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Global trends in the study of virtual reality and health education : A bibliometric review

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Introduction

- **Virtual Reality** (VR) has moved from pilots to mainstream across medical, nursing, and interprofessional education, offering immersive, safe, repeatable practice environments that improve knowledge, skills, decision-making, and even empathy.

- Since the early 2010s, the rapid convergence of educational technology, simulation science, and medical pedagogy has driven VR's application across medical, nursing, public health, and interprofessional education domains.

Introduction

- Many studies have focused on virtual reality and health education (Car et al., 2019; Duff et al., 2016; Jiang et al., 2022; Kyaw et al., 2019; Marín-Morales et al., 2018; Park et al., 2023; Souza et al., 2025; Taubert et al., 2019).
- → However, a comprehensive and systematic review is lacking.

- Therefore, the objective of this study is to clarify the trends, progress, and focus of studies on virtual reality and health education through bibliometric analysis.

Results and Discussion — Trends

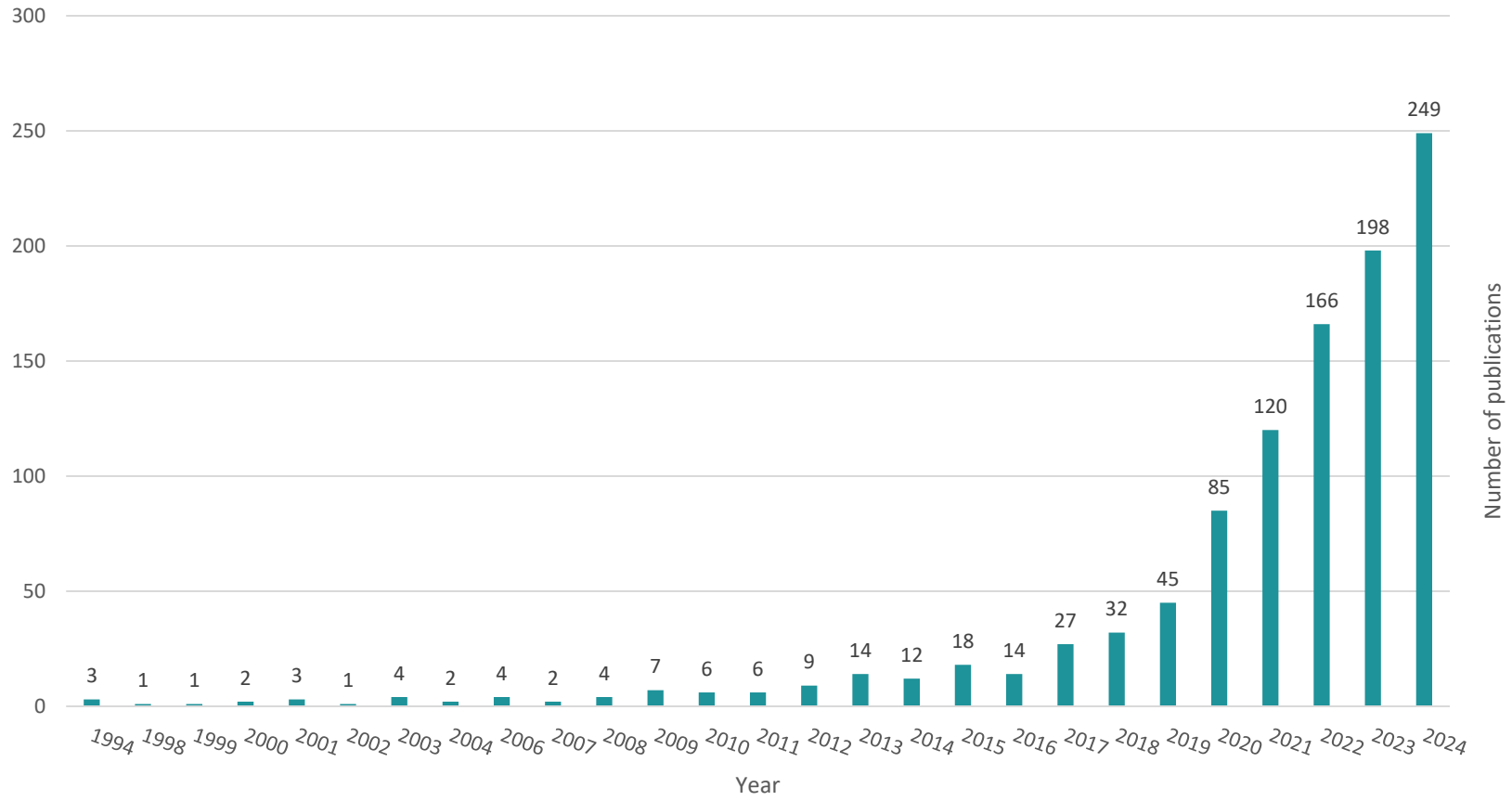

Figure 2 The trend in the annual number of publications on the study of virtual reality and health education

Results and Discussion — Countries contribution analysis

Figure 3 The geographical distribution and co-citation network for the study of virtual reality and health education

