



## Mosul Journal of Nursing

Online ISSN: 2663-0311 - Print ISSN: 2311-8784

Website: <https://mjn.mosuljournals.com>



### Synthesizing Critical Thinking Proficiency in Nursing Education: A Systematic Review

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#### Article information

##### Article history:

Received on June 13, 2023

Accepted on November 11, 2023

Available online June 12, 2024

##### Keywords:

critical thinking, nursing education, learning environment, clinical performance, patient outcomes

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#### Abstract

**Objectives:** This systematic review aimed to thoroughly examine the literature on developing critical thinking (CT) skills in nursing education. The review aimed to identify and summarize the components and definitions of CT as perceived by nursing educators, explore the various factors that influence CT development in nursing education, analyze interventions and strategies designed to promote CT skills among nursing students, and evaluate the broader implications of CT on clinical performance and patient outcomes in the field of nursing.

**Methods:** To achieve these objectives, a systematic literature search was conducted using reputable databases such as PubMed, Web of Science, and Scopus. The search focused on identifying relevant studies published in peer-reviewed journals that addressed CT development in nursing education. Inclusion criteria were carefully applied to select studies directly addressing CT, interventions, factors influencing CT, and outcomes related to CT skills in clinical practice. After the selection process, data extraction, quality assessment, and data synthesis were conducted to analyze and interpret the findings from the included studies.

**Results:** The systematic review identified 17 relevant studies that provided insights into CT development in nursing education. These studies revealed key components of CT, including information gathering, questioning, analysis, problem-solving, and theory application. Factors influencing CT development were categorized into students, educators, the education system, and the learning environment. Interventions and strategies to promote CT skills among nursing students were also documented, encompassing questioning techniques, reflective writing exercises, case-based learning methods, and other innovative teaching approaches.

**Conclusion:** This systematic review highlights the dynamic nature of CT in nursing education and underscores the importance of ongoing research and innovative teaching practices. Enhancing educators' CT competence is crucial for effectively fostering CT skills among nursing students, with implications extending to improved clinical performance and patient outcomes in nursing practice. The findings of this review contribute to the broader understanding of CT development within the context of nursing education and emphasize its significance in preparing competent and reflective nursing professionals.

DOI: <https://doi.org/10.33899/mjn.2024.183131> authors, 2024, College of Nursing, University of Mosul.

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## INTRODUCTION

Globalization has resulted in transformations across various domains of life, including social, political, economic, and cultural spheres. Furthermore, the nursing profession is changing, shifting away from the biological model of care that emphasizes technical aspects and instead prioritizing the holistic well-being of individuals through open communication and mutual agreements between the healthcare provider and the patient. Being part of a multidisciplinary team necessitates modifications in the curriculum plan and the training of teachers to meet the requirements of a new type of graduate. This new profile emphasizes developing critical thinking, self-reflection, and professional accountability skills. (Jiménez-Gómez et al., 2019).

Academic attainment is vital to students' future success, and neglecting it can lead to academic failure and higher education expenditures. Family, individual, socioeconomic, education, training, and psychological factors affect academic achievement. Assessing these factors and determining their contribution to academic achievement helps educational planners identify the factors affecting academic success and failure and focus on promoting positive factors and reducing negative ones. Critical thinking helps academic performance, clinical decision-making, nursing practice, and education (Shirazi & Heidari, 2019).

The nurses will utilize the nursing process, consisting of five steps, to accurately execute the taxonomies of nursing diagnoses, outcomes (NOC), and interventions (NIC). This approach is the most effective method for ensuring safe and high-quality nursing practices. In addition, they will possess the requisite critical thinking skills necessary to make ongoing improvements and innovative modifications while monitoring patient results. (Facione et al., 2021).

The study aims to comprehensively assess nursing students' and educators' present critical thinking abilities while pinpointing successful strategies and interventions designed to improve critical thinking within nursing education. It examines how different educational methods impact the cultivation of critical thinking skills among nursing students. Through a thorough synthesis and analysis of existing literature, the research offers valuable insights for advancing future research and enhancing practical approaches in nursing education regarding critical thinking.

## METHODOLOGY:

This systematic review follows established guidelines and procedures to comprehensively investigate the enhancement of critical thinking

skills in nursing education. The methodology is structured as follows:

### **Literature Search Strategy:**

*Databases Utilized:* PubMed, Web of Science, Scopus.

*Keywords:* "critical thinking," "nursing education," "strategies," "interventions," and related terms.

*Time Frame:* Studies published within the last ten years to ensure currency and relevance.

*Search Process:* Conducted using Boolean operators and truncation to capture variations of search terms.

*Inclusion of Grey Literature:* Consider relevant sources to minimize publication bias.

### **Inclusion Criteria:**

The study focuses on critical thinking skills within nursing education, explicitly exploring interventions, educational programs, and assessments linked to critical thinking. It emphasizes examining research published in peer-reviewed journals or reputable sources, with a requirement for English language due to the research team's proficiency.

