RUSSIAN TEACHERS IN THE DIGITAL TRANSFORMATION OF GENERAL EDUCATION: CHALLENGES, EXPECTATIONS, AND PROSPECTS

OS PROFESSORES RUSSOS NA TRANSFORMAÇÃO DIGITAL DA EDUCAÇÃO GERAL: DESAFIOS, EXPECTATIVAS E PERSPECTIVAS

PROFESORES RUSOS EN LA TRANSFORMACIÓN DIGITAL DE LA EDUCACIÓN GENERAL: RETOS, EXPECTATIVAS Y PERSPECTIVAS

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ABSTRACT: The survey is aimed at identifying the quality of difficulties in teachers' activity in the new reality of digitalization, their personal and professional expectations, and prospects for the solution of the emerging professional tasks. The goal of the study is to describe the substantial content of a teacher's readiness to take part in the digitalization of the educational process in Russian schools. The results of the empirical study conducted via an online survey of teachers of general educational organizations in the Russian Federation are processed using the methods of modeling, mathematical statistics, and comparative methods. The tendency of teachers to improve the specialized knowledge required for solving the pedagogical tasks shaped by the changed conditions of professional activity is revealed. Teachers are found to be concerned about changes in the content and technologies of direct and indirect interaction with other subjects of educational relations—students and parents.

KEYWORDS: Russian Federation. Digitalization of education. School teachers.

RESUMO: A pesquisa visa identificar a qualidade das dificuldades na atividade dos professores na nova realidade da digitalização, suas expectativas pessoais e profissionais e as perspectivas para a solução das tarefas profissionais emergentes. O objetivo do estudo é descrever o conteúdo substancial da disponibilidade de um professor para participar da

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digitalização do processo educacional nas escolas russas. Os resultados do estudo empírico realizado através de uma pesquisa on-line com professores de organizações educacionais na Federação Russa são processados utilizando os métodos de modelagem, estatísticas matemáticas e métodos comparativos. É revelada a tendência dos professores de melhorar os conhecimentos especializados necessários para resolver as tarefas pedagógicas moldadas pelas condições alteradas da atividade profissional. Verifica-se que os professores estão preocupados com as mudanças no conteúdo e nas tecnologias de interação direta e indireta com outras disciplinas das relações educacionais — alunos e pais.

PALAVRAS-CHAVE: *Federação Russa. Digitalização da educação. Professores de escola.*

RESUMEN: *La investigación pretende identificar la calidad de las dificultades en la actividad de profesores en la nueva realidad de la digitalización, sus expectativas personales y profesionales, y las perspectivas de solución de tareas profesionales emergentes. El objetivo del estudio es describir el contenido sustancial de la disposición del profesor a participar en la digitalización del proceso educativo en las escuelas rusas. Los resultados del estudio empírico realizado a través de una encuesta en línea a los profesores de las organizaciones educativas de la Federación Rusa se procesan utilizando los métodos de modelización, comparativos y estadística matemática. Se revela la tendencia de los profesores a mejorar los conocimientos especializados necesarios para resolver las tareas pedagógicas en las condiciones de la actividad profesional. Los profesores se muestran preocupados por los cambios en el contenido y las tecnologías de interacción directa e indirecta con otros sujetos de las relaciones educativas — estudiantes y padres.*

PALABRAS CLAVE: *Federación de Rusia. Digitalización de la educación. Maestros de escuela.*

Introduction

The new reality of educational relations at the beginning of the 21st century is primarily determined by the onset of the digitalization process, which has reached a global scale. Amid the dismantling of traditional paradigms of education, new conditions for the development of this sphere critically important for society and individuals are discussed and subjected to partially fair, but often unfounded criticism. This indicates the lack of understanding and acceptance of the social phenomenon of digitalization, there are concerns and fears of losing familiar life processes, including educational guidelines. Such ambiguous assessments are also quite evident in the vocabulary of the digital block of education. Many concepts remain ambiguous and debatable in content, for example, the terms *digital transformation of education* and *digital economy*, which has been repeatedly recognized by experts. In accordance with the national project "Education", within the framework of which

is the federal project "Digital educational environment" is implemented, by 2024, Russia has to create the conditions for the introduction of

> a modern and safe digital educational environment providing for the formation of the value of self-development and self-study in the students of educational organizations of all types and levels by means of the renewal of the information and communication infrastructure, personnel training, and the creation of a federal digital platform (RUSSIA, 2018, our translation).

