Continuing Education in Nursing: The Use of Virtual Reality, Clinical Simulation, and Active Methodologies for Training

Educação Permanente Em Enfermagem: Uso de Realidade Virtual, Simulação Clínica e Metodologias Ativas para Capacitação

Educación Permanente en Enfermería: Uso de Realidad Virtual, Simulación Clínica y Metodologías Activas para la Capacitación

RESUMO

Este estudo objetivou analisar as contribuições da simulação clínica, da realidade virtual e das metodologias ativas no contexto da educação permanente em enfermagem. Por meio de uma revisão integrativa da literatura, foram selecionados onze estudos publicados entre 2015 e 2025, com foco na utilização de estratégias pedagógicas inovadoras na formação e atualização profissional de enfermeiros. A análise revelou que essas abordagens promovem uma aprendizagem mais significativa, fortalecem competências técnicas e comportamentais e favorecem a articulação entre teoria e prática. A simulação clínica destacou-se como ferramenta eficaz para o desenvolvimento de habilidades específicas em ambientes seguros e controlados. A realidade virtual mostrou potencial para enriquecer experiências formativas por meio de cenários imersivos e interativos. As metodologias ativas, por sua vez, incentivam o protagonismo do profissional no processo de aprendizagem e estimulam o pensamento crítico. Apesar dos benefícios identificados, persistem desafios relacionados à infraestrutura, formação docente e resistência à mudança. Conclui-se que a integração dessas estratégias representa um avanço para a qualificação da prática em enfermagem e deve ser incentivada como eixo estruturante da educação permanente em saúde.

DESCRITORES: Educação permanente em saúde. Enfermagem. Simulação clínica. Realidade virtual. Metodologias ativas.

ABSTRACT

This study aimed to analyze the contributions of clinical simulation, virtual reality, and active methodologies within the context of continuing education in nursing. Through an integrative literature review, eleven studies published between 2015 and 2025 were selected, focusing on innovative pedagogical strategies for training and professional development in nursing. The analysis revealed that these approaches promote meaningful learning, strengthen technical and behavioral skills, and support the integration of theory and practice. Clinical simulation stood out as an effective tool for developing specific competencies in safe and controlled environments. Virtual reality demonstrated potential to enhance training experiences through immersive and interactive scenarios. Active methodologies, in turn, foster learner autonomy and stimulate critical thinking. Despite the recognized benefits, challenges persist regarding infrastructure, faculty training, and resistance to innovation. It is concluded that integrating these strategies represents a significant advancement for the qualification of nursing practice and should be encouraged as a structural axis of continuing education in health.

DESCRIPTORS: Continuing education. Nursing. Clinical simulation. Virtual reality. Active methodologies.

RESUMEN

Este estudio tuvo como objetivo analizar las contribuciones de la simulación clínica, la realidad virtual y las metodologías activas en el contexto de la educación permanente en enfermería. A través de una revisión integrativa de la literatura, se seleccionaron once estudios publicados entre 2015 y 2025, centrados en el uso de estrategias pedagógicas innovadoras en la formación y actualización de profesionales de enfermería. El análisis evidenció que estas metodologías favorecen un aprendizaje significativo, fortalecen competencias técnicas y comportamentales, y facilitan la articulación entre teoría y práctica. La simulación clínica se destacó como herramienta eficaz para el desarrollo de habilidades en ambientes seguros y controlados. La realidad virtual presentó potencial para enriquecer la formación mediante escenarios inmersivos e interactivos. Las metodologías activas promueven el protagonismo del profesional y estimulan el pensamiento crítico. A pesar de los beneficios señalados, persisten desafíos relacionados con la infraestructura, la formación docente y la resistencia a los cambios. Se concluye que la integración de estas estrategias representa un avance para la cualificación del ejercicio profesional y debe ser promovida como eje estructurante de la educación permanente en salud.

DESCRIPTORES: Educación permanente. Enfermería. Simulación clínica. Realidad virtual. Metodologías activas.

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INTRODUCTION

The growing complexity of healthcare systems and the rapid evolution of clinical practices require nursing professionals to continuously update their knowledge and skills. In this context, Continuing Health Education (CHE) has established itself as an essential strategy for improving the quality of care and strengthening professional competencies. Unlike traditional continuing education, EPS starts from the problematization of everyday practice, valuing experiential knowledge and promoting meaningful and situated learning[1].