Results and Discussion — Countries contribution analysis

Table 1 Top 10 countries with the most publications surrounding the study of virtual reality and health education

Rank	Country	Number of Publications	Starting Year
1	USA	309	1994
2	UK	162	1998
3	Australia	99	2001
4	China	78	2008
5	Canada	61	2007
6	South Korea	50	2013
7	Germany	49	2013
8	Spain	47	2001
9	Italy	46	2001
10	India	34	2009

Results and Discussion— Institution contribution analysis

Table 2 Performance of the top 5 institutions with the most publications within the study of virtual reality and health education

Rank	Institution	Country	Number of Publication
1	Harvard University	USA	85
2	University of California System	USA	38
3	University of Toronto	Canada	22
4	University System of Ohio	USA	20
5	Imperial College London	UK	19

Results and Discussion — High productive journals analysis

Table 3 Top 5 journals in the domain of virtual reality and health education research (SCIE/SSCI)

Rank	Journals	Number of indexed publications	JIF 2024	Categories
1	Journal of Medical Internet Research	30	6.0(Q1)	Health Care Sciences & Services(SCIE); Medical Informatics(SCIE)
2	JMIR Serious Games	25	4.1(Q1)	Health Care Sciences & Services(SCIE); Medical Informatics(SCIE)
3	Clinical Simulation in Nursing	17	2.5(Q1)	Nursing(SSCI)
4	Anatomical Sciences Education	16	4.7(Q1)	Education, Scientific Disciplines (SCIE)
5	BMC Medical Education	15	3.2(Q1)	Education, Scientific Disciplines (SCIE); Education & Educational Research (SSCI)

