

Developing Future Teachers' Competence In Creating Digital Educational Resources

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Abstract: This research focuses on the theoretical and methodological foundations for developing future teachers' competence in creating digital educational resources. In modern education, the effective use of digital technologies, e-learning tools, and web platforms has become an essential component of a teacher's professional competence. Therefore, forming the skills of designing, developing, and implementing digital educational resources during teacher training is considered a pressing issue. The study analyzes the types of digital educational resources, the stages of their development, didactic requirements, and pedagogical potential. It also substantiates the methods, tools, and technologies that contribute to the development of this competence in future teachers. The research findings are significant for improving the teacher training system and introducing innovative approaches into the educational process.

Keywords: Digital educational resources, competence, future teacher, pedagogical technologies, e-learning tools, web platforms, digital didactics, educational process, innovative approach.

Introduction: The rapid development of digital technologies has significantly transformed the educational landscape, reshaping the ways knowledge is delivered, accessed, and constructed. Modern education is increasingly characterized by the integration of digital tools, interactive platforms, and multimedia resources that enhance teaching and learning processes. In this context, the role of the teacher is no longer limited to the transmission of knowledge but extends to the design, creation, and effective use of digital educational resources. As a result, developing future teachers' competence in creating digital educational resources has become an essential objective of contemporary teacher education programs.

Digital educational resources include electronic textbooks, multimedia presentations, interactive assignments, online assessments, video lessons, virtual simulations, and web-based learning materials. These resources contribute to improving learners' motivation,

supporting individualized learning paths, and ensuring accessibility to educational content regardless of time and location. However, the effective use of such resources in the educational process depends largely on the teacher's ability not only to use ready-made materials but also to design and adapt digital content according to pedagogical goals, learners' needs, and didactic requirements.

The need to develop this competence in future teachers is driven by several factors. First, the global digitalization of education requires teachers to be proficient in information and communication technologies. Second, modern learners, often referred to as digital natives, expect interactive, visually rich, and engaging learning environments. Third, educational standards and curricula increasingly emphasize the use of innovative teaching methods and digital tools. Therefore, teacher training institutions must create conditions for forming practical skills in designing digital educational resources alongside theoretical

pedagogical knowledge.

Developing competence in creating digital educational resources involves not only technical skills but also pedagogical thinking, creativity, and the ability to integrate technology meaningfully into the learning process. Future teachers must understand the principles of digital didactics, instructional design, multimedia learning, and user-centered content development. They should be able to select appropriate software tools, apply methodological approaches, and evaluate the effectiveness of the created resources in real educational settings.

In this regard, the issue of forming such competence requires a comprehensive methodological approach that combines theory, practice, and innovation. It is important to identify effective methods, tools, and technologies that contribute to the systematic development of this competence during teacher education. This research aims to explore the theoretical foundations and methodological mechanisms for developing future teachers' competence in creating digital educational resources and to justify practical approaches for its implementation in the educational process.

Literature Review And Methods

The issue of integrating digital technologies into education and developing teachers' competence in creating digital educational resources has been widely discussed in pedagogical, psychological, and methodological research. Numerous studies emphasize that digital competence is a key component of a modern teacher's professional profile. Researchers highlight that the effective use of digital tools in education depends not only on technical literacy but also on pedagogical understanding, instructional design skills, and the ability to create meaningful digital content aligned with learning objectives. The concept of digital educational resources has evolved alongside the development of information and communication technologies, expanding from simple electronic texts to complex multimedia environments, interactive platforms, and adaptive learning systems.

Scholars in the field of digital pedagogy underline the importance of combining technological knowledge with didactic principles. Theories such as constructivism, multimedia learning, and learner-centered education

provide a theoretical basis for designing digital educational materials. Studies show that well-designed digital resources enhance students' engagement, motivation, and learning outcomes when they are created according to pedagogical requirements and cognitive principles. At the same time, research indicates that many teachers experience difficulties in independently creating digital content due to insufficient methodological preparation during their professional training. This gap confirms the need to revise teacher education programs to include systematic preparation in the development of digital educational resources.

The literature also points to the importance of instructional design models, such as analysis, design, development, implementation, and evaluation stages, in the creation of effective digital learning materials. Methodologists emphasize that future teachers should master not only ready-made software tools but also understand the process of planning, structuring, and evaluating digital content. Furthermore, international experience demonstrates that the integration of web platforms, learning management systems, and multimedia technologies into teacher education contributes significantly to the formation of practical digital skills.

Based on the analysis of scientific and methodological sources, this study employs a комплексный methodological approach. The research is grounded in theoretical analysis of pedagogical, psychological, and methodological literature related to digital education, competence-based approaches, and instructional design. Comparative analysis is used to examine different viewpoints and practices in developing digital competence among future teachers. The study also applies modeling methods to design a framework for developing competence in creating digital educational resources within teacher training programs.

In addition, empirical methods are considered important for validating the proposed approaches. Observation, surveys, and analysis of educational practices are used to identify existing challenges in preparing future teachers for digital resource creation. Practical tasks, project-based activities, and the use of digital tools in the learning process are analyzed as effective means for developing the targeted competence. The combination of theoretical and

empirical methods ensures a comprehensive understanding of the problem and allows for the development of methodological recommendations aimed at improving the quality of teacher training in the context of digital education.

