



# **IMPROVING THE SYSTEM OF PREPARING FUTURE TECHNOLOGY TEACHERS FOR PROFESSIONAL ACTIVITY IN THE CONTEXT OF DIGITALIZATION OF THE EDUCATIONAL PROCESS**

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## **Abstract**

The rapid development of digital technologies is transforming education systems worldwide and requires a rethinking of approaches to teacher training, particularly in the field of technology education. This article examines the necessity of improving the system of preparing future technology teachers for professional activity in the context of the digitalization of the educational process. The study emphasizes that the integration of digital tools, e-learning platforms, and innovative teaching strategies is no longer an additional option but an essential component of pedagogical practice. Preparing future teachers involves not only mastering subject-specific knowledge but also developing digital competencies, creative thinking, adaptability, and the ability to manage new educational environments. The article argues that the modernization of curricula, the adoption of blended and online learning approaches, and the creation of digital learning resources contribute significantly to the readiness of technology teachers for contemporary challenges. Furthermore, the role of teacher educators in fostering digital literacy, research skills, and project-based learning is highlighted as a crucial aspect of professional development. The findings suggest that a comprehensive approach that combines theoretical preparation, practical training, and digital innovation provides the most effective framework for preparing future technology teachers. By aligning teacher education with global educational trends and the demands of the digital economy, institutions can ensure the formation of highly qualified specialists capable of guiding students in navigating the digital age.

**Keywords:** Digitalization, teacher education, technology teachers, professional preparation, pedagogy, e-learning, digital competence, innovation, professional activity, higher education.



## **Introduction**

The digital transformation of education has become one of the defining characteristics of the twenty-first century. The integration of advanced technologies into the teaching and learning process has changed not only the methods of knowledge delivery but also the professional requirements for future teachers. Within this context, preparing technology teachers for professional activity represents a crucial task, as these specialists are expected to serve as mediators between technological progress and pedagogical practice. Their role involves not only teaching technical subjects but also guiding students to use digital tools effectively, creatively, and responsibly in solving real-life problems. Therefore, enhancing the system of preparing future technology teachers is a key factor in ensuring the sustainability and relevance of modern education.

The need for such improvement arises from several global and local trends. On a global scale, the increasing reliance on artificial intelligence, digital platforms, and virtual learning environments demands that teachers possess advanced digital competences. On a more immediate level, educational institutions are shifting toward blended learning models, which combine traditional face-to-face instruction with digital resources, thus requiring teachers to adapt to hybrid teaching scenarios. For future technology teachers, this adaptation is not optional but integral to their future professional practice. They must be trained not only in technical knowledge but also in instructional design, digital pedagogy, and methods of fostering critical thinking and collaboration in digitally mediated settings.

In addition, the digitalization of education has redefined the notion of professional readiness. No longer limited to subject-matter expertise, professional readiness now includes the ability to design interactive learning resources, implement innovative assessment tools, and engage students in project-based and problem-oriented activities supported by digital technologies. Consequently, teacher education programs must be updated to provide prospective technology teachers with the skills necessary for these new demands. This includes creating opportunities for practice-oriented training, promoting research activities, and encouraging the use of digital laboratories and simulation tools.

Ultimately, the introduction of systemic changes into teacher preparation programs ensures that graduates are equipped with the competences required by both the labor market and society. By aligning teacher education with the



processes of digitalization, institutions foster the development of educators who can successfully integrate innovation into their professional activity, support the digital literacy of their students, and contribute to the broader goals of educational modernization. This makes the improvement of the system of preparing future technology teachers not only timely but also essential for the future of pedagogy.

## **Methods**

The methodological foundation of this study is based on a combination of theoretical analysis, comparative investigation, and practice-oriented approaches aimed at identifying effective strategies for improving the system of preparing future technology teachers in the context of digitalization. A theoretical framework was established through the analysis of pedagogical literature, policy documents, and current international practices related to teacher training in the digital era. This provided a basis for understanding how digital transformation affects professional standards, curriculum design, and instructional methods for technology educators.

