

VII International Forum on Teacher Education

“Digitalization of Education” in Science and Practice of Training a Teacher

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Abstract

The intensive introduction of information and digital technologies into the educational practice, insufficient definition of the concept of “digitalization of education”, the priority areas of training teaching staff in the context of the changes in education determines the need for systemic understanding and study of the term “digitalization of education” as a scientific category and a challenge determining changes in the education system. The article presents the results of the theoretical and empirical research devoted to the problem of applying information and digital technologies in education. The essence of the concept of “digitalization of education” (phenomenon, process and instrument for achieving the goal of education) was formulated, which enriches the conceptual field of pedagogical science and determines a possibility of further system analysis of the components of digitalization of education and clarification of connected concepts (digital competence and its criteria, digital ethics). The description of the importance of digitalization for the education as a social institution, a system and a process reflects the results of the system analysis and serves as the basis for constructing the prospects for the development of education in the variety of its definitions. The results of the theoretical analysis and the survey carried out among students of higher education institutions made it possible to identify the skills of future and current teachers which are in demand in the context of digitalization (special communication, marketing, presentation skills; skills and experience of working with various programs and platforms and others).

Keywords: information technology, digital technologies, digitalization of education, training of teaching staff.

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Published by Kazan federal university and peer-reviewed under responsibility of IFTE-2021 (VII International Forum on Teacher Education)

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Introduction

The intensive introduction of information and digital technologies into the educational practice (The program “Digital Economy of the Russian Federation”, 2017: Priority project “Modern digital educational environment in the Russian Federation”, 2016) insufficient definition of the concept of “digitalization of education”, the priority areas of training teaching staff in the context of the changes in education determines the need for systemic understanding and study of the term “digitalization of education” as a scientific category and a challenge determining changes in the education system. The research devoted to the problem of applying information and digital technologies in education (Besshaposhnikov, Leonov & Prilipko, 2018; Buryak & Shostka, 2019; Platonova, 2018) allows us to state the following: the focus of the system of professional training and advanced training of teaching staff on mastering information and communication competence does not solve the entire range of problems of interaction with a student and his or her family in the context of solving the problems of development and formation of personality. The issue of the impact of digitalization on the development of education as a social institution, as a system and process is studied insufficiently.

Purpose and objectives of the study

Purpose of the study is to characterize the essence of the concept of “digitalization of education” and the priority areas of training teaching staff to be ready to solve issues of professional activity in view of the influence of information and digital technologies.

Objectives of the study are the following: to study the existing definitions and authors’ points of view of the concept of “digitalization of education”; to identify the skills of future and current teachers which are in demand in the context of digitalization.

Literature review

Russian researchers (Besshaposhnikov, Leonov & Prilipko, 2018; Buryak & Shostka, 2019; Nikulina, 2018; Platonova, 2018 and others) recognize the importance of digitalization through a prism of implementing a wide range of educational and developmental opportunities of information technologies, handling priority issues of the education system, ensuring the availability and mass character, also quality of education. Having noted the emerging difficulties in the use of information technologies in education (digital inequality, changing roles of a teacher and a student, and others), the researchers characterize digitalization as a tool or condition for lifelong education.

Nikulina (2018) presents an over view of the current understanding of digitalization: digitalization as a change in the paradigm of interaction between education participants; the basic digitalization technologies (mobile communication and the Internet), emphasizing the availability of digitalization. The author notes that the digitalization of education is focused on the continuous and mobile character of the education process, its individualization via advanced education technologies, and it presupposes the use of Internet technologies by students. Thus, the digitalization of education is focused on its proficient change. It must facilitate the effective introduction of new tool sand information resources in to the educational process, and “digitalize” the educational process.

Kolykhmatov (2018) lists the key areas of development of the educational environment, methods and technologies of the educational process structure: expansion of educational computer games (gamification of education); use of cloud computing technologies; implementation of augmented reality solutions; development of social networks in education; use of distance learning, development of mass public online courses and new visualization technologies.

The question of the essence and significance of digitalization for the development of education and personality remains outside the field of detailed study.