Although the document does not use the term *digitalization of education*, the target indicators established in it allow identifying the main vector of the policy, which in many studies has been titled as *the digital transformation of education* or *the digitalization of education*. Back in 2010, the new Federal State Educational Standard set the objective of developing each student's ability to manage their own learning, and the text of the standard also includes references to the widespread use of information and educational technology in the professional activities of a teacher focused on students' mastery of the educational program.

Such substantial, compared to the previous periods of schools' functioning, changes in the historically established educational relations must not only be recorded but subjected to scientific scrutiny by the representatives of humanities, because the problems of involving teachers, students, and parents in digitalization are not exclusively pedagogical. There is a need for comprehensive interdisciplinary research, primarily on the perception of the digital transformation of the renewing school by the subjects of educational relations.

In the meantime, the professional pedagogical community does not have a holistic image of the ongoing changes in the system of general education associated with the assessment of the readiness of all participants in educational relations to tackle the set tasks. Recommendations on the digital transformation of education coming, in particular, from the specialists of the National Research University "Higher School of Economics" are not backed up by serious psychological, pedagogical, and methodological analysis of the effectiveness of their implementation in the Russian schools and do not practically reflect the mechanism of a teacher's preparation for this transformation. Specifically, the authors of the collective monograph *Russian education: Achievements, challenges, and prospects* (CENTER FOR STRATEGIC RESEARCH, 2018; KUZMINOV; FRUMIN, 2019) connect the needs of the digital economy for personnel demonstrating the key competencies of the 21st century (critical thinking, the ability to self-educate, the ability to make full use of digital instruments, sources, and services in their daily work) and the need for a radical transformation of the

education system. This transformation, according to the researchers, should harmonize the following processes within the unified educational process: students' mastery of the preselected material, their achievement of the externally formulated and independently chosen goals; support for and development of students' learning abilities, the formation of their independence in learning, the formation and development of their personal identity in the process of mastering both socially assigned and self-selected content. Accordingly, digital technology creates the conditions for resolving this problem through the improvement of the means of planning and organization of the educational process, the wide use of active learning methods, and the transition to a personalized and efficient organization of the educational process (UVAROV; GABLE; DVORETSKAIA; ZASLAVSKY; KARLOV; MERTSALOVA; SERGOMANOV; FRUMIN, 2019).

The objectives faced by the Russian education system are not limited to the issues associated with the digital transformation, which comprises the development of the digital infrastructure of education, digital educational and methodical materials, and instruments and services including digital testing and the development and distribution of new models for the organization of educational work (UVAROV; GABLE; DVORETSKAIA; ZASLAVSKY; KARLOV; MERTSALOVA; SERGOMANOV; FRUMIN, 2019). The problem of teachers' mastery of digital technologies, the so-called *digital literacy*, and the development of digital infrastructure are undoubtedly important components of the process of transformation of schools, but not the only ones. V. V. Putin stresses that

> "The digital" and telecommunications offer colossal opportunities, of that we are well aware. But, of course, they cannot replace live communication between a teacher and a student, the creative, collaborative, friendly environment of schools, universities, and colleges. [...] The education system not only teaches but also educates, shapes the personality in many ways, transmits the values and traditions on which our society is based (PUTIN, 2020, our translation).

The digitalization processes and other global changes spread across all spheres of life of society creating new opportunities, challenges, and dangers for the next generations, and there is no doubt that the profession of a teacher will not only continue to exist in this society but, having undergone major changes, will remain highly important. The significance of the teacher's mission in modern society is underlined in the sociopolitical sphere by several initiatives; in particular, the year 2023 has been declared the Year of the Educator by the President of the Russian Federation.

The importance of teachers' mission was also repeatedly voiced at panel discussions and in speeches at the Russian International Forum "Time for Education". In his speech at the forum, S. S. Kravtsov, the Minister of Education of the Russian Federation, pointed out that teachers remain the main driving force of the educational process and their work cannot be called a service: "The teacher is not a service provider—it is a mission, a calling". Nevertheless, the teaching community has yet to consider the processes of transformation of the Russian education system and the role of the teacher in them as a response to the challenges of the digital revolution accompanied by profound changes and growing contradictions in the social, cultural, and economic life of countries and peoples around the world.

