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Digitalization of Education in Russia: From Modern Technologies to an Innovative Model of the Educational Environment

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ABSTRACT
The innovative model of the educational environment in the study appears to be the result of a number of transformations, the result of which depends on the consistent implementation of five elements into existing relationships: formal-legal, technical, substantial, personal-psychological, social-mental. The system must move progressively, and each element can become part of the system only after certain processes formed at the previous stage: a jump through a step is impossible. The paper analyzes two strategies for the digitalization of education in Russia: the integration of digital technologies into the educational process and the integration of the educational process into the digital field. These strategies give different results: formal or substantive. The considered elements do not provide a formal transition of Russian education to a new strategy, but allow developing specific tactics to change the existing reality and gradually implement the digitalization of education.
Keywords: *digitalization, digital education, innovation, educational environment, digital education transformation elements*

1. INTRODUCTION

The changes that have occurred in the field of educational technologies, methods and systems over the past two decades against the background of globalization and simultaneous glocalization have posed many questions for modern society and the state and indicated a number of problems that need to be addressed. Education is one of the promising areas of activity in any state, since it makes it possible to create the necessary conditions for the full development of the individual and, as a result, provide all areas with qualified specialists that meet the current needs of the labor market. It is important to understand that education that does not meet the needs of society and does not take into account modern changes in the principles of organizing social, political, legal, economic and other relations cannot be called for. When such elements of public life as electronic document management, cloud accounting, e-government, digital hospital, digital economy, etc. appear, education must also change its format and undergo the process of digitalization.

Education in the legal field is usually understood as "a single purposeful process of upbringing and education, which is a socially significant benefit and is carried out in the interests of a person, family, society and the state, as well as a set of acquired knowledge, skills, attitudes, experience and competence of a certain volume and difficulties for the purpose of intellectual, spiritual, moral, creative, physical and (or) professional development of a person, satisfaction of his/her educational needs and interests". This definition is contained in the definitional part of the profile Federal Law of December 29, 2012, No. 273-FZ "On Education in the Russian Federation". The legal interpretation contains a broad definition of education, both as the process itself, involving the implementation of a set of sequential actions to achieve a result, and as a product obtained as a result of these actions. Looking even more broadly, education is a constitutional right, enshrined in Part 1 of Art. 43 of the Constitution of the Russian Federation, for everyone on the territory of Russia.

In science, education is understood much more diversely. Even lexicographic sources offer very polar characteristics of education, defining it as: "a set of knowledge and skills" [1], "a purposeful process of teaching and upbringing" [2], "a process of pedagogically organized socialization" [3], "a special sphere of social life" [4]. Based on the approach of B. S. Gershunsky, let us formulate 4 concepts in the interpretation of education, understood in modern science as: value, system, process and result [5].

Digital education does not have a clear definition both in the legal field and in the scientific field, therefore there are various approaches to the interpretation of the term, largely related to the field of activity of scientists and/or their belonging to a particular scientific school. But more often this term is deciphered through the technological side of the process - digital technologies [6, 7, 8]. Although this side is not the only one that we will pay attention to in the main part of the article.

In our opinion, the features of this concept are most fully characterized in the work of M.E. Weindorf-Sysoeva and

M.L. Subnominal, which reflects several aspects of digital education at once: "the process of organizing interaction between educators and learners while moving from goal to result in a digital educational environment, the main means of which are digital technologies, digital tools and digital traces as the results of educational and professional activities in digital format "[9].

In this work, we will understand digital education as a set of:

- tools, which are modern digital technologies, and the process of their adequate use for educational purposes;
- content that should meet the new capabilities of the educational environment, and ensure the high efficiency of existing technical capabilities;
- teaching methods and educational technologies that create conditions for students to acquire new competencies;
- competencies of trainers and students, which will allow them to fully use the above tools, content, methods and technologies to obtain a qualitatively new learning outcome.

Consequently, it is not yet possible to talk about digital education as an already established phenomenon, therefore, in our opinion, it is preferable to use the term "digitalization of education", which emphasizes the procedural nature of the changes that are taking place in the modern education system. This term is understood not only to translate educational information into digital form, but also to a number of complex solutions of an infrastructural, managerial, behavioral nature in a new format [10].

The subject of this study is the process of digitalization of the modern educational space, which actively transforms the model of relationships between subjects of educational relations in the 21st century.

The purpose of this study is to formulate the basic principles of the transition to digital education in Russia, to analyze the current state of this process and its prospects for the formation of an innovative model of the educational environment.

