PEDAGOGICAL FOUNDATIONS OF PROFESSIONAL TRAINING OF FUTURE PRIMARY SCHOOL TEACHERS IN THE CONDITIONS OF DIGITAL EDUCATION

Ibrokhimova Gulnoza Sadullayevna
Doctoral student of Kokand University

ARTICLE INFO

Received: 04th May 2026
Accepted: 06th May 2026
Online: 08th May 2026

KEYWORDS

digital education, primary education, future teachers, digital competencies, ICT, virtual learning, pedagogical training, multimedia technologies, artificial intelligence, innovative pedagogy

ABSTRACT

This article discusses the pedagogical foundations of the professional training of future primary school teachers in the context of digital education. The study emphasizes the importance of developing digital competencies, using ICT-based technologies, and integrating electronic resources, multimedia tools, and artificial intelligence into the educational process. The role of digital education in enhancing interactive learning, independent study, creative thinking, and professional development is also highlighted.

The process of digitalization is transforming the content of pedagogical activity and teaching methods within the education system. The expanding use of digital platforms, electronic resources, interactive tools, and artificial intelligence technologies in the educational process requires future teachers to possess competencies related to effective professional activity in a digital educational environment. The professional preparation of teachers at the primary education stage is of particular importance, as this stage serves as a fundamental basis for shaping pupils' subsequent learning activities and independent learning skills.

Today, the virtual environment is interpreted not merely as a set of technological tools, but also as a system that individualizes the educational process and ensures interactive collaboration. Consequently, preparing future primary school teachers for ICT-based professional activity has become one of the pressing issues of contemporary pedagogy. Alongside the ability to use digital tools effectively, teachers are also expected to integrate them purposefully into the educational process and apply innovative methods in pedagogical practice. Digital transformation intensifies the need to modernize the content of teacher education and to integrate advanced technologies into the professional training system. In particular, the ability of primary school teachers to carry out effective pedagogical activity plays a significant role in ensuring the high-quality formation of pupils' initial knowledge, skills, and competencies.

Digital education is regarded as an integrated didactic system based on information and communication technologies that ensures collaboration among educational participants and serves the continuity, flexibility, and individualization of the educational process. By organizing educational activity on an interactive basis, it enables the visualization of learning

materials, individualized instruction, and the support of independent learning activities through electronic platforms, multimedia tools, and elements of artificial intelligence [2;5]. In addition to traditional methodological knowledge, future primary school teachers are expected to possess competencies related to the effective pedagogical use of digital platforms and electronic resources for instructional purposes.

The digital competencies that should be developed in teachers encompass the ability to organize the educational process effectively, enrich educational content through electronic tools, and establish interactive collaboration with learners [1;2]. These competencies include skills related to searching for and analyzing information, creating electronic educational resources, working with digital platforms, organizing distance learning, and complying with digital security requirements [3; 5]. In primary education pedagogy, the use of electronic didactic materials and multimedia tools plays an important role in enhancing pupils' cognitive activity, interest, and learning motivation. Furthermore, future teachers should also possess competencies associated with virtual communication culture, creative thinking, and the ability to adapt to emerging technologies [4;6].

The integration of modern technologies into the process of teacher training is considered one of the key directions in the modernization of the higher education system, as the use of blended learning, electronic resources, and virtual platforms makes it possible to combine teachers' theoretical knowledge with practical activity [2;4]. On the basis of innovative approaches, future teachers are prepared to develop electronic lesson materials, utilize multimedia tools, organize virtual classroom activities, and work with electronic assessment systems [1;5]. Systems equipped with electronic platforms and elements of artificial intelligence expand opportunities for supporting teachers' independent learning activities, monitoring the dynamics of individual development, and recommending appropriate educational resources. At the same time, they contribute to the formation of innovative approaches oriented toward creative thinking, reflection, and continuous professional development among teachers.