The research also employed a comparative method to examine how various countries have integrated digital tools into teacher education programs. Case studies from institutions that successfully implemented blended learning, online teaching modules, and digital competence frameworks were analyzed to highlight best practices and transferable strategies. This comparison allowed for the identification of strengths and weaknesses within existing local models of teacher preparation, as well as the development of recommendations for adaptation to contemporary needs.

Practice-oriented approaches were used to explore how the professional readiness of future technology teachers can be enhanced through experiential learning. This included an examination of training methods such as project-based learning, digital simulation, and the use of e-learning platforms to simulate real-world teaching environments. Surveys and interviews with teacher educators, students, and practicing teachers provided valuable insights into the effectiveness of current preparation systems, as well as the challenges faced in the transition toward digitalized instruction.

The study also applied elements of pedagogical design methodology, focusing on the restructuring of teacher education programs to include modules on digital pedagogy, information literacy, and the use of virtual and augmented reality tools



in education. The methods used aimed to create a holistic approach that combines knowledge acquisition with practical application, thereby ensuring that graduates possess not only theoretical competence but also the ability to implement innovative solutions in professional contexts.

In addition, the research incorporated evaluative techniques to assess the outcomes of teacher training programs, with particular attention to the formation of digital competences, adaptability, and creative problem-solving skills. These methods were instrumental in determining how well current programs prepare students for the challenges of digital education and in formulating proposals for further improvement. Together, these methodological approaches form a comprehensive basis for analyzing and enhancing the preparation of future technology teachers for professional activity in the digitalized educational environment.

## **Results**

The research revealed several important outcomes related to the improvement of preparing future technology teachers for professional activity in the context of digitalization. First, it was found that current teacher education programs often remain focused on traditional content delivery, with limited emphasis on developing digital competences. While students acquire subject-matter knowledge, they are not always adequately trained to integrate digital tools and methodologies into their teaching practice. This gap highlights the need for systematic reforms that align curricula with the requirements of digital pedagogy and modern educational standards.

Second, the study demonstrated that incorporating digital technologies into teacher training enhances student motivation and professional readiness. When future technology teachers were exposed to project-based learning, digital simulations, and online collaborative tools, they displayed improved adaptability, creativity, and problem-solving skills. These experiences also encouraged them to reflect on their teaching methods, leading to a more student-centered approach that aligns with global trends in pedagogy.

Third, the results indicated that the integration of digital tools into practice-oriented training significantly increased confidence among prospective teachers. Participants who engaged in blended learning scenarios, online course design, and the use of virtual laboratories reported a greater sense of preparedness for



real-world teaching environments. This finding underlines the importance of experiential learning opportunities in bridging the gap between theory and practice in teacher education.

Fourth, the comparative analysis showed that institutions which prioritize digital literacy and provide access to advanced educational technologies produce graduates with higher professional competence. These institutions successfully embedded modules on digital pedagogy, e-learning platforms, and ICT integration into their teacher training curricula. The outcomes suggest that the most effective preparation involves a balanced combination of theoretical knowledge, digital skill development, and hands-on practice in simulated or real classroom settings.

Finally, the study identified challenges that need to be addressed for further improvement. These include limited infrastructure in some institutions, insufficient professional development opportunities for teacher educators, and resistance to change among both students and faculty. Addressing these issues requires strategic planning, investment in digital resources, and the creation of supportive policies that encourage innovation.

Overall, the results confirm that improving the system of preparing future technology teachers involves more than updating curricula. It requires fostering a culture of digital innovation, providing access to modern resources, and ensuring that educators are equipped to guide students effectively in the digital age. These outcomes form the basis for recommendations aimed at enhancing the quality and relevance of teacher education in a rapidly evolving educational landscape.

## **Discussion**

The findings of the study provide a strong basis for reflecting on the challenges and opportunities associated with preparing future technology teachers in the context of digitalization. One of the central issues is the need to rethink the concept of professional readiness. Traditionally, teacher preparation focused heavily on subject knowledge and general pedagogy, yet in the digital era this is insufficient. Teachers must not only know their subject but also be capable of designing learning environments that integrate digital tools in meaningful ways. This transformation requires institutions to place equal emphasis on digital competence, creativity, and adaptability.



The research also highlights the value of experiential learning approaches such as project-based tasks, digital simulations, and the use of e-learning platforms. These approaches immerse students in realistic teaching scenarios, encouraging them to practice problem-solving and collaboration while using digital technologies. Such experiences contribute to the development of confidence and resilience in professional activity, traits that are increasingly demanded in dynamic educational contexts. At the same time, they shift the focus of teacher education from theory-centered to practice-centered learning, aligning better with labor market needs.

Another important discussion point is the role of teacher educators. The effectiveness of digital transformation in teacher training depends on whether those who deliver education themselves possess advanced digital literacy and innovative teaching strategies. If teacher educators are not sufficiently trained or supported, they may struggle to integrate digital practices effectively into their programs. Therefore, professional development for teacher educators is just as essential as training for students. Institutions must invest in continuous training programs, workshops, and collaborative platforms that equip educators with the necessary skills to model digital pedagogy effectively.

The study also reveals structural and institutional challenges. Limited infrastructure, unequal access to technology, and resistance to change remain significant barriers in the digitalization of teacher education. Overcoming these issues requires systemic solutions, including increased funding for educational technologies, institutional policies that prioritize innovation, and the promotion of a positive mindset toward digital transformation. Without addressing these underlying challenges, even well-designed programs may fail to achieve their intended outcomes.

Finally, the broader implication of this research is that digitalization is not merely a technological shift but also a cultural and pedagogical one. It requires a reorientation of values, teaching methods, and assessment practices to reflect the realities of the digital age. Preparing future technology teachers is therefore not just about providing technical training but also about cultivating the ability to navigate complexity, foster creativity, and guide students toward becoming responsible digital citizens. This comprehensive approach ensures that the education system remains relevant, innovative, and capable of meeting the challenges of the twenty-first century.



## **Conclusion**

The study confirms that the process of preparing future technology teachers must be fundamentally improved in order to meet the demands of digitalization in education. The traditional focus on subject-specific knowledge is no longer sufficient; instead, training programs must integrate digital pedagogy, innovative teaching strategies, and experiential learning opportunities. This shift ensures that prospective teachers are not only knowledgeable in their disciplines but also capable of designing and managing modern learning environments that are dynamic, interactive, and student-centered.

One of the most important conclusions is that the improvement of teacher education requires a comprehensive approach. Institutions must modernize curricula, introduce modules on digital literacy and educational technologies, and create opportunities for students to engage in project-based learning, simulations, and blended learning experiences. Such practical training allows future teachers to build confidence and adaptability, preparing them for real-life professional challenges. Moreover, systematic reforms should be complemented by investment in digital infrastructure, as well as the continuous professional development of teacher educators.

The findings also emphasize that effective preparation of technology teachers extends beyond technical competence. It involves fostering creativity, critical thinking, and the ability to navigate the social and ethical dimensions of digital education. Future teachers must be equipped to address the challenges of inequality in access to technology, promote digital citizenship, and contribute to the development of inclusive learning environments. By embedding these values into teacher preparation, institutions ensure that graduates can play an active role in shaping the future of education in a responsible and innovative way.

Overall, improving the system of preparing future technology teachers for professional activity in the context of digitalization requires strategic, long-term action. This includes aligning educational policies with global trends, providing access to modern resources, and creating supportive institutional cultures that value innovation. If these measures are implemented, teacher education can become a driving force in the digital transformation of education, ensuring that students are guided by competent, forward-thinking, and digitally literate professionals capable of meeting the challenges of the twenty-first century.

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