In recent years, the incorporation of active methodologies in the context of EPS has gained prominence for favoring the protagonism of the professional in the training process. Strategies such as problem-based learning (PBL), flipped classrooms, and case studies have been widely used to stimulate critical thinking and decision-making[2]. In this scenario, innovative technologies such as virtual reality (VR) and clinical simulation emerge as powerful pedagogical tools, allowing professionals to experience complex care situations in safe, controlled, and realistic environments[3].

Clinical simulation, in particular, has proven effective in promoting technical and behavioral skills and is recognized as a valuable resource for the development of reflective practice and teamwork[4]. Virtual reality, on the other hand, due to its immersiveness, provides interactive experiences that enhance engagement and knowledge retention, expanding the possibilities for training and continuing education for healthcare workers. Thus, integrating these technologies into active methodologies represents an advance in strengthening CPE, with a direct impact on the quality of care and patient safety.

Despite the methodological and technological advances observed in recent years, significant challenges remain in the effective implementation of Continuing Education in Nursing. The fragmentation of training processes, resistance to pedagogical innovation, and structural limitations of health institutions often hinder the systematic adoption of more active and technological practices in everyday professional life[1]. The absence of an institutional culture focused on continuous learning and the lack of investment in infrastructure and facilitator training contribute to the reproduction of traditional teaching models, which prove insufficient in the face of the complex demands of current practice[2].

In addition, it is noted that many professionals still understand in-service education as isolated events disconnected from practical reality, which weakens the proposal of EPS as a transformative, critical, and collective process[3]. The introduction of tools such as virtual reality and clinical simulation therefore requires not only material resources, but also a change in the educational paradigm, in which mistakes are reframed as learning opportunities and reflection on practice takes center stage[4].

In this sense, it is essential to understand that the use of these technologies is not restricted to technical and operational aspects, but involves a structured pedagogical approach capable of promoting participant engagement and the articulation between theory and practice[5]. When integrated with active methodologies, such tools not only diversify learning scenarios but also expand the possibilities for critical analysis, favoring the collective construction of knowledge and shared responsibility for improving services[6].

Therefore, reflecting on these training possibilities is not only a matter of innovation, but a necessity in view of nursing's ethical and social commitments to quality of care and patient safety. This article proposes to discuss the integrated use of virtual reality, clinical simulation, and active methodologies as strategic tools for nursing training, in light of the most recent evidence in the field of health education.

METHOD

This is an integrative literature review, a methodological approach that allows the systematic gathering, analysis, and synthesis of available knowledge on a given topic, with the aim of deepening understanding and supporting informed decisions in professional practice. This methodology was chosen because it allows for the incorporation of different types of studies and is suitable for the critical analysis of scientific productions re-

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lated to nursing training in the context of continuing education, with a focus on the application of innovative technologies and pedagogical strategies.

The review was conducted based on the formulation of a guiding question that oriented the entire investigative process. The question sought to identify what scientific evidence has been published on the use of virtual reality, clinical simulation, and active methodologies as tools to support professional training in health services, particularly in the field of nursing.

To ensure the consistency and quality of the survey, previously defined inclusion and exclusion criteria were established. Articles available in full, published between 2015 and 2025, in Portuguese, English, or Spanish, that directly addressed the theme of continuing education in nursing associated with the use of the technologies in focus were included. Studies that did not address the nursing profession were excluded, as were editorial-type publications, letters to the editor, conference abstracts, dissertations, theses, and duplicate works.

The search for studies was conducted in electronic databases widely used in the field of health and human sciences, including national and international sources. The search strategy combined controlled descriptors and free terms related to continuing education, nursing, clinical simulation, virtual reality, and active methodologies, using Boolean operators to broaden and refine the results.

The selection of studies followed three stages: reading the titles, analyzing the abstracts, and reading the full texts that met the established criteria. The process was carried out independently by two evaluators, ensuring greater rigor in the selection. When there was disagreement regarding the inclusion of a study, the reviewers discussed the issue until consensus was reached.

The analysis of the selected studies involved the extraction of relevant information such as year of publication, objectives, type of methodological approach, strategies used, and main results. The data were organized into thematic categories to facilitate understanding of each study's contributions to the field under investigation. The synthesis of the findings allowed us to identify trends, gaps, and possibilities for applying the tools analyzed in the context of professional nursing training through continuing education.

