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Modern teacher under the conditions of digitalization of education

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***Abstract* — At present, Russia is implementing the priority federal project Modern Digital Educational Environment in the Russian Federation (within the framework of the national project Development of Education developed in accordance with Executive Order No 204 On National Goals and Strategic Objectives of the Russian Federation through to 2024 dated May 7, 2018). The Sverdlovsk region is also making serious efforts to create a digital educational environment (regional project Modern Digital Educational Environment of the Sverdlovsk Region). To ensure the global competitiveness of the Russian education and the entry of the Russian Federation in the top 10 countries in terms of the general education quality, the ambitious objective on the creation of Digital School by 2024 is set, in which the system of educational process organization, teachers' work, and administrative and economic management should be digitized, i.e. to be provided with modern information technologies and accompanied by informationally competent teaching staff. Based on the analysis of modern research, the article identifies key problems arising in the process of implementing the project on digitization of education.**

Keywords — digitalization of education, digital educational environment, information technologies in education, information competence of a teacher, informatization of education, stream-learning technology, innovations in education, web resources, gadgets, distance learning.

I. INTRODUCTION

The modern world is actively changing due to the rapid development of technology. In the 21st century, digitalization has become a global phenomenon and a factor of the development of all spheres of human activity. Under the conditions of the formation of the information society, radical changes are also taking place in the field of education. Thus, since 2016, a priority federal project “Modern Digital Educational Environment in the Russian Federation” is being implemented in Russia (as part of the national project “Development of Education”, developed in accordance with Executive Order No.204 “On National Goals and Strategic Objectives of the Russian Federation through to 2024 dated May 7, 2018"). In the process of implementing this project, it is supposed to “modernize the education system and vocational training, bring educational programs in line with the needs of digital economy, widely introduce digital tools of educational activity and integrate them holistically into the information environment, ensure the possibility of learning citizens on an individual curriculum throughout life - at any time and in any place” [1]. Serious efforts are also being made to create a digital educational environment as a new element of the system of general and vocational education in the Sverdlovsk region (regional project "Modern Digital Educational Environment of the Sverdlovsk Region").

In order to ensure the global competitiveness of Russian education, the possibility for the Russian Federation to be among the 10 leading countries of the world in terms of the quality of general education, an ambitious task is set to create Digital School by 2024 in which the system of organizing the educational process, teachers' labor, administrative management should be “digitized”, that is, provided with modern information technology and information-competent teaching staff.

II. RESEARCH METHODS

The methodological basis of the study is a competence approach in which information competence is considered as one of the key ones in the structure of bachelor degrees (L.V. Bocharova, V.I. Baidenko, A.S. Belkin, G.B. Golub, E.F. Zeer, I.A. Zimnaya, V.V. Kraevsky, G.K. Selevko, A.V. Khutorskoy, K.V. Shaposhnikov and others). We consider readiness and the ability to improve our knowledge in accordance with the requirements set by the state and society for vocational education, including the readiness to be an active participant in the digitalization process, as one of the components of information competence of the individual in modern conditions.

In this study, digitalization is understood as a “modern global trend in the development of economy and society which is based on digitizing information and leads to an increase in the efficiency of the economy and an improvement in the quality of life” [2]. Key study methods were: comparative-historical, synthesis, comparison, generalization, analysis of psychological, pedagogical and scientific methodical literature, documents on educational issues, current legal acts on informatization and digitalization.

We assume that in the modern world digital technologies are not just a tool, but a special environment of existence which opens up new possibilities: learning at any convenient time, continuous education, the ability to design individual educational routes, becoming creators from consumers of electronic resources [3]. The training of teachers in the use of information technology in education is one of the key indicators for assessing the readiness of Russian higher education for the digital economy [4].

III. RESULTS

Digitalization of education leads to dramatic changes in the labor market, in educational standards, focuses on the reorganization of the educational process, rethinking the role of the teacher. As emphasized by T.V. Nikulin and E.B. Starichenko, "on the one hand, digitalization undermines the methodological basis of the school inherited from the past, on the other, it generates the availability of information in its various forms, not only in text, but also in sound, visual. The availability of information will require constant search and selection of relevant and interesting content, high processing speeds. Therefore, the digitalization of education leads to its radical, qualitative reorganization" [5]. A modern teacher is obliged to learn how to apply new technological tools and practically unlimited information resources in the professional activity. Virtual reality technologies create a unique opportunity to use a variety of simulator programs that are not referred to a single workplace. Mobile learning technologies makes it possible to study anytime, anywhere. At the same time, the digital environment requires from teachers and the academic community a different mentality, the formation of a new view of the world, completely different ways and forms of work with students.

