INPLASY

Research Trends in Metaverse-based Education for Nursing Students

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ADMINISTRATIVE INFORMATION

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 August 2025 and was last updated on 27 August 2025.

INTRODUCTION

Review question / Objective Primary objective: Describe the current status, characteristics, and measured outcomes of metaverse-based education programs for nursing students.
Secondary objective: Identify design features (e.g., briefing/debriefing, communication channels, fidelity, exposure dose) associated with educational outcomes and highlight gaps to inform future trials.

Condition being studied Health professional education — metaverse-based nursing education in nursing students (educational outcomes: knowledge, self-efficacy, communication, critical thinking).

METHODS

Participant or population Undergraduate or graduate nursing students.

Intervention Metaverse-based educational programs delivered on persistent multi-user virtual platforms (avatar-based, synchronous social spaces).
Explicit exclusion: Studies focused solely on VR/AR/XR applications not embedded within a metaverse platform.

Comparator Traditional instruction, online non-metaverse learning, or no intervention. Single-group pre–post designs eligible.

Study designs to be included Randomized controlled trials (RCTs) and quasi-experimental designs (including pre–post without control).

Eligibility criteria - Population: Undergraduate or graduate nursing students.
- Intervention: Metaverse-based educational programs delivered on persistent, multi-user 3D platforms (avatar-based, synchronous interaction; social/world persistence).

- Comparator: Traditional instruction, online non-metaverse learning, or no comparator (single-group pre–post designs eligible).
- Outcomes (quantitative): At least one measurable educational outcome (e.g., knowledge/competence, self-efficacy, communication, critical thinking); secondary outcomes may include satisfaction, perceived realism/presence, teamwork.
- Study designs: RCTs and quasi-experimental designs (including non-randomized controlled, pre–post). Mixed-methods studies are eligible if extractable quantitative outcomes are reported.
- Setting: Academic courses, skills labs, or simulated clinical environments using metaverse platforms.
- Time frame: Publications from 2013-01-01 to 2023-12-31.
- Language: English or Korean.
- Publication type: Peer-reviewed journal articles with full text available.

Information sources Databases (Korean): RISS, KISS, DBpia, KMbase.
Databases (International): CINAHL, EMBASE, MEDLINE, PubMed.
Search window: 2013-01-01 to 2023-12-31.
Limits: Language (English/Korean); peer-reviewed articles; exclude letters/editorials/conference abstracts.
Reproducible strategies: Database-specific Boolean strings, field tags, truncation, and date last searched are provided in Supplementary Table 1 (Full Search Strategy).
Note: VR/AR/XR terms were intentionally excluded to align with the predefined metaverse-specific scope (acknowledged as a limitation).

Main outcome(s) Primary: Knowledge/competence, self-efficacy, communication, critical thinking.
Secondary: Learning satisfaction, perceived realism/presence, problem-solving, teamwork.

Quality assessment / Risk of bias analysis Non-randomized studies: RoBANS (six domains).
Randomized trials (if any): RoB 2.

Strategy of data synthesis
Synthesis structure:
- Education type: skills training vs major course vs clinical simulation;
- Outcome type: knowledge, self-efficacy, communication, critical thinking;
- Design features: pre-briefing/debriefing, communication channel fidelity (voice/non-verbal/chat), environmental fidelity, exposure dose.

Effect sizes: Where sufficient statistics are reported, study-level direction and approximate magnitude will be described; no pooled standardized effect sizes will be computed across studies.

Subgroup analysis
Subgroup/Moderator narrative: Qualitative exploration by education type, outcome type, and design features.
Small-study/reporting bias: Not formally assessed given qualitative synthesis and small evidence base.

Sensitivity analysis
1. Risk of bias restriction: Re-interpret findings after excluding studies rated at high risk of bias (overall or ≥2 high-risk domains).
2. Design restriction: Exclude single-group pre–post studies and retain only controlled designs (RCTs or non-randomized controlled).
3. Measurement quality: Retain only studies using validated instruments and complete pre/post statistics for primary outcomes.
4. Sample size threshold: Re-check conclusions after excluding studies with very small samples (pre-specified threshold, e.g., total n < 40 or n < 30 per arm).
5. Intervention dose/fidelity: Exclude outlier studies with non-comparable exposure dose (e.g., unusually short/long duration) or low communication/environmental fidelity.
6. Leave-one-study-out (narrative): Iteratively remove each study to see if any single study unduly drives a conclusion.
7. Categorization robustness: Re-classify outcomes (e.g., knowledge vs self-efficacy vs communication vs critical thinking) and education types (skills vs course vs clinical simulation) to confirm that patterned conclusions persist across reasonable alternative groupings.
8. Language sensitivity: Compare conclusions including vs excluding Korean-language studies.

Language restriction English, Korean.

Country(ies) involved Republic of Korea.

Keywords health education; metaverse; nursing; systematic review.

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