

**EFFECTIVENESS OF DIGITAL PEDAGOGICAL TOOLS IN TECHNICAL EDUCATION**

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**Abstract**

This article thoroughly analyzes the state of application of digital pedagogy tools in the technical school education system, their impact on the educational process, and their effectiveness. During the study, the influence of digital tools on the quality of education was studied through surveys, interviews, and experimental classes conducted with the participation of teachers and students of the technical school. The results showed that the correct and targeted application of interactive and digital educational technologies serves to significantly increase the level of students' knowledge, motivation for the lesson, and practical skills. At the same time, existing problems - insufficient technical infrastructure, low digital literacy of teachers - limit the effectiveness of these tools. The article also put forward practical proposals for eliminating these problems. The research creates a scientific, theoretical, and practical basis for the implementation and development of digital pedagogy tools in technical school education.

**Keywords:** Digital pedagogy, technical school education, interactive learning tools, digital technologies, educational effectiveness, digital literacy, vocational education, virtual laboratories, practical skills, educational innovations.

**INTRODUCTION**

Today, the rapid development of information and communication technologies in the field of education is fundamentally changing educational processes. Digital pedagogical tools - interactive educational platforms, virtual laboratories, simulations, online testing systems, and other modern technologies - have become an important factor in improving the quality and effectiveness of education. In particular, the system of vocational education, including technical schools, requires the introduction of innovative pedagogical tools to ensure the effectiveness of the educational process. These tools allow not only to convey educational materials in an interactive form, but also to monitor students' knowledge at the individual level, create a learning system adapted to their abilities and needs.

Since technical school education is aimed at preparing students for professional skills and practical knowledge, the study of the role and effectiveness of digital pedagogical tools in this process is of great scientific and practical importance. New requirements arising in the spheres of the modern economy and industry require the widespread use of innovative technologies in the educational process, in addition to traditional methods. Therefore, the need for effective organization of the educational process in technical schools through digital means, increasing the knowledge and skills of students, and further strengthening their professional training remains relevant.

In addition, the use of digital pedagogy tools plays an important role in increasing students' interest and activity in learning, as well as in expanding the methodological potential of teachers. Therefore, conducting scientific research on assessing the effectiveness of digital pedagogical tools in technical

school education, identifying the possibilities of their practical application, and eliminating emerging problems is of great importance.

This article analyzes the impact, effectiveness, and difficulties in implementing digital pedagogy tools in technical school education into the educational process and develops recommendations for their effective application [1,2,3].

## **LITERATURE ANALYSIS**

In the field of studying the application of digital pedagogical tools in the educational process and their effectiveness, there are many scientific studies by international and domestic scientists. These studies serve as the basis for the development of innovative approaches aimed at improving the quality of education, activating students, and improving professional training.

Among foreign scientists, Richard E. Mayer (2009) deeply studied the influence of multimedia and interactive learning tools on the cognitive process. Meyer's theory of "cognitive load" shows that the means of digital pedagogy allow students to effectively convey information, focus their attention, and retain knowledge for a long time. At the same time, John Hattie (2012) in his work "Visible Learning" emphasized that technological tools help to significantly improve student performance, but reminded of the need for methodologically correct organization for their effective application.

The research conducted by Jean van den Berg et al. (2018) on the role and effectiveness of digital pedagogical tools in vocational education, in particular in technical schools, is of great importance. They proved that virtual laboratories, simulations, and interactive platforms significantly improve students' practical skills in learning technical skills, accelerating the process of analyzing and correcting errors. These methods, unlike traditional lessons, provide students with opportunities for independent and active learning.

Research by domestic scientists also shows the importance of digital pedagogical tools in technical school education. For example, a member of the Academy of Sciences of the Republic of Uzbekistan Sh. Ismailov (2020) noted in his work that as a result of the use of interactive educational platforms in technical schools, the level of assimilation and motivation of students have increased. Ismailov emphasizes the effectiveness of the use of digital tools in encouraging students to participate more actively in practical classes and consolidating knowledge [4,5].

Also, N. Khudoyberdiyev (2021) conducted scientific research on the implementation of digital pedagogy tools in technical schools, increasing the digital literacy of teachers, and developing educational infrastructure. In his opinion, for the widespread introduction of digital technologies, it is important not only to improve technical capabilities, but also to improve the qualifications of teachers. This will significantly improve the quality of the educational process.

In addition, practical research conducted on the effectiveness of digital pedagogical tools in the education system of Uzbekistan shows that the effective implementation of these tools in technical schools is an important factor in improving the quality of education. However, existing research also highlights such problems as weak technical infrastructure, low digital literacy of teachers, and a lack of methodological manuals (Kadyrov, 2019; Tursunov, 2020). By solving these problems, it is possible to further increase the effectiveness of digital pedagogical tools in technical schools.