Analysis of the current state of the teaching staff training system allows us to identify a number of problems that adversely affect both the process of introducing modern technologies into the educational environment and the creation of a digital economy in Russia.

1. Quite high variety of modern technical means and educational technologies does not always correspond to the level of information competence of modern teachers (especially teachers of non-technological subjects) for their systematic and effective use in the educational process [6].
2. It is necessary to note the lack of a developed methodology for introducing information technologies into the pedagogical process [7].
3. The effective development of the digital environment in the education system is hindered by the psychological unreadiness of many teachers to accept innovations and to abandon traditional forms and methods of education [8]. The conservative attitude of teachers is due to their lack of interest, low level of confidence in the use of modern information technologies, which, in turn, does not allow introducing blended education in schools and universities properly.
4. The real technical capabilities of pedagogical universities that train future teachers often lag far behind the technical equipment of a modern school, and teacher training, carried out in most subjects, does not allow students to choose the forms, methods of teaching in various types of classes in a developing digital educational environment, providing opportunities for direct and distance information interaction.
5. Insufficient involvement of future teachers in work with specialized electronic educational resources that correspond to pedagogical, ergonomic, technological requirements, make it possible to collect relevant data on the use of modern technical devices in the field of education, to exchange advanced educational experience [9].
6. Lack of universal authorial teaching methods using the resources of the digital educational environment (application of modern mobile devices, gadgets, interactive equipment, podcasting, screencasting, streaming and augmented reality technologies as well as web services, mobile applications and alternative software in education).

To solve the problems outlined above, the primary task is to intensify the activity of pedagogical universities for an involvment in the modernization processes. The implementation of the Digital School project must begin with the creation of conditions for the training of teachers who are able and ready to update constantly their knowledge, to involve in the continuous process of improving the forms, means and teaching methods using digital technologies. An important step to achieve this purpose is the creation of a digital educational environment in which we highlight the following aspects in pedagogical universities:

- psychological and pedagogical - it is necessary to develop psychological and pedagogical technologies and methods of training teachers for active involvement in the digitalization process;
- technological - digitalization of education can be effective only if modern "digital classrooms" are created on the basis of pedagogical universities, equipped with technical devices (gadgets, interactive whiteboard, 3D printer, devices for organizing video conferences, smart lighting technologies, maintaining temperature, light and humidity in the classroom). According to N.V. Dneprovskaya, "most of the universities are at an early stage of informatization which implies the formation of the IT infrastructure of the university, the automation of educational and administrative processes" [10];
- methodological - a system of methods for organizing and managing students' learning activity by the teacher on the basis of the technologies under consideration should be developed;
- guidance - it is necessary to prepare guidance manuals, articles, monographs devoted to the method of introducing technologies into the educational process of the school and the university and based on the experience of practical application of technologies in the educational process of the school and the university.

IV. DISCUSSION

The problem of digitalization has become urgent for domestic researchers in the last decade. However, an analysis of the literature shows that the authors mainly turned to digitalization (digitalization) in the field of economics and business. With regard to education, domestic researchers began to consider the problem of digitalization over the past two years which is explained both by the intensification of state policy in this direction and the need to respond to the

rapid penetration of new technologies into all spheres of life, including education. At the moment, we have not been able to identify fundamental research on the methodological, psychological, pedagogical and technological aspects of the digitalization of education. As a rule, the authors turn to the specific aspects of the topic. Thus, the psychological and pedagogical basis of the quality of modern vocational education, including the characteristics of education in universities, were scientifically substantiated in the works of V.S. Bezrukova, V.I. Zagvyazinsky, E.F. Zeer, M.B. Kalashnikova, P.I. Pidkasisty, A.A. Rean and others. The psychological and pedagogical basis of the development and implementation of the digital educational environment was the subject of the studies by A.A. Kuznetsov, L.P. Martirosyan, Yu.A. Prozorova, I.V. Robert. In the works of authors such as P.V. Zuev, V.A. Kozyrev, E.S. Koshcheeva pedagogically significant characteristics of the educational environment were revealed, features of the educational process carried out using modern information technologies were highlighted.

