

URGENT PROBLEMS IN TEACHING THE DISCIPLINE OF PEDAGOGICAL SOFTWARE TOOLS IN THE CONTEXT OF DIGITAL EDUCATION

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Annotatsiya. Ushbu maqolada raqamli ta'lim sharoitida pedagogik dasturiy vositalar fanini o'qitish jarayonida yuzaga kelayotgan dolzarb muammolar tahlil qilinadi. Zamonaviy ta'lim tizimida raqamli transformatsiya jarayonlari o'quv fanlarining mazmuni, metodikasi va texnologik ta'minotiga sezilarli ta'sir ko'rsatmoqda. Xususan, pedagogik dasturiy vositalar fanini o'qitishda metodik nomukammallik, texnik infratuzilmaning yetarli emasligi, o'qituvchilarning raqamli kompetensiyasi darajasi hamda talabalarning amaliy ko'nikmalarini shakllantirish bilan bog'liq muammolar mavjud.

Maqolada mazkur muammolar tizimli tahlil qilinib, ularni bartaraf etishning samarali yo'llari taklif etiladi. Jumladan, innovatsion pedagogik texnologiyalarni joriy etish, raqamli platformalardan samarali foydalanish, o'qituvchilar malakasini oshirish hamda amaliyotga yo'naltirilgan ta'lim modelini takomillashtirish masalalari yoritiladi. Tadqiqot natijalari pedagogik dasturiy vositalar fanini o'qitish samaradorligini oshirishga xizmat qiladi.

Abstract. This article analyses the pressing issues that arise in the teaching of the discipline of pedagogical software tools in the context of digital education. In the modern education system, digital transformation processes are having a significant impact on the content, methodology and technological support of academic disciplines. In particular, there are methodological shortcomings in teaching the subject of pedagogical software tools, inadequate technical infrastructure, issues concerning teachers' levels of digital competence, and problems related to the development of students' practical skills.

The article systematically analyses these problems and proposes effective ways to address them. In particular, the introduction of innovative pedagogical technologies, the effective use of digital platforms, the enhancement of teachers' qualifications and the improvement of a practice-oriented educational model are addressed. The research findings contribute to enhancing the effectiveness of teaching the science of pedagogical software tools.

Kalit so'zlar: Raqamli ta'lim, pedagogik dasturiy vositalar, ta'lim jarayonini raqamlashtirish, raqamli kompetensiya, innovatsion pedagogik texnologiyalar, interaktiv o'qitish metodlari, ta'lim platformalari, elektron ta'lim resurslari, metodik muammolar, texnologik infratuzilma, masofaviy ta'lim, kompetensiyaviy yondashuv, amaliy ko'nikmalar, ta'lim samaradorligi.

Keywords: Digital education, pedagogical software tools, digitisation of the educational process, digital competence, innovative pedagogical technologies, interactive teaching methods, educational platforms, electronic educational

resources, methodological issues, technological infrastructure, distance learning, competency-based approach, practical skills, educational effectiveness.

The rapid development of digital technologies is demanding the introduction of new approaches and innovative solutions in the education system. The effective use of pedagogical software tools by prospective science teachers at institutions of higher pedagogical education is regarded as a contemporary requirement. Therefore, it is essential to examine the nuanced aspects of digital pedagogy and competence, and to study the challenges faced by teachers who deliver science skills courses in schools using digital platforms.

In recent years, the global digital transformation processes have brought about profound changes to the education system, as well as to all other spheres of society. As the rapid development of information and communication technologies, the introduction of artificial intelligence elements into the educational process, and the widespread use of e-learning resources and digital platforms, necessitate a re-evaluation of the content, form, and methodology of education based on a new approach. Ensuring the effectiveness of the pedagogical process has become a pressing issue, particularly in the context of the emerging digital learning environment.

Digital education is emerging not only as a means of delivering information electronically, but as a comprehensive system that enables the educational process to be organised in an interactive, flexible and personalised manner. This, in turn, further enhances the importance of the science of pedagogical software tools. This subject serves to develop the digital competence of prospective teachers, to enable effective use of software products in the teaching process, and to foster skills in creating and evaluating electronic learning resources.

At the same time, a number of problems are observed in the teaching of the discipline of pedagogical software tools. In particular, the curricula have not been fully updated in line with modern requirements, and the methodological support has not been sufficiently developed, limited technical infrastructure and disparities in teachers' digital competence levels are negatively affecting educational effectiveness. Furthermore, the issue of developing students' practical skills alongside their theoretical knowledge is also emerging as a pressing problem.

Systematically analysing these problems and developing ways to address them plays a crucial role in enhancing the effectiveness of teaching the science of pedagogical software tools. Because in the modern education system digital literacy and technological competence are regarded as one of the main factors determining a teacher's professional success.

Overall, identifying the specific characteristics of teaching the science of pedagogical software tools and enriching them with practical methodological recommendations stems from the pressing needs of the modern education system. This topic is significant for its content, which unites the scientific community and the field of practical education: it plays a crucial role in modernising teaching methodology, enhancing the digital competence of teaching staff, and strengthening students' professional preparedness during the digitisation of

education. By achieving these objectives, the research is expected not only to enrich theoretical knowledge but also to lead to significant positive changes in educational processes in practical terms.

