

Immersive Virtual Reality and Educational Escape Rooms in Undergraduate Nursing Education: A Comparative Quasi-Experimental Study on Learning Outcomes and Student Engagement

Simion Marius Pavel¹, Gaia Sciotti¹, Eleonora Tosto², Lanfranco Cortegiani³, Marinella Durante⁴, Gabriella Facchinetti⁵

¹ Department of Cardiology and Neurology, University Hospital Foundation Campus Bio-Medico, Rome, Italy

² Department of Cardiac Surgery, University Hospital Foundation Campus Bio-Medico, Rome, Italy

³ Department of Palliative Care, University Hospital Foundation Campus Bio-Medico, Rome, Italy

⁴ Department of Oncology, University Hospital Foundation Campus Bio-Medico, Rome, Italy

⁵ National Centre for Clinical Governance and Care Excellence, Italian National Institute of Health, Rome, Italy

(Corresponding Author: mp.simion@alcampus.it)

Citation: Simion MP, Sciotti G, Tosto E, Cortegiani L, Durante M, Facchinetti G. “Immersive Virtual Reality and Educational Escape Rooms in Undergraduate Nursing Education: A Comparative Quasi-Experimental Study on Learning Outcomes and Student Engagement” (2026) *International Journal of Health Supplements* 1(Suppl. 1):48-49. Supp. DOI: <https://doi.org/10.82051/ijhs-2026-1>

Introduction. Healthcare professional education requires teaching methodologies capable of integrating theoretical knowledge, practical skills, and decision-making competencies within simulated learning contexts. Serious Games and gamification strategies have established themselves as effective tools for promoting active learning and facilitating the transfer of competencies to clinical practice. The present study evaluates the effectiveness of two innovative interventions: immersive virtual reality (VR) and Educational Escape Rooms (EER), aimed at developing transversal competencies fundamental in high-criticality healthcare settings.

Methods. Quasi-experimental pre-post study with an explanatory sequential mixed-methods approach (QUAN → qual), conducted at the Clinical Simulation Centre of Campus Bio-Medico University of Rome, involving two cohorts of nursing students. Primary outcomes include knowledge acquisition and technical-practical competencies; secondary outcomes encompass engagement, perceived clinical self-efficacy, and satisfaction with the educational experience.

Results. Both interventions are expected to produce statistically significant improvements in post-intervention scores. For the VR cohort, improvements are anticipated in procedural competencies and a reduction in performance anxiety; for the EER cohort, advances in clinical reasoning and collaborative skills. Qualitative analysis is expected to highlight recurring themes related to intrinsic motivation and transferability of competencies to real clinical contexts.

Discussion. The expected findings contribute to the ongoing debate on the effectiveness of innovative methodologies in Italian nursing education. VR proves effective for technical-procedural competencies, while EER targets non-technical skills often neglected in traditional curricula. Despite limitations related to the absence of randomization and the lack of follow-up assessment, the study represents an original contribution to healthcare educational research in the Italian context.

Keywords: Serious Games, Virtual Reality, Educational Escape Room, Simulation-Based Learning, Clinical Competence, Self-Efficacy, Active Learning, Mixed Methods, Undergraduate Nursing, Problem Solving

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Funding: This research received no external funding. **Conflict of Interest:** The authors declare no conflict of interest.