Great attention in the modern literature is paid to the problem of developing electronic educational resources (the works of I.E. Vostroknutov, A.V. Isaev, A.V. Osin, O.K. Filatov), teaching requirements to them (V.A. Krasilnikova, L.P. Martirosyan, Yu.A. Prozorova, I.V. Robert), methodological approaches to the evaluation of the pedagogical-ergonomic quality of electronic educational resources (V.P. Grab, S.G. Daniluk, A.A. Pavlov, I.V. Robert, Yu.A. Romanenko and others). The analysis shows that the quality of electronic educational resources does not fully meet the pedagogical and ergonomic requirements, does not provide the conditions for pedagogical feasibility of using them in the educational process and the realization of the teaching capabilities of information technologies which necessitates a separate theoretical understanding of the use of such resources in the digital educational environment [11; 12].

There are the studies focused on the training of future teachers to work in the conditions of informatization of education such authors as S.A. Beshenkov, Ya.A. Vagramenko, M.I. Kovalenko, O.A. Kozlov, T.A. Lavina, L.P. Martirosyan, I.V. Robert and others. The scientific-pedagogical and organizational-methodological basis of the teacher's professional activity in the context of using information technologies were developed, the components of the activity were analyzed using information and communication technologies in the works of these authors.

The questions about place and role of computer technology in the formation of students' information competence were taken up by A.P. Bazaeva, I.M. Bashtanar, A.M. Witt, A.N. Zavyalov, O.B. Zaitseva, T.N. Lukina, E.F. Morkovina, A.S. Nefedova, Yu.A. Plotonenko, N.I. Sakovich, S.A. Sladkov and others.

The development of the problems of using broadcast and streaming video (podcasts, screencasts, live broadcasts on the Internet) in the educational process has recently been addressed by representatives of the pedagogical and psychological sciences, including: S.S. Arbuzov, B.E. Starichenko, K. Khammond, A. Chester. S.S. Arbuzov analyzing the characteristics of introducing information technologies into the educational process at a pedagogical university indicates a contradiction between the need to apply the above technologies when teaching university students studying using distance technologies and the teachers's unwillingness to put into practice online classes using telecommunication technologies and distance services for the interaction of participants in the educational process [13].

It should be noted that insufficient attention is paid to the problem of psychological readiness of teachers to the process of education digitalization in modern scientific literature. A fairly large number of studies (without specifying the type of innovation) is devoted to studying the readiness of teachers to introduce innovations in general (E.F. Zeer, V.A. Slastenin, E.N. Frantseva). Readiness for the use of technological innovations in the educational information environment of an educational organization is essential to the effectiveness of the process of creating a digital school and the transition to a digital economy. Modern authors note a low level of psychological readiness to use technological innovations in their practice by most teachers who have extensive teaching experience and are based on the traditional learning style [14] as well as a low level of readiness of high school teachers and their weak motivation to initiate innovations [15]. Thus, the analysis of the literature allows us to conclude that a comprehensive psychological and pedagogical analysis of the phenomenon of digitalization of education, taking into account the specifics of the Russian education system and the technical capabilities of modern Russian schools and pedagogical universities, was not undertaken. This problem requires further theoretical understanding and practical solutions.

V. Conclusions

E.V. Gnatyshina and A.A. Salamatov rightly point out that "every student brings digitalization to the university in his gadget (smartphone, tablet...), it does not require an implementation program, it does not need additional resources" [15]. A modern teacher is forced to live in the conditions of an emerging and transforming digital environment, regardless of his own interests, desires and needs. The study and analysis of scientific, methodological and educational literature, conceptual and regulatory documents as well as the results of dissertation research suggests that there is a contradiction between the growing needs of an individual, society and state in the priority innovative development of education in terms of its digitalization and the ability of the educational system to fully meet these needs. In this regard, pedagogical universities in modern conditions face the task of training future teachers and retraining current teachers who are able to quickly respond to changes in the field of education and adapt to professional activities in digitalization [16; 17].

The Ural State Pedagogical University, being one of the oldest pedagogical universities in the region and the main training center for schools in Yekaterinburg and the Sverdlovsk region, is actively involved in the modernization processes that are currently taking place in the field of education.

Only with the help of the close interrelation of theoretical developments and practical experience of realizing digital projects, the leading universities of the country, it will be

possible to effectively perform the tasks facing the modern system of Russian education.

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