The importance of the role of a teacher in the context of the digital transformation of education in the world community is emphasized by foreign researchers, particularly the German scientist Andreas Schlachter, one of the recognized authorities in the field of educational research, and Edmond Gable (2019), a development consultant in the sphere of information and communication technologies, their implementation, and the digital transformation in education.

The problems of teachers' activity as the subjects of educational relations in the conditions of digitalization are examined in the works of Russian researchers Mukhametzianov (2020), Kolykhmatov (2019), Murtazina and Rezer (2020), Grebenyuk (2020), and others.

Within the scope of the outlined problem, it is possible to actualize the data of studies and surveys by the Russian Public Opinion Research Center (RASSHIRENNAIA, n.d.), the analytical center of the national agency for financial research (AIMALETDINOV; BAIMURATOVA; ZAITSEVA; IMAEVA; SPIRIDONOVA, 2019), the online learning platform Uchi.ru (KOLESNIKOVA, 2019), Federal State Autonomous Institution "Fund for the New Forms of Education Development" (SBORNIK, 2020), and particular research teams.

The present study uses the results of a theoretical analysis of Russian and foreign scientific and methodological literature, the results of sociological surveys and studies, including those conducted by us independently, as well as the analysis of the results of our own scientific and pedagogical work.

The goal of the study is to identify the content of the readiness of teachers as the subjects of educational relations for the transformation processes in the system of general

education shaped by the digitalization of society based on a theoretical analysis of the results of contemporary researchers and the conducted empirical study.

The study objectives are to determine the content of teachers' readiness for innovations and the continuous processes of educational relations; to identify the problems in the adaptation of the educational process subjects to the processes of transformation of the general education system caused by the digitalization of society; to identify the development prospects and challenges faced by practicing teachers due to the need to use digital instruments and technologies in the educational process.

The study procedure is to study and identify the challenges and problems in the educational process faced by teachers in general education in the context of digitalization, by conducting a sociological survey among the teachers of general education organizations. The content of the provided questions is also consistent with the focus of the research study *The Russian general education system and practical recommendations for its improvement in the conditions of digitalization: The dynamics of value orientations, expectations, and problems of different population groups*.

The survey is conducted in seven subjects of the Russian Federation: Belgorod oblast, Volgograd oblast, Krasnodar Krai, Lipetsk oblast, Rostov oblast, Stavropol oblast, and the Chechen Republic. The survey was administered in Google Forms. The total sample of the survey exceeds 1,700 respondents, and 80% of the surveyed teachers work in rural schools and 20% in urban schools.

The current article presents the results of analyzing three blocks of the survey questions. The first block of questions focuses on teachers' assessment of the state of the digital infrastructure in their schools and at the homes of subjects of the educational space in the context of implementing education with the use of distance learning technologies. The second block of questions addresses teachers' self-assessment of their digital literacy and readiness for work under the conditions of digitalization of education. The third block of questions aims at identifying the challenges, problems, and expectations of teachers regarding the digitalization of education, specifically the use of digital instruments and technologies in the educational process including the context of using distance learning technologies.

Results

The obtained data are analyzed in accordance with the specifics of each block of questions. The results of the survey are subjected to quantitative and qualitative analysis to clarify the digital content and substantial understanding of the data acquired.

Answers to the first block of questions allow examining teachers' opinions on the state of digital infrastructure in educational organizations and at the homes of participants in educational relations. To the question "How satisfied are you with the material and technical equipment of the school for the educational process in the distance form?", 22% of the respondents answered "Completely satisfied, the level of readiness is high" and 56.2% are "Partially satisfied", which aligns with the results of the survey conducted by the National Research University "Higher School of Economics" in 2019 (Figure 1). More than 90% of the survey participants report that their workplace is equipped with a personal computer (desktop or laptop). Of these, 92.5% have Internet connection but face infrastructural problems: insufficient bandwidth and low speed of the Internet connection (40% of those who have a Wi-Fi connection at the school) and unstable connection (31%).

