
# The Role of Digital Technologies in Growing Secondary School Students to the Profession

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ABSTRACT

This article discusses the role of digital technologies in attracting secondary school students to the profession. In our country, as in many other countries, there is no large-scale system for assessing the quality and selection of digital resources for education. This means that a variety of digital tools with various positive and negative properties can be at the disposal of teachers. Under these conditions, a modern teacher cannot but be partly an expert, able to independently identify ineffective digital tools.

**Keywords:** Digital technology, informatics, pedagogy, methodology, innovation, technology, thinking, new pedagogical technology.

Despite the emergence and rapid development of new pedagogical, digital and other technologies that are actively used in education, the personality of the teacher, his human and professional qualities have been and will be a key factor determining the effectiveness of the training of students and schoolchildren. This is evidenced by the personal feelings of every person who has ever studied, and the opinion of those who are studying now, and the actions of parents, most of whom choose a class or even a school for their children, not because of what technologies or teaching aids are used, but depending on personal and professional qualities of the teacher.

This does not at all detract from the importance of research on approaches to the most effective development of the education system, when digital technologies are increasingly penetrating into the processes of education, upbringing and development. Any university teacher who gives lectures when students are free to choose the means of learning has probably noted more than once that over time, the proportion of students who record lecture material not with a pen in a notebook, but with the help of laptops, tablets or even smartphones, is steadily increasing. This indirectly indicates that the proportion of people in society who are able and willing to learn using certain digital tools is increasing. However, this need varies depending on the age of the students. Statistics show that there are already about 40% of people of the corresponding ages in Russia, and about 50% in the world. The education system has no right to ignore this objective fact.

There is another “spiral development” that is so characteristic of education. There are processes of large-scale digitalization external to the education system in all spheres of life and activity of society. People are increasingly using digital technologies in everyday life and at work. The education system cannot but respond to these changes. It takes into account the needs of students in working with digital tools and aims to prepare members of society for activities in the context of total digitalization. This is facilitated by the penetration of computer tools into all types of educational activities. Due to this improvement in the education system, there are even more people who are versed in digital technologies,

ready to carry out all types of their activities using digital means. This, in turn, increases the level of digitalization of society. And a new round is added to the "spiral".

Combining previous judgments about the inevitability of the digitalization of education and the key role of teachers, we can make a reasonable conclusion about the relevance and paramount importance of research aimed at the integrated use of digital tools at all levels of the teacher training system. This is also evidenced by the fact that what was said above about the increase in the proportion of people who are able and need to learn using digital technologies is directly related to both students of pedagogical specialties of universities and students of future teachers. This means that a complex interconnected use of digital tools is necessary in all types of educational activities that make up the system of professional training of teachers.

The rapid development of the country's digital economy and the speed of information in human life requires constant training and advanced training. The age of digital technologies sets new requirements for professional educational organizations for the formation of high digital literacy, the development of critical thinking and creative abilities. Now the graduate cannot base his knowledge only on the program of the educational standard for the profession or specialty. In vocational education, there are new opportunities for the implementation of the educational process. This:

- availability of online classes and programs;
- training texts are now digitized;
-mobile learning;
-personalized teaching and learning;
- managed results.

The role of technology in education has four aspects: it is included in the curriculum as a means of facilitating the acquisition of information and as a tool to improve the entire learning process. Thanks to this approach, education has moved to a new level of its development.

Education is essential in corporate and academic environments. In the first case, education or training is used to help workers do things differently than they did before. In the second case, education aims to create curiosity in the minds of students. In any case, the use of technology can help students better understand and retain concepts.

The principle of a digital approach to education and the dynamics of its development in the Russian format must be analyzed in terms of possible pros and cons for modern students, as well as in terms of the effectiveness of the learning process in which they are involved [2]. Moreover, the digital format of education today is more interesting and accessible to students than classical education. On the one hand, this is the result of the rapid development of network technologies and communications, which for young people are their favorite living environment [1]. On the other hand, the methods used in the classroom with the involvement of multimedia tools are more close and understandable to students and as a result, increase their interest. Improving the quality indicators of education, equalizing educational opportunities are the undeniable and most significant advantages of digital education [3]. The goals set and practical implementation, in front of modern education, is the main indicator for assessing the importance of digital educational technologies and assessment today.

Teacher education is special in terms of digital learning and the use of digital technologies. After all, on the one hand, the system of training teachers in universities is part of the education system, and all approaches and factors due to large-scale informatization of education are applicable to it. On the other hand, this system trains teachers who must introduce digital technologies and work in the conditions of using such technologies in education. In this regard, the problems related to the digitalization of education, considered from the point of view of the development of teacher training systems, are the most multifactorial, extensive and relevant.