The analysis of the competencies reflected in the federal state educational standard of higher education 3++ for specialties 44.03.01 (Pedagogical education) and 44.03.05 (Pedagogical education) made it possible to formulate a conclusion about the insufficient preparation of future teaching staff for the implementation of professional tasks in such areas as interaction with parents and colleagues and attitude to the profession. The provided individual competencies do not provide a full-fledged preparation of a future teacher for complex and non-standard situations in their job, defining short-term and delayed negative difficulties and problems in the teacher's activity. Outside the field of study and subject analysis on the part of the teacher remain the personality of a student and the personality of the teacher-educator proper.

The study of interpretations presented in scientific publications for the last three years (Besshaposnikov, Leonov & Prilipko 2018; Buryak & Shostka, 2019; Platonova, 2018) allows to view the concept of “digitalization of education” in the following interpretations:

- as a phenomenon associated with the influence of technology, economic, and global integration processes, including those between branches of knowledge and sciences; in this context, digitalization not only reflects the influence of other processes and phenomena, but also influences other processes, being a part of in various systems of relations and interconnections;

- as a process of changing the educational process by means of information technology; such a change covers, among other things, supportive processes related to staff management, methodology expertise and handling of other issues that ensure the education process implementation;

- as a set of digital tools that determine the education process availability in new conditions; in this sense, digitalization encompasses both information technology and adaptable and projectable models of the education process organization, methods of teaching and assessment of the results of educational activities.

The definition of contexts for analyzing the concept of “digitalization of education” makes it possible to comprehensively consider the likely consequences of implementing its process in educational practice. It should be emphasized that the intensive use of digital technologies in various fields of scientific knowledge leads to their transformation, and introduction of new fields (like digital humanities, digital pedagogics), which not only develop the optimized tools for solving the tasks of this field of science/scientific knowledge, but also bring about the formation of sub disciplines solving a set of tasks to ensure the use of new tools in practice.

In previously published articles (Guseva, 2019; Lubkov, Gordienko & Sokolova, 2020; Machekhina, 2017; Milkevich, 2020), the idea has already been formulated that, in the context of the ongoing changes in teaching technologies and methods, increase of the information technologies significance and scale of application, the personality of a student remains outside the field of attention of a teacher. In this regard, it is important to determine the significance of digitalization for education as a social institution, system and process.

In the context of digitalization, people's perception of education as a historically established social institution aimed at the satisfaction of need population various groups in acquiring knowledge, skills, and certain experience develops new features:

- controversial evaluation of the education by the population;
- decrease of the significance of the role of a teacher, educator;
- misimpression on the decline in the quality of education.

This context demands a system of measures to maintain the prestige of education, also cultural and educational activities among various groups of the population on the organization of education against the background of ongoing changes, and mechanisms to ensure its quality.

Methodology

The work is based on the theoretical analysis, system analysis, survey, document analysis, generalization and systematization of research results, formulation of conclusions. We formulated the following assumptions: digitalization of education is an effective tool for training graduates of pedagogical universities; digitalization of general and higher education imposes new requirements on the skills and personality traits of the future teacher; the system of training teachers needs changes to ensure a timely response to the digitalization of education.

The empirical research is organized using the survey method developed by the authors of the article "Demand for professional skills of a teacher-educator in the context of the use of digital technologies". The need to develop a questionnaire is determined by the lack of diagnostic tools that meet the objectives of the study. This questionnaire includes a number of open-ended questions. The survey method used is quite reliable and informative in terms of the formation of a general picture of the demand for specific skills and personality traits of future teachers. Carrying out a questionnaire survey among first and graduate students is due to the need to identify the difference in students' ideas about their future profession and the necessary skills to solve professional problems. The absence of division of students into control and experimental groups is due to the peculiarity of the study (ascertaining character). The most significant conclusions based on the results of studying the results of the questioning of first and final year students are presented in the article.

The Research was conducted in the state educational institution of higher education of the Moscow region "State University of Humanities and Technology" (Orekhovo-Zuevo, Moscow region, Russia). The study involved 346 students (specialty 44.03.01, Pedagogical education; specialty 44.03.05, Pedagogical education), of which 126 students were 1st year students, 218 students graduate students.

