the following questions were asked:

- Do you need special training for implementation of distance learning?

- In your opinion, what kind of assistance should be provided to teachers who, for various reasons, were not quite ready for transition to distance learning?

The answers were as follows (Figures 10, 11):

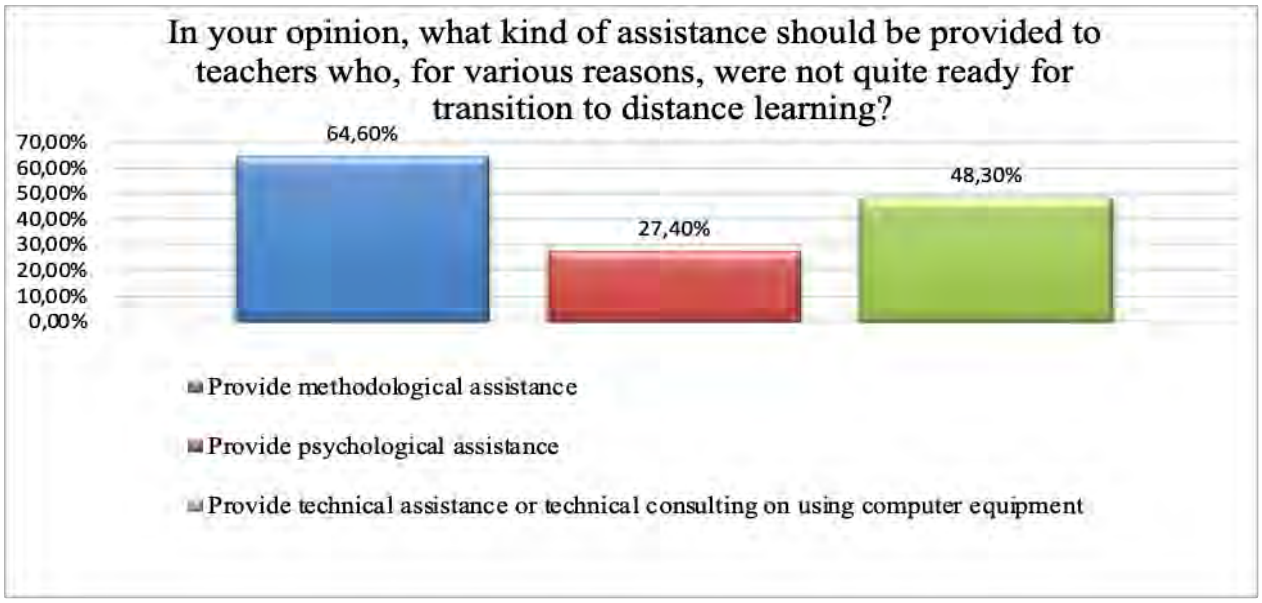

Figure 10 - Types of assistance needed for teachers who, for various reasons, were not quite ready for transition to distance learning

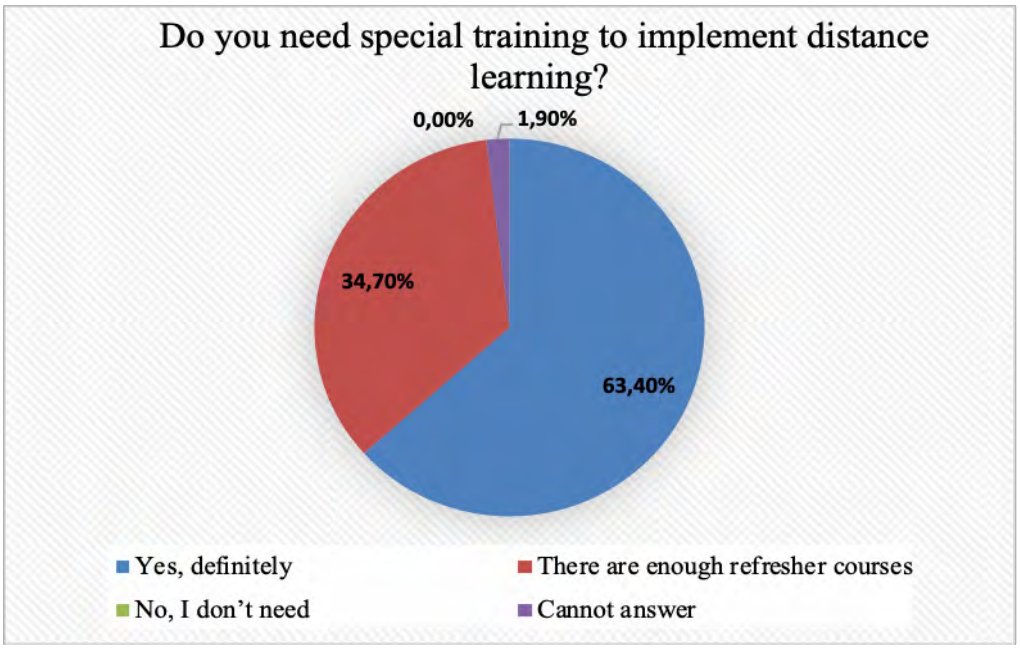

Figure 11 - The need for special training for distance learning

As can be seen from the diagrams (Figures 11, 12), the interviewed teachers give first place to methodological assistance for working in the distance learning system - 64.6% and the need for special training in distance learning - 63.4%.