Results and Discussion — Keywords analysis

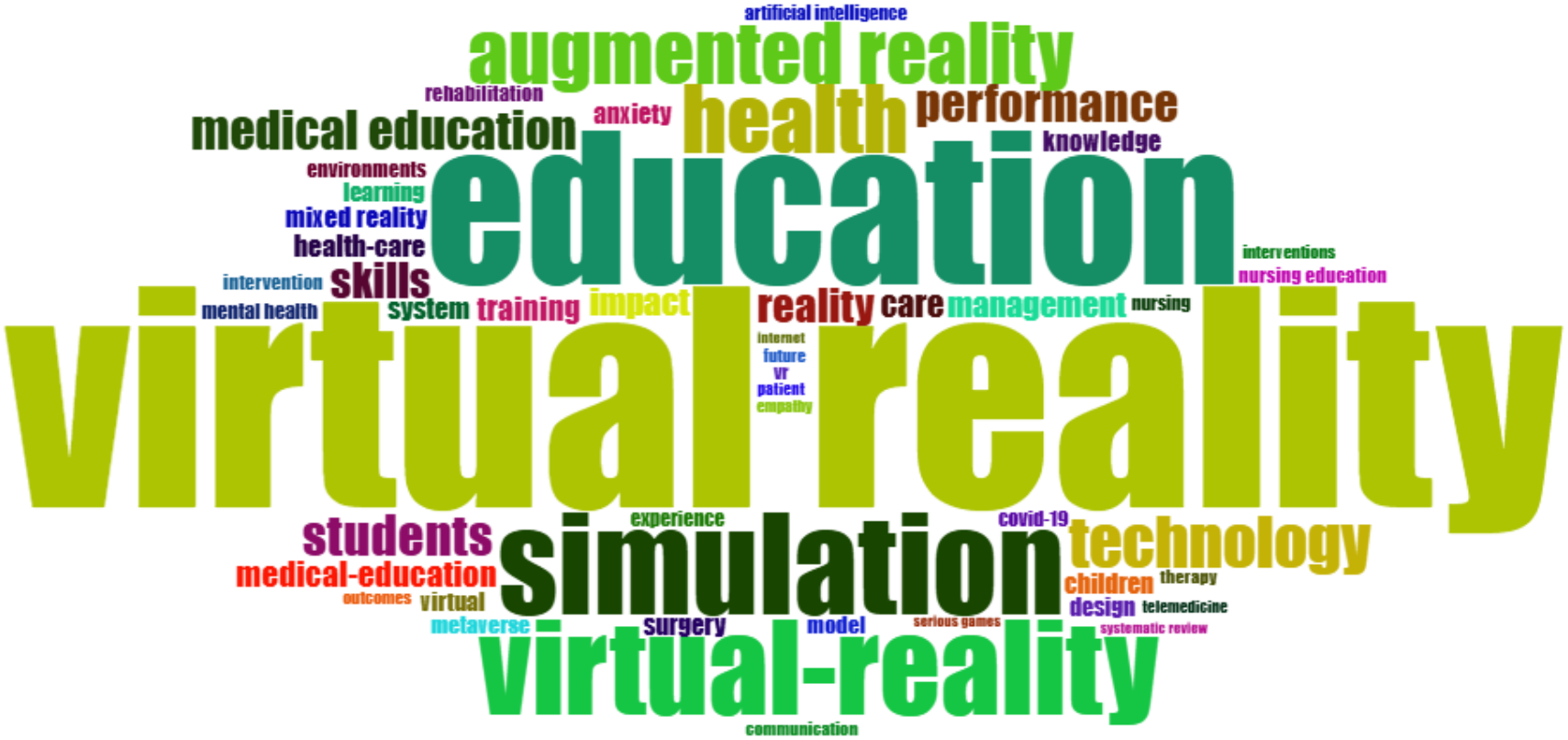

Figure 4 Word cloud of keywords for the study of virtual reality and health education

Results and Discussion — Keywords analysis

Table 4 Top 10 keywords in the domain of virtual reality and health education

Rank	Keywords	Frequency
1	Virtual Reality	668 (65%)
2	Education	327 (31%)
3	Simulation	214 (21%)
4	Health	143 (14%)
5	Augmented Reality	134 (13%)
6	Technology	109 (11%)
7	Students	88 (9%)
8	Medical education	84 (8%)
9	Performance	82 (8%)
10	Skills	75 (7%)

Conclusions

- VR has transformed health education into a multisensory, learner-centered, and data-driven experience that bridges theory and practice.
- Global collaboration and technological convergence have accelerated research output, with strong institutional networks and emerging participation from Asia and developing countries.
- Current frontiers focus on integrating VR with AI, expanding interprofessional simulation, enhancing critical care education, and applying immersive technologies to public and climate-related health education.
- VR is not only a pedagogical innovation but also a digital bridge between education, health equity, and sustainable development, shaping the next generation of healthcare professionals and informed citizens.

Thank you