Overall, this allows concluding that the material and technical equipment of general education organizations is sufficient for the implementation of distance learning technologies. However, only 40.0% of the teachers are fully satisfied with their workplace at home in the context of implementing distance learning, 42.9% report that the available gadgets do not allow them to solve the present-day problems, and 18.0% note that they lack the technical equipment required for the implementation of distance learning at their homes. Only 13.3% of the respondents give an affirmative answer on the presence of the necessary material and technical base at all students' homes and 49.5% of the teachers report that the material and technical base available to students does not provide for distance learning. The obtained results demonstrate the need to more closely consider the material and technical component of providing for distance learning in the conditions of the modern realities of digitalization.

Figure 1 – Quantitative distribution for the indicator "Satisfaction with the level of material and technical equipment of the school for the educational process in the distance form"
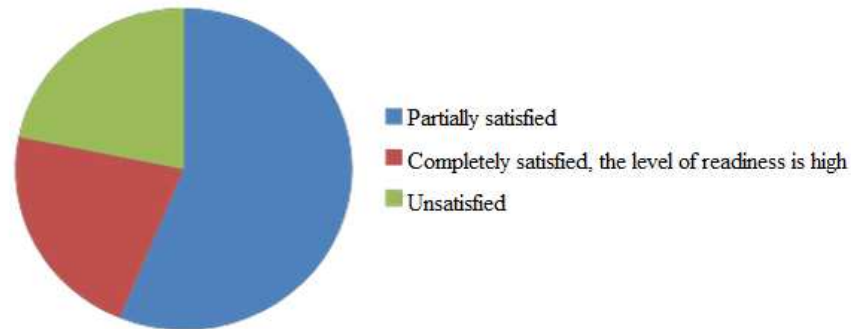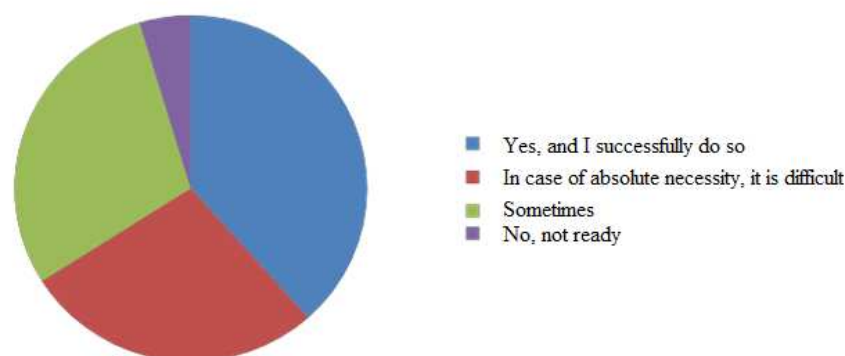

Source: Prepared by the authors

The analysis of answers to the second block of questions provides information on the teachers' self-assessed level of their digital literacy and the existing challenges and prospects associated, in particular, with the use of distance learning technologies. It can be stated that the teachers show high readiness for using digital instruments for educational purposes. Forty percent of the survey participants already do so successfully and only 4% report not being ready (Figure 2).

The teachers assess their level of mastery of digital instruments for the implementation of the learning process as quite high, as well – more than 85% of the respondents rate their proficiency as high or medium, less than 8% rate it as low, and the rest have difficulty assessing it.

Figure 2 – Quantitative distribution for the indicator of teachers' readiness for the use of digital instruments for educational purposes

Are you ready to use digital instruments for educational purposes?

- Yes, and I successfully do so
- In case of absolute necessity, it is difficult
- Sometimes
- No, not ready
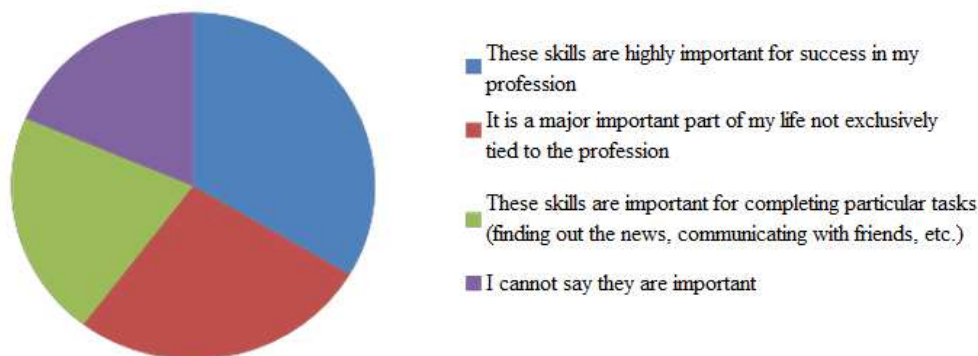
Source: Prepared by the authors

