

PURPOSE

- Objective: To assess the current state of knowledge regarding the use of holograms in health sciences education. Based on the findings of the review, we developed the HSSOBP™ guide to provide practical recommendations for the integration of hologram technology in simulation-based education.

Research Questions

- Primary Research Question
 - What are the best practices for implementing and utilizing hologram technology in health sciences education?
- Secondary Research Questions
 - What types of hologram technology are currently being used in health sciences education?
 - What are the reported impacts of hologram technology on students' learning outcomes, including engagement, clinical skills acquisition, and empathy?
 - What challenges and limitations have been identified regarding the integration of holograms into simulation-based learning environments?
 - What gaps exist in the current literature regarding the use of holograms in health sciences education?
 - What recommendations can be drawn from the literature to inform the development and implementation of standardized best practices such as the HSSOBP™ framework?

INCLUSION CRITERIA

- Population: Health sciences students or professionals (e.g., nursing, medical, allied health).
- Concept: Use of hologram technology in educational contexts.
- Context: Formal educational institutions or clinical training environments.
- Peer-reviewed empirical studies published in English, Spanish, or Portuguese Studies using hologram technology for education or training

METHOD

- All records retrieved from databases were exported in RIS format, managed using EndNote for deduplication, and exported in XML format to JBI Sumari for screening, appraisal and extraction. Two researchers independently screened each record and synthesized the data.

Best Practices for Implementing Holograms in Clinical Simulation: Insights from a Scoping Review

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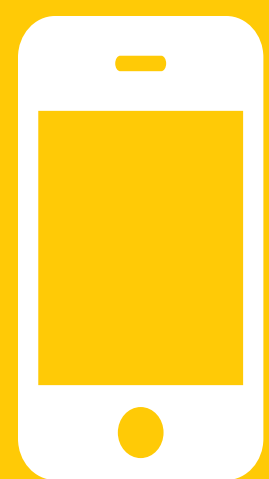
*AI: book, hologram, magazine

DATA EXTRACTION POINTS AND THEMES

Metadata: Author(s), Year of Publication, Country of Origin, Journal	Study Design: Study Type (e.g., RCT, Qualitative, Mixed Methods), Sample Size, Population Characteristics	Type of Hologram Technology Used: 2D/3D, AR Integration, Holographic Displays, Projection Method
Educational Context: Type of Institution (University, Hospital, etc.), Setting (Anatomy Class, Emergency Simulation, Etc.)	Reported Outcomes: Student Engagement, Knowledge Acquisition, Skills Improvement, Empathy, Teamwork, Decision-making	Measurement tools: Instruments Used to Evaluate Outcomes (If Applicable)
Implementation Characteristics: How the Hologram was Introduced, Integrated Into Curriculum, Challenges Faced	Perceived Barriers and Facilitators: Cost, Accessibility, Training Needs	Gaps and Recommendations: As Reported by Individual Study Authors Qualitative Themes (If Present)