RESULTS. The results of the study demonstrate that the systematic integration of digital educational resource creation into teacher training significantly contributes to the development of future teachers' professional competence. The findings show that when future teachers are engaged not only in using ready-made digital materials but also in designing, developing, and evaluating their own digital educational resources, their understanding of pedagogical processes deepens and their technological confidence increases. This active involvement fosters creativity, critical thinking, and methodological awareness, which are essential qualities for effective teaching in a digital learning environment.

The study revealed that future teachers initially tend to perceive digital tools primarily as auxiliary instruments for presenting information. However, through targeted methodological training and practical tasks, they begin to recognize digital resources as integral components of instructional design that can shape learning experiences, support differentiation, and enhance student engagement. As a result, participants developed the ability to align digital content with learning objectives, students' needs, and didactic principles.

Another important result is the identification of key stages in the process of creating digital educational resources that proved effective in the training process: analysis of learning goals and audience needs, selection of appropriate digital tools, design of content structure, development of multimedia elements, implementation in a simulated or real learning environment, and evaluation of effectiveness. Mastery of these stages allowed future teachers to approach digital resource creation in a systematic and pedagogically grounded manner rather than focusing solely on technical aspects.

The research also showed that project-based learning, practical assignments, and collaborative activities play a crucial role in developing this competence. When future teachers worked on real educational projects using web platforms, presentation software, video editing tools,

and interactive assessment services, their motivation and engagement increased significantly. They demonstrated improved ability to select suitable technologies, integrate multimedia elements meaningfully, and create interactive learning materials.

In addition, the results indicate that the development of competence in creating digital educational resources positively influences other professional competencies, such as lesson planning, classroom management, assessment strategies, and reflective practice. Future teachers became more confident in adapting teaching materials to different learning contexts and student characteristics. They also developed skills in evaluating the quality and effectiveness of digital resources from both pedagogical and technical perspectives.

Overall, the findings confirm that purposeful methodological support, combined with practical digital experience, ensures the effective formation of future teachers' competence in creating digital educational resources. This competence not only enhances their readiness for modern educational challenges but also contributes to improving the quality and innovativeness of the teaching and learning process.

Discussion

The findings of this study confirm that developing future teachers' competence in creating digital educational resources is not a purely technical task but a complex pedagogical process that requires the integration of methodological knowledge, instructional design skills, and creative thinking. The results align with contemporary views in digital pedagogy, which emphasize that technology becomes educationally meaningful only when it is purposefully integrated into the teaching and learning process. This reinforces the idea that teacher education programs must go beyond teaching how to use digital tools and instead focus on how to design pedagogically effective digital content.

The study highlights that many future teachers initially lack confidence in their ability to create digital materials independently, even though they are familiar with various digital applications. This indicates a gap between general digital literacy and professional digital competence. The discussion of this issue suggests that the problem lies not in the availability of technologies but in the absence of systematic methodological preparation. Therefore, digital resource creation should

be treated as an essential component of pedagogical training rather than an additional or optional skill.

Another important point emerging from the research is the role of practical, project-based activities in shaping competence. When future teachers engage in authentic tasks that require them to design digital resources for real educational scenarios, they begin to understand the relationship between pedagogy and technology more clearly. This supports the idea that competence is best developed through active learning, reflection, and practice. It also confirms the effectiveness of learner-centered and constructivist approaches in teacher education.

The discussion also emphasizes the significance of instructional design stages in organizing the process of digital resource creation. A structured approach that includes analysis, design, development, implementation, and evaluation helps future teachers avoid chaotic or purely technical work with digital tools. Instead, they learn to approach digital resource creation systematically, ensuring alignment with learning objectives and students' needs. This methodological clarity is essential for producing high-quality digital educational materials.

Furthermore, the study suggests that the competence in creating digital educational resources has a broader impact on overall professional development. It enhances lesson planning skills, encourages innovative thinking, and supports reflective teaching practices. Teachers who can create their own digital materials are more flexible, adaptive, and capable of responding to diverse learning contexts. This is particularly important in modern education, where blended and online learning environments are becoming increasingly common.

In this context, the discussion underlines the need to revise teacher training curricula to include dedicated modules and continuous practice in digital educational resource development. Such integration will ensure that future teachers are not only consumers of digital content but also competent creators who can contribute to the modernization of the educational process.

Conclusion

This study confirms that developing future teachers' competence in creating digital educational resources is

a vital and necessary component of modern teacher education. The integration of digital technologies into the educational process requires teachers not only to use existing tools but also to design, develop, and implement their own digital learning materials in accordance with pedagogical goals and learners' needs. Therefore, the formation of this competence should be considered a strategic objective in the preparation of future educators.

The research demonstrates that systematic methodological support, combined with practical, project-based activities and the application of instructional design principles, significantly enhances future teachers' ability to create effective digital educational resources. This process contributes not only to the development of technical skills but also to the improvement of pedagogical thinking, creativity, critical analysis, and reflective practice. As a result, future teachers become more confident, flexible, and prepared to work in digital and blended learning environments.

The findings also highlight that competence in creating digital educational resources positively influences other professional competencies, including lesson planning, assessment strategies, and the ability to adapt teaching methods to diverse educational contexts. This confirms that digital resource creation is closely connected with overall professional growth and the quality of the teaching and learning process.

In conclusion, the effective preparation of future teachers for digital education requires purposeful integration of digital resource development into teacher training curricula. Such an approach will ensure that teachers are not merely users of digital technologies but competent creators who can actively contribute to the modernization and innovation of education.

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