These results are consistent with the data of research on the level of digital literacy among teachers presenting the index of teachers' digital literacy, an integral indicator of the level of teachers' readiness for the digital economy developed by the national agency for financial research based on the approach proposed at the G20 Summit in April 2017, which relies on the assessment of the indicators of information, computer, and communication literacy, as well as media literacy and attitudes toward technological innovation; the study shows that the index reaches 87 points of out of 100, which is quite a high result. School teachers undoubtedly exceed their students by all indicators of digital literacy aside from the attitude to innovations—adolescents use modern gadgets and technologies more actively in their daily life and easily understand technological innovations (AIMALETDINOV; BAIMURATOVA; ZAITSEVA; IMAEVA; SPIRIDONOVA, 2019).

A major part of the respondents, 39.6%, note high labor intensity and time costs as obstacles on the way toward the improvement and development of their digital skills, 32.1% are satisfied with their current level of skills, and only 16% indicate the negative impact of the digital environment on people's mental and physical health as a factor hindering the development of digital skills.

Meanwhile, the importance of mastery of digital instruments is noted by more than 80% of the survey participants (Figure 3).

Figure 3 – Quantitative distribution for the indicator "Teachers' ideas about the importance of mastering digital instruments for professional growth"

Do you believe that mastery of end-to-end digital technologies is essential to your professional growth?

- These skills are highly important for success in my profession
- It is a major important part of my life not exclusively tied to the profession
- These skills are important for completing particular tasks (finding out the news, communicating with friends, etc.)
- I cannot say they are important

Source: Prepared by the authors

When asked what opportunities in the professional activities of teachers are offered by digital instruments, most respondents respond that they see broad prospects for the implementation of students' project activities with the help of digital tools—27.3%, a more complete implementation of the operational program is noted by 17.7%, advantages for the construction and implementation of individual educational routes are indicated by 14.4%, opportunities for teaching children with disabilities are noted by 10.6%, and the opportunity to establish contact with students is highlighted by 13.2% of the respondents.

Regarding the questions addressing teachers' involvement in continuing education, the teachers unanimously give favorable assessments of the advanced training courses in this area. The answer option "Very useful, provide a lot of necessary information" is selected by 40.7% of the teachers, although the need to increase the share of practical lessons in training is recognized by 45.9%, and only 13.4% of the respondents agree with the statement that the offered courses are of a formalistic nature.

The questions assessing teachers' readiness for additional training in the sphere of digital technology demonstrate the high level of teachers; readiness for self-study—68.0% of the survey have independently improved their digital literacy in the past three years, 33.8% did so by means of advanced training courses, and only about 10.0% did nothing to improve (the questions allowed for multiple choice).

Thus, it can be concluded that the teachers are aware of the necessity of continuing education and are generally ready for it in their professional activities. Moreover, the majority

of the respondents, 60%, note having a personal interest as a stimulus for additional training: "It is interesting for me, it offers new opportunities in the profession and self-development"; 30.6% of the respondents associate high digital literacy with success in the labor market: "It increases my chances of success in my career".

Overall, the obtained results go in line with the results of the study by the national agency for financial research. The study indicates that the majority of teachers believe that a teacher has to be fluent in digital technology. In confirmation of this, 71% of the respondents are planning to take training related to the development of competencies in the field of information and communication technologies on their own initiative, and 87% are doing so currently: read the thematic resources (47%), take free in-person courses (47%) and free online courses (45%), participate in thematic conferences and forums (41%) (ACTIVITY EDU, 2019).

Several survey questions focus on teachers' opinions on the advantages and disadvantages of digital instruments and technologies, their expectations and concerns in this sphere. In evaluating the advantages of learning with the use of digital educational technologies, most respondents, 41.9%, note the opportunity to easily access educational information, 26.2% agree with the statement that the mastery of digital technologies will be useful in the long run, 29.3% of the teachers agree that the use of digital instruments makes mastering the material easier, yet quite a significant share of the teachers, 24.4%, do not see any advantages.