Research by foreign and domestic scientists shows that the effective use of digital pedagogical tools in the educational process is important for improving the quality of education, involving students in active and independent learning, and developing practical skills. At the same time, the need to continue work

on infrastructure, methodology, and advanced training in this area is emphasized. To increase the effectiveness of digital tools in technical school education, a comprehensive approach is necessary, taking into account not only technological, but also pedagogical, methodological, and organizational aspects [6,7].

## RESULT AND DISCUSSION

This study is aimed at a deep analysis of the role of digital pedagogical tools in technical school education and their influence on the educational process. In the course of the study, the real situation was studied based on a scientific approach, carried out in combination with qualitative and quantitative methods. In particular, surveys were conducted among teachers and students working in technical schools, the lesson process was observed, and the results of lessons conducted in experimental groups with and without digital tools were compared and analyzed. Within the framework of the study, the experience, problems, and needs of teachers in working with digital tools were also clarified through interviews.

The obtained results showed that the correct and systematic use of digital tools in technical school education increases students' motivation for learning, turns them into active students, and has a positive impact on strengthening professional and practical skills. In particular, the use of interactive simulations, 3D models, online laboratories, and virtual lessons in technical schools serves to increase students' participation in the educational process and better assimilation of knowledge. As a result of the experiments, it was found that lessons conducted using digital technologies revealed a positive difference of 15-20% in the results of students. This means that for technical school students, the material presented through digital means will be more understandable and memorable than in traditional lessons.

Furthermore, digital tools have created opportunities for teachers to diversify their pedagogical activities and enrich them methodologically. However, interviews and analyses have shown that the existing technical infrastructure (for example, internet speed, lack of devices, shortage of interactive whiteboards) prevents the full use of these tools in most technical schools. In addition, it was found that the level of digital literacy of teachers varies, especially among older teachers. This will negatively affect the effectiveness of education [8,9].



Figure 1. Digital Tools in Technical Education

The scientific novelty of the research lies in the fact that it analyzed the effectiveness of digital pedagogy tools in the context of technical school education through real practical experiments. Previously, such studies, focused mainly on school and higher education, did not sufficiently cover the technical school stage. This work made it possible to draw conclusions with concrete scientific foundations about how modern technologies work in the conditions of technical schools, what problems arise, and what solutions exist.

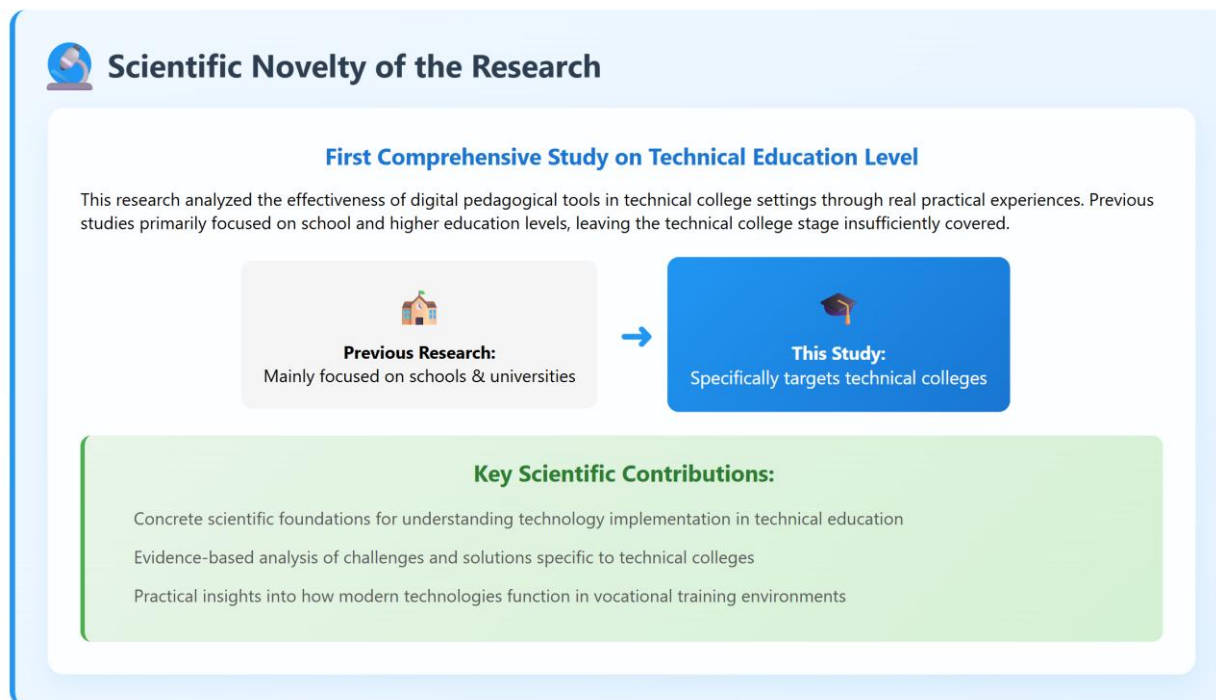


Figure 2. Scientific novelty of the research

The research is also relevant from a scientific and practical point of view. The obtained results can be used to develop specific recommendations for the modernization of technical school education, accelerating the process of digital transformation, and improving the qualifications of teachers. For example, the need to create digital educational laboratories in each technical school, organize continuous professional development courses in digital pedagogy for teachers, and adapt lesson plans and curricula to digital content is being put forward.

