Active Methodologies and Pedagogical Innovation in Critical Nursing Education in Intensive Care

Metodologias Ativas e Inovação Pedagógica no Ensino Crítico da Enfermagem em Terapia Intensiva

Metodologías Activas e Innovación Pedagógica en la Enseñanza Crítica de la Enfermería en Cuidados Intensivos

RESUMO

Objetivo: Relatar a experiência docente na disciplina de Enfermagem em Terapia Intensiva, destacando o impacto das metodologias ativas na formação crítica e reflexiva do enfermeiro. **Método:** Estudo qualitativo, descritivo-analítico, baseado em observação sistemática e registros em diário de campo. As atividades incluíram aulas dialogadas, práticas supervisionadas e seminários integradores. **Resultados:** As metodologias ativas favoreceram a autonomia discente, o desenvolvimento do raciocínio clínico e a consolidação de competências técnicas, cognitivas e relacionais, com ampliação do engajamento, da segurança técnica e da liderança nas práticas simuladas. **Conclusão:** A integração entre teoria, prática e reflexão crítica potencializa a formação de enfermeiros comprometidos com a segurança do paciente e com os princípios do SUS.

DESCRITORES: Metodologias ativas; Educação em enfermagem; Enfermagem em terapia intensiva; Raciocínio clínico; Segurança do paciente.

ABSTRACT

Objective: To report the teaching experience in the Intensive Care Nursing course, emphasizing the impact of active methodologies on critical and reflective nursing training. **Method:** Qualitative, descriptive-analytical study based on systematic observation and field diary records. Activities included dialogued classes, supervised practices, and integrative seminars. **Results:** Active methodologies promoted student autonomy, clinical reasoning, and the consolidation of technical, cognitive, and relational skills. Increased engagement, technical safety, and leadership were observed in simulated practices. **Conclusion:** Integrating theory, practice, and critical reflection enhances the education of nurses committed to patient safety and the principles of the Brazilian Unified Health System (SUS).

DESCRIPTORS: Active methodologies; Nursing education; Intensive care nursing; Clinical reasoning; Patient safety.

RESUMEN

Objetivo: Relatar la experiencia docente en la asignatura de Enfermería en Cuidados Intensivos, destacando el impacto de las metodologías activas en la formación crítica y reflexiva del enfermero. **Método:** Estudio cualitativo, descriptivo-analítico, basado en observación sistemática y registros en diario de campo. Las actividades incluyeron clases dialogadas, prácticas supervisadas y seminarios integradores. Resultados: Las metodologías activas favorecieron la autonomía del estudiante, el razonamiento clínico y la consolidación de competencias técnicas, cognitivas y relacionales, con mayor compromiso, seguridad técnica y liderazgo en las prácticas simuladas. **Conclusión:** La integración entre teoría, práctica y reflexión crítica potencia la formación de enfermeros comprometidos con la seguridad del paciente y con los principios del Sistema Único de Salud (SUS).

DESCRIPTORES: Metodologías activas; Educación en enfermería; Enfermería en cuidados intensivos; Razonamiento clínico; Seguridad del paciente.

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INTRODUCTION

Training nurses to work in intensive care units (ICUs) involves the challenge of preparing professionals for highly complex scenarios in which quick, informed, and safe decisions can determine vital outcomes[1,2]. In this context, active methodologies are powerful teaching strategies capable of articulating theory, practice, and critical reflection[1,2].

The ICU is characterized by the intensive use of technology, continuous monitoring, and the need for quick decisions directly related to patient safety[3,4]. More than just transmitting content, nursing education should promote technical, cognitive, and attitudinal skills, such as clinical reasoning, autonomy, leadership, and collaborative work, favoring skills for coordinating care and decision-making in multidisciplinary teams[5–8].

Active methodologies shift students from passivity to protagonism, bringing learning closer to the complexity of health work and integrating technical-scientific knowledge, ethical judgment, and social commitment. National evidence points to gains in autonomy, critical reflection, and student engagement[9–11].

Among these methodologies, clinical simulation has established itself as a central resource for articulating theory and practice in safe environments,

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promoting meaningful learning, while international studies reinforce its effectiveness in the development of clinical reasoning and care safety.

The National Curriculum Guidelines for the Nursing course provide guidance for critical, reflective, and generalist training, inextricably linked to teaching, service, and the community[15]. Complementarily, the National Policy for Continuing Education in Health proposes work as the central axis of learning, understanding it as a space for problematization and transformation[16].