The survey participants were also presented with the question "What difficulties have you faced in the process of distance learning?" "The lack of personal emotional contact with students, colleagues, parents" is noted by 50.3% of the respondents, 17.6% experience "difficulties organizing and planning time for preparation for the classes"; 18.5% of the teachers report "difficulties organizing the workspace to avoid distractions"; 33.4% of the survey participants report "greatly increased labor intensity (the amount of time required to prepare for classes and check materials has increased)", and 44.5% point to "difficulties explaining new material, the absence of feedback from students". Over half of the surveyed teachers indicate increased strain on the eyes, the nervous system, etc. A low level of personal digital literacy is noted as an issue by only 6.5% of the respondents (Figure 4).

Figure 4 – Quantitative distribution for the indicator "The attitude of teachers of general education organizations to the challenges of distance learning"

What difficulties have you faced in the process of distance learning?
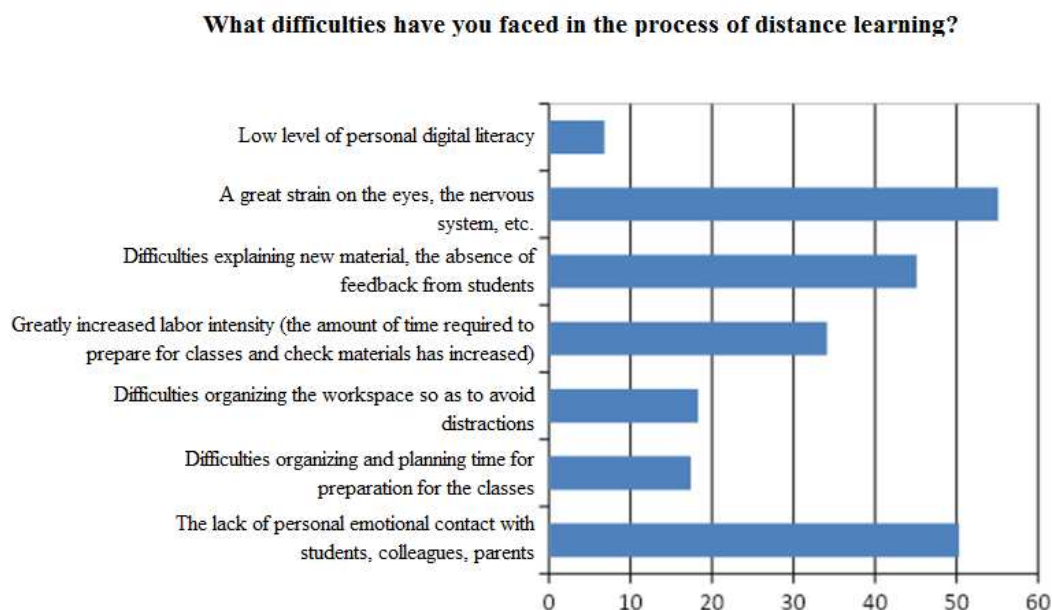
Source: Prepared by the authors

Meanwhile, assessing the perspectives of the development of education with the use of distance educational technologies, 32.5% of the respondents note that the quality of such education is worse compared to the traditional and 35.7% only see it as supplementation for traditional learning. Over 60% of the respondents indicate that they can only view the implementation of distance learning as an exclusive and forced measure.

The main fears and concerns of teachers regarding the future are associated with the risk of losing the opportunity for direct interaction with students—90% of the respondents agree with this statement. The teachers are also concerned about the lack of conditions for the implementation of innovations in pedagogical activity, which involve the use of digital services (47.5%).

