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**TRANSFORMATION OF THE TEACHER'S ROLE IN DIGITAL  
AGE (RUSSIA & FRANCE)**

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*Abstract*

Rapid changes in the country's socio-economic development and the adoption of digital technologies as its main component are two aspects that the education system cannot ignore. In order to increase the country's competitiveness in the field of education, it is necessary to train highly qualified specialists who will be able to take responsibility for operating modern technologies and new methods of education in the digital age. In addition, future specialists must be ready for continuing education, and this requires a high-quality information and communication base. Current conditions in the digital age dictate new requirements for the organization of training, changing the content, forms and methods of teaching. School education management is gradually being digitized. All this leads to the fact that the role of the teacher in timely conditions is fundamentally changing. In addition, in the context of globalization, there is an interest in foreign practices in education. The article contains a comparison of the evolution of Informatization of education in Russia and in France. Attention is drawn to the formation of digital competencies in future teachers and the emergence of new teaching professions, such as e-learning tutor, distance learning teacher consultant, etc., which arose in response to the needs of society and are associated with the spread of digital technologies in the educational process.

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**Keywords:** Digitalization of education, digital age, education in Russia and in France, information and communications technologies, teaching professions.



## 1. Introduction

Modern living conditions of every person are inextricably linked with information and communication technologies in connection with the progress of digitalization and the transition to an information society. In addition, discussions about the problems and prospects of digital transformation of the education system are growing with each passing day. Given the conservative nature of education, however, an increasing number of specialists in this field are more likely to believe that digitalization is a global change that affects the education system, changing the forms and methods of teaching. Digital technologies are not just a tool, but also an environment that opens up new opportunities, such as flexible learning schedules, individualization of learning, and, therefore, more opportunities and prospects for continuing education. Most often, when speaking about the essence and content of the digital transformation of education, researchers (Lomonosova & Zolkina, 2018) agree that it should allow for flexible and effective use of the latest technologies for the transition to a targeted, individual-oriented educational process. To achieve this result, many interrelated tasks are being solved in different countries. Such key tasks are as follows:

- enhancing and improving the quality of the education system material infrastructure;
- implementing digital programs;
- developing online learning system;
- developing new training management systems (administration and control of training courses);
- improving the IT competence of teachers.

## 2. Problem Statement

Improving digital skills in work and education has an impact on transforming jobs. Knowing how to use digital resources has become almost as important as being able to read, write, and count. Digitalization of all sectors of the economy is being dynamically implemented, for example, in France, but according to a study by the National Institute of Statistics and Economic Studies, 30% of the country's population still has not formed digital skills at the proper level. The integration of modern technologies and the creation of a unified digital educational environment entail changes in the content of school education, need for material and technical equipment, and also requires high-quality training and retraining of teachers, since only 30-40% of teachers are able to easily communicate with the new tools (Andryuhina et al., 2020). In the digital world states face the need to solve problems to improve the organization of the educational process. In order for the educational process to be most effective, it is necessary to specifically train future teachers and specialists for the field of education, to prepare them for the new conditions of activity in the digital age. The key point in education is the development of digital culture, strengthening the integration of culture and digital technologies in school and university education. The processes of globalization, which are clearly felt in the Bologna process, including Russia, France and other European countries, lead to the creation of a single European educational space, and pose similar challenges to these countries. In this regard, the study of foreign experience is necessary for understanding the "digital fate" of national education and choosing a strategy for further development.

### 3. Research Questions

The solution of this problem required a theoretical understanding of the following issues:

- How has the use of information and communications technology in education changed?
- Why is there a need for new requirements for training teachers?
- What are the main results of the transformation of the teacher's role in the conditions of digitalization (on the example of Russia and France)?

### 4. Purpose of the Study

Thus, the purpose of the article is to study the evolution of digital technologies in education in a comparative aspect and determine the patterns in the transformation of this role of the modern teacher in accordance with the digitalization of education. The study also deals with new professions that are emerging in education in the digital age.

### 5. Research Methods

In our study, we used the following methods of pedagogical research:

- retrospective analysis to identify the evolution of information and communication technologies in education;
- source research method as the result of research of official documents and scientific literature devoted to this problem;
- comparative analysis of school and higher education systems in Russia and in France;
- linguistic analysis for the correct use of terms.

