

The School Innovative Educational Model: Issues of Digitalization

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Keywords: digital school, digitalization of education, digital school model

Abstract: The purpose of the study is to build an innovative educational model of a digital school based on an analysis of the best practices in using digital technologies in the educational activities of the school. The study analyzes the practical experience of the leading schools of Russia implementing various digitalization projects at their educational sites. The main results of the study characterize the components of the digital school model in the (a) targets, (b) software and technology, (c) content-methodological, and (d) evaluative-reflective blocks. The authors state that school digitalization is basically a system of measures (a) to create an electronic digital school management system, to develop the school's digital base; (b) to create an innovative electronic information and educational environment; (c) to implement network educational programs; (d) to develop digital competences in teachers and digital literacy in students. The scientific novelty of the work lies in the integrity of the approach to understanding the essence of the digital school and determining its role in the digital transformation of the economy in Russia.

1. Introduction

Today, in solving the problem of compliance of educational institutions with modern requirements of the digital transformation of all spheres of human activity, the problem of school modernization is relevant. As an open educational space, and an environment of joint social activity of teachers, students, parents, school personnel, the school is a complex object for study. It consists of various administrative levels, represented by a variety of horizontal and vertical connections between participants in the educational process. The mission of the school is focused on achieving the following social goals: improving the quality and expanding the range of educational services, improving the qualification and educational potential of school education, as well as creating a comfortable and safe educational environment and others. In the context of digitalization of education, the priority social goals of the school include the following: preparing students for life in the digital world, the effective use of digital technology to meet the needs of various levels (cybersecurity, information and communication on the Internet, digital consumption), digital socialization of students, the formation of digital literacy of students.

These factors will allow children to focus on the perception of virtual space not as a vehicle for entertainment, but as a universal provider of knowledge and information that can be effectively used for self-education and professional development [3]. To solve the tasks and follow the development strategies of the state and society (implementation of the Digital School program), the school should become digital in the near future. To understand school change strategies in the context of the state format of the digital economy and determine tactics for the near future, there is a need to specify the scientific concept "Digital School," to identify its essential characteristics and build an innovative educational model of the school, namely, the digital school model. The purpose of the study is to build an innovative educational model of a digital school based on an analysis of best practices in the use of digital technologies in educational activities.

2. Materials and Methods

In formulating the concept of "digital school," identifying its essential characteristics, the following will be used: the methods of analysis of the scientific literature of domestic and foreign author; the generalization of practical experiences of a number of schools that have developed digital school implementation projects on

educational sites of advanced schools in Russia; the formation of the concept of an innovative digital school model. The ideas of a systematic approach will constitute the methodological basis of the study.

3. Results

In scientific literature, Russian and foreign scientists affirm the priority role of digital technologies in education [1; 6; 8]. Inevitable changes in the content and organization of education caused by the implementation of the state program “Digital Economy” are noted [10]. “The Russian education system should, as soon as historically possible, carry out a digital transformation, move to a new model for organizing the educational process, and use high-tech organizational, pedagogical, and methodological solutions for this” [8]. It is proposed to widely introduce highly productive and cost-effective digital technologies. The need to create a digital school infrastructure is noted [5]. Advanced Russian schools offer digital school projects [2; 3], which are focused on improving digital integration in teaching and working with studying youth. There are competitions to create the best digital school. The experience presented in the European space is interesting. There, the parameters are defined, in the presence of which the school is assigned the status of a digital school. In the Russian educational space, the analysis of these parameters (licensed software, the integration of ICT into the school curriculum, and a wide range of educational subjects, the school has a website, etc.) is regulated as already established standards required at the federal level. In this sense, the need to clarify the characteristics of a digital school, based on the meaning and essence of its understanding in Russia, is obvious.

Researchers note that “the core of the “digital school” is open information and educational environment (which is a developed infrastructure of the educational activities of all participants in the process) [3]. In turn, the information and educational environment (IEE) of the school is “a systematically organized set of data transmission tools, information resources, interaction protocols, hardware, and methodological support, focused on the satisfaction of users in information services and educational resources” [3]. As the central link of the digital school, the information and educational environments are represented by components that are diverse in their target orientation: hardware, information, personnel and regulatory [3] focusing on executable functions. With the digital transformation of the school, the goal of providing free access for all participants in the educational process to the various information and educational resources of the school is pursued. Attention is paid to the following traditional organizational components of the educational organization: school management, record keeping, financial accounting, school meals, library, educational process, educational content, classroom management, the interaction between teachers and students.

Today, in the development of software and hardware issues for the listed components of the digital school, information technology experts have already made a breakthrough, outlined approaches to creating the digital infrastructure of a modern school. This refers to the fact that the digital school provides for use in the educational space of information systems and automated environments for organizing the educational process. Today, the “Digital School” information system has already been developed. It modernizes the school, organizes the process, automates the work of the school divisions, and provides access to modern technology. Such a system is already in operation in dozens of Russian institutions.