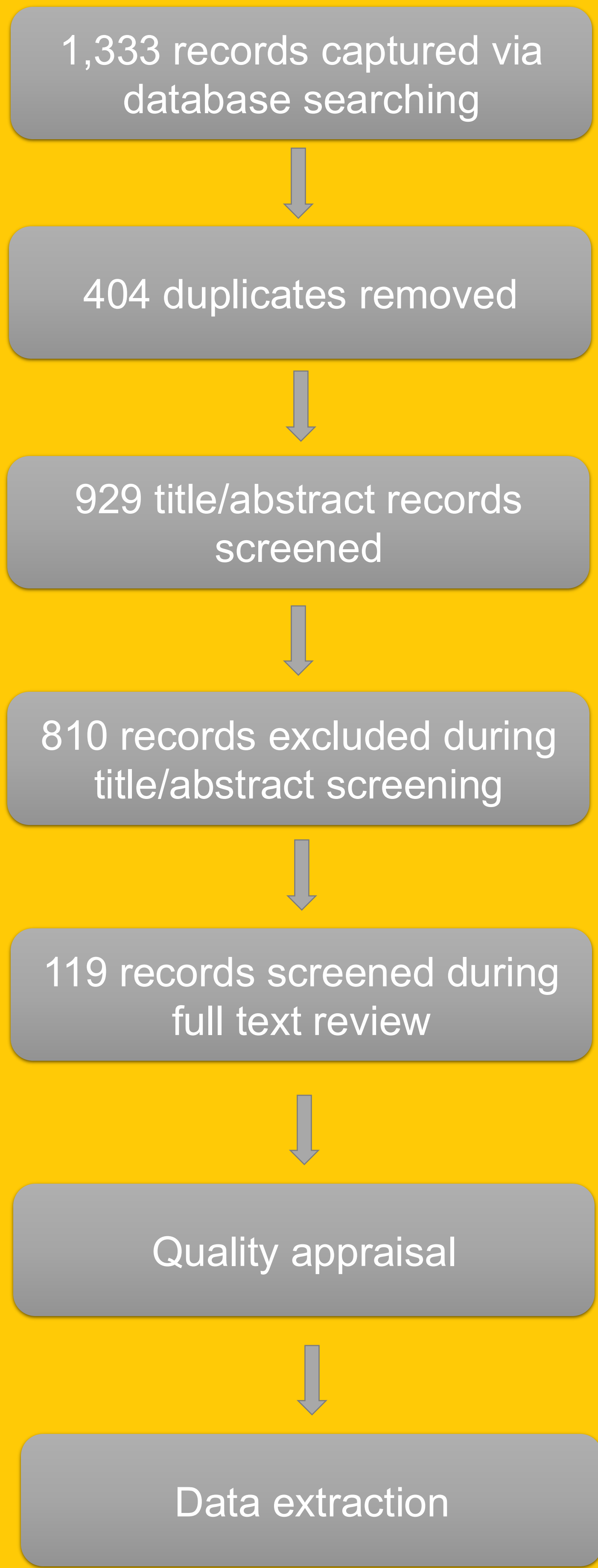
REFERENCES

- See QRS code for References.



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SCREENING PROCESS



Protocol

- Lino, M. M., Todd, A., Castro, L. S. E. P. W., Amadigi, F. R., Lamanna, J., Anderson, M., ... Díaz, D. A. (2025, April 30). Best practices for hologram technology utilizing HSSOBPTM®: a Scoping Review. Retrieved from osf.io/kajy8



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Databases

- The following electronic databases were searched:
 - PubMed: For biomedical and health-related literature.
 - CINAHL: For nursing and allied health-focused studies.
 - Web of Science: To capture a broad range of studies.
 - Academic Search Premier: To yield comprehensive interdisciplinary database results.
 - Applied Science and Technology Source: For technical and engineering-focused literature
 - ERIC: To include studies from educational and pedagogical contexts

Example Search Terms

- Holograms
 - (MH "Holography") or hologra* or 3D virtual patient* or Three-dimensional virtual patient* or projected virtual patient* projection or 3D avatar* patient* or Three-dimensional avatar* patient*
- Simulation, Education & Training
 - (MH "Simulations") or (MH "Augmented Reality") or (MH "Patient Simulation") or (MH "Education, Clinical") or (MH "Education, Nursing+") or (MH "Education, Medical+") or (MH "Education, Health Sciences+") or (MH "Teaching Methods, Clinical+") or (MH "Education, Pharmacy") or (MH "Education, Interdisciplinary") or simulat* or "virtual Reality" or "augmented Reality" or educat* or train* or teach* or learn* or competen* or self-efficacy or communicat* or "disaster planning" or team OR skill*)
- Population
 - (MH "Health Personnel+") OR (MH "Allied Health Personnel") OR (MH "Expert Clinicians+") OR (MH "Medical Staff, Hospital+") OR (MH "Nurses+") OR (MH "Physicians+") OR (MH "Multidisciplinary Care Team+") OR (MH "Students, Nursing+") OR (MH "Students, Health Occupations+") OR (MH "Students, Allied Health+") or (nurs* N3 student* or nurs* N3 educat* or Health* educat* or medical N3 educat* or nurse* or physician* or provider* or clinician* or medical N3 student* or health* N3 student* or practitioner* or resident* or residency or intern or internship*)



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