### 6. Findings

#### 6.1. Development of information technologies in the field of education

The first attempts to develop a computer science program for secondary school students with a mathematical bias were made in the mid-50s of the 20<sup>th</sup> century in the Soviet Union. The first textbooks on programming for students were developed by academician A.P. Yershov who introduced the scientific term "computer science" (as cited in Krayneva, 2017). In the 60s, certain schools in the USSR introduced elective courses in computer science. Academicians V.P. Lednev and A.A. Kuznetsov contributed to the creation of new courses and disciplines, for example, the course "Fundamentals of Cybernetics" with 140 hours allocated in secondary school, as well as courses "Vector Spaces and Linear Programming", etc. Despite the fact that in the 70s of the 20<sup>th</sup> century there was no proper promotion of computer technology and national computer science programs, in the USSR, there were classes of programmers, as well as physical and mathematical schools. In addition, there was training of specialists whose activities were related to computers. Since academic year 1985, "Fundamentals of computer science and engineering" became a compulsory subject in Soviet schools. The problem of personnel, which arose in connection with the introduction of a new discipline, was solved as follows: teachers were not only teachers of natural science subjects, but also engineers and programmers of specialized research institutes. Computer

science lessons were gradually becoming a thing of the past, as the Soviet industry began to produce personal computers. In addition, there were also imported PCs in schools of this time.

The legal and regulatory framework aimed at the development of digital education and information society in the Russia is the “Strategy of information society development in the Russian Federation for 2017-2030” and the National Program “Digital Economy of the Russian Federation 2024”. The draft program provides that by the end of 2025, more than 11 million students will have completed online education (Nacional'naya programma, 2018). Within the framework of the project in the field of education, a number of priority key guidelines have been initiated:

- introduction of legal documents aimed at the development of online learning;
- creating a unified online learning platform;
- increasing the number of online courses in education with the involvement of social partners;
- formation of expertise and assessing the quality of the online courses content;
- creation of the Regional IT Competence Centers;
- training of teachers in the field of online learning (Pasport, 2016).

Among European countries, France is a leader in the use of modern digital technologies in education. The organization of all types of distance education is carried out by the National Centre for Distance Education founded in 1939 by a government decision to provide distance education in the run-up to the Second World War. The era of computerization of schools in France continued in 1967, when at the initiative of Prime Minister Michel Debré, General de Gaulle began to develop a plan for the development of information technology in order to ensure the country's independence in relation to large computers from American manufacturers. It was in the context of the race for industrial information technologies that the first attempt was made to introduce them into general education. In the following years (70-90-ies of the 20<sup>th</sup> century), the French government constantly implemented new plans aimed at equipping school institutions with computers and preparing teachers to work with new technology: the number of educational institutions and teachers constantly increased (Baron et al., 2014). In 2003, the so-called digital workspace was created in France. It is an integrated set of digital services selected and provided to all stakeholders in the educational community. In 2010, a plan was developed for the use of digital technologies at schools, and every effort was made to provide educational institutions with high-quality infrastructure and modern material equipment. However, periods of enthusiasm in this area have alternated with disappointment over the years. For example, the subject of dispute has been the content and goals of computer science education in French schools for a long time.

## **6.2.Variability of digital learning technologies**

According to research by French specialists of Institut Montaigne, digital technologies primarily help strengthening the autonomy of universities and facilitate access to research data. Turning France into a “learning society” is a priority set out in the 2015 National Higher Education Strategy. The country has developed digital tools for learning, including new educational technologies called “EdTechs”. Training takes place using interactive communication technologies. Students can also receive presentations and videos for self-study and further discussion.

Digitalization of education in Russia is taking place in stages. Implementation of pilot projects of a virtual platform for interaction of all subjects of educational activity in the school, the certain elements of which were used back in 2010 (for example, electronic diaries, interactive whiteboard, automated verification of written papers, push notifications to parents). The entire learning process in a modern school is almost entirely digital, for example, lessons are presented in the form of visual presentations, students use electronic textbooks, interactive whiteboards and online tests check knowledge, virtual laboratories help train practical skills, although in a virtual space, the results of evaluation are also performed by a computer during automated verification.

