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DEVELOPMENT OF DIGITAL COMPETENCE IN STUDENTS THROUGH MODELING THE EDUCATIONAL PROCESS

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Abstract. *This article is devoted to the problem of developing digital competence in students through modeling the educational process. The theoretical foundations of digital competence, its significance in modern education, effective methods of modeling the educational process, and their role in the formation of digital skills in students are analyzed in detail. Within the framework of the study, existing regulatory legal acts and best foreign practices were studied, and practical recommendations for the development of digital competence were developed.*

Keywords: *education, modeling, educational model, digital competencies, digital competence of students.*

Introduction

Today, the field of IT education is of strategic importance in Uzbekistan. The country is reviewing and updating its education system in accordance with the development of digital technologies in the world. In this process, first of all, the formation of practical skills, the introduction of modern training programs that meet market requirements, and the attraction of qualified specialists are of great importance.

In the Decree of the President of the Republic of Uzbekistan dated October 6, 2020, No. DP-6079, “On Approving the Strategy Digital Uzbekistan – 2030 and Measures for its Effective Implementation” [1], and dated April 29, 2019, No. DP-5712, “On Approving the Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030” [2], the introduction of digital technologies in the field of education and increasing the digital literacy of students are defined as priority tasks. This necessitates the adaptation of the educational process to modern requirements, in particular, the development of digital competence in students through its modeling. To achieve these goals, the Republic of Uzbekistan is making serious investments in the field of IT education – new universities and technology parks are being created, programs based on international standards are being introduced, and international cooperation is expanding. At the same time, projects are being implemented aimed at increasing digital literacy from school age, teaching the basics of programming, and developing innovative thinking.

Digital competence includes not only the skills of searching, processing, and transmitting information, but also the ability to think critically, solve problems, take a creative approach, and ensure security in the digital environment [3]. The modern education system should equip students not only with theoretical knowledge but also with practical skills that prepare them for future professions, including digital competence. Therefore, the development of this competence through the modeling of the educational process is a relevant scientific and practical problem.

Literature review

The concept of digital competence and its significance in education have been studied by many foreign and domestic researchers. A. Leshchenko and his colleagues analyzed the

possibilities of modeling education through educational process management systems (LMS) and their effectiveness of educational quality [4]. These models allow students to acquire knowledge through interactive methods and serve to develop their skills in using digital technologies.

Another researcher, A. Ferrari, considers digital competence in the context of the European Union and divides it into five main areas. These are information literacy, communication, content creation, security, and problem-solving. The integration of these models into the educational process is of fundamental importance for the formation of complex digital skills in students [5].

One of the Uzbek researchers, O. Fotina, focused on the role of teachers in the formation of digital competence and issues of improving their qualifications. In his view, it is difficult for teachers to develop this competence in students without having sufficient digital skills themselves [6]. Also, A. Khushvaktov conducted scientific research on improving digital competence through the use of innovative technologies in education [7]. Such research will become the basis for expanding the theoretical and practical aspects of modeling the educational process.

Research methodology

In the research work, such research methods as a systematic approach, comparative analysis, synthesis, modeling, pedagogical observation, and questionnaires were used. The following stages were identified as the main direction for modeling the educational process: 1) Identification and analysis of the problem (identifying the existing level of digital competence in students and analyzing the factors hindering its development; 2) Defining goals and objectives (development of specific goals and objectives for the formation of digital competence); 3) Design of an educational model (development of a model of the educational process aimed at developing digital competence, which involves the use of interactive teaching methods, project-based learning, distance learning platforms, and virtual simulations); 4) Application and evaluation of the educational model in practice (changes in students' digital skills, the level of motivation, and assimilation indicators are assessed).

Results

As a result of the study, the following model of the educational process aimed at developing digital competence in students was developed (Figure 1). Each component of the model is aimed at developing various aspects of digital competence in students. For example, project-based learning allows students to solve real-life problems using digital tools. Virtual simulations help reinforce their practical skills in a safe environment. In order to determine the level of effectiveness of the proposed model within the framework of scientific research, an experimental-testing process is organized. 150 students of the 9th and 10th grades of specialized schools of the Tashkent, Kashkadarya, and Syrdarya regions, under the jurisdiction of the Ministry of Preschool and School Education of the Republic of Uzbekistan, were involved in the experimental work in 2024-2025.

The experimental work was carried out in three stages: substantiating (determination of experimental sites; determination of the number of respondents; formation of experimental and control groups; organization of experimental work; development of a program of experimental work), educational (establishment of experimental work; preliminary examination of the effectiveness of the developed methodology; enrichment of the content of lecture texts, practical and laboratory assignments to improve the existing methodological support based on the results of the experiment) and clarifying (during the experimental work, the results of training using the educational model were summarized, the obtained conclusions were tested practically, and these results were analyzed using the Student-Fisher T-criterion mathematical-statistical method).

As a result of the conducted experimental work, it was established that the implementation of this model significantly (15%) increases the level of students' digital competence. According to the results of questionnaires and tests, the skills of students in the experimental group in searching and processing information, creating digital content, communicating online, and complying with cybersecurity rules showed a higher result compared to the control group.

