

Artificial Intelligence in Nursing Education: A Systematic Review of Educational Outcomes, Engagement, and Clinical Competence (2015–2025)

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Abstract:

Background: Artificial intelligence (AI) is rapidly being integrated into nursing education to enhance teaching and learning; however, its pedagogical effectiveness remains uncertain, particularly regarding learning outcomes, clinical competence, and higher-order cognitive skills.

Aim: This systematic review evaluates the impact of AI-based educational interventions on nursing students' learning outcomes, engagement, and clinical competence, and explores students' perceptions and associated challenges.

Methods: A systematic search of PubMed, Scopus, CINAHL, and ERIC identified studies published between January 2015 and December 2025, following PRISMA 2020 guidelines. Sixteen studies met the inclusion criteria. Owing to methodological heterogeneity, findings were synthesised narratively, and study quality was appraised using established critical appraisal tools.

Results: AI interventions—including chatbots, virtual patients, and generative AI such as ChatGPT—enhanced engagement and learning experiences, with some improvements in academic performance and clinical skills. However, evidence regarding clinical reasoning and ethical decision-making was inconsistent. Students reported positive attitudes alongside concerns about reliability, ethics, and over-reliance.

Conclusion: AI shows promise as a complementary pedagogical tool; however, rigorous longitudinal research is needed to determine its sustained impact on clinical competence and professional practice

Keywords:

Artificial intelligence, Nursing education, Clinical competence, Student engagement, Generative AI, Systematic review.