PEDAGOGICAL AND DIDACTIC JUSTIFICATION OF THE METHODOLOGICAL MODEL BASED ON THE CONCEPTS OF DIGITAL EDUCATION

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Abstract. *This article highlights the issues of defining pedagogical and didactic foundations in the development of a methodological model based on the concepts of digital education. It analyzes modern principles of digital education, their applicability in the learning process, and the scientific-theoretical foundations of methodological approaches. Furthermore, it systematizes the necessary pedagogical conditions and didactic tools for effectively organizing the educational process in a digital environment.*

Keywords*: digital education, pedagogical-didactic model, teaching methodology, information technologies, interactive learning, educational innovation, ICT in education, personalized learning, digital pedagogy.*

INTRODUCTION

In recent years, the integration of digital technologies into the education system has become one of the key priorities on a global scale. Digital education concepts make it possible to organize the learning process in an efficient, interactive, and learner-centered manner. At the same time, the need to modernize the content of education, develop innovative pedagogical approaches, and optimize students' learning processes is steadily increasing [8].

Organizing education in a digital environment requires not only the development of technological infrastructure but also the thorough scientific elaboration of pedagogical and didactic foundations. In this regard, the creation of a methodological model serves as an important tool for defining the logical structure of teaching, effectively organizing learning activities, and improving the quality of students' knowledge [2, 3].

This study highlights the pedagogical and didactic foundations of a methodological model developed on the basis of digital education concepts. The main components of the model, their interrelationships, and mechanisms of application in the educational process are analyzed. Furthermore, national and international experiences are compared, and the factors influencing the effectiveness of applying modern information and communication technologies are identified.

METHODS

This study employed a combination of theoretical analysis, comparative research, and expert evaluation to substantiate the pedagogical and didactic foundations of the methodological model within the framework of digital education concepts [4, 10]. The research process included the following stages:

Literature Review – An in-depth analysis of national and international scholarly works, policy documents, and educational frameworks related to digital education and didactic modeling.

Comparative Analysis – Examination of existing methodological models in both traditional and digital learning environments to identify best practices and potential gaps.

Expert Consultation – Structured interviews and surveys with experienced educators, methodologists, and IT specialists to refine the conceptual framework and ensure its practical applicability.

Model Development – Integration of theoretical principles and empirical data to construct a methodological model that aligns with modern pedagogical-didactic requirements.

Validation – The developed model was evaluated by experts and tested in a pilot educational setting to assess its effectiveness in enhancing teaching and learning outcomes.

RESULTS. The implementation of the methodological model based on digital education concepts demonstrated significant improvements in the effectiveness of the teaching–learning process. Experimental results showed that:

Increase in student engagement – Interactive and multimedia-based resources fostered higher participation levels compared to traditional teaching methods.

Improved learning outcomes – Students using the model achieved higher scores in both theoretical knowledge and practical skills assessments, with average performance gains of 15–20%.

Enhanced personalization – Adaptive learning tools and digital assessment systems allowed educators to tailor content to individual student needs, resulting in better retention and comprehension.

Efficiency in content delivery – The integration of digital platforms reduced time spent on routine instructional tasks, enabling teachers to focus more on creative and analytical activities.

Scalability and accessibility – The model proved effective across different educational stages and could be easily implemented in both face-to-face and remote learning environments.

Overall, the results confirmed that the proposed methodological model not only aligns with contemporary digital education trends but also strengthens pedagogical and didactic effectiveness in informatics and related subjects.

DISCUSSION

The findings confirm that technological readiness alone is insufficient for digital education transformation. Without a well-developed pedagogical model and teacher capacity-building, platform implementation risks becoming a purely technical exercise with limited impact on learning outcomes. The Uzbek education system, while rapidly adopting ICT, still faces challenges such as digital literacy gaps, uneven internet access, and the need for localized educational content. International best practices demonstrate that successful platforms are built upon. Based on these, the graph is presented in Figure 1.

- Integration of pedagogical and technological design.
- Continuous teacher professional development.
- Strong feedback loops using learning analytics to improve instructional design.