Thus, considering the features of the transition to digital education in modern Russia, we will focus on five elements that make up it:

- formal legal;
- technical;
- meaningful;
- personal and psychological;
- socially-mental.

Digital education seems to be a relatively new phenomenon for our education system, since the active digitalization of various official spheres of human life begins only in the 21st century, before that there was a preparatory stage - informatization. At the same time, entering the global digital space, of course, contributed to the development of the idea that the potential of educational institutions is not fully used.

The relevance of determining a promising direction of education is associated not only with the formation of a digital form of new educational relations, but also with their substantive revision. The formal and substantive aspects of the educational process are influenced both by intra-system factors (the level of training of students at each stage of education, the technical capabilities of the educational institution and participants in educational relations, the principles of interaction between subjects of different levels) and external (state policy, international trends, the increasing role of digital technologies in the life of every person).

2. METHODOLOGY OF THE STUDY

The material of the research was the existing state and regional program documents, educational programs and teaching materials, as well as their scientific and methodological understanding. A separate very significant layer of material that was analyzed when writing this study is the experience of applying those innovations that are being introduced into the modern education system in Russia since the beginning of the 21st century. When analyzing issues related to the process of changes in one of the most priority social spheres, it is of paramount importance to understand not only political and legal tendencies, but also the reflection of the innovators themselves in relation to the processes that have been launched by the state at the moment.

In order to analyze the theoretical and empirical material that became the basis for this study of the digitalization of education in Russia, we relied on the following in our work to ensure the reliability of the results and methods.

The first stage of this research was associated with the study of various sources of information of a legal and scientific nature.

The legal block of information made it possible to form an idea of the current state of the problem of digitalization of the educational process in Russia. The profile document is the National Project "Education", which contains a step-by-step plan for the transition to a new type of educational relations by the end of 2024, including the implementation of a complex of 10 federal projects. One of the most important in terms of considering this topic is the Federal project "Digital Educational Environment", which is aimed at implementing the task voiced in the Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On National Goals And Strategic Objectives of The Development of the russian federation for The Period Until 2024": creating a modern and safe digital educational environment. The content is supplemented and detailed by related documents: the National Program "Digital Economy of the Russian Federation" and the Federal Projects "Young Professionals" and "New Opportunities for Everyone". These projects are supported by regional initiatives in this direction, taking into account the specifics of the development of the constituent entity of the Russian Federation.

Scientific approaches in the 21st century to the analysis of the digitalization process in Russia can be divided into descriptive, correlative, causal, and systemic.

The followers of the first approach base their research on a description of the process of introducing any specific digital innovations, focusing on the activities that were carried out, the resources that were used, and the results that were achieved. Research data are usually associated with reflection in relation to innovations in a specific professional area [11, 12, 13] and at the level of education [14, 15, 16].

Researchers who adhere to the second approach base their conclusions on the search for correlations between different stages of the introduction of digital elements into the educational environment or different methods of their implementation. So, we can talk about a fairly large base of comparative studies [17, 18, 19].

The third group of works is devoted to the establishment of cause-and-effect relationships between the factors that determine the need for change and the transition to a digital field, and the consequence of this transition. In such studies, as a rule, not only promising trends in innovations are determined, but also their problematic aspects [20, 21, 22].

The systems approach is one of the general scientific ones and, of course, is actively used in the process of understanding the essence of digitalization. In this case, scientists pay close attention to those complex indicators that are characteristic of education due to its immanent systemic nature and interconnection with other spheres of public and state life [23, 24, 25].

A significant part of the studies studied is based on empirical research methods, which are most relevant in the analysis of such an object to the educational system.

Methods of observation and comparison made it possible to establish key indicators inherent in the process of digitalization of education and draw a number of conclusions about the properties of the studied subject.

We used modeling and abstraction methods to form a general idea of the level of digitalization of the education system as a whole, without taking into account the elements that do not affect the model of the process as a whole.

3. RESULTS OF THE STUDY

As a result of the study, a five-element model of digitalization of education in Russia in the first two decades of the 21st century was formed, the structural elements of which are not only interdependent within the educational system, but also extra-systemically predetermined, which forms the cyclical nature of the stages of transformation of education. Each of the identified elements (formal-legal, technical, meaningful, personal-psychological, social-mental) is one of the conditions for the transition of the Russian education system from the stage of introducing modern technologies into the existing educational space to an innovative model of the educational environment.

