Information and communication technologies and their use in additional and higher education

N G Ivanova1,4, E S Shcheblyakov2, S M Kurbatova2,3, D V Rahinsky3 and A A Kuzhleva2

1 Krasnoyarsk State Pedagogical University named after V. P. Astafiev, 82 Ada Lebedeva St., Krasnoyarsk, 660049, Russia
2 Krasnoyarsk State Agrarian University, 90 Mira Ave., Krasnoyarsk, 660049, Russia
3 Krasnoyarsk State Medical University named after Prof. V.F.Voino-Yasenetsky, 1 Partisan Zheleznyak St., Krasnoyarsk, 660022, Russia
4 E-mail: natalya-i15@mail.ru.

Abstract. In the light of recent events (COVID 19), we are increasingly hearing about the use of information and communication technologies in the educational process. Moreover, the use of the information and educational environment in the current epidemiological situation is relevant and in demand for all educational institutions without exception, since only it can, in a situation of distancing, provide high-quality meaningful education that meets all the requirements of modern times and the demands of society. Currently, among the main requirements of our time, the state is faced with the task of strengthening the quality of education, which is responsible for the training of highly qualified specialists. This means that the system of higher and additional education is becoming the leading ones in the training of such personnel. Achieving high quality education that meets the requirements of didactics and scientific and technological progress of society is possible with the introduction of modern practice-oriented, individualized forms of education into the practice of universities and additional education. Among such forms of education, one of the most popular and relevant are information and communication technologies.

1. Introduction

The modern education system is now increasingly resorting to the use of information and communication technologies in the educational process. To a greater extent, this trend is characteristic of the system of higher education and additional education, since it is they who are responsible for the training of highly qualified competitive specialists.

Today, the education system is engaged in the preparation of competent highly qualified specialists. And education at the present time in the Russian Federation is one of the priority directions in the implementation of state policy and management of public relations. Thus, in our country, the education system is given a special role, since it is the state policy that is aimed at solving the issues of professional competence of personnel that meet the requirements and standards of modern society.

A modern specialist must be in demand on the labour market, competent and mobile. The last two qualities are formed in the system of the competence-based approach in education. It is the competent approach that allows the future specialist to acquire the professional skills and abilities necessary for
successful professional activity in the learning process, as well as to contribute to the personal development of future specialists.

The problem of training highly qualified personnel, therefore, seems to be relevant, since a social and state order is ripe for the development of the education system. The quality of education, in turn, can be achieved through the use of various educational technologies used in the educational process. In connection with the designated problem, we decided to consider the possibilities of using information and communication technologies in the system of higher education and additional education.

2. Research problem statement
Based on the analysis of scientific literature, determine the current state of the problem of researching information and communication technologies in education.

To study the importance of using information and communication technologies in the educational process of the university and additional education.

Consider the means and forms of information and communication technologies in teaching university students and students of advanced training and professional retraining programs.

Within the proposed formulation of the problem, the following research questions are considered:

- Possibilities of using information and communication technologies in the system of the university and additional education.
- Distance learning - as a form of information and communication technologies in education.

The aim of the study is a theoretical review of scientific literature on the use of information and communication technologies in the system of higher and additional education.

3. Methods
As research methods in this work, we used theoretical research methods: analysis of scientific literature on the research problem; systematization and generalization of the results obtained, formulated in the form of inferences and conclusions.

4. Results and discussion
Currently, in the system of higher and additional education, there is a need for the use of information and communication technologies in the educational process, which, firstly, is explained by the demand of society for the quality of specialists who are prepared by the educational system and rapidly developing technologies that should be purposefully used in the training of such personnel. ; secondly, the general informatization of education, where without the use of various digital and electronic resources, the educational system loses its value, since now information and communication technologies are increasingly used in the educational process, which make it possible to rebuild the traditional education system taking into account the requirements of a competency-based approach; thirdly, the current complex epidemiological situation (COVID 19) around the globe, etc.

In our age of informatization and rapidly developing information and educational technologies, the education system, at the same time, is also undergoing changes. The educational system is constantly changing didactic means, forms and methods of teaching that meet the modern requirements of the educational environment and didactics. And, if earlier, the appearance of an interactive whiteboard in an educational institution was a rarity, then modern living conditions dictate the opposite. The use of interactive whiteboards, multimedia resources and electronic manuals, interactive educational platforms, Internet resources, etc. is considered an integral attribute of the modern educational process. Thus, traditional pedagogical technologies are filled with new content and thus, qualitatively change the educational level of students.

