



## **THE ROLE OF DIGITAL TECHNOLOGIES IN THE DEVELOPMENT OF PROFESSIONAL COMPETENCE OF FUTURE TEACHERS**

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### **Abstract**

The article analyzes the importance of digital technologies as a necessary condition for the formation of the readiness of future teachers for methodological work, and also emphasizes the importance of paying special attention to the gradual introduction of information and communication technologies into the educational process and improving the system of training programmers in accordance with modern requirements.

**Keywords:** Continuous education, information, digital technologies, cloud technologies, artificial intelligence, digital educational resources, educational portals, website, competencies, knowledge, skills and qualifications.

### **Introduction**

Along with the comprehensive development of science and technology in the world, the use of digital technologies is actively included in the processes occurring in our daily lives. In particular, the informatization of the continuous education system practically brings its fruits for the educational process. As a result, the content of education is changing qualitatively, and the national education system is aimed at introducing and developing digital technologies in all types of activities, with much attention being paid to rationalizing the intellectual activities of future teachers through digital technologies. These changes serve to improve the theoretical and practical training of students, enhance their creative abilities, logical and cognitive thinking, develop professional competence, and improve the theoretical, methodological and methodological foundations for systematizing the educational process.

Also, in turn, there is a need to improve the teaching methods of disciplines related to programming languages. This is evidenced, in our opinion, by the fact that the Concept for the Development of the Higher Education System of the Republic of



Uzbekistan until 2030 identifies the following priority tasks: “Training highly qualified, creative and systemically thinking personnel capable of making independent decisions based on international standards.” Therefore, the improvement of the educational and organizational structure of classes in subjects related to programming languages in higher educational institutions and the development of an open information and educational environment, aimed at organizing independent educational activities of students on the subject of “Programming Languages”, is one of the pressing problems of our time [1,2,3].

### **Literature Analysis**

Research of scientific and theoretical foundations of the introduction of information technologies to improve the efficiency of teaching subjects in the system of continuous education, problems and solutions of using advanced pedagogical technologies to improve the efficiency of teaching are reflected in the works of our scientists U. Sh. Begimkulova[4], M. M. Abdurazakova [5], R. D. Shodieva [6] and others, and on theoretical, practical and scientific-pedagogical foundations of methodological training of future teachers – D. B. Sulaimanova [7], M. Kh. Lutfilaeva [8].

Research into the methods of teaching programming languages in higher education institutions and the problems of developing students’ programming competence were conducted by N.Sh.Turdiev[9], U.M.Mirsanov[10], F.J.Tohirov[11]. Methodology for training future specialists in the field of computer science, development of various didactic and electronic educational tools, mechanisms for developing teachers' competencies, theories and practices of introducing information technologies into the education system and introducing distance learning systems were developed by foreign scientists such as E.S. Polat [12], A.V. Ovcharov[13], I.V. Robert [14].

Despite the research conducted in the above-mentioned areas, methods for improving the efficiency of teaching subjects in the field of computer science, the introduction of digital technologies into the system of continuous education, the creation of information and educational resources in educational institutions, such scientific problems, such as the development of a modern methodological level of improving the methodological training of future teachers, determining the professional training of their students, studying the methodology for developing



competence in lesson design, have not been fully studied in scientific and theoretical terms.

### **Research Methodology**

As is known, in connection with the development of modern digital technologies, the profession of a programmer is one of the most popular and sought-after. With the help of specialists in this profession, it is possible to solve existing problems in the field of information technology and digitalize all spheres of society, as well as develop information and communication technologies.

According to L.V. Zemnukhova, the profession of a programmer will continue to occupy a leading position among professions in demand on the labor market for a long time. She notes that programmers develop software products that ensure successful interaction between humans and computers, and therefore provide an opportunity to implement and disseminate modern technologies in society [15].

Therefore, today it is necessary to pay special attention to improving the system of training programmers in accordance with modern requirements. To do this, it is necessary, first of all, to improve the system of training future computer science teachers.

Also, digitalization of educational and other system data entails the need to change the qualifications and skills of teachers, which will entail a change in the requirements for improving the level of knowledge of students, as well as the content, forms and methods of work of teachers at all levels - from schools to higher education institutions.