The general purpose of the study was to determine the effectiveness of digital pedagogical tools in technical school education and to develop scientifically based proposals for their widespread implementation. To achieve this, the current state of digital tools was analyzed, their effectiveness was measured through real experiments, and existing problems were deeply analyzed. This serves as a scientific basis for the formation of future strategies for the implementation of digital pedagogical tools in technical schools [10,11].

**CONCLUSION**

The results of the conducted research showed that the use of digital pedagogical tools in technical school education is an important factor in increasing the effectiveness of the educational process. Digital tools - interactive educational platforms, virtual laboratories, online testing systems, and visual simulations - have a positive impact on students' deeper assimilation of knowledge, the development

of independent work skills, and increasing their motivation and participation in the lesson. The study found that in an educational environment equipped with such tools, learning outcomes improve by an average of 15-20%.

At the same time, in the course of the research, some problems of using digital tools in technical schools were identified. In particular, the limited technical infrastructure, the insufficient digital literacy of teachers, and the lack of methodological materials and practical guides hinder the full and systematic implementation of these tools.

The scientific novelty of the research is that the effectiveness of digital tools in technical school conditions was analyzed on an empirical basis, that is, through real lesson processes and experiments. This situation allowed us to approach this issue not only from a theoretical, but also from a practical point of view. The conclusions obtained from the study provide a basis for developing digital educational strategies for technical schools, preparing teachers for working with modern technologies, and making proposals for the phased digitalization of the educational process.

In general, the effective implementation of digital pedagogical tools in technical school education not only meets the requirements of modern education, but also plays an important role in improving the professional training of students, strengthening their practical skills, and forming them as personnel suitable for the real labor market. By implementing consistent reforms in this area, improving the qualifications of teachers, and providing them with modern technologies, it is possible to maximize the benefits of digital pedagogy tools.

## REFERENCES

1. Ogli Y. S. S. LEGAL STATUS OF AGRICULTURAL LAND //Eurasian Journal of Technology and Innovation. – 2024. – T. 2. – №. 5. – C. 105-113.
2. Yokubov S. DEVELOPMENT OF AGRICULTURAL CARDS USING ARCGIS AND PANORAMA TECHNOLOGIES //Innovations in Science and Technologies. – 2024. – T. 1. – №. 1. – C. 101-107.
3. Khakimova K., Yokubov S. CREATION AND MAINTENANCE OF STATE CADASTERS IN THEREPUBLIC OF UZBEKISTAN //Innovations in Science and Technologies. – 2024. – T. 1. – №. 1. – C. 85-93.
4. Yokubov S. SCIENTIFIC AND THEORETICAL FOUNDATIONS FOR THEDEVELOPMENT OF MAPS OF THE LEGAL STATUS OF STATE LANDCADASTERS IN THE TERRITORY USING GIS TECHNOLOGIES //Innovations in Science and Technologies. – 2024. – T. 1. – №. 1. – C. 80-84.
5. Yusufovich G. Y. Shavkat o 'g 'li SY CARTOGRAPHIC RESOURCES USED IN THE CREATION OF ELECTRONIC AGRICULTURAL MAPS OF FERGANA REGION //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – T. 11. – №. 3. – C. 1001-1009.
6. Abduvakhovich A. A. Shavkat o'g'li, SY Improving the Method of Mapping Agriculture Using Remote Sensing Data //Finl. Int. Sci. J. Educ. Soc. Sci. Humanit. – 2023. – T. 11. – C. 1093-1100.
7. Yusufovich G. Y. et al. The use of remote sensing technologies in the design of maps of agricultural land //Texas Journal of Agriculture and Biological Sciences. – 2023. – T. 23. – C. 17-21.
8. Eshnazarov D. et al. Describing the administrative border of Koshtepa district on an electronic digital map and creating a web map //E3S Web of Conferences. – EDP Sciences, 2023. – T. 452. – C. 03009.
9. Khakimova K. et al. Application of GIS technologies for improving the content of the tourist map of Fergana province, Uzbekistan //E3S Web of Conferences. – EDP Sciences, 2023. – T. 386. – C. 04003.

10. Khakimova K., Yokubov S. Creation of agricultural electronic maps using geoinnovation methods and technologies //Science and innovation. – 2023. – T. 2. – №. D1. – C. 64-71.
11. Xakimova K. et al. Theoretical and methodological issues of creating the “ECO FERGANA” mobile application of tourist objects and resources of Fergana region //E3S Web of Conferences. – EDP Sciences, 2023. – T. 452. – C. 05025.