The educational environment today is built taking into account the requirements and psychological knowledge in the educational process. Based on the data of the theory of neurolinguistic programming, today it is impossible to imagine a lecturer giving a lecture and not demonstrating the text of the lecture.
being read on the projector screen, taking into account the importance and significance of the representative systems of each specific subject of the educational process. In addition, information and communication technologies allow, taking into account the individual characteristics and capabilities of trainees, at an affordable pace to receive and master information for various categories of trainees, which makes it possible to individualize the educational route, which is especially important when teaching people with disabilities.

Thus, it becomes obvious that the use of information and communication technologies is one of the central elements of the educational process, and therefore of all education as a whole. The use of these technologies is justified since their application in the educational process makes it possible to improve the learning process at all levels of education with all categories of students. This fact is undoubtedly an advantage of this technology, since no other technology can testify to such a scale of its use with all age groups, without exception.

The system of the university and additional education, as we have already said, is aimed at training highly qualified personnel. Mastering a profession in this case becomes the central problem of university or postgraduate education. New pedagogical technologies used in the training of future specialists significantly change the traditional educational environment. And it is the information and educational environment in this situation that provides qualitatively new parameters of education, determined by state policy and the demand of modern society in the field of personnel training.

Information and communication technologies allow, first of all, to expand the sources of information received. Thus, university students and trainees of professional advanced training and retraining programs in order to provide themselves with the necessary knowledge own all possible information means [9].

There are many different educational sites, information and educational resources, concentrated on a single educational platform, for example, the LMS Moodle electronic distance learning system. In addition, the university's webinar rooms are actively used with university students and students of additional education programs: Zoom, Skype, Webinar, Microsoft Teams, etc.

Such educational platforms have existed in universities for a long time as they are one of the requirements for organizing the activities of higher educational institutions by the Ministry of Science and Higher Education of the Russian Federation. And in the light of the current epidemiological situation in our country and abroad (COVID-19), such educational platforms have gained particular popularity and significance for organizing a high-quality educational space of a university and postgraduate education.

The established practice shows that a single platform for online courses allows students and listeners to be equal participants in the educational process. This is due to the fact that with the help of the educational platform, they get access to the disciplines of the course, to the educational materials, which allows them to obtain the information and knowledge necessary for the successful mastering of their future profession in the shortest possible time.

In addition, the data obtained by V L Uskov show that digital resources, which are now actively used in the educational process, create conditions for the development of students, taking into account advancing development [1]. Moreover, students are not constrained by the framework of the educational process. Each student acquires knowledge and skills at an individual pace. Thus, when using digital resources in the educational process, the emphasis in the educational process is placed on the individual development of each student, regardless of his age, location, abilities, capabilities, etc. [1].

The value of information and educational technologies lies in the automation of the control system, assessment and correction of students' knowledge. The educational process, in this case, is aimed primarily at organizing the individual work of students, as well as the ability to integrate various forms and strategies for mastering knowledge in the disciplines of the curriculum. It should be noted that the individualization and differentiation of education, in this case, are the main component of the Federal State Educational Standard.

Thus, the above examples allow us to judge the automation of the process of educational material assimilation, consolidation and application, taking into account the interactivity of the educational
environment. All this undoubtedly affects the training of highly qualified specialists and the formation of their professional competencies in a particular area of knowledge.

The role of the teacher in the management of educational technologies is decisive, since it is the teacher who builds a system of interaction aimed at mastering professional competencies by future specialists. In this case, the information and educational environment of the university has a significant impact on the construction of educational relations.

After analysing the literature on the research problem, we found that the issues of the information and educational environment were considered in the works of Yu. G. Korotenkova, A. A. Kuznetsova, S. N. Pozdnyakova and other authors. Thus, there are various approaches to understanding this concept [2].

So, Yu.G. Korotenkov defines the information and educational environment as “an area and an integrated resource for the implementation and implementation of the educational process and educational interaction, which, under the influence of informatization, has become information and educational, information and cognitive, information and activity and information and communication” [3].

Other scientists- Grinshkun V.V., Grigoriev S.G. and others in their research note that the information and educational environment functions in the educational system as a single integral system. This system will be effective if a model of the educational process is built. And the educational process itself should include the possibility of using information and communication technologies [4].

According to O. A. Ilchenko, the information and educational environment includes a complex of information, educational, methodological, and technical support used in the educational process. Thus, both the technical equipment and equipment used in the educational process, and various information resources provided to students with access to electronic libraries, educational and methodological complexes of disciplines and programs, as well as all kinds of resources of various educational sites are included in the information and educational environment [5].