4. DISCUSSION OF RESULTS

The educational space has radically changed under the influence of social requests: the traditional approach of relaying information from the teacher to the students is being replaced by an innovative approach to its joint production in the learning process. It is not the knowledge itself that becomes important as a result - the priority is now given to the process of obtaining it, that is, the formation of those competencies in students that will allow them in the future to independently design their own knowledge field. Thus, the potential of the educational environment changes in accordance with the goals that are facing education, and with the technical capabilities that the participants in educational relations have. Therefore, we can talk about replacing the inductive educational paradigm with a deductive one.

The modern trend of digitalization of education is considered by scientists in a number of aspects: formal-legal, structural-content, functional and a number of others. In this paper, we will focus on the dialectical aspect in order to consider the features of the process of transformation of the educational space and related spheres of society under the influence of digitalization.

At the same time, it is important to understand that in the 21st century, the elimination of digital illiteracy of the population is becoming as important a condition for the further positive development of society and the state as educational programs in the 20th century in Soviet schools. According to the Digital 2020 Global Overview report, at the beginning of 2020, the number of Internet users was 4.54 billion people, which is almost 60% of the world's population.

Thus, the formation of a digital educational space is becoming a vital necessity, however, as practice shows, the process of transition to a new format turns out to be quite difficult, since this is not a revolutionary change, but an evolutionary one, determined by various phases of the transition from one stage to another. In this paper, we will consider 5 elements that, in our opinion, should be present in the transformation process so that we can talk about the formation of digital education.

First, we will consider the basic elements, which are largely interrelated, since one without the other will not be able to form the basis of new relations: formal legal and technical. They are the primary condition for the adequate implementation of a new approach to learning: the first provides a legal basis for innovative implementations and socio-political prerequisites for their further adoption, the second forms the technical capabilities for implementing the planned transformations. So, without the proper level of development of scientific and technological progress, there is and cannot be any changes, and without their legal regulation there will be no adequate and relevant criteria for establishing the boundaries of such innovations. These two elements usually appear at the first stage of digitalization, and in Russia their formation occurs at the end of the twentieth century, when the active introduction of computer technologies into the educational process begins and the legal prerequisites for the existence of

various forms of education, including distance education, appear.

Usually, such changes are gradual, permanently slightly changing the surrounding reality, therefore, as a rule, people usually do not notice cardinal changes. However, there are also sharp leaps. For example, the implementation of the concept of the Internet, which completely changed both the principles of obtaining information and its status. The education system, though not immediately, had to accept this change. Classic libraries, academic lectures, "information hunger" and much more are a thing of the past. Or the coronavirus outbreak in 2020, which changed the lives of most people on the planet, when many areas of life support moved to a remote format. Education also had to choose a new format - distance learning. But such cardinal changes, dramatically transforming the surrounding reality and the possibilities of man in it, are still rare.

After that, there is usually a transition to the formation of a meaningful element. New opportunities open up new perspectives, which, of course, should be embodied in the educational process. The content element is a fundamental condition for the transition from theory to practice. At this stage of transformation, the old methods are changed, the forms of interaction are updated, and new tools are included. One cannot but agree with the researchers who call the digitalization of education "the time of innovative pedagogical solutions" [15] and note that at this stage there is "an optimal alternation of virtual means and real production processes" [26].

The digitalization process is not only the technical capabilities of the participants, but also their personal role in this process. Digital education is not the dominance of machines, but the intelligent use of machines by humans to achieve their educational goals. Thus, digital education makes it possible to expand the circle of participants in the interaction process, for example, to create a virtual professional community, which is important, first of all, for higher and postgraduate education, or to involve parents and curators in school education.

Usually, this stage of innovation begins with the incrustation of individual techniques and methods based on innovative technologies into the standard education process without structural changes, but over time, the changes should become more and more, and the very model of educational relations is transformed.

In the process of substantive changes, it becomes clear that the formal translation into the digital field of stereotypes of educational relations and the old principles of organizing the educational process is unlikely to be relevant. In particular, speaking about textbooks as the main source of knowledge for standard schoolchildren and students of the twentieth century, we can agree with the opinion of T. M. Smirnova, who raises the question: "can a textbook be absolutely neutral from the point of view of social models, moral values and behavioral norms transmitted by it?" [27]. The textbook has long been a source of not only professional knowledge, but also a moral code and ideological guidance. However, the new field is multidirectional, everyone can find what he wants in it. And here the role of a mentor, teacher, educator increases, who must explain how to use the information that is available, how to evaluate it, how to navigate the existing polemic. This requires not only personal interest, but also a lot of time from each of the participants in educational relations.

