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ARTICLE

A Review of the Impact of Virtual Simulation and Real-Scene Interactive Training on Clinical Thinking Ability of Nursing Talents under the Background of Intelligent Services in Internet Hospitals

LI Na DONG Jia GENG Gonglong DING Le LIU Fanghua

QingDao Binhai University,QingDao ,Shandong Province,266555,China

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ABSTRACT

This review synthesizes the technical characteristics and applications of virtual simulation and real-scene interactive training within internet hospitals' intelligent services, examining their role in improving clinical thinking among nursing professionals. It highlights advantages such as enhanced decision-making skills and experiential learning, while addressing challenges like technological limitations and integration barriers. The discussion concludes with future directions for optimizing educational strategies to support nursing reform and competence development under this intelligent framework.

Introduction

Internet hospitals, as a pivotal component of smart healthcare, have transformed medical and nursing services by leveraging technologies like telemedicine, EHRs, and real-time data analytics to offer efficient, remote care that overcomes geographical and resource constraints [1]. The enhancement of nursing professionals' clinical thinking—critical for care quality and safety—remains challenging under traditional education methods, which often lack adequate practical training [2]. Innovations such as virtual simulation and real-scene interactive training have emerged as effective tools, providing immersive, experiential learning that strengthens clinical reasoning, decision-making, and skill application among nursing students [3]. This review systematically examines the impact of these technologies on nursing clinical thinking within internet hospital frameworks, highlighting their role in preparing competent nursing professionals for smart medicine.

2. Theoretical Foundations and Research Review

2.1 Internet Hospital Smart Services and Their Impact on Nursing Education

The rise of internet hospitals, defined as a

**Corresponding Author:*
Na Li, Female, Ph.D., Professor;
Research interests: Nursing Education;
Address: Dazhushan Campus, Qingdao Binhai University, No. 1568 Shanchuan Road, West Coast New District, Qingdao, Shandong Province, 266555, China;
Email: 893981586@qq.com

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transformative healthcare model leveraging telemedicine, EHRs, and AI-driven decision support, has redefined service delivery through improved accessibility and personalized care [4][5][6]. Concurrently, smart services within nursing have integrated IoT devices and intelligent systems to optimize workflows, enhance real-time patient monitoring, and improve care quality and efficiency [7][5][8]. This evolution profoundly impacts nursing education by necessitating a shift towards digitally competent professionals. Internet hospitals provide a platform for integrating virtual simulation and real-scene interactive training into curricula, exposing students to remote care modalities and diverse clinical scenarios. This fosters the development of clinical thinking and bridges the theory-practice gap, preparing students for the demands of smart healthcare ecosystems [9][10][11].

2.2 Technological Foundations of Virtual Simulation and Real-Scene Interactive Training

Virtual simulation technology, including VR, AR, and MR, creates immersive 3D environments for safe, repeatable practice of clinical skills and decision-making [12][13][14]. Its effectiveness hinges on sound instructional design and perceived relevance for learning [15][16]. Real-scene interactive training complements this by augmenting physical clinical environments with virtual elements, enhancing realism and multi-sensory engagement through tools like AR glasses or hybrid simulations with standardized patients [17][18]. This approach strengthens situational awareness and facilitates reflective learning [19]. Applications in nursing education are diverse, spanning procedural skill training (e.g., vacuum blood collection via VR [20]), clinical reasoning development through virtual cases [12], and emergency preparedness using immersive disaster simulations [23]. These technologies collectively enhance practical skills, clinical judgment, and learner satisfaction [21][22][24].

2.3 Cultivating Clinical Thinking Ability: Mechanisms and Evidence

Clinical thinking in nursing encompasses observation, analytical judgment, decision-making, and reflection, evaluated through indicators like knowledge application and problem-solving [25][26]. Virtual simulation enhances this ability by providing a safe space for repetitive practice with immediate feedback, facilitating knowledge consolidation and self-regulated learning [28][25]. Its immersive nature promotes hypothesis generation and adaptive reasoning [29]. Real-scene interactive training further promotes clinical thinking by sharpening contextual adaptability and teamwork skills within authentic settings, improving critical and systematic thinking [30][31]. Empirical evidence strongly supports the efficacy of both modalities, with studies showing significant improvements in clinical reasoning, knowledge retention, and performance, particularly when combined in blended approaches [25][28][30][32]. However, challenges such as high costs, faculty training needs, and technological limitations regarding realism and personalization remain. Future directions include developing cost-effective solutions, enhancing faculty development, integrating AI for adaptive learning, and improving simulation fidelity to maximize educational impact [34][35][29].

Conclusion

In conclusion, the integration of intelligent services within internet hospitals has transformed nursing education by leveraging virtual simulation and immersive technologies to enhance clinical thinking, decision-making, and experiential learning. These innovations bridge theory-practice gaps, improve accessibility, and foster critical competencies, though challenges like technical limitations and curriculum integration persist. Future advancements will rely on interdisciplinary collaboration, evidence-based practices, and personalized learning pathways to fully realize their potential in preparing skilled nursing professionals for modern healthcare demands.

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