The use of digital technologies in the professional training of cadets

Aksar A Eltemerov and Svetlana N Fedorova
FSBEI of Higher Education Mari State University, Yoshkar-Ola, Russia

E-mail: aksarus@mail.ru, svetfed65@rambler.ru

Abstract. The modern education system should provide the society with a confident transition to the digital era. Digitalization contributes to the immediate response to any emergency. Consequently, the introduction of digital technologies plays an important role in the training of rescuers. The significance and ways of introducing digital technologies in the process of professional training of universities teaching fire-safety specialists have been analyzed in the article. It is emphasized that the system of training future specialists requires the use of innovative methods of training. The experience of leading universities is analyzed, where various training programs, electronic textbooks and simulation facilities are used. The role of pedagogical technologies based on students’ own activity, interactive communication, teamwork, group and individual reflection is growing. At the stage of the specialist’s training, the situation of possible emergency situations is simulated and the student is placed in conditions in which the personal qualities necessary for professional activity will be developed. The variety of forms for organizing educational activities in the conditions of digitalization will increase significantly, if they acquire a dynamic character (shift groups, spatially distributed training teams, various scenarios of rapid transition from group to individual activities and vice versa).

1. Introduction
Recently, the researches on the processes of informatization and digitalization of education have become especially relevant. Moreover, it should be noted that, currently, there is no clear understanding of their distinctive features among researchers. Digitalization is often tried to be revealed precisely through the informatization of education.

Informatization of education involves the introduction of electronic products, ICT (Information and Communications Technology), various information tools into the educational process, that is the use of information technologies for the formation and use of information resources, electronic document flow [1]. The main condition for successful teaching in the information and educational environment (IEE) is the mutual adaptation of subjects of the educational process to interaction in the IEE, when not only students adapt to new learning conditions, but the environment also takes into account students’ personal characteristics [2].

Digitalization is a challenge for education and contributes to the expansion and deepening of the educational process. Digital technologies in education are a way of organizing a modern educational environment based on digital technologies. It is connected with the fact that the requirements for students are changing in the modern world, who should have completely different skills: they need not only to
Digital technology is developing at a great speed, it is based on the representation of signals by discrete bands of analog levels, and not in the form of a continuous spectrum. All levels within the band represent the same signal state. Digital technologies are mainly used in computer digital electronics, especially computers, in various areas of electrical engineering, such as slot machines, robotics, automation, measuring devices, radio and telecommunication devices, and many others.

Higher education institutions are the basis for the development, testing and application of forms and methods of digital education, as well as for studying the individual and social consequences of digitalization.

Federal laws and regulations are the basis for initiating and implementing digital education. According to the regulations, the goal of digitalization of vocational education is to ensure a wide access to information and digital resources and the use of digital technologies in the educational process.

The purpose of the study is to provide theoretical justification and practical confirmation of the importance of using digital technologies in the training of rescuers in the field of fire safety.

The object of study is digital technologies in the professional training of specialists.

The subject of study is the process of using digital technologies in the professional training of specialists of leading universities.

2. Materials and methods

The system of training future specialists requires the application of innovative teaching methods. Today, the digital education platform is based on the following principles:

- unification and technology of digital educational products;
- micro-service architecture application;
- open platform and building developers’ ecosystem;
- interaction channels unification with digital educational products recipients;
- partnership for the joint development of the platform;
- mobile and paperless interaction;
- artificial intelligence and data fabrics application;
- digital laboratory for rapid development and modernization of digital educational products.

In the higher education system such forms of digital technologies introduction can be distinguished, as: electronic student ID card, electronic student’s record book, an electronic document on education, smart contracts and credit of academic disciplines studied in various online educational institutions.

Digitalization of specialists’ vocational training involves the implementation of the following tasks:

- improving teachers’ skills in the use of digital technologies in the educational process;
- introduction of digital technologies into the educational process;
- providing the collective use of digital resources and access to them in cloud resources;
- accumulation, systematization and dissemination of information on the use of digital and cloud technologies, etc.

The main feature of the digital transformation of education is that digital technologies help actually use new pedagogical practices (new models of organizing and conducting educational work) [4].

It should be noted that the training system of future fire safety specialists various training programs, electronic textbooks and simulation facilities have already been used. One of them is the mobile educational and training complex "Grot" (developers V.A. Grachov, M.A. Shurygin and D.V. Popovsky). The training complex is intended for practical training of gas and smoke protection
specialists for work in unsuitable for breathing environment with personal protective equipment (breathing apparatus) or without it under the circumstances, simulating a fire situation or an emergency.

Tasks of the training complex:

- improving practical working skills with fire equipment;
- increasing physical strength and psychological preparedness for actions under extreme conditions;
- improving conditions of gas and smoke protection specialists’ cardiovascular system;
- developing resistance to terminal exposure;
- improving professional skills on victims rescue work.

At the same time, the role of active and interactive forms and methods of training is growing. The role of long activities, homogeneous in structure, “passive” forms of educational work, such as a lecture, is noticeably being reduced. The role of pedagogical technologies based on students’ own activity, interactive communication, teamwork, group and individual reflection is growing. All these technologies make it possible for the student to form a set of social competencies necessary in the conditions of a digital society [5] (figure 1).

![Figure 1. Outline of the European Model of Digital Competencies for Education.](image)

Digital literacy is based on digital competencies:

- the ability to meet the diverse challenges of information and communication technologies (ICT);
- use and create content using digital technologies, including searching and sharing information, answering questions, interacting with other people;
- computer programming.