### **Exclusion Criteria:**

The study excludes research that does not directly address critical thinking in nursing education, studies lacking methodological rigor, and studies providing insufficient reporting of essential information. Additionally, non-English-language publications are not included due to language limitations, ensuring a focus on high-quality, well-documented research relevant to critical thinking in nursing education.

### **Study Selection:**

The screening process begins with an initial assessment of titles and abstracts to determine their relevance to the inclusion criteria regarding critical thinking in nursing education. Eligible studies identified during this stage proceed to a thorough full-text review for final inclusion. To ensure consistency and reliability, two reviewers independently evaluate each study, and any disagreements are resolved through consultation with a third reviewer, maintaining the integrity and accuracy of the selection process.

### **Data Extraction:**

The data collection process encompasses vital data items such as study design, participants' characteristics, interventions or educational strategies employed, outcomes specifically related to critical thinking, and key findings. A comprehensive data extraction form has been developed and piloted to standardize the collection process, ensuring consistency and thoroughness in capturing relevant information from each study. Quality control measures include cross-checking extracted data to guarantee accuracy and completeness and maintaining the reliability and

integrity of the dataset for subsequent analysis and interpretation.

**Quality Assessment:**

Tools Used: The Cochrane Risk of Bias tool for randomized controlled trials (RCTs) and the Newcastle-Ottawa Scale for observational studies.

Criteria Evaluated: Methodological quality, risk of bias, and overall study validity.

Quality Assessment Process: Conducted independently by two reviewers, with discrepancies resolved through discussion.

**Data Synthesis:**

The synthesis process involves both qualitative and quantitative approaches. Qualitative data undergo thematic analysis to identify patterns and themes, providing rich insights into the subject matter. For quantitative data, if feasible and appropriate, meta-analysis is conducted using statistical software to combine and analyze results across studies. Integrating qualitative and quantitative findings enables a comprehensive overview, enriching the understanding of critical thinking in nursing education by incorporating diverse perspectives and empirical evidence.

**RESULTS**

This systematic review included 14 articles, (5) cross-sectional studies, (4) qualitative studies, (1) longitudinal study and (5) quasi-experimental studies. The sample sizes in the qualitative research varied from 6 to 70 participants. Six of these studies specifically examined nursing educators, six concentrated on nursing students, four encompassed educators and students, and one specifically addressed freshly graduated nurses enrolled in a learning course.

The systematic review encompassed studies from various locations, each providing unique insights into fostering critical thinking skills in nursing education. Studies from Brazil (Nes et al., 2022) emphasized effective teaching methods to enhance critical thinking among Brazilian nursing students, while research from China (Jin & Ji, 2021) focused on core competency development and integrating critical thinking into educational methods. Greece (Christodoulakis et al., 2024) investigated the impact of online learning environments, and Saudi Arabia and Egypt (AlOtaibi et al., 2023) examined motivational methods in online learning to encourage critical thinking. Australia (Thomas & Isobel, 2019) implemented a critical reflection diary to improve critical thinking skills among nurses, and Vietnam (Nguyen et al., 2023) highlighted the continuous need to bolster critical thinking attitudes and skills among nursing students. Iran (Nemati-Vakilabad et al., 2023) emphasized prioritizing the teaching of critical thinking in clinical settings, while South Africa (Boso et al., 2023) proposed a framework

for fostering critical thinking skills within diverse cultural contexts. Turkey (İlaslan et al., 2023) compared online distance education methods, Sweden (Sterner et al., 2023) explored blended simulation-based education benefits, and the USA (O'Halloran, 2022) investigated combined pedagogies' effectiveness. Chile (Berger et al., 2021) examined factors contributing to critical and metacognitive thinking. Iran (Ahmady & Shahbazi, 2020) studied the impact of structured social problem-solving training on critical thinking and decision-making. These diverse geographical perspectives enrich our understanding of educational strategies and challenges in nurturing critical thinking abilities among nursing students globally:

*Influence of the Education System and Atmosphere on Critical Thinking in Nursing Education*

Factors influencing critical thinking in nursing education encompass various aspects highlighted in recent studies. Positive associations between critical thinking disposition, innovation, and maturity were observed among nursing students in Iran (Mousazadeh et al., 2021). In Saudi Arabia (Sagaca et al., 2022), student nurses exhibited insufficient critical thinking skills, with no significant variations by age, nursing pathway, or year level, and academic performance showed no correlation with critical thinking components. Gender emerged as a significant predictor of critical thinking ability among nursing students in Vietnam (Van Nguyen & Liu, 2021). Meanwhile, in Turkey (Pour & Havva, 2017), inadequate clinical practice duration, absence of conferences in clinical settings, and perceived lack of respect from hospital staff towards students were key factors impacting critical thinking levels. These findings underscore the multifaceted nature of factors influencing critical thinking in nursing education, ranging from individual dispositions and experiences to institutional and cultural contexts.

