ISSN:3030-332X
Impact factor: 9,493
International journal of scientific researchers

DEVELOPING TEACHERS' PROFESSIONAL COMPETENCIES THROUGH ARTIFICIAL INTELLIGENCE AND DIGITAL EDUCATIONAL TECHNOLOGIES

Ferangiz Qodirova Himmatilla kizi
Uzbekistan state world languages university
kodirovaFerangiz24@gmail.com

Dr. Ahmad Juma Khatib
Gunadarma universitas (Indonesia)

Abstract

The rapid development of digital technologies and artificial intelligence (AI) has significantly transformed contemporary educational systems. These innovations have reshaped teaching methodologies, learning environments, and professional requirements for educators. Consequently, the development of teachers' professional competencies has become a strategic priority in higher education and teacher training programs. This article examines the role of artificial intelligence and digital educational technologies in enhancing teachers' professional competencies. Using a qualitative research approach based on literature analysis and conceptual review, the study explores key dimensions of digital competence, AI integration in education, and the challenges associated with technological transformation. The findings indicate that AI-powered educational tools contribute to instructional effectiveness, personalized learning, professional development, and educational quality. The study concludes that continuous development of teachers' digital and AI-related competencies is essential for ensuring educational innovation and sustainability in the digital age.

Key words: artificial intelligence, digital education, teacher competencies, digital competence, professional development, educational technologies, digital pedagogy, higher education, AI in education, teacher training.

Introduction

The twenty-first century has witnessed unprecedented technological advancement, fundamentally changing the ways knowledge is created, disseminated, and acquired. The emergence of digital educational technologies and artificial intelligence has accelerated educational transformation across the globe, creating new opportunities and challenges for educational institutions and teachers. As education increasingly shifts toward technology-enhanced learning environments, the professional competencies required of teachers have expanded beyond traditional pedagogical knowledge. Modern educators are expected to effectively integrate digital technologies into instructional processes, facilitate online and blended learning, utilize data-driven decision-making, and adapt to rapidly evolving technological innovations. In particular, artificial intelligence technologies such as ChatGPT, Gemini, Microsoft Copilot, adaptive learning systems, and intelligent tutoring platforms have introduced new possibilities for personalized instruction, automated assessment, and educational content generation.

This article aims to examine the role of artificial intelligence and digital educational technologies in developing teachers' professional competencies and to identify strategies for effective implementation within modern educational contexts.

Results and Discussion

Digital competence has become one of the most essential professional competencies for modern educators. According to the European Digital Competence Framework for Educators (DigCompEdu), digital competence involves the confident, critical, and responsible use of digital technologies for teaching, learning, assessment, communication, and professional development. The findings indicate that teachers with advanced digital competencies demonstrate greater instructional flexibility and effectiveness. They are capable of integrating multimedia resources, online learning platforms, collaborative technologies, and digital assessment tools into educational practice. Furthermore, digital competence enables educators to create engaging learning environments that support student-centered

instruction and active learning. In higher education settings, digital competence contributes to improved curriculum design, enhanced communication with students, and more efficient management of educational resources. As digital technologies continue to evolve, the importance of ongoing professional development becomes increasingly apparent.

Artificial intelligence technologies are transforming educational processes by automating routine tasks and providing data-driven support for instructional decision-making. AI-powered tools assist teachers in generating lesson plans, creating educational materials, designing assessments, and analyzing student performance. One of the most significant contributions of AI is its ability to support personalized learning. Intelligent systems can analyze learners' needs, identify knowledge gaps, and recommend customized learning pathways. This enables teachers to provide differentiated instruction and address individual learning preferences more effectively.

Additionally, generative AI applications such as ChatGPT and Gemini facilitate content creation, language learning support, and academic writing assistance. These technologies allow educators to save time on administrative tasks and focus more on pedagogical interactions and student engagement. The study also reveals that AI can support teachers' professional learning by providing access to educational resources, instructional recommendations, and real-time feedback. Through continuous interaction with AI systems, educators can enhance their pedagogical knowledge and technological proficiency.

Challenges of AI Integration in Education. Despite its potential benefits, the implementation of artificial intelligence in education presents several challenges.

Ethical Concerns. The use of AI-generated content raises questions regarding academic integrity, authorship, and responsible technology use. Educational institutions must establish clear guidelines for ethical AI implementation.

Data Privacy and Security. AI systems often require access to user data for effective functioning. Protecting personal information and ensuring compliance with data protection regulations remain critical concerns. Addressing these challenges requires comprehensive institutional policies, continuous professional development programs, and strategic investment in digital infrastructure.

Strategies for Developing Teachers' Professional Competencies. To maximize the benefits of digital technologies and artificial intelligence, educational institutions should implement systematic approaches to teacher professional development.

The following strategies are recommended: Integrating AI literacy into teacher education curricula, providing regular professional development workshops and training programs, encouraging participation in digital learning communities, promoting ethical and responsible use of AI technologies, supporting innovation through collaborative projects and research initiatives, establishing institutional frameworks for digital transformation. These measures can contribute to the development of adaptable, innovative, and digitally competent educators capable of meeting contemporary educational demands.

Conclusion

The digital transformation of education has fundamentally altered the professional requirements of teachers. Artificial intelligence and digital educational technologies have become powerful tools for enhancing instructional quality, supporting personalized learning, and facilitating professional growth. As educational systems continue to evolve, the development of teachers' professional competencies must remain a central priority. The findings of this study demonstrate that digital competence and AI literacy are essential components of modern teacher professionalism. Educators who effectively integrate digital technologies into their practice are better equipped to respond to changing educational needs and foster meaningful learning experiences.

However, successful implementation requires careful attention to ethical considerations, data privacy, technological accessibility, and continuous professional development. Educational institutions should therefore adopt comprehensive strategies that support teachers in developing the competencies necessary for effective participation in digital learning environments. Future research should focus on empirical investigations of the relationship between AI-assisted teaching practices and educational outcomes across diverse educational contexts.

References

1. European Commission. (2022). *The Digital Competence Framework for Educators (DigCompEdu)*. Luxembourg: Publications Office of the European Union.
2. Falloon, G. (2020). From Digital Literacy to Digital Competence: The Teacher Digital Competency Framework. *Educational Technology Research and Development*, 68(5), 2449–2472.
3. Holmes, W., Bialik, M., & Fadel, C. (2022). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Boston: Center for Curriculum Redesign.
4. Isakulova, B. K. (2024). DEVELOPING LEADERSHIP SKILLS IN THE EDUCATIONAL PROCESS OF MANAGEMENT SYSTEMS. GOLDEN BRAIN, 2(21), 188–192. https://doi.org/10.5281/zenodo.14252113
5. UNESCO. (2023). *Guidance for Generative AI in Education and Research*. Paris: UNESCO Publishing.
6. Voogt, J., Fisser, P., Roblin, N., Tondeur, J., & Van Braak, J. (2020). Technological Pedagogical Content Knowledge: A Review of the Literature. *Journal of Computer Assisted Learning*, 36(1), 109–121.
7. Isakulova, B. K. (2024). ROLE OF LEADERSHIP STYLE IN TEACHING PROCESS. GOLDEN BRAIN, 2(1), 615–619. https://doi.org/10.5281/zenodo.10466856
8. UNESCO. (2024). *Global Education Monitoring Report 2024: Technology and Education*. Paris: UNESCO Publishing.