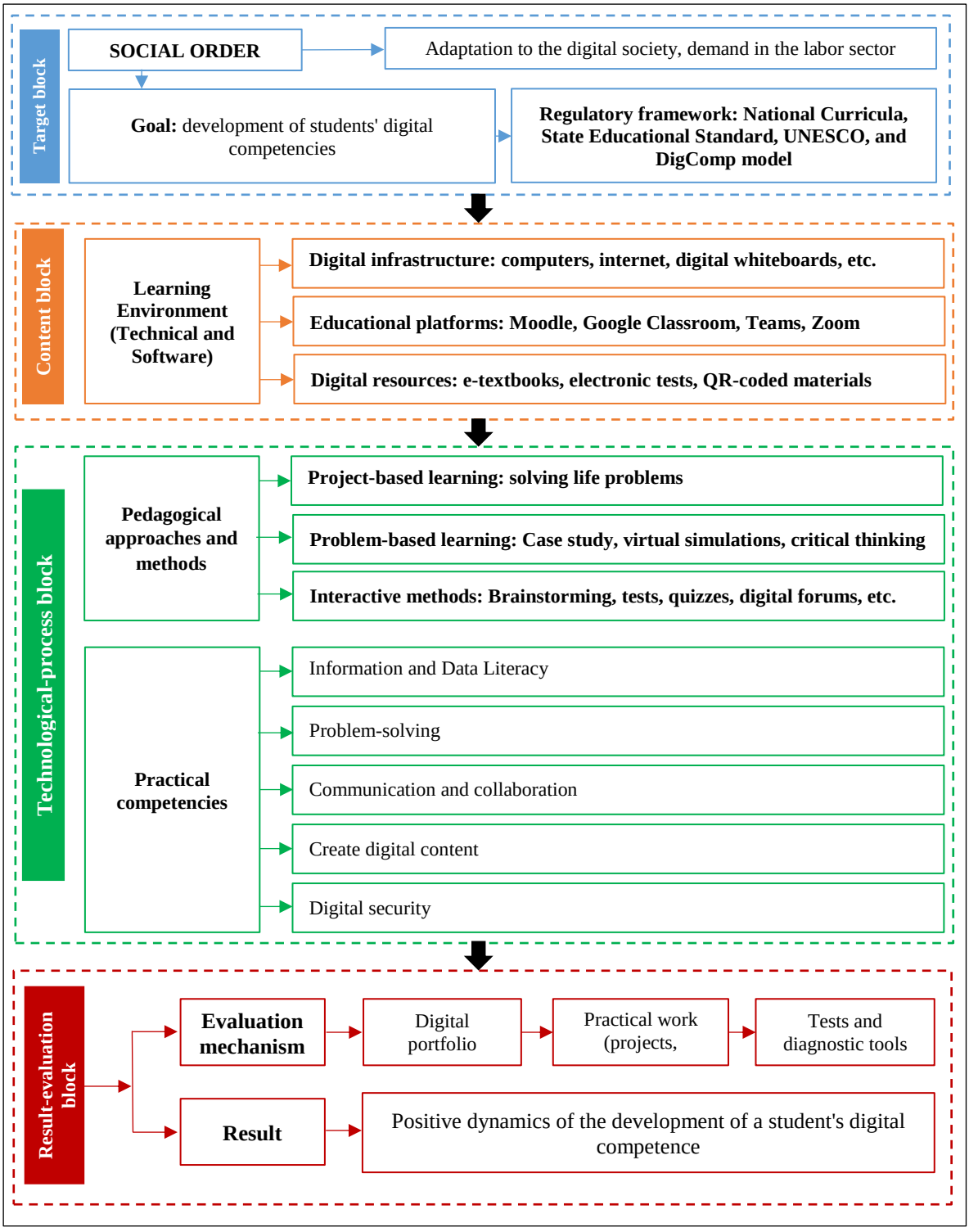

Figure 1. Model of the educational process aimed at developing students' digital competence

Discussion

The research results show that systematic modeling of the educational process can be an effective solution in the formation of digital competence in students. This conclusion is consistent

with the advanced ideas of M. Gruzdeva's (2018) research "Digital Technologies as a Factor in the Transformation of the Educational Process." It emphasizes that the effectiveness of the educational process can be increased through the digitalization of all educational processes [8].

At the same time, modeling the educational process requires not only the introduction of technical means but also the revision of pedagogical approaches. For example, the use of problem-based learning, project-based learning, and interactive methods instead of traditional teaching methods increases student engagement and helps them develop digital skills more effectively. This also aligns with the cooperative learning concepts of D. Johnson and R. Johnson, which emphasize the importance of developing students' knowledge and skills through collaborative activities [9].

Another important aspect is that for the implementation of this model, it is necessary to improve the qualifications of teaching staff and equip them with digital skills. If teachers themselves cannot move freely in the digital environment, they will not be able to adequately prepare students in this area. In this case, the tasks defined in the decisions and decrees adopted by the state, in particular, systematic work to improve the ICT literacy of professors and teachers, are of great importance.

Conclusion

The development of digital competence in students through the modeling of the educational process is one of the urgent issues of modern education. The developed model allows students to systematically develop digital skills such as information literacy, communication, content creation, security, and problem solving. The research results show that it is possible to significantly increase students' digital competence by introducing interactive and project-based methods into the educational process, using modern digital platforms, and improving the qualifications of teaching staff. This, in turn, will make an important contribution to the implementation of the tasks within the framework of the “Digital Uzbekistan – 2030” strategy and the building of a digital society.

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