At present, there are three key problems that are typical for the use of digital tools in teacher education and the education system as

a whole - the lack of access for the teacher and students to the required modern information and telecommunication technologies, the low quality of the content of educational electronic resources and the unwillingness of teachers to implement their professional activities in the context of the use of digital tools and systems.

It should be noted right away that the first problem, due to the insufficiency of the available computer hardware and the quality of access to telecommunication networks, certainly takes place. The year 2022 and forced remote learning have revealed a whole range of actions that need to be taken to reduce the severity of this problem. [1] However, even today it can be stated that the relevance of this problem is fading into the background compared to other indicated problems. Its solution is largely related to financial, organizational and other factors and, for the most part, is not based on the results of pedagogical research. Obviously, the fleet of computer equipment in the education system is steadily increasing, and in many educational organizations, including most pedagogical universities, it is relatively sufficient. Moreover, a numerical analysis of the results of monitoring the performance of Russian universities shows that in leading Russian universities, including those that train teachers, the number of computers and other digital tools per student is declining, having reached its peak. This is due to a simple reason. Teachers and students are increasingly using their personal digital devices without accessing computers and even telecommunications networks of universities.

In support of this fact, one can cite arguments related to the emergence and wide spread of the so-called BYOD strategy (BYOD - Bring Your Own Device, translated from English - “Bring your own device”).[2] Personal computers, tablets and smartphones of educators and students are combined into single networks and systems, heterogeneous software is being developed specifically for them, and special teaching methods are being created. As an example, we can cite the technological and pedagogical approaches described in other articles, based on the creation and application of the so-called "smart audiences". [3]Considering the widespread use of personal digital devices, it can be argued that such techniques will soon significantly reduce the severity of the first of the above problems. At the same time, strategies for relying on personal digital tools should become significant both for the digitalization of teacher education and for expanding the content of teacher training. Training teachers to use technologies similar to BYOD is a significant practical contribution to solving the problem under discussion.

Key for the current stage of development of the education system, the second and third problems are closely related. At the same time, this relationship is based on the teacher and the system of pedagogical education. This is clearly seen from Figure 1, which shows the main factors and, at the same time, ways of developing teacher education in the context of digitalization. The prospective efficiency of digitalization of all education as a whole largely depends on the effectiveness of the use of digital tools in teacher education. The structure of the figure and the links-arrows indicate the presence of a relationship between digital tools, the ways of their application and the specifics of teaching them within the framework of the teacher training system.

In this regard, the ways of solving the two remaining of the noted problems cannot be considered separately. First of all, I would like to dwell on the relationship between the use of digital tools as an object for study and a means of teaching teachers. Unfortunately, it is not uncommon for teachers to learn certain disciplines without any justification using completely different digital tools that are used to teach schoolchildren. In this case, it is necessary to pay attention to the use of those digital tools that are necessary in terms of the specifics of the implemented methodological teaching system and not to use digital resources just because the teacher knows and can use them. So, for example, many resources of the projects "Russian Electronic School", "Moscow Electronic School" and others, intended for teaching schoolchildren, can be

effectively used to train students of pedagogical specialties of universities[4].

At the same time, such resources themselves, of course, need to be improved. Speaking about teaching digital technologies themselves, it should be noted that every year their functionality and interface become more and more accessible to teachers and students.

Most modern computer programs are successfully mastered by people on their own, without listening to lectures and without doing practical classes. Massive remote learning, launched in 2022, showed that most educators somehow own digital tools, understand their capabilities, differences, and how to work with them. At the same time, school and university teachers experienced incomparably greater difficulties in learning and organizing their professional activities using such tools. This means that in the system of teacher education, it is advisable to gradually redistribute the emphasis, goals, content, study time and other resources from teaching only computer science and information technology to learning how to carry out all types of professional activities in the context of the widespread use of digital tools.

It should be taken into account that those students who are now studying in the system of teacher education will have to live and work for decades in conditions of rapid change in technologies and means. In this regard, when preparing in the field of informatics and informatization of education, significant attention should be paid to the fundamental, time-invariant properties, principles and conditions for the functioning of digital technologies. This can be done by using modern digital tools as an example that demonstrates the fundamental approach to improving the efficiency of human activity based on the use of technology. Such factors should be taken into account when formulating the goals and selecting the content of teacher education.[7] In part, the corresponding requirements should be presented to those digital tools that are used in teacher training universities.