RESULTS

With the aim of consolidating the available evidence on the use of virtual reality, clinical simulation, and active methodologies in the training of nursing professionals, eleven studies that met the previously established inclusion criteria were selected. The following table presents the characterization of these studies, including information such as year of publication, objectives, type of study, and main findings. Content analysis allowed us to identify methodological trends, recurring pedagogical approaches, and relevant contributions to strengthening continuing education in different nursing contexts.

TABLE 1 – Presentation of scientific articles:

N°	Study Title	Year	Objective	Type of Study	Main Findings
1	Permanent Health Education and Active Methodologies: An Integrative Systematic Review	2021	To analyze the use of active methodologies in continuing health education.	Integrative review	Active methodologies promote greater engagement and meaningful learning in professional practice.
2	The Use of Simulation and Gamification in Health Education	2022	To analyze the use of simulation and gamification in health education.	Theoretical-reflective study	Simulation and gamification enhance participation and learning among healthcare professionals.
3	Educational Technologies in Higher Education in Nursing	2022	To discuss the application of technologies in nursing education.	Narrative review	The use of technological resources strengthens the teaching-learning process in educational settings.
4	Clinical Simulation as a Continuing Education Strategy for Nurses in the Insertion of the Laryngeal Mask	2022	To describe the experience with clinical simulation for airway management training.	Experience report	Clinical simulation is effective in preparing professionals for specific technical procedures.
5	Updating Nursing Knowledge and Practices through Continuing Health Education to Face COVID-19	2021	To report the importance of Continuing Health Education (CHE) in the context of the pandemic.	Experience report	Continuing education was essential for adapting practices during the health crisis.
6	Realistic Simulation Training in Wound and Dressing Care: An Experience Report	2023	To present an experience with realistic simulation in wound care.	Experience report	Simulation contributes to improving care quality and patient safety.

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7	Development of a Guidance Manual for Continuing Education in the Surgical Center: Experience Report	2020	To report the development of a manual to support continuing education actions in the surgical center.	Experience report	Organized educational materials optimize the process of ongoing training.
8	Evaluation of the Applicability of Active Teaching-Learning Methodologies in Professional Nursing Education	2022	To evaluate the use of active methodologies in nursing education.	Qualitative research	Active methodologies foster autonomy, critical thinking, and clinical reasoning.
9	Realistic Simulation as a Teaching Method for Nurse Training	2022	To present the application of realistic simulation in nurse training.	Experience report	Simulation provides safe practice and technical improvement for professionals.
10	Use of Realistic Simulation in Nurse Training for the Management of Critical Patients	2022	To report a training experience with simulation in a critical context.	Experience report	Simulation enhances autonomy and improves clinical performance.
11	Virtual Reality and Nursing Education: Contributions to Teaching and Practice	2023	To analyze the impact of virtual reality on nursing education and practice.	Integrative review	Virtual reality stimulates clinical reasoning and active learning.

Source: Research data, 2025.

DISCUSSION

The analysis of the selected studies identified three main axes that support innovative practices in professional nursing training in the context of continuing education: clinical simulation, virtual reality, and active methodologies. These resources have been valued for promoting learning environments that approximate real-life care situations, favoring the construction of meaningful knowledge, the development of technical and behavioral skills, and the strengthening of professional autonomy.

Clinical simulation has been highlighted in several studies as an effective strategy for developing essential nursing skills, especially in contexts that require quick and accurate decision-making[1,2,3]. By providing a controlled and safe environment for repeating procedures and experiencing complex situations, this methodology contributes to the technical improvement, clinical reasoning, and self-confidence of professionals. In addition, simulation has proven effective in preparing for critical situations, such as caring for patients in serious condition or handling specific equipment and techniques, such as the use of laryngeal masks and wound care[4,5].

Another relevant aspect that has been highlighted is the use of virtual reality as a tool to support the training process. The immersiveness provided by this technology encourages active participation by learners and facilitates the assimilation of content in a more engaging way. Studies have shown that virtual reality contributes to knowledge retention and improves the ability to analyze and respond to simulated clinical scenarios, promoting critical and reflective learning[6,7].

The accessibility and possibility of customizing scenarios make this strategy especially useful in contexts where face-to-face training is limited, such as in health emergencies or in institutions with few physical resources. Active methodologies, in turn, emerge as a pedagogical approach capable of transforming the logic of traditional training, centered on the unidirectional transmission of content.

