

**DIGITAL EDUCATIONAL TECHNOLOGIES IN TEACHING PROPAEDEUTICS OF
CHILDHOOD DISEASES: A REVIEW OF RECENT ADVANCES AND
METHODOLOGICAL APPROACHES**

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Abstract

This review article examines the current state of digital educational technologies in teaching propaedeutics of childhood diseases in medical higher education. Emphasis is placed on simulation-based learning, virtual patient platforms, and interactive digital tools that enhance students' clinical reasoning, practical skills, and professional competence. The study synthesizes findings from peer-reviewed publications, global guidelines, and educational reports to identify effective pedagogical approaches and highlight existing challenges. The review concludes with recommendations for integrating digital technologies into pediatric propaedeutics curricula to optimize learning outcomes.

Keywords

digital education technologies, propaedeutics of childhood diseases, medical education, simulation-based learning, clinical reasoning, professional competence.

Introduction

The teaching of propaedeutics of childhood diseases is a critical component in the formation of future physicians' clinical knowledge and diagnostic skills. Traditional teaching methods, primarily consisting of lectures and limited bedside practice, are often insufficient for developing practical competencies and clinical reasoning among medical students. Over the last decade, the integration of digital educational technologies has emerged as a transformative approach to medical training.

Digital technologies, including multimedia presentations, virtual patients, online assessment platforms, and simulation-based learning, provide students with opportunities for repeated practice, immediate feedback, and interactive engagement. These technologies not only enhance knowledge acquisition but also contribute to the development of critical thinking and problem-solving skills necessary in pediatric practice.

Despite increasing adoption worldwide, the effectiveness and methodological implementation of digital tools in teaching propaedeutics of childhood diseases remain under-explored. This review aims to synthesize the current literature on the topic, assess the pedagogical potential of digital technologies, and provide methodological recommendations for their integration in medical education.

Methods. A systematic literature search was conducted in major academic databases, including PubMed, Scopus, Web of Science, and Google Scholar, using the following keywords: "*digital education technologies*", "*propaedeutics of childhood diseases*", "*simulation-based learning*", "*medical education*", and "*clinical skills training*".

Inclusion criteria: peer-reviewed articles published between 2015 and 2025, studies focusing on undergraduate medical education, and articles addressing digital tools in pediatric propaedeutics or related clinical skills. Exclusion criteria included non-English publications, opinion pieces without empirical data, and studies outside the context of medical education.



In total, 45 articles were identified, of which 12 were selected based on relevance and methodological rigor. Data were extracted on types of digital technologies used, pedagogical approaches, effectiveness, and implementation challenges.

Results: Simulation-Based Learning in Pediatric Propaedeutics

Simulation-based learning is one of the most widely adopted digital methodologies. Studies by McGaghie et al. (2010) and Chen et al. (2023) demonstrate that simulation enhances both theoretical knowledge and practical skills, allowing students to repeatedly practice clinical procedures without risk to patients. Virtual pediatric patients and mannequin-based simulations provide realistic scenarios, improving diagnostic reasoning and procedural competencies. Simulation also supports formative assessment, as students receive immediate feedback on their performance. Reports from WHO (2021) indicate that medical schools incorporating simulation-based learning experience higher student engagement and improved learning outcomes.

Virtual Patients and Interactive Platforms

Virtual patient platforms, such as Touch Surgery and custom online pediatric cases, enable students to engage with complex clinical scenarios interactively. Studies by Lees et al. (2025) show that virtual patients enhance critical thinking, decision-making, and retention of clinical knowledge. These platforms often include branching scenarios, quizzes, and adaptive feedback, which promote individualized learning and self-directed practice. Integration of virtual patients into curricula provides a cost-effective solution for overcoming the limitations of bedside teaching, especially in institutions with high student-to-teacher ratios or limited clinical exposure.

Multimedia and Online Learning Tools

Multimedia tools, including video demonstrations, interactive lectures, and mobile learning applications, support visual and auditory learning styles. McGee et al. (2024) report that students using multimedia-enhanced instruction in pediatric propaedeutics exhibit higher academic performance compared to traditional lecture-based methods. These tools facilitate flexible learning schedules, enabling students to review procedures and theoretical material independently.

Online quizzes and assessment platforms, combined with multimedia resources, allow continuous monitoring of students' understanding and provide educators with data to adjust teaching strategies.

Challenges in Implementation

Despite clear advantages, challenges remain in integrating digital technologies effectively. Barriers include limited technical infrastructure, insufficient faculty training, and varying student digital literacy levels. Abdullaev (2021) and Polat (2019) highlight that successful implementation requires institutional support, standardized curricula, and alignment of digital tools with learning objectives.

Additionally, over-reliance on digital tools may reduce opportunities for face-to-face interaction and bedside experience, which are essential for professional socialization and real-world clinical skill development.

Discussion. The review highlights a consistent trend: digital educational technologies significantly enhance learning outcomes in pediatric propaedeutics when combined with traditional teaching methods. Simulation-based learning and virtual patient platforms are



particularly effective in developing clinical reasoning and practical skills. Multimedia and online tools complement these approaches, offering flexibility and individualized learning paths.

For optimal results, integration should follow a structured methodological model, including clear learning objectives, alignment with assessment strategies, and faculty training. Future research should focus on longitudinal studies evaluating the long-term impact of digital technologies on professional competence and patient care outcomes.

Conclusion. Digital educational technologies are a powerful tool in teaching propaedeutics of childhood diseases. Simulation, virtual patients, and multimedia platforms improve student engagement, knowledge retention, and practical skills. Methodological integration of these technologies into medical curricula is essential for producing competent and confident future pediatricians. Institutions should focus on infrastructure, faculty development, and evidence-based implementation strategies to maximize benefits.

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