Experience shows that the informatization of education (and digitalization as part of informatization), considered as a human activity aimed at providing education with the most reliable, new and demanded information, can be taught. Appropriate areas of training can be formed on the basis of disciplines taught in pedagogical universities that have different names, but are dedicated to the use of digital technologies in the professional activities of a teacher. In this case, additional factors and criteria will appear that group such disciplines into a single system, which contributes to greater fundamentality and completeness, minimization of semantic contradictions and unjustified repetitions, the use of a single terminology and many other positive aspects.

The acquaintance of teachers with the peculiarities of the use of digital tools in different areas of their professional activity should also become complex. In this regard, it is advisable to single out at least five such areas in which the use of information technology has significant organizational, technological, didactic and other differences. We are talking about educational, extracurricular, control and measuring, scientific, methodological and organizational and managerial activities of each teacher. In most cases, in all these areas of activity within schools and universities, digital tools are already actively used[8]. But such an application, as a rule, is unsystematic, and the corresponding digital resources are interface-wise, technologically, terminologically, and meaningfully unrelated. It is obvious that the consistent and interconnected acquaintance of teachers with the use of digital tools in all five types of educational activities will make a significant contribution both to improving the efficiency of teachers and to the formation of a unified system of digitalization of education [9]. With this in mind, it is necessary not only to expand the content of the relevant disciplines of pedagogical universities , but also the introduction in such universities of digital tools that are actively used in a variety of activities of educational organizations.

As already noted, the quality of the numerous digital resources available is in many cases a significant barrier to their effective use in education. At the same time, technical,

technological, design, ergonomic and functional shortcomings of such resources do not seem to be such a big problem as the insufficient quality of their content. Modern enterprises involved in the creation and implementation of digital tools for education are very quickly improving their performance and design. At the same time, the presence of deep content flaws, the identification and elimination of which may require significant time, intellectual and labor costs, leads to very serious and long-term consequences, in which teachers and their subsequent students get a wrong idea about the objects, phenomena or processes being studied.

It should be understood that in modern conditions, the development of truly high-quality digital resources with meaningful content is practically impossible alone. The vast majority of effective digital tools have been developed by professional teams of authors, which include methodologists, psychologists, programmers, designers, other specialists and, of course, educators. In this regard, teachers need to be taught how to work in such teams, the principles and specifics of not only the development of digital resources, but also the qualitative formation of their content. Naturally, for such training, a pedagogical university must have the appropriate modern digital tools.

In our country, as in many other countries, there is no large-scale system for assessing the quality and selection of digital resources for education. This means that a variety of digital tools with various positive and negative properties can be at the disposal of teachers. Under these conditions, a modern teacher cannot but be partly an expert, able to independently identify ineffective digital tools. Obviously, the criteria and technologies for such selection should also be included in the content of teacher training, and pedagogical universities should have everything necessary for such training.

Together, such training in the future will simultaneously improve the quality of the content of existing digital resources and limit the interaction of students with resources, the content of which may adversely affect the effectiveness of training. There is an obvious relationship between the development of teacher education and solving the problem of insufficient quality of the content of educational digital resources.

In view of the foregoing, it is possible to propose further development of the system of training teachers in the field of informatization of education and the corresponding provision of pedagogical universities with digital tools so that students have all the opportunities for consistent and systematic study:

- goals and opportunities for the use of digital tools in education;
- fundamental principles and prospects for the development of digital technologies used in education;
- functionality of modern hardware and software computer software, features and methods of working with it;
- search and selection technologies for educational digital resources;
- technologies for the development of educational digital resources, methods of work in a team engaged in such development;
- criteria and technologies needed to assess the quality of the applied digital tools;
- areas of need for learning systems in the application of certain information technologies, ways of appropriate and justified use of digital tools;
- approaches to the effective implementation of educational, extracurricular, control and measuring, scientific, methodological and organizational and managerial activities with the systematic use of digital tools.

Such a sequence can determine not only the content of training, but also form a sequence of practical exercises, determine the forms and methods of teaching used, and serve as the basis for the selection of digital tools necessary for the training of teachers.

Of course, the problems described in this article and possible ways to solve them, one way or another related to the use of digital tools in the preparation of teachers, are not the only and exhaustive. But even the above arguments are sufficient to base the further development of teacher education and its technological equipment on the search for key factors and their interrelationships that affect the effectiveness of the teacher's activity in the conditions of informatization of education.

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