In addition, digitalization of education is implemented through cloud systems for exchanging and saving documents, virtual platforms that offer various tools for creating resources and interactive interaction. For example, the PRONOTE system is used in more than 7,000 educational institutions in France, including secondary and high schools. The first version of this system was used for filling out and editing report cards. Now it is a platform for teachers, parents and students. An alternative version in Russian education is the virtual portal “Russian E-School”, which is an information and educational environment for interaction between students, teachers and parents. Such portals as “Russian Education”, “Federal Center for Information and Educational Resources”, “New Generation Educational Resources”, etc. serve as a bank of electronic educational resources for Russian schoolchildren. In France, there are platforms for school children, such as CANOPE, PIX, or Compass, which allow students to acquire digital skills from an early age. According to the PIX standard, for schools, students’ digital skills are assessed at the primary school level.

University education in the digital age is characterized by a variety of forms of education and the organization of educational and research activities. A blended learning is gaining popularity, which allows to combine full-time and distance (online) education. The blended learning involves a combination of traditional and e-learning methods, such as virtual educational platforms, mass online courses that include videos, educational content, online events, discussion groups or forums that guarantee continuity of communication, distance communication between students and the institution. Mass open online courses differ in the way they are available to an unlimited number of participants, are often free of charge, provide a convenient organization of educational material and are focused on specific knowledge and skills of the user (Zakharova & Tanasenko, 2019). Both in Russia and France, many universities present their online courses within the framework of western educational platforms, such as Coursera and EdX. There are Russian platforms, such as the National Open Education Platform, as well as the Intercollegiate E-Learning Platform “Universarium”. In France, there are FUN and Open Education Europa platforms, which are the source of a large number of educational programs.

At the level of higher education in France, virtual faculties and students’ personal accounts are being opened. A striking example is the digital faculty of virtual law, which was opened in 1999 in France. In Russia, the most common is the Moodle education management system. It is used for online learning in universities. However, there are other software companies’ products for creating virtual platforms for the unified educational space of higher education institutions, training personnel, e.g. electronic platforms eLearning Server 4G, eClass, Mobile eLearning developed by Hypermethod. In addition, there are other platforms for organizing online learning (GetCourse, WebTutor, Virtual

Classroom, TalentLMS etc.). For students and teachers, there is Hyperplanning software that is used by higher education institutions in France. It includes an interactive calendar of events, classroom management, summary of student performance, and accompanying students during their internship. The advantage is that the program is available to every student, teacher, and administrative staff. The M@gistère platform is an initiative of the French Ministry of Public Education and is designed to train students, teachers, faculty and staff in the field of higher education. Since 2015, the country has been operating the Glose platform, which serves both as a library of digital books with an extended reading interface and a social network of readers. The purpose of the platform is to introduce young people to literature without changing their “digital habits”. Other platforms that are designed for interaction between teachers and faculty for educational purposes in France are eTwinning, Viaeduc, etc.

### **6.3. Teacher training in the digital age in education**

In the new information society, the teacher is at the very center of changes that lead to the renewal of the content of pedagogical activity. In particular, currently, the teacher becomes a conductor of new information and communication changes (Tulchinskii, 2017). In this regard, the content of teacher training could be divided into several blocks:

- “future teacher - education system”;
- “future teacher - set of theoretical and empirical information”;
- “future teacher - community”;
- “future teacher - student”.

The first block involves the information interaction of the teacher with the educational institution where the teacher is trained. The second block assumes that the teacher receives all the required information on the specialty being studied and other related issues from the necessary information systems. The third block implies interaction of the future teacher with the external environment, for example, participation in educational communities, communication with colleagues, etc. The fourth block is interaction with those information and communication systems that accompany the educational process of future pupils and students in the process of obtaining practical skills by the future teacher. In part of the first block, special mention should go to the possibility of direct interaction between the student and the teacher, either via email or through a blog. One of the classic examples in the second block is getting access to electronic scientific databases and electronic libraries. For a long time, all European organizations have free access to global databases, which allows for improving the quality of training and research. As far as the last block is concerned, when teaching practical skills of conducting pedagogical activities, the future teacher is forced to possess knowledge about the digital educational environment that is used in the relevant educational institution.