Results

Changes in education as a system affect the functions of educational organizations, also the material and technical, educational, methodological, software, staff implementation support of educational programs at various levels. The experience of implementing information technologies during the pandemic makes it possible to define the following educational system features which also reflecting its internal problems:

- fragmentation of educational content, its insufficient subordination to the implemented teaching materials for educational programs at various levels of education;

- insufficient network of methodological services, ready for and capable of implementing new projects, models and teaching methods in the context of the predominance of the distance learning format;
- lack of teaching staff ready to implement a blended and distance learning model.

In the context of intensive digitalization, education as a process is characterized by the following problems:

- focus on achieving a result without a clear understanding of the algorithm/procedure for the formation of certain knowledge, skills, experience,
- insufficient focus of digital content on achieving the goal and solving the problems and tasks of the lesson;
- insufficient effectiveness of time use at various stages of the lesson;
- formalization of the procedure for assessing the knowledge and results of mastering the educational program, exclusion of the motivating function of knowledge assessment;
- unjustified predominance of students' independent work in the educational process.

The empirical research is organized using the survey method developed by the authors of the article. The study involved students of the first year and graduate students with the aim to realize the dynamics of the development of understanding the significance of digital technologies and the assessment by students of the qualities and skills of the individual which are on demand due to determining their success in professional activities from the perspective of using digital technologies.

The survey results are presented in Table 1 (Demand for professional skills of a teacher-educator in the context of the use of digital technologies).

Table 1. Demand for professional skills of a teacher-educator in the context of the use of digital technologies.

Demand for professional skills	Students	
	1st year students	graduate students
special communication skill	67%	81,6%
presentation skills	64,5%	83,2%
marketing skills	51,5%	81,6%
skills and experience in working with various programs and platforms	78%	80,3%

providing online		
skills related to time management	64,5%	67%
knowledge and mastery of the techniques of psychological self-defense, self-help and self-support, methods and techniques of self-regulation and self-control	59%	60,3%
ability to design and organize interaction with the students' parents	64,5%	67%
ability to design and implement various forms of assessment and control of the results of mastering the curriculum	67%	83,2%

The table shows that demand the skills, as of special communication, presentation, marketing, the ability to interact with parents, design various form soft assessment based on digital technology opportunities, is higher among graduate students than among first-year students. This may be due to the absorption of graduate students in professional activities, their awareness of the existing problems of teaching work as a result of various types of teaching practice and professional activity proper in educational institutions.

The obtained data are consonant with the research results of Aralbaeva & Sapargalieva (2016), Bogoviz, Gimelshteyn, Shvakov, Maslova & Kolosova (2018), Sergeeva, Medved & Gribkova (2016), Techieva & Sabanova (2015).

Discussion

The development of the phenomenon of “digitalization of education” is a result of the influence of regulatory support and technical and technological advances in various spheres of society life. However, the consequences of the impact of digitalization of education on social institutions present a figuratively formulated forecast. The possible consequences of such an impact can be stated as follows (without any indication of any possible positive or negative vector of this impact):

- change in basic values, determined not only by the expansion of digital education practice, but also by the entire sociocultural situation of the emerging digital society;
- change in a person's ideas on the ways of satisfying his or her needs and existing social institutions as historically developed forms for their satisfaction, which lead to the transformation of many social institutions (education, culture, economics, politics);
- emergence of new environments that actively influence the spheres of social life, and the grounds for society structuring (in the terms of availability of digital technologies, involvement in digital environments, use of technologies in everyday life).

From the perspective of the implementation of this concept to the vocational education system, it is important to address the specific character of the directions and profiles of training future graduates. It is rather difficult to imagine the predominant use of digital technologies in the training of creative occupation students and those focused on interaction with other people and individuals (occupations like “person-artistic image”, “person-person”). The example of the teaching occupation clearly shows the difficulties of the professional activity of a future teacher, namely: problems of building collaborative relationships with children, parents, colleagues, designing a lesson, solving social, psychological and pedagogical problems and difficulties of a student.