Therefore, the digitalization of education poses the task for higher education teachers, firstly, to prepare future teachers to improve the quality of their professional activities, and secondly, requires students to constantly improve their practical programming skills in various examples and tasks using programming languages, as well as prepare practical projects.

Analysis and results. Based on the analysis of scientific and methodological sources of our republic, CIS countries and foreign scientists on the topic of the study, as well as the current state of teaching in higher education institutions, a number of problems in teaching programming technologies in higher education institutions were identified. A conclusion was made about the need to solve the following tasks to eliminate these problems:



- “to create an information and educational environment for organizing lectures, practical and laboratory classes in programming languages, as well as to consistently and coherently form the content of didactic electronic educational resources for mobile phones and computers” [16];
- development of lesson plans based on the integration of advanced pedagogical technologies and electronic educational resources when organizing lectures, practical and laboratory classes in programming languages and posting them on the global network [17];
- “to place in the information and educational environment the necessary educational resources for students’ independent study of programming technologies, as well as a bank of examples and tasks aimed at developing their logical, creative abilities, cognitive thinking, and the formation and development of competence” [17];
- creation of an online system of independent self-assessment of students;
- experimentally test the proposed idea. If any problems arise during the test, eliminate them [17].

By completing such tasks, it is possible to increase the interest of future computer science teachers in programming in educational institutions and develop their competence in algorithmization and programming.

Thus, the pedagogical potential of the future teacher’s knowledge of digital technologies and prospects is determined by the development of the level of awareness of innovations, the acquisition of experience in using digital technologies, involving students in the practice of using digital technologies in the educational process, thereby increasing the personal level of digital competence of each student [18].

As is known, digital technologies often include technologies for designing management, business and administrative processes, since the design results usually involve the use of computers and electronic environments.

In general, according to their functional purpose, the following types of information technologies are distinguished: presentations, educational programs, electronic resources, virtual (experimental) systems, e-learning applications, electronic encyclopedias, etc.[19].

Thus, based on the above, as a means of forming the readiness of a future teacher of digital technologies for methodological work, we propose the following as the main classifications of the educational process:

- by intended purpose;
- by the systematic nature of educational resources;
- by the type of education;
- by the purpose of digital tools;
- by the nature of the impact on creative abilities;
- by the content of the information provided.

All this allows us to conclude that it allows not only to use new technologies in the learning process, but also to systematize and analyze knowledge and skills, and to form the information culture of students.

As a result of the analysis of scientific and methodological sources and online learning systems, information and educational environments and platforms related to programming, individual conceptual approaches, The forms and methods of programming presented in world educational practice, allowing the formation of modern trends in the field of teaching programming, changing its content, forms and methods, can be reduced to the following rules [20]:

- 1) it is necessary to use a project-based approach to form and develop students' creative abilities, cognitive thinking and programming competence;
- 2) it is advisable to develop mechanisms for collective work on various projects when teaching students programming. This will allow training specialists who are in demand in the modern labor market;
- 3) each laboratory work offered to students should be aimed at completing the result with practical tasks. This will significantly increase motivation for learning and development of research skills;
- 4) it is advisable to use graphic applications and virtual environments that simulate social interaction of students in the process of solving educational problems;
- 5) it is advisable to use the capabilities of an information and educational environment that ensures openness, multimedia, interactivity and group forms of learning in the process of teaching programming languages;
- 6) ensure a practical component and interest for students by including elements of robotics in programming language classes;



7) it is necessary to improve the system of implementing online programming courses for students based on projects for creating mobile applications. This will increase the interest and efficiency of students, as well as ensure the productivity of classes.

Thus, digital technologies emphasize that future specialists in the computerized world must be able to competently use computers in their professional activities, supplement the content and methodology of studying educational material in achieving educational goals, which increases their ability to enrich and systematize their educational experience.

## **Conclusion**

Thus, the factors that determine the need to build an educational process based on digital educational technologies are the following trends characterizing the formation of a digital society: digital economy and modern requirements for it; digital technologies that are formed and developed in the digital environment; formation of a digital environment.

Thus, a clear definition of learning outcomes allows us to predict the success of each student in their chosen field through educational material, identify the need to enrich the existing methodological system of the teacher's work, and identify trends in the development of the education system.

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