Efforts to educate young people should lead to their conscious use of digital technologies. In this regard, at the beginning of the 2019 academic year, a new discipline “Information Science and Digital Technologies” was introduced in secondary schools in France. A team of subject teachers has developed a textbook for this course, which corresponds to the curriculum, the needs of students and has a rich content of information, so that every teacher can refer to it regardless of what discipline they lead (Sauzeau et al., 2019). In addition, the introduction of a new discipline required the creation of new jobs for teachers

specializing in this subject area. The government has also created a new certificate confirming the professional digital competence (French Government, 2019).

Recording of educational results is carried out in the conditions of digital education. The content of the teachers' activities is changing. They are now developing and approving standards of educational achievements that fix the competencies that each student should master when studying the modules of the digital curriculum. One of the mandatory requirements for a teacher is the ability to implement the "pedagogical design" procedure as the main tool for planning and organizing classes. One may talk of changing of the teacher's role, who is currently a subject teacher and a mentor (Ignatieva & Ryabkova 2018). The organization of a learning system using Internet technologies requires that the teacher is both a moderator and an integrator of educational elements. In this regard, it is necessary to free up the teacher's working time so that they can immerse themselves in the study of ways to improve digital educational content. According to the research of Organisation for Economic Cooperation and Development, the use of digital tools does not help students in learning if this process is not accompanied by adapted pedagogy. For a positive result, it is necessary to have special training manuals, ability to provide individual support and advice to students in the digital space, support from the teaching staff (e-learning tutor). Formation of IT competencies for teachers and the emergence of new teacher roles, such as mentor, coordinator, navigator, moderator, etc., are also a key point (Gudmundsdottir & Hatlevik, 2018). Most teachers in the European Union would like to receive professional development in terms of skills in digital education. However, areas, such as educational engineering, project management training, and online marketing, are still rarely studied in France, although the content of teacher training programs has changed significantly in recent years. In the training of teachers, special attention is paid to the revision of curricula for primary teacher education, flexible training (Golitsyna, 2017), a system of incentives and increased motivation, and the development and implementation of new mechanisms for professional evaluation.

Teacher training in France after the 2013 reform is organized at the level of the master's degree in teaching in the field of "Professions in Education and Training", as well as in the field of "Educational Sciences". Here are examples of educational programs of pedagogical master's degrees in these areas in Russian and French universities. The National Higher Institute of teaching and education of the Versailles Academy offers a program "Digital Technologies and Research in Education" for applicants. The training is aimed at studying and deepening knowledge about the theoretical foundations and methodology of scientific research in the field of education and didactics, including training in digital technologies. The Academy of Toulouse offers a program of basic training of specialists in the implementation of distance learning, project management, in the development of scenarios for training distance courses "E-Learning and the Digital Environment". In this master's program, they form skills for creating online courses and evaluating them, teach computer design and tutorship in digital education. Another master's program "Digital Educational Resource Designer" offers training for creating the design of digital and interactive educational resources, supporting students and evaluating their results in the digital educational space. Graduates of the master's program can realize their potential in the profession of a project manager for digital and multimedia resources, a graphic designer, and can also train teachers in the conditions of digitalization of education.

Russian and French universities implement master’s programs aimed at training teachers who are proficient in digital technologies. For example, the Herzen State Pedagogical University of Russia offers master’s programs “Information Technologies in Education” and “Pedagogy of Distance Educational Interaction”. Graduates can work as organizers of educational projects, methodological consultants of distance learning, and tutors of digital learning. In order to implement the “Strategy of Scientific and Technological Development of Russia and the Digital Economy”, the master’s program “Teacher for the School of High Technologies” was created at the St. Petersburg State University. It is designed to train a technology teacher who solves professional tasks using digital equipment and is ready to interact in both real and virtual educational environments.

The development of information technologies and informatization of education can be divided into three stages, i.e. electronics, computerization and digitalization of education, as a result of which it is possible to trace the history of the formation of the modern education process and teacher training in the digital age (Table 1).