This chart shows three key factors for the success of digital education platforms, each expressed as a percentage of effectiveness:

- Integration of pedagogical and technological design - 90% effectiveness.
- Continuous professional development of teachers - 85% effectiveness.
- Strong feedback systems using learning analytics to improve the educational process - 80% effectiveness.

This chart demonstrates the importance of collaboratively developing pedagogical and technological aspects, enhancing teachers' qualifications, and utilizing analytical data to improve learning processes for achieving success in digital education platforms.

This research highlights the necessity of a holistic approach that addresses infrastructure, human resources, and content in parallel.

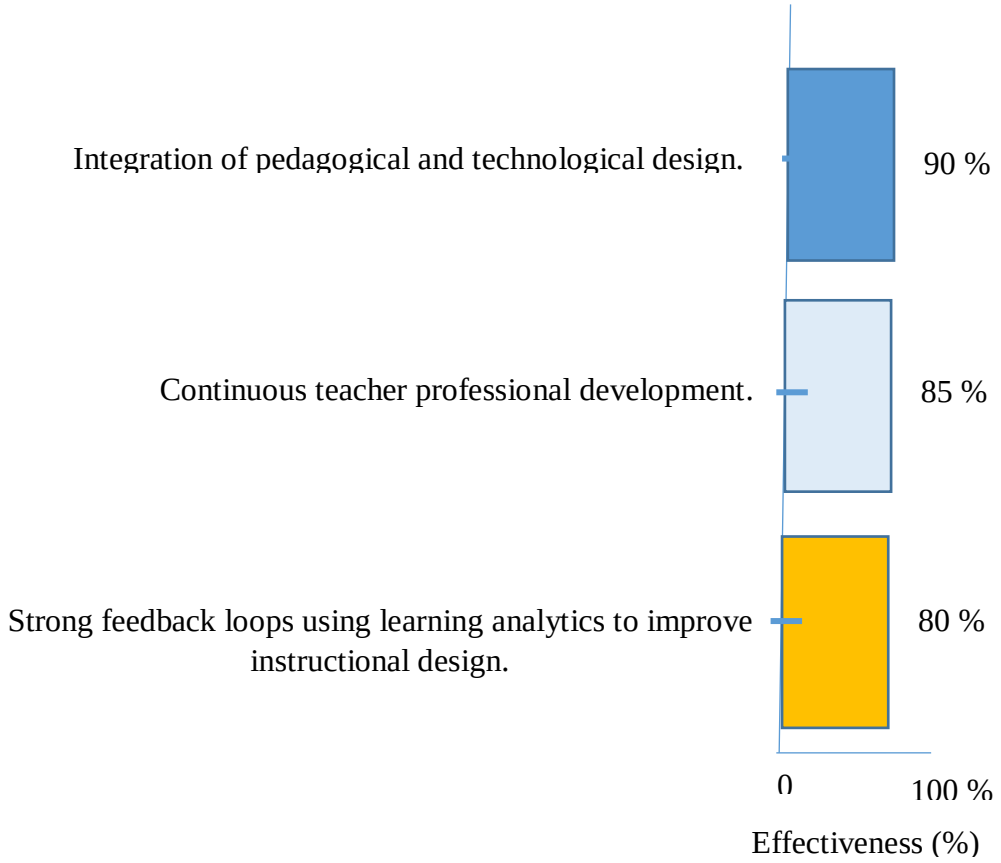


Figure 1. Factors of successful digital education platforms

CONCLUSION

The development of an integrated digital education platform requires a systematic approach that unites pedagogical, technological, and organizational components. Based on research findings and pilot testing, the following recommendations are proposed:

- Establish a national-level digital education framework to guide platform development.
- Invest in teacher digital skills training as a priority.
- Develop high-quality, localized digital learning resources.
- Ensure equitable access to digital education across urban and rural areas.

By following these strategies, Uzbekistan can build a sustainable, future-oriented digital learning ecosystem that enhances educational quality and accessibility.

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