The results of theoretical and empirical study make it possible to define the need for training teachers ready to implement professional activities in the context of digitalization of education. Thus wise, the following skills are demanded and necessary:

- special communication skill soft pedagogical staff for cento work in a blended learning environment (sufficient emotional and expressive cap abilities, command of methods of active listening and interaction with on line audience, appropriate communication and incorporation of a teacher in the process of mastering curricula material by students through information and digital technologies, etc.);
- presentation skills that allow the teacher to present both himself or her elf and the curricula material, providing an organic combination of various channel audience impact and, therefore, more successful mastering of the material by students;
- marketing skills that allow the teacher to promote own success and professional achievements, supporting the authority of the teacher and the educational institution in the minds of the parental community, and ensure the development of a loyal attitude towards the institution, and a value-based attitude towards education in general on a long-term horizon;
- skills and experience in working with various programs and platforms providing online and blended learning opportunities for students of different age groups;
- skills related to time management of work and rest periods under the conditions of increasing workload, personal readiness to change their own daily routine and work schedule if necessary, willingness and ability to teach the time management techniques to children;
- knowledge and mastery of the techniques of psychological self-defense, self-help and self-support, methods and techniques of self-regulation and self-control;

- ability to design and organize interaction with the students' parents in new conditions for informing and consulting the students' families;
- ability to design and implement various forms of assessment and control of the results of mastering the curriculum.

From the point of view of the revealed skills and the preservation of the student-centered educational process in vocational train in institutions, their sue of using digital technologies requires detailed research, namely in the follow in areas:

- what extent these technologies should be applied, and in relation to which academic subjects;
- what is the best compromise between traditional and digital technologies;
- what is the specific character of the digital technologies application, depending on the focus of the academic subject, course of study, type and purpose of the training session;
- what are the possibilities for the development of a moral-ethical and value-semantic construct of vocational education within the framework of a specific subject and lesson;
- what is the way to organize knowledge in various fields of science and subject training, as well as practical skills and experience through the use of these technologies;
- what are the conditions for the transfer of models of professional activity and methods of solving professional activity problems from the world of digital technologies into the practice of person-to-person interaction between a teacher and a student.

Conclusion

Thus, the intensive introduction of information and digital technologies into the educational practice, the focus of the system of professional training and advanced training of teaching staff on mastering information and communication competence does not solve the entire range of problems of interaction with a student and his or her family in the context of solving the problems of development and formation of personality. The provided individual competencies in the federal state educational standard of higher education 3++ for specialties 44.03.01 (Pedagogical education) and 44.03.05 (Pedagogical education) do not provide a full-fledged preparation of a future teacher for complex and non-standard situations in their job, defining short-term and delayed negative difficulties and problems in the teacher's activity.

Outside the field of study and subject analysis on the part of the teacher remain the personality of a student and the personality of the teacher-educator proper. The presented author's viewing of the contexts for studying the concept of digitalization, the meaning of digitalization for education allows us the understanding of the emerging new concept included in the conceptual field of pedagogical science and educational practice. The essence of the concept of "digitalization of education" (phenomenon, process and instrument for achieving the goal of education) was formulated, which enriches the conceptual field of pedagogical science and determines a possibility of further system analysis of the components of digitalization of education and clarification of connected concepts (digital competence and its criteria, digital ethics, etc.). The description of the importance of digitalization for the education as a social institution, a system and a process reflects the results of the system analysis and serves as the basis for constructing the prospects for the development of education in the variety of its definitions. The results of the theoretical analysis and the survey carried out among students of higher education institutions made it possible to identify the skills of future and current teachers which are in demand in the context of digitalization (special communication, marketing, presentation skills; skills and experience of working with various programs and platforms; the knowledge and mastery of psychological self-defense, self-help and self-support techniques, the techniques of self-regulation and self-control; the ability to plan, design, control and evaluate knowledge, achievements and personal development). The formulated results and findings of the research expand the understanding of ways to preserve the personality-oriented approach in the educational practice in the context of the implementation of information and digital technologies, and also serve as the basis for constructing a forecast for training teaching staff within the framework of vocational training programs, professional retraining and advanced training, as well as developing forms of interaction between teaching staff and others involved in the educational relations, methodological support to help implement different types of educational work at the school level.

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