**Table 01.** Development of informatization of education and teacher training in Russia and in France

Stage of Development	Stage description	Russia	France
Electronization of education (mid-20 <sup>th</sup> century)	Beginning of introduction of electronic means and computer technology (computers) in specialized courses of educational programs of secondary and higher education. Creation of the first textbooks on programming.	Development in the 50s of the 20 <sup>th</sup> century of optional programming courses for secondary and higher schools with a mathematical bias. In the 60s, introduction of courses in cybernetics and programming for students of humanities - training of the first specialists.	1948 - certain universities introduced the first courses in applied analysis. 1958 - opening of the Educatel distance learning center. In the late 60s and 70s, computer science was introduced to secondary schools, and the first experimental practices were conducted to train specialists in the field of information science.
Computerization of education (end of the 20 <sup>th</sup> century)	Wide dissemination of computer science and necessary technical equipment in the educational process, training and short-term retraining of teachers in the field of information science. Programming is taking a back seat, and there is a growing interest in information technology as a didactic tool in teaching process.	1985 - introduction of compulsory computer science in all schools. By the mid-80s, teachers of computer science and other specializations with knowledge of information technologies were being trained in pedagogical universities. In the 90s, concept of informatization of education was developed, and projects were developed to	1985 - development of the education plan “Informatics for All”, introduction of a compulsory discipline “Informatics” in schools. Early 80s - three levels of teacher training were defined depending on their role, i.e. the user, the animator (a teacher who owns and uses information technology for didactic purposes in their professional activities), and the teacher “with double competence” (which implies in-depth



		create an information educational environment.	professional training of teachers). Introduction of new disciplines, such as “Pedagogical Application of Informatics”, etc.
Digitalization of education (beginning of the 21 <sup>st</sup> century)	Transition to new and more powerful information technologies and the spread of mobile personal devices. Education is being digitized, i.e. virtual educational platforms are being created for schools and universities, a unified information educational space, higher education systems, mass open online courses, multimedia digital technologies in education, etc. Transition to distance or mixed learning. Creating a legal framework for digital education. The modern teacher’s role is changing.	Regulatory documents are being approved in the context of digitalization, such as strategies for the development of the information society, national programs and projects. The number of hours in computer science has increased, and the name and content of computer science courses in schools have changed. Universities offer a wide range of educational programs, e.g. “Information Technologies in Education” and “Pedagogy of Distance Educational Interaction”.	Official documents have been developed, such as a plan for the use of digital technologies in schools, decrees and regulations aimed at the development of digital technologies in education. Introduction of new disciplines in schools. 2000 - creation of the certificate for middle (B2i) and high school students (PIX). 2019 - creation of the certificate confirming professional IT competence. New university educational programs for teacher training are gradually emerging (for example, “Digital Technologies and Research in Education”, “E-Learning and the Digital Environment”).

## 7. Conclusion

Information technologies in education have developed progressively since the middle of the last century. In the 21<sup>st</sup> century, digitalization has penetrated all sectors of the country’s economy, including education, while IT is continuously developing. The introduction of digital technologies in school education and the creation of a digital educational environment required a review and change of forms and methods of teaching, the content of education. In addition, the training of subject teachers with new roles, formation of future teachers’ IT competencies corresponding to the realities of modern society in the digital age has become an urgent task. Thus, the main trends that are associated with the transformation of the teacher’s role are the digitalization of the educational environment, which also affects the individualization of the learning process (Vainshtein et al., 2019). The study of the peculiarities of using digital technologies in the education system of Russia and France has shown a gradual change in the forms, content and technologies of teaching school and higher education. As a result, new IT-oriented disciplines and electives have been introduced into the curriculum, information

technology specialists have been involved in training students, and virtual spaces and platforms have been created for teaching and pedagogical interaction of educational entities. The developed platforms have become not just a dematerialized version of the university in its physical embodiment, but a real space for experiments in the field of digital technologies, e-learning based on modern regulations (Aagaard & Lund, 2019). In addition, due to the digital transformation of education, there is a need for teachers with IT competence, teaching professions that change the role of the teacher, which has affected the content and updating of master's education curricula. The results of the transformation of the teacher's activity in the conditions of digitalization of education in Russia and France include:

- creation of jobs for teachers with new qualifications as a result of the introduction of new disciplines and requirements for the organization of training (for example, emergence of new professions, such as “distance learning tutor”, “curator of online educational programs”, “blended learning coach”, “online learning methodological consultant”, etc.);
- creation of new educational university programs (in particular, master's programs) in view of the need of society and the state to train specialists who have digital competence and are able to conduct training in the conditions of digitalization;
- creation of variable educational platforms for accessible learning and interaction of all subjects of educational activity in the digital space.

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