Hence, it is necessary to familiarize teachers with constantly developing virtual teaching tools, with the rational organization of communication, consideration of methodological ways of building the educational process without having direct contact with students, study of teaching methods on air, providing feedback, and studying the psychological aspects of distance learning.

Further, the need of teachers for additional training in the context of advanced training in the use of DLT in the educational process was studied.

To the question “What type of competence improvement is preferable for you?”, 48.4% of the surveyed respondents indicated practice-oriented seminars; 29.2% - master classes; 22.6% - short-term refresher courses; 21.4% - refresher courses (2 weeks); 25.5% - individual consultations of specialists in the field of IT-technologies; 19.4% - type of work aimed at increasing professional competence through consideration of cases from practice that caused difficulties when working with students; 25.9% is a permanent website on teacher education.

The rest indicated other types (Figure 13).

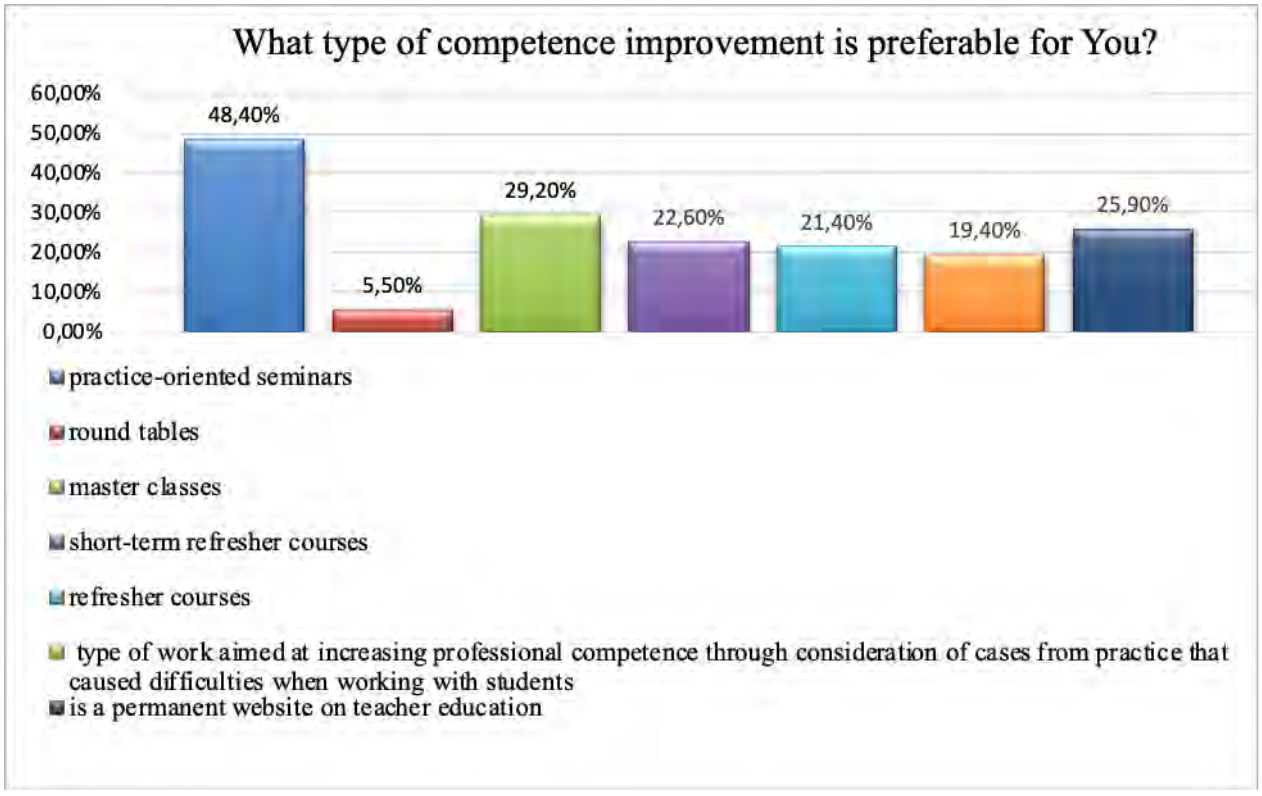

Figure 14 - The need to improve competencies in the field of DLT

As follows from the data obtained, the need for various types of advanced training varies from 19.4% to 48.4%. Most of the interviewed respondents need to improve their competence in the field of distance learning in the form of practice-oriented seminars (48.4%).