From this perspective, Continuing Health Education has been recognized as an indispensable strategy for integrating teaching, management, care, and social control, constituting a pedagogical innovation within the Unified Health System (SUS)[17].

Despite these regulatory advances, significant gaps remain between what is planned and what is achieved in practice, due to structural inequalities and insufficient pedagogical resources in many institutions[18]. This study is justified by the need to bring nursing education closer to the real demands of ICU care.

Despite regulatory advances, there is still a mismatch between guidelines and practices, especially regarding the integration of theory and clinical experience[15–18]. Reporting how active methodologies contribute to strengthening innovative strategies that increase student leadership, improve clinical reasoning, and consolidate skills aligned with the needs of the SUS[17]. In addition, this re y report offers insights that can be replicated and adapted in different institutions, disseminating critical, reflective, and socially committed teaching practices[9,12].

METHOD

This study is a qualitative, descriptive-analytical research based on systematic observation recorded in a field diary and spontaneous feedback from students. The adoption of this approach follows Minayo's perspective[16], according to which qualitative research makes it possible to capture the meanings and intentions attributed by the subjects to pedagogical practices, going beyond the mere description of activities and producing a critical reflection on the formative processes experienced in the discipline of Nursing in the Intensive Care Unit, offered in an undergraduate course at a public higher education institution[16,17].

Following COREQ, it should be noted that the experience was conducted by a teacher-researcher, with systematic recording of pedagogical practices and without the use of formal interviews or direct data collection instruments with students. Reflexivity was considered through the recognition of the researcher's position as a teacher of the discipline and mediator of the training process[17].

The experiment took place throughout the academic semester, involving approximately 60 students enrolled in the sixth to eighth semesters of the course, organized into two regular classes. Twenty face-to-face meetings were held, distributed between theoretical and practical modules, designed to integrate technical and scientific knowledge, psychomotor skills, and critical reflections on the role of nurses in highly complex scenarios.

The theoretical classes were conducted in a dialogical and expository format, prioritizing the active participation of students and the collective construction of knowledge. Resources such as interactive videos, support materials, and guided debates aided in the understanding of highly dense content, while the analysis of clinical cases allowed for the practical application of concepts, stimulating clinical reasoning, informed decision-making, and ethical reflection[16,17].

Supervised laboratory practices were structured around three central axes of nursing practice in the Intensive Care Unit. The first axis involved arterial blood gas analysis, addressing the collection technique, biosafety principles, and the interpretation of acid-base parameters in correlation with different clinical conditions[19–21].

The second axis covered airway management, with an emphasis on oxygen therapy strategies, the use of basic and advanced devices, simulations of critical situations, and the application of safety checklists for orotracheal intubation. The third axis corresponded to mechanical ventilation, including the fundamentals of ventilation modes, initial adjustments, parameter monitoring, analysis of graphical curves, and troubleshooting related to ventilatory assistance[3].

As an integrative activity, students organized and presented seminars on medications administered by infusion pump, covering preparation, dilution, dose calculation, compatibility, safe promotion of infusions, and prevention of adverse events, a stage that reinforced the interface between pharmacology, technology, and patient safety[3].

The empirical material that supports this report was produced from records in the teacher's field diary and spontaneous feedback from students during and after the activities. The analysis followed a descriptive-analytical approach, allowing the identification of technical, cognitive, and relational advances, as well as the meanings attributed by students to the training process, in line with the qualitative perspective[16].

From an ethical standpoint, it should be noted that no data was collected from patients or students for scientific research purposes. This is exclusively a report of teaching experience, in accordance with CNS Res-

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olution No. 510/2016, and therefore there is no need for submission to the Research Ethics Committee.

RESULTS

The results of this teaching experience showed significant advances in the training process of nursing students, especially in the development of clinical, cognitive, and attitudinal skills essential for care in intensive care units. Throughout the twenty meetings, there was a growing engagement, reflected in active participation in theoretical discussions and increased autonomy in the management of practical activities, confirming the transformative potential of active methodologies in the critical and reflective training of nurses[1,2,8,25]. This evolution corroborates the relevance of pedagogical proposals capable of breaking with traditional passivity and , and favoring meaningful learning, as already demonstrated in studies on pedagogical innovation and student protagonism in nursing[9–11,26].

In theoretical classes, the dialogical nature proved to be fundamental for the collective construction of knowledge, promoting a solid understanding of complex content such as mechanical ventilation, arterial blood gas analysis, and patient safety. The literature shows that student-centered teaching strategies enhance the integration between theory and practice, expanding clinical reasoning and intellectual autonomy[6,8,12,26]. This experience reinforced, in my teaching practice, the importance of methodological diversification in health education, with an emphasis on the articulation between technical-scientific knowledge, ethical judgment, and informed decision-making[3,7,15,25].

Supervised practices proved decisive for the consolidation of clinical reasoning. In arterial blood gas analysis exercises, a gradual evolution was observed in students' interpretation of acid-base disorders, with greater confidence in the correlation between laboratory findings and real clinical situations[19–21]. These results are consistent with studies demonstrating the impact of practical methodologies and clinical simulations on the training of critical care nurses, enabling them to integrate theoretical knowledge and confident decision-making[12,13,14].

In the airway management module, there was a significant improvement in the students' technical accuracy and self-confidence, evidenced by the correct execution of procedures and the application of safety protocols. This progress indicates that simulation and supervised training favor the development of psychomotor skills and situational clinical judgment, contributing to care safety and professional leadership[5,6,12].

In activities related to mechanical ventilation, students showed progressive ability to analyze ventilation curves, recognize alarms, and adjust parameters, confirming the relevance of pedagogical strategies that bring theory closer to the reality of the ICU[3,4,6,15]. The literature reinforces that problem-based learning and high-fidelity simulation broaden the understanding of physiological processes and rapid decision-making in highly complex contexts[12,13,14,27].

Another relevant finding emerged in the seminars on infusion pumps. During the presentations, students demonstrated increasing mastery of drug preparation and administration, dose calculation, and solution compatibility, articulating pharmacology, technology, and patient safety[3,9,10,26]. This activity confirmed the role of active methodologies in interdisciplinary integration and the consolidation of clinical and managerial skills, aligned with good patient safety practices and a culture of centered care[5,9,11].

In terms of relationships and attitudes, significant advances were noted in assertive communication, empathy, leadership, and teamwork, corroborating the role of dialogic interaction and collaborative learning in the ethical and humanized training of nurses[1,2,7,26]. The students' spontaneous reports revealed even greater motivation and a sense of belonging to the educational process, aspects often associated with meaningful learning and Freirean problematizing education[8,9,15,26].

In an integrated manner, the experience demonstrated that active methodologies favor the construction of a critical and reflective stance towards clinical cases, broadening the understanding of the complexity of decisions in intensive care and reframing the role of nurses in highly complex contexts[1,3,7,27]. Thus, the discipline analyzed brought academic training closer to the reality of care, strengthening the articulation between theory, practice, and critical reflection—indispensable elements for the training of competent, autonomous, and socially committed nurses, in accordance with the guidelines of the Unified Health System[16,17,25,27].

DISCUSSION

The teaching experience analyzed shows that the pedagogical organization of the Intensive Care Nursing course enhances professional training when structured in a way that combines theory, practice, and critical reflection. In my experience, this articulation proved decisive for student engagement and the consolidation of clinical and relational skills. This finding converges with studies that argue that teaching should overcome the linearity of teaching[24,31] and emphasize the role of active methodologies in the construction of critical and socially committed subjects[9,11,26]. This perspective is supported by Freirean

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pedagogy and concepts of meaningful learning, in which students are protagonists of their own learning process and teachers act as mediators of knowledge[7,8,15].

With regard to highly technical content, such as arterial blood gas analysis, mechanical ventilation, and pharmacotherapy, I realized that differentiated approaches were essential to promote understanding and practical application. The dialogical nature of the classes and the use of clinical cases helped to avoid fragmentation in teaching, bringing students closer to the reality of healthcare[2,6,7,19,20]. The literature corroborates that the integration of theory and practice is one of the pillars of active learning, as it enables students to recognize the significance of knowledge in the real work context[1,2,6,12]. Above all, it confirms the value of teacher mediation, which is the element that gives meaning and context to learning[7,9,24,31]. Without adequate institutional conditions—such as simulation spaces, teaching time, and investment in infrastructure—there is a risk that these methodologies will be limited to individual efforts, without systemic educational reach[4,5,14,27].

Another central aspect was the strengthening of clinical reasoning and evidence-based decision-making. In practice, I noticed greater confidence among students in interpreting laboratory parameters and justifying conduct. This result is consistent with previous studies[2,5,12,19], which highlight the importance of supervised practice and active methodologies for the development of clinical judgment and professional autonomy. Such skills, as evidenced by Ghezzi et al.[8] and Kim and Yoo[12], are consolidated when the use of educational technologies is associated with critical reflection and clinical contextualization. In this sense, active methodologies proved to be more than technical instruments: they constituted pedagogical processes that require critical teaching mediation and constant dialogue[7,9,24,31], supporting the training of autonomous and reflective professionals.

The relational and organizational dimension also stood out. Teamwork, assertive communication, and leadership emerged as competencies strengthened during supervised practices, in line with the literature on preceptorship in complex environments[28] and care management in nursing education[8,20]. In particular, clinical deterioration simulations allowed for experiences of multidisciplinary cooperation and rapid decision-making, as already discussed by Miranda et al.[5] and De Mendonça Lopes et al.[3], who point to such experiences as unique opportunities for the development of collaborative and care safety skills[13,14].

The seminar on infusion pumps was another revealing moment, as in addition to delving into technical aspects such as preparation and dose calculation, it provided discussions on risks and protocols[3,9,10,26]. This experience reinforced the culture of safety and co t responsibility in the use of health technologies, confirming the findings of Fernandes et al.[10] and Jeffries[11], which demonstrate the potential of active methodologies and clinical simulation for the safe teaching of complex practices. Thus, learning extended beyond technical mastery to include ethical understanding and the prevention of adverse events[12,26,27].

Student motivation and satisfaction also emerged as relevant elements. Several students spontaneously reported greater confidence and engagement, which, in my view, was a direct reflection of the leading role they assumed in the activities. This result is similar to analyses that highlight confidence as a determining factor for retention and motivation in intensive contexts[26,29,30]. Recent international studies indicate that the active involvement of students in complex teaching-learning processes is associated with strengthening self-efficacy and reducing anxiety in highly complex care environments[11,12,13].

From a normative point of view, the results are in line with the milestones of health education in Brazil. The National Curriculum Guidelines for Nursing Courses[15] and the National Policy for Continuing Education in Health[16] already provide guidance for critical, comprehensive education linked to health work. My experience confirms that, although these guidelines are well established, there is still a gap between what is prescribed and what materializes in institutions[15–18,24]. Opinion CNE/CES No. 443/2024 signals a necessary update, closer to the contemporary demands of the SUS, but it will still require interinstitutional efforts to overcome structural inequalities and consolidate the integration of teaching, service, and community.

Despite the advances, some challenges remained evident: the heterogeneity of prior knowledge and the limited time to deepen debriefings limited part of the process. This difficulty corroborates analyses that indicate the need for methodologies that consolidate clinical reasoning as a cross-cutting axis of training. In my practice, I identified the urgency of leveling strategies, expanding simulation spaces, and greater institutional investment in order to reduce inequalities and improve learning[12,14,15,27].

Finally, the experience reinforced the role of the teacher as a mediator, capable of guiding students in the construction of critical and socially committed knowledge[24,31]. This teaching mediation, anchored in dialogue and Freirean problematization, is the axis that transforms the teaching space into a place of ethical reflection, emancipation, and social commitment[7,8,9,31]. Without it, even the most innovative methodologies lose their transforma-

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tive power.

Overall, the discussion shows that teaching in Intensive Care, supported by active methodologies and supervised practices, goes beyond the transmission of technical content. It promotes the training of critical, reflective professionals who are aligned with the principles of the SUS[15,16,25,27]. This experience highlights the relevance of pedagogical innovation in this field and points to the need for its institutionalization as a structured training practice, ensuring sustainability and collective reach[8,9,15,24].

CONCLUSION

The teaching experience in the Intensive Care Nursing discipline showed that the integration of dialogue-based classes, supervised practices, and integrative activities favors the development of technical, cognitive, and relational skills, in addition to strengthening student autonomy and clinical reasoning. This methodological combination proved essential for training critical nurses committed to patient safety and the principles of the SUS, demonstrating that active methodologies, when institutionalized, contribute to a more reflective training aligned with contemporary healthcare demands.

Despite the advances observed, challenges remain, such as the heterogeneity of prior knowledge, limited time for debriefings, and limited pedagogical resources. These factors reinforce the need for institutional policies that expand faculty support and investments in infrastructure and simulation spaces. Overall, the experience confirms that teaching in Intensive Care is a strategic field of pedagogical innovation, capable of transforming the teaching-learning process and consolidating a critical, ethical, and socially committed educational practice.

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