The methodology of using digital platforms, interactive tools, and artificial intelligence technologies represents one of the innovative directions of contemporary pedagogical activity. Electronic platforms make it possible to systematically organize educational materials, manage the instructional process, and establish interactive communication with learners, while interactive tools enhance pupils' cognitive interest and classroom engagement [1;4]. In primary education, the use of electronic assignments, multimedia applications, and didactic games serves as an important didactic instrument for presenting educational materials in an engaging and accessible form, as well as for developing pupils' logical thinking and creative activity [2;5].

Artificial intelligence technologies expand opportunities for monitoring pupils' levels of knowledge, identifying their individual needs, and organizing the educational process on an adaptive basis. In doing so, they strengthen differentiated approaches, increase the effectiveness of instruction, and contribute to the development of future teachers' competencies related to analytical thinking and innovative decision-making [3;6].

Virtual education is increasingly emerging as a modern educational space that provides broad opportunities for the development of students' independent learning activities. At

present, the advancement of electronic libraries, distance learning systems, and multimedia resources enables the pedagogical process to continue uninterrupted beyond the traditional classroom environment, while also supporting teachers in acquiring knowledge independently, analyzing information, and continuously improving their professional competencies. In particular, independently organized learning activities conducted within a virtual environment contribute to the development of such important professional qualities in teachers as self-management, activity planning, and the formation of individual development strategies [1;3].

The communicative and collaboration-based opportunities of the information and educational system also occupy an important place in enhancing the professional activity of future teachers. Through ICT platforms, students are increasingly able to participate actively in various scientific seminars, virtual discussions, online training sessions, and methodological forums. Such opportunities contribute to broadening their professional outlook, studying innovative pedagogical experiences, and increasing their adaptability to contemporary educational trends. Moreover, these technologies support the development of teachers' teamwork skills, the implementation of educational projects based on electronic collaboration, and the formation of a professional communication culture [2;5].

It also creates favorable conditions for the development of primary school teachers' creative and innovative professional activity. The processes of developing electronic resources, utilizing multimedia tools, creating virtual lesson models, and working on educational projects stimulate the creative thinking of future teachers. Through digital education, opportunities for analyzing the outcomes of pedagogical activity, engaging in self-improvement, and developing a reflective approach are steadily expanding. As a result, these processes strengthen future teachers' professional independence, enhance their pedagogical initiative, and prepare them for innovative professional activity [4;6].

References:

1.Адольф В.А., Крупецких И.Р. Особенности развития цифровой компетенции педагогов в условиях цифровой образовательной среды // Человеческий капитал. – 2024. – № 11(191). – С. 173-181.
2.Arstorp A.-T., Olofsson A.D., Lindberg J.O. Professional digital competence in teacher education – where are we, where are we headed and how to get there? // Teachers and Teaching. – 2024. – Т. 30. – № 4. – P. 395-399.
3.De la Calle A.M., Pacheco-Costa A., Gómez-Ruiz M.Á., Guzmán-Simón F. Understanding teacher digital competence in the framework of social sustainability: a systematic review // Sustainability. – 2021. – Т. 13. – № 23. – 13283.
4.Ibrokhimova G. Formation of Key Competencies of a Teacher as a Condition for Improving the Quality of Education // Development of Pedagogical Technologies in Modern Sciences. – 2025. – Vol. 4. – № 6. – P. 68-71.
5.Köstler V., Wolff M.-S. Promoting digital competencies in pre-service teachers: the impact of integrative learning opportunities // Education Sciences. – 2025. – Т. 15. – № 3. – 337.
6.Nagel I. Digital competence in teacher education curricula: what should teacher educators know, be aware of and prepare students for? // Nordic Journal of Comparative and International Education. – 2021. – Т. 5. – № 4. 104-122.

7.Tomczyk Ł. Digital competence among pre-service teachers: a global perspective on curriculum change as viewed by experts from 33 countries // Evaluation and Program Planning. – 2024. – T. 105. – 102449.