The innovative model of the educational environment is associated with an electronic learning system, in which the roles of the teacher and the student must change. It is important to understand this. The first should relinquish some of the powers to manage the activities of the second, and he, in turn, should take more responsibility for the result.

If in our education system, the stage of introducing formal-legal and technical elements has passed rather quickly, then the personal-psychological one cannot be considered fully mastered. There are both teachers and students who are not ready for a new relationship. Further changes can only occur after this element becomes part of the system. It is on this basis that we are not ready to talk about digital education as a result of the transformation process at this stage in the development of educational relations in Russia. The process of transition from modern technologies to an innovative model of the educational environment occurs subject to the presence of the fourth element of the educational paradigm - personal and psychological acceptance of the changes that were discussed above.

At the moment, we can talk about two fundamentally opposite trends in the digitalization of education in Russia: the integration of digital technologies into the educational process and the integration of the educational process into the digital field.

In the first case, when integrating digital technologies into the educational process, we are talking about including individual innovations in the traditional system of interaction that do not change the essence of the entire process as a whole. For example, a visual component in the form of a presentation is added to a standard academic lecture. The quality of the process of mastering the material, of course, increases, since among young people there are much more visuals than audials. Consequently, such an audience will better perceive a polycode text, which is a complex semiotic whole and includes verbal and visual components. However, the very principle of information exchange in such interaction does not change: there is a teacher who independently forms the information field, including students in it as objects of influence. The learner, albeit with new technical capabilities, does not receive the necessary freedom and is limited by the predetermined role of the recipient. Unfortunately, we have to admit that this trend is quite common.

In the second case, when integrating the educational process into the digital field, the very principle of interaction is transformed, because it is based on a digital space with its own rules, into which the teacher and students enter as subjects of interaction with different roles, but the same capabilities. Modern young people, to use the terms of S. Wheeler and M. Prensky, are part of the "Digital Tribe" and act there as "digital natives", they

perceive the world differently, information for them acts as a tool in the process of achieving a set goal, and not an independent value. The digital environment does not imply that N. Rothschild's statement "who owns the information owns the world" is relevant. Everyone can own information, in modern conditions it needs to be properly disposed of. With such a transformation of education, it is not a formal, but a meaningful transition to new principles of interaction that is important. For example, the very concept of "digital university" presupposes the presence of all services in a single digital space, which complement and enrich each other, forming a synergistic effect and moving the process itself to a new level. The digital space is already being formed by more than one university, it is becoming global, cross-border and timeless: training courses can be taught by teachers from different universities from different parts of the world, preparation materials are not tied to libraries, and the students themselves are not bound by a strict academic schedule.

This trend is not yet particularly widespread in Russian universities, although there are already successful examples of positive changes of a systemic nature. This trend gives rise to the formation of the fifth element of the transformation system - social and mental, when we can talk about ensuring the social result of digitalization in this area. At this level of formation of a new mentality, all innovations are accepted as an immanent property of the system, all participants in the transformation process recognize the need for innovations, understand their meaning and recognize themselves as part of the new system.

5. CONCLUSIONS

As a result of the study, we found that the formation of an innovative model of the educational environment does not imply the introduction of sporadic technological innovations, but the transformation of the principles of relationships between the subjects of educational relations and a completely different qualitative approach to the content and orientation of the content of the educational process.

In the situation of the formation of an innovative model of the educational environment, taking into account the process of global digitalization, the concept of content quality comes to the fore, when it is not the tools themselves (new platforms and their technical capabilities) that are important, but their purpose. A new environment can be formed only if there are five important elements of transformation (formal-legal, technical, content, personal-psychological, social-mental), which only together will provide a synergistic effect. In this case, the system must move progressively and each element can become part of the system only after certain processes formed at the previous stage. So, without formal, legal and technical conditions, it makes no sense to move on to the development of the content part, and, even more so, the social and mental part.

At the moment, Russian education is at the stage of introducing certain modern technologies into the educational space, which must not only be mastered, but also evaluated by the participants in educational relations. Provided that the importance of transformations and their inevitability is realized, with a change in the mental code, taking into account the already existing positive changes, in the next decade a qualitative model of an innovative educational environment for a new generation of students can be built and implemented.

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