The European Commission, in its definition of digital competency as a part of the Action Plan for the Development of Digital Education (DEAP), stresses the importance of the conscious and responsible use of digital technology in teaching, at work, in public life.

Digitalization affects not only the content of education, but also its organization. The teacher turns from a medium of translated knowledge and skills into a navigator who helps navigate knowledge bases
Digital competence must include digital collaboration, security and problem solving. Digital literacy includes the personal, technical and intellectual (digital) skills that are needed to live in the digital world.

3. Findings and discussion
The modern learning process is characterized by rich technical means that increase the visibility of training, allow conveying complete and accurate information to cadets, developing and maintaining their activity and independence, performing monitoring and self-control, increase interest in classes, help perceive the studied material more specifically, allow creating various educational situations, reducing fatigue.

Today, in the universities where rescuers are being taught, a substantial material and technical base of the modern training system has been created. Technical training tools, multimedia and computer tools with training software products are used. Using computer programs, students simulate specialists’ actions in emergency situations, undergo trainings.

At the stage of the specialist’s training, the situation of possible emergency situations is simulated and the student is placed under conditions in which the personal qualities necessary for the professional activity will be developed.

For this, we also created a model of training cadets in the education process in order to interact effectively with the social environment in an operational setting. The main features are profound training in IT and modern computer technologies, individualization of the training process, the targeted specialists’ training for the information and public warning system, combining the training process with the implementation of research works [7].

In case of emergency, training of personnel is of a paramount importance. For example, when conducting command and staff training exercises (CSE) in specialized universities, the training process is aimed at the formation and development of professional qualities based on managerial, tactical psychological knowledge. The participants of the CSE are divided into groups: the expert group, the operational group of the training center on managing crisis situations, the aeromobile group of the Academy, the information department, etc. A certain task is set and each group should show its practical actions in this situation. Due to the ability to simulate different situations, the practical approach to the training process allows necessary developing practical skills and abilities among employees in order to make decisions in a specific environment.

A graduate must have an appropriate information culture, that is, be able to find, structure, interpret and use any kind of information.

4. Conclusions
During digitalization, the educational process is transformed in the direction of increasing the degree of structuring the educational activities. In this case, the following principle works: the complexity of forms and methods of training should be adequate to the complexity of the teaching tools used. The variety of forms of educational activities organization under the conditions of digitalization increases significantly, they acquire a dynamic character (shift groups, spatially distributed training teams, various scenarios of a quick transition from group to individual activities and vice versa) [8].

This significantly increases the pedagogical effectiveness of the educational process. For example, the role of long, homogeneous activities, "passive" forms of educational work, such as a lecture, is noticeably reduced. And the role of pedagogical technologies based on students’ own activity, interactive communication, teamwork, group and individual reflection is increasing. They have a complex structure and a certain internal scenario, such as students’ project work, in all its versions, game training technologies, case studies, group discussions and debates, etc. These technologies allow the cadets to form a complex of social competencies necessary under the conditions of digital society.

In general, the mastery of various kinds of competencies is the ultimate goal of the training process, determined in modern society by the employers’ needs [9]. Today, this request is determined by the requirements of a digital society based on such principles as: the preservation of digital national sovereignty; free access for each to digital assets; dominance of national digital technologies; a single
digital space; development of digital competencies of subjects; the development of new digital values with the preservation of traditional culture [10].

The system of vocational education should take into account the fundamental needs of the digital society and create conditions for the use of digital technologies in the educational process in order to form students' professional competencies.

References

[1] Il'in V D 1996 Bases of situational Informatization. Moscow, Bases of situational Informatization. (Moscow: Nauka, Fizmatlit Publ.) 180 p ISBN: 978-5-02-015213-7
[2] Toktarova V I and Fedorova S N 2019 Adaptation of students to studying in the university electronic educational environment Bulletin of the Mari state University, Yoshkar-Ola 13(3) 383-390 pp DOI: 10.30914 / 2072-6783-2019-13-3-383-390
[3] Nikulina T V and Starichenko E B 2018 Information and digital technologies in education: concepts, technologies, management Pedagogical Education in Russia 8 107-13
[4] Kozlova N S 2019 Digital technologies in education Bulletin of the Maikop state technological University 1(40) 83-91
[5] Sineva N L, Vagin D Yu and Islamova G I 2019 Study of trends, technologies and models for the development of digital skills Topical issues of the modern economy 4 https://www.elibrary.ru/item.asp?id=39212157
[6] 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 https://www.elibrary.ru/item.asp?id=32574155
[7] Eltemerov A A 2016 Information model of training cadets in the learning process for the purpose of effective managed interaction with the social environment in an operational environment. Master's thesis. (M: State Fire Academy of EMERCOM of Russia Publ.)
[8] Blinov V I, Dulinov M V, Esenina E Iu and Sergeev I S 2019 Project of the didactic concept of digital professional education and training (M: Pero publishing House)
[9] Fedorova S N and Vorontsova E M 2018 Formation of information and communication competence of future bachelors and masters (Yoshkar-Ola: Mari State University Publ. house)
[10] Ageev A I, Averianov M A, Evtushenko S N and Kochetova E Yu 2017 Digital society: architecture, principles, vision Economic Strategies 1 114-25