Thus, all respondents felt the need for some form of additional training on distance learning issues. If the problem of full-fledged training of teachers for distance learning is not solved, then there will be a high probability of reducing the effectiveness of distance learning, as well as the level of quality of education in distance learning.

Assessment of readiness of future specialists in the system of education (students, undergraduates, doctoral students) to work in the conditions of distance learning has great importance.

The results of the survey showed that, despite the cautious attitude of most of the undergraduates and doctoral students to the prospects of their participation in distance learning, they still believe that they accept the distance education format and are ready for distance learning. Thus, the results of the empirical research allow us to conclude that, in general, the survey participants consider it necessary to prepare for the educational process in this format and are ready to study for pedagogical activity in the context of distance learning.

In the course of the research, the interest was aroused by the point “Your opinions and recommendations on teachers preparation for students distance learning”. The majority of respondents consider that in order to improve teachers preparation for students distance learning, the following is necessary:

• increasing the competence of practicing teachers through various forms of additional education (improvement courses, individual training, etc.);

• preliminary special training;

• self-education (study of additional information, additional resources and educational platforms, instructional materials).

Here are the examples of some answers: “We need preliminary training”, “We need special training”, “Introduce changes in the distance learning system”, “We need to pay attention to the psychological component, rational time management, organization of the daily routine”, “Professional development of the teaching staff”, “IT technology courses”, “It is necessary to study additional resources and educational platforms, instructional and methodological materials. Use innovative technologies “, etc.

Among 588 students who took part in the survey in the frame of the diagnosis of adaptation to new conditions with the statement “I had no problems using modern educational technologies (online university platforms, WebEx, GoogleMeet, Googleclassroom, Zoom, Team, Bilimland, iMektep, etc.)” 249 (42.3%) agree; partly agreed, partly not - 140 (23.8%); totally agree - 99 (16.8%), disagree - 60 (10.2%) completely disagree - 34 (5.8%), don’t know - 6 (1%).

These results indicate that the information competence of a significant part of the respondents is formed at an insufficient level. In this regard, there is a need for formation of professionally significant qualities of future teachers for implementation of distance learning, as well as the need to develop a technology for their formation in the process of studying at university.

Conclusions.

Thus:

1. Training of teachers who have the knowledge, skills and abilities of organizing distance learning for students and creating electronic academic and methodological complexes can be carried out in universities, in the system of additional education (refresher courses, training practice-oriented seminars, e-courses offered by certain training centers and institutions), also at the place of work of teachers.

2. The following conditions can be distinguished to ensure successful preparation of teachers for distance learning implementation:

1) pedagogical, related to taking into account psychological and pedagogical principles of distance learning and organization of the pedagogical process, using the means, methods and techniques corresponding to the aims of teaching ;

2) organizational and communicative, associated with formation of knowledge in management psychology, educational psychology;

3) technical, related to formation of computer literacy, use of modern distance educational technologies, etc.

3. Accordingly, the teacher training program may include such modules as the fundamentals of informatics; features and technologies of distance learning; development of electronic academic and methodological complexes, control and measuring instruments and control organization in the distance learning system; practical work in computer networks, etc.

Therefore, based on the results of empirical research obtained by the survey, it may be assumed that the technology of preparation of a future teacher for distance learning implementation involves the following stages:

- Generally preparatory. The aim of this stage is to form the system of psychological and pedagogical knowledge and knowledge in informatics, skills and abilities for implementation of various distance learning technologies. The content of training future teachers will be the course of informatics, discipline of psychological and pedagogic cycle, course on communicative technologies, and also elective courses related to introduction to distance learning;

- vocationally orienting. The aim of this stage is to form didactic and communication readiness of teachers for implementation of distance learning of an educational (school) subject. The content will include the disciplines of psychological and pedagogical cycle, the methodology of teaching the subject, information technologies in teacher's work and elective courses related to the foundations and technology of DL;

- vocationally specialized. The aim of this stage is to form methodical experience of distance learning implementation. The content is elective courses related to socio-psychological aspects of working in distance learning system, methods of distance learning, with development of electronic educational and methodological complexes).

The carried out research allows us to draw the following conclusions, which are prerequisites for development of technology for formation of teachers' readiness for distance learning:

1. distance learning is an effective form of education;

2. today, different models of distance learning are possible, which are mainly defined by the used technologies;

3. to implement formation of readiness of future teachers at university to work in the distance learning system, educational programs of pedagogical specialties should include training courses reflecting the general, vocationally orienting, vocationally specialized training of teachers.

The possibility of further research on creation of modern, favorable pedagogical conditions for efficient formation of readiness of future teachers for distance learning will allow to develop a model and technology for formation of a teacher's readiness for students distance learning, program and methodological materials and recommendations on implementation of technology for training teachers who implement successfully distance learning.

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