

Immersive AI-Driven Nursing Education: Integrating VR and Conversational AI for Advanced Wound Care Training

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Nursing education faces significant challenges in delivering effective wound care training due to limited faculty resources, high costs of traditional manikin-based simulations, and ethical constraints surrounding patient consent. These barriers restrict hands on practice, impede skill development, and delay clinical preparedness among nursing students. This study explores the integration of Virtual Reality (VR) simulations and Conversational AI models to revolutionize advanced wound care education, aiming to bridge the gap between theoretical knowledge and practical application. The primary objectives are to enhance critical thinking, clinical competency, knowledge retention, and learner engagement through immersive, interactive technologies tailored to nursing education. A structured literature review was conducted, analyzing 45 peer reviewed studies on VR and AI applications in nursing education, with a specific focus on wound care training. Studies were systematically categorized based on their use of VR, Conversational AI, or combined approaches, revealing a notable gap in research on integrated systems. Findings indicate that VR significantly improves immersion, spatial understanding, and skill acquisition but lacks realistic tactile feedback and robust support for complex decision-making. Conversely, Conversational AI excels in delivering dynamic, personalized feedback and guidance, yet struggles with contextual adaptability and speech recognition accuracy in clinical scenarios. The integration of these technologies remains underexplored, primarily due to hardware limitations, software compatibility issues, and the complexity of replicating domain specific wound care scenarios. Despite these challenges, combining VR's immersive environments with AI's adaptive communication offers a promising pathway to create realistic, scalable training platforms. Such systems could simulate diverse clinical cases, provide real time feedback, and foster critical decision-making skills in a safe, controlled setting. This study underscores the transformative potential of integrated VR-AI systems to address current educational limitations, enhance learner outcomes, and better prepare nursing students for real world clinical challenges. Future research should prioritize developing pedagogically sound, interoperable systems that overcome technical barriers, focusing on scalability, accessibility, and alignment with nursing curricula to ensure practical implementation and widespread adoption in educational settings.

Keywords: Virtual reality, conversational AI, nursing education, wound care training, immersive learning