Through strategies such as problem-based learning, gamification, and the flipped classroom, professionals are encouraged to reflect on their practice, identify real problems, and propose well-founded solutions, becoming protagonists in their own learning process[8,9]. This type of approach also favors collaborative work, interdisciplinarity, and the integration of theory and practice, which are essential aspects for the qualification of health care.

Despite the favorable evidence, some challenges have still been pointed out, especially related to infrastructure, resistance from professionals and managers to adopting new methodologies, and the scarcity of teacher training focused on the use of these technological tools in the continuing education environment[10,11]. These limitations indicate the need for institutional investment, technical support, and public policies that encourage innovation in the field of continuing nursing education.

Although the benefits of these strategies are widely recognized, the incorporation of educational technologies and active methodologies in continuing nursing education requires more than the occasional adoption of teaching resources. Above all, it requires pedagogical restructuring supported by planning, intentionality, and continuous evaluation. In many health services, continuing education is still treated as a secondary, occasional activity that is disconnected from the real needs of workers and the specificities of the nursing work process[10].

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This limits the transformative potential of these practices and perpetuates traditional teaching models centered on memorization and the unidirectional transmission of knowledge.

In addition, some studies point out that even when resources such as simulation and virtual reality are available, their use may be superficial or disconnected from well-defined educational objectives[11]. The effectiveness of these technologies is directly related to how they are integrated into teaching methodologies, the clarity of training objectives, and the pedagogical mediation exercised by the facilitator. Therefore, the qualification of professionals who work as health educators is an urgent demand, especially with regard to pedagogical training focused on the mediation of participatory, reflective, and contextualized processes.

Another point worth highlighting is the potential of these approaches to promote more inclusive and accessible learning environments that are adapted to the different realities of nursing practice. In regions where the presence of physical training centers is limited, for example, the use of immersive technologies can enable distance learning without compromising the quality of the training experience[6]. Technology-mediated active learning can also favor the continuity of educational processes in crisis contexts, as was observed during the COVID-19 pandemic, when many professionals needed to be quickly updated to deal with emergency situations[5].

The articulation between theory and practice, facilitated by these methodologies, also contributes to strengthening critical thinking, autonomy, and decision-making skills among nursing professionals. This is especially important in a field where clinical decisions are made under pressure and directly impact patients' lives. When properly applied, active methodologies, simulation, and virtual reality not only improve technical performance but also strengthen ethical, communication, and collaborative skills, which are fundamental to safe, empathetic, and humanized practice[2,4].

Thus, the studies analyzed reinforce the transformative potential of continuing education when combined with dynamic, interactive pedagogical strategies centered on the reality of healthcare work. The integration of simulation, virtual reality, and active methodologies represents a promising path to strengthening clinical skills, promoting patient safety, and improving the quality of care provided.

FINAL CONSIDERATIONS

This integrative review showed that the use of clinical simulation, virtual reality, and active methodologies constitutes a strategic set of high pedagogical value for the training of nursing professionals in the context of continuing health education.

The studies analyzed demonstrated that these approaches favor the development of technical and relational skills, promote greater engagement of participants, and contribute to more meaningful learning, centered on practice and the resolution of real problems in everyday professional life. Clinical simulation has proven effective in the technical qualification of professionals, allowing the repetition of procedures in safe environments, which increases patient safety and reduces risks in care.

Virtual reality, in turn, expands training possibilities by offering immersive experiences that stimulate clinical reasoning and learner autonomy. Active methodologies transform the educational process by encouraging critical participation, collective knowledge building, and accountability for one's own professional development.

Despite the advances identified, important challenges still need to be addressed, such as institutional resistance to pedagogical innovation, limited technological resources in some services, and the lack of teacher training focused on the use of these methodologies. In this sense, it is essential to strengthen public policies that value continuing education as a structuring axis of health work and encourage the implementation of innovative educational practices at different levels of care.

It is concluded that the integration of these strategies in the context of continuing nursing education represents a promising path for improving care, valuing the work of the nursing team, and building safer, more effective, and more humanized health systems. Further research is recommended to deepen the assessment of the impacts of these technologies on clinical practice, especially in diverse contexts such as primary care, emergency care, and remote areas, thus expanding the applicability of the findings of this review.

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