The problems reported by students include increased mental and physical strain, including on the eyes (54.5% of the surveyed teachers), the lack of personal emotional contact with students, colleagues, and parents (49.8% of the respondents), difficulties in explaining new material (44.1% of the respondents) and increased labor intensity of the work process (33.4% of the survey participants).
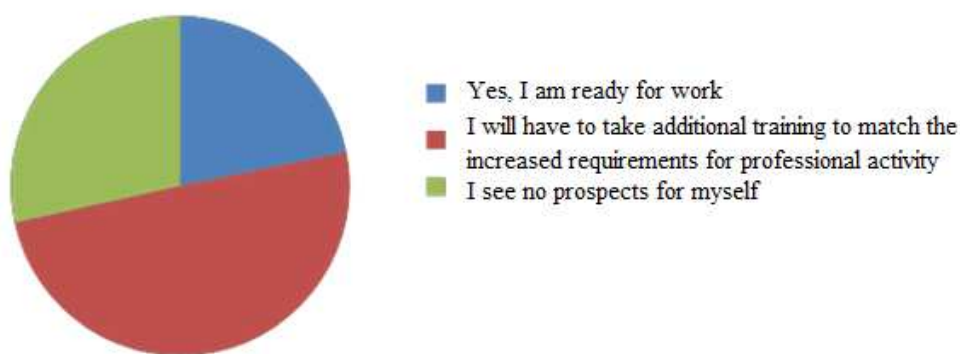
Moreover, only 20.7% of the respondents are fully satisfied with the methodical equipment for their subject in the conditions of distance learning, 62.2% report partial satisfaction, and 17.1% of the respondents are dissatisfied.

Regarding the effectiveness and convenience of the system for the control of the mastery of educational material in distance learning, 15% of the respondents estimate it as high, 48.2% note that its effectiveness is not any better or worse than the traditional assessment technologies, 22.6% view the system as ineffective and inconvenient, and 14.3% of the teachers had difficulty answering.

When asked about the prospects of working in the digital school, 21.8% of the respondents express their willingness to work in the digital environment; 49.7% of the respondents admit that they would need to improve their skills; 28.5% say they see no prospects for working in a digital school environment (TSIFROVAIA SHKOLA, n.d.) (Figure 5). Already 42.1% of the teachers surveyed have a great interest in innovation in pedagogical activity involving the use of digital services, 47.7% have interest but believe that there are no conditions for its implementation, and only 10.1% of the teachers show no interest.

Figure 5 – Quantitative distribution for the indicator "Teachers' readiness to work under the conditions of the implementation of the 'Digital school' project"

Do you see any prospects of work for yourself in the "Digital school" (implementation of the Federal Project "Digital school")?

- Yes, I am ready for work
- I will have to take additional training to match the increased requirements for professional activity
- I see no prospects for myself

Source: Prepared by the authors

Discussion

The results of a survey of school teachers from several Russian regions presented in this study quite comprehensively reflect the ambiguous picture of general education entering the digital era. Having first presented itself as a technical phenomenon, digitalization immediately became a social, political, and cultural problem of humanity. Education as a social segment open to interaction with various social and economic structures ended up

involved in this process ex-post, i.e., without long preliminary preparation. A vivid example supporting this argument is the content of a school teacher's readiness to participate in the transforming school education process. The teachers' answers demonstrate that they mastered digital competencies in a very short time (both the means and technologies) and have special knowledge allowing them to master digital instruments. At the same time, the teachers note the need for them to receive additional training in this sphere. The educators express some criticism of the mass practice of training in the so-called refresher courses, which have become the most widespread and are officially supported by the current system of professional certification. There is, therefore, a clear need to increase the diversity of the forms of additional professional education for teachers while primarily supporting teachers' self-study.

Serious concern among teachers is caused by the potential loss of familiar forms of verbal and nonverbal interaction between the teacher and other subjects of educational relations. The teachers note major advantages of the use of digital instruments in professional activity but also have serious doubts and concerns about their deteriorating health, emotional connections, etc.

Final considerations

As a result of the study, the qualitative content of a teacher's readiness for innovations in the digital educational environment and substantial renewal of the processes of educational relations is identified; the substantial problems in the adaptation of teachers to the processes of transformation of general education caused by the digitalization of society are revealed; the tendencies in the process of a school teacher entering the digital educational environment are determined.

This study has prospects for continuation to clarify and consider in more detail the emerging difficulties of psychological and pedagogical and methodological nature and the development of appropriate recommendations for all subjects in educational relations in the context of digitalization of society.

expectations, and problems of different population groups" carried out at the expense of the federal budget under the state task of the Ministry of Education of the Russian Federation.

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