For a holistic view of the range of tasks to be solved with the digital infrastructure of the school, we will characterize the main modules of this system based on-site data (<https://цифроваяшкола.рф>). An analysis of the proposed digitalization services for the school shows that the system developers identified the following defining modules: *school management*, *electronic school card*, *language lab*, a school canteen, a school entrance, a *cloud cash desk*, *multimedia class*, *SMS generator*, *paid contractual services*, a payment system, food plants, a library and a reading room, an *educational augmented reality portal*, a *suppliers register*, *time tracking*, a certification system, an *interactive class schedule*, a *mobile app*. Generally, the structure of the electronic digital school management system can be represented as part of the following modules: “Education quality management system,” “Management system,” “Monitoring the quality of education,” “Digital training zones,” “Electronic Journal,” “Electronic Teacher’s Room,” “Electronic Library,” “Electronic Portfolio of Teacher and Student,” “Electronic School Newspaper,” “Virtual School Museum.” These modules solve the following problems: workflow, planning, scheduling, performance monitoring, the formation of analytical reports, the organization of the educational process, the provision of educational content, the interaction of participants in the educational process. In the process of school digitalization, the model of pedagogical science is changing, as well as the essence of the organization of the educational

processes does. “The traditional teaching methodology oriented towards a collective perception of information is gradually being supplanted, giving way to innovative methods based on the use of digital educational technologies, which make it possible to more fully realize and reveal the potential capabilities of these technologies” [9].

It is worth noting that in addition to the high-tech equipment of the educational environment and modular automated support of the educational process, the status of a digital school implies the following: the introduction of new information and educational technologies, the use of progressive forms of organization of the educational process, active and interactive teaching methods, as well as teaching and learning materials in digital format, corresponding to the modern world level. Digital technology is becoming the foundation of a new educational environment. They contribute to the formation of the school's single information space and the new media culture of education. The digital school provides for the formed digital competence of teachers, the willingness of the teacher to create a personal learning environment, to build a system of educational content based on open digital sources, to analyze data on educational results of students, and to apply mixed and adaptive learning technologies. The teacher gets the opportunity to “create his/her own personal digital environment, select the necessary digital tools to solve problems associated with the organization of the educational process, interaction with students and colleagues, with their own professional development” [6].

He/she must learn to navigate the flow of digital information, work with it, select digital tools in accordance with the type of didactic tasks to be solved, apply new technological tools, master digital technologies and use them productively in educational activities. The modern and effective digital tools a teacher has at a digital school include the following: (a) learning management tools that allow one to submit and save educational content in electronic form, post interactive training materials, conduct automatic assessment and tracking of learning outcomes; (b) learning platforms that allow you to develop interactive training courses with tests, video materials; (c) keeping a personalized record of achievements in digital format, organizing a digital portfolio of the teacher and student.

4. Discussion

We consider the model of the digital school as “the totality of new information and educational technologies that allow combining various technological components and modern information technologies within a single information space” [4]. We recognize the core of the digital school as a piece of electronic information and educational environment, which is complemented by other infrastructures to meet the full range of tasks. As part of the electronic information and educational environment of a digital school, we would like to especially single out a digital educational environment, which “is a combination of digital educational resources, means, and technologies that provide the educational process in the context of digitalization” [9]. As an open humanitarian environment of the modern information society, the basis of which is the information and educational environment of the school, a digital school can be represented by the following conceptual model:

The target block regulates the creation of conditions for improving the quality of educational services through the use of digital technologies in the educational process and ensuring the availability of digital information resources of the school to the participants of the educational process.

The objectives of *the digital school* are as follows: creating an open educational system, a modern and safe digital educational environment; providing the high quality and accessibility of education of all types and levels; developing the high-tech educational information environment; intensification of the educational process, increasing the efficiency of all its participants; building individual educational technologies, diversification of learning approaches; improving the quality of education management through automation of planning, organization and management of the educational process, creating analytical and statistical reports, collecting information on-line; expanding the awareness of the participants of the educational process about the content and results of educational and educational activities, providing access to information resources; preparing students for life in a digital society, shaping their digital literacy; building productive skills in a digital economy.

The software and technology block determines the components and functional features of the digital infrastructure of a digital school, demonstrates the procedure for informatization of school infrastructure at all levels (pedagogical, managerial, technical).

The content-methodical block characterizes the following features and conditions for the implementation of the educational process in the digital environment: training in various settings and spaces, including network and virtual ones, training in the educational network and self-study in the educational environment, the organization of design processes, the formation and development of educational routes, the variety of pedagogical functions of the teacher in the digital educational space, and the use of active and interactive teaching methods. This block regulates the requirements for digital competence of teachers and the level of digital literacy of students in schools.

The assessment and reflexive block involve assessing the potential of digital technologies in school education and adjusting the content of the program-technological and substantive-methodological blocks of the digital school model, taking into account the coordination of social needs and educational effects of the digital school.

5. Conclusion

The introduction of a digital school model in Russia involves a whole range of interrelated activities: the creation of an electronic digital school management system, the development of the school's digital base, the implementation of online educational programs that provide access to a new quality education for all participants in the educational process, the creation of an innovative electronic information and educational environment that promotes the formation of the necessary competencies of participants in real and virtual networked educational space to increase their mobility, readiness for self-identification, self-development, and self-determination, the formation of digital competence of a teacher and digital literacy of a student. The creation of a new educational model of the school in the context of the development of the digital economy (a digital school) provides an innovative nature of learning and the achievement of a new quality of education.

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