Kalimullina. O, Tarman.B and Stepanova I. These scientists in 2020 “Education in the Context of Digitalization and Culture: Evolution of the Teacher’s Role, Pre-pandemic Overview” In the article entitled "Intensive Mandatory Use of Distance Technologies in the Educational Process Has Permanently Changed the Approach to Education." What exactly has changed? This is already a new research topic. We suggest taking a step back to examine how the teacher’s role changed as the use of digital technologies intensified before the pandemic. There are many opportunities, applications and automated digital environments in the world, but none of them can operate, either partially or fully, without a supervisor or teacher. Furthermore, the article found that despite the diversity of digital learning tools, there are problems associated with their use.”

Sarva. E and Bieza. K. These scientists in 2023 “Educators’ Perspectives on the Main Challenges and Opportunities for Implementing Digital Solutions in Learning and Teaching” In the article entitled "The gap between technological development and education is one of the international problems that must be addressed. Teacher professional development is considered one of the best solutions." However, schools are struggling to meet the requirements set by national and international bodies due to a lack of guidance and support. It was argued that this study aims to identify the main challenges and opportunities in implementing digital solutions in teaching and learning.

Chukhno.O and Chekhratova.O. These scientists in 2025 “Exploring digital tools: teachers’ and learners’ experience” In the article entitled the rapid development of technology has led to a re-evaluation of traditional teaching methods in education. The COVID-19 pandemic and the development of artificial intelligence (AI) have accelerated the evolution of the educational context. This change led to teachers increasingly incorporating digital tools into their pedagogical practices, which was thought to result in students being more active and motivated in a technology-based learning context.

The Uzbek scholar Quljonov N. J. in his 2025 article "The Effectiveness of Software-Didactic Tools in Training Pedagogical Personnel in the Context of Digitalisation" In his 2025 article, the digital transformation of the pedagogical process and the opportunities for enhancing the quality of education through electronic platforms and interactive educational resources are analysed. The study outlines the types of modern digital tools, the criteria for selecting them, and their practical effectiveness through examples. The author argues that these tools play a crucial role in developing digital competencies in pedagogical practice.

The rapid development of digital transformation processes has become an integral part of modern society’s development, creating the need for a fundamental overhaul of the education system. The rapid development of information and communication technologies, artificial intelligence, distance learning platforms and the widespread adoption of e-learning resources necessitate a review of the content, form and methodology of the educational

process. In such circumstances, the discipline of pedagogical software tools becomes even more significant, as it serves to prepare future educators to operate effectively in a digital environment.

In the teaching of the discipline of pedagogical software tools, a number of systemic problems exist. First, from a methodological standpoint, the subject content has not been fully updated in line with modern digital requirements. In the curricula, theoretical knowledge is prioritised, and the proportion of practical sessions is insufficient. As a result, students lack adequate skills in independently creating, analysing and integrating software tools into the pedagogical process.

Furthermore, the inadequate development of technical infrastructure is also one of the significant problems. In some educational institutions, the lack of modern computer equipment, licensed software and a stable internet connection adversely affects the efficiency of scientific work. The effectiveness of digital education is directly linked to the material and technical infrastructure, and this factor cannot be overlooked. Moreover, disparities in teachers' digital competence levels are also a pressing issue. Effective use of digital tools, application of interactive methods, creation of electronic learning resources and assessment skills have become essential competencies for every teacher. However, practice shows that not all educators have fully mastered modern technologies. This hinders the full implementation of innovative approaches in the teaching process. The issue of developing students' practical skills also requires special attention. If methods such as project-based teaching, the creation of problem-based scenarios and working with real educational platforms are not sufficiently employed in the teaching of the science of pedagogical software tools, the subject remains purely theoretical. The modern digital education model, however, demands the preparation of specialists who are practice-oriented, creative and independent thinkers. To address these issues, curricula must first be updated in line with the requirements of digital transformation. The implementation of innovative pedagogical technologies, the widespread use of interactive and project-based teaching methods, and the development of skills in working with open educational platforms and digital services are of great importance. Moreover, regularly enhancing teachers' qualifications and training them to use modern software tools is a crucial prerequisite for improving the quality of education.

In the context of digital education, the role of the teacher is undergoing a fundamental transformation. Teachers are now emerging not only as knowledge providers but also as facilitators, mentors and managers of the digital environment. Therefore, to teach the science of pedagogical software tools effectively, it is necessary to systematically develop teachers' professional and digital competencies.

It is advisable to pursue professional development in the following areas:

- Working with modern pedagogical software tools
- Use of LMS (Learning Management System) platforms
- Interactive and project-based teaching methods
- Digital assessment systems

Integrating elements of artificial intelligence into education

The professional development process should be continuous, modular and focused on practical training. Not only theoretical seminars, but also practical tasks such as creating a real project and developing digital resources should be prioritised.



Conclusion. The pressing issues in teaching the science of pedagogical software tools in a digital learning environment are grouped into three blocks: a lack of digital-pedagogical competence, gaps in infrastructure and policy, and difficulties adapting assessment and inclusivity to the digital environment. As solutions, targeted pedagogical (not just IT) professional development, clear didactic models, a stable infrastructure and an inclusive, humane digital policy are necessary. In the context of digital education, the problems arising in the teaching of pedagogical software tools are complex in nature and require a systematic approach to their resolution. Teaching effectiveness can be significantly enhanced by modernising the curriculum, strengthening the technical infrastructure, developing teachers' digital competence and implementing a practice-oriented teaching model.

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