Karakozov S.D., Uvarov A.Yu. note that the FSES interprets the information and educational environment as an open pedagogical system formed on the basis of a variety of information educational resources. In this case, information educational resources are understood as modern information and telecommunication means, as well as pedagogical technologies, the purpose of which is to form a creative, active personality, as well as the competence of all participants in educational relations. The interaction of subjects of educational relations is aimed primarily at solving educational, cognitive and professional tasks through the use of information and communication technologies [6].

Shmelkova L.V. argued that the information and educational environment provides a new level of education quality, in which each student has the opportunity to unleash his creative potential, regardless of location, health status, socio-economic conditions, etc. And the use of interactive forms of education allows the student to independently acquire knowledge, skills, skills necessary for him to successfully master professional competencies [7].

Thus, in accordance with the Federal State Educational Standard, the information and educational environment acts, on the one hand, as a means of implementing the standard itself, and, on the other hand, as the most important information and methodological condition for the implementation of the basic educational programs of the university.

After analysing the scientific literature and existing practice, we come to the conclusion that digital education, namely, information and communication technologies used in the practice of the educational system of the university, is undoubtedly convenient and effective for all subjects of educational relations. In connection with the development of Internet resources, it is, first of all, available to all participants in the educational process, since each educational institution has the necessary material and technical base to implement the requirements of the Federal State Educational Standard [8].

In addition, this educational technology makes it possible to develop a system of continuous education. This form has long been actively used in the educational system of higher and postgraduate education. This is the so-called distance form of education, which is acceptable in a situation where the
student needs to receive education, but the possibility of full-time education is not available for certain life or other circumstances.

Currently, distance learning technologies, which are a form of information and communication technologies used in education, are increasingly used in the training system. It is the distance form of education that is currently becoming the only correct form of education for obtaining high-quality higher education or professional retraining [9].

5. Conclusion
The use of information and communication technologies in the educational process is justified by its practical significance in organizing the educational process in the system of higher education and additional education.

Information and communication technologies are a special educational system that has a number of characteristics: flexibility and plasticity enable the student to choose a development trajectory depending on his own interests and needs. Mobility allows you to improve and develop through the study of a sufficiently voluminous flow of information, as well as to respond as quickly as possible to changes in the educational environment. Manufacturability allows the student to organize his educational process with the help of various information and communication resources. Dialogue, as well as interactivity, is achieved through a dialogue between the teacher and the student in on-line mode [9].

With all such a variety of characteristics in favour of interactive and communicative forms of education, we can still distinguish deficiencies in the system of higher and additional education, where the main disadvantage of interactive forms of education is the lack of “live” direct interaction between the student and the teacher, with peers. The lack of direct communication in this situation, ultimately, may also affect the quality of the studied material, affect the strength of the assimilation of knowledge.

But with all this, it should still be noted that the use of information and communication technologies in the system of the university and additional education creates a new stage in the digitalization of society, which makes this technology generally available and reliable for solving the tasks in terms of developing the quality of education.

References
[1] Digital skills for life and work, report of the joint commission of UNESCO and ITU Preprint gr-qc/ http://d-russia.ru/vyshel-doklad-sovmestnoy-komissii-yunesko-i-mse-o-tsifrovyh-
navykah-neobhodimykh-dlya-zhizni-i-raboty.html
[2] Shmel’kova L V 2016 Personnel for the digital economy: a look into the future Additional Professional Education in the Country and the World 8
[3] Akimova O B and Shcherbin M D 2018 Digital transformation of education: timeliness of educational and cognitive independence of students Innovative Projects and Programs in Education 1 27-34
[4] Trubitsyna E V 2009 Two approaches to the definition of the information and educational environment Congress of Conferences ITO Preprint gr-qc / http://ito.edu.ru/2009/MariyEl/I-0-13.html
[5] Sokolova O I 2001 Basics of developing the information environment of a pedagogical university Preprint gr-qc / http://ito.edu.ru/2001/ITO/IV0-41.html
[6] Kozlova N Sh 2018 Topical issues of staffing for IT specialists during the period of digital transformation Proc. Int. Conf. on Digital Economy: a New Reality (Maikop: MSTU) p 45-8
[7] Karakozov S D and Uvarov A Yu 2016 Successful informatization - transformation of the educational process in the digital educational environment Problems of modern education (Problemy sovremennogo obrazovaniya) 2 7-19
[8] Ivanova N G and Shcheblyakov E S 2017 Implementation of the competence-based approach in the educational process of the university Sovremennye Issledovania Socialnyh Problem (Modern Studies of Social Issues) 8 2-2 104-08 Preprint gr-qc / http://ej.soc-journal.ru