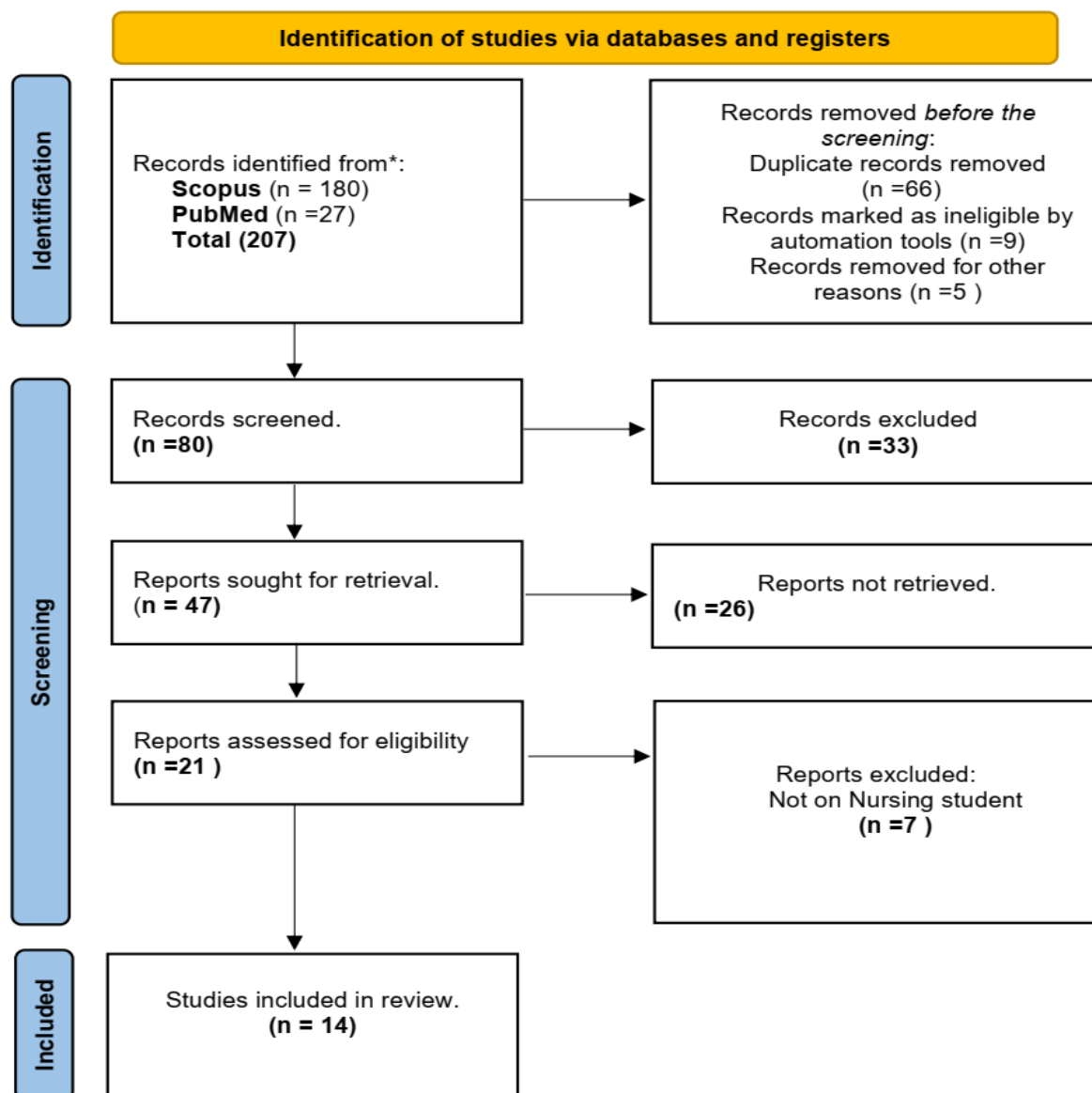
*Strategies to Foster Critical Thinking*

The studies conducted by Carbogim et al. (2019) in Brazil, Popil (2011), Kaddoura (2013), and Kaddoura (2011) in the USA collectively demonstrate the efficacy of various teaching strategies in promoting critical thinking skills among nursing students. Carbogim et al. implemented the Active Teaching Model associated with Problem-Based Learning, while Popil emphasized using case studies for active learning. Kaddoura's study confirmed the benefits of the Think-Pair-Share strategy in fostering critical thinking development. Additionally, Kaddoura's comparison between lecture-based teaching and Case-Based Learning highlighted the

superiority of CBL in enhancing critical thinking skills and potentially impacting patient outcomes positively. These findings underscore the importance of active teaching methodologies like

problem-based learning, case studies, and interactive strategies such as think-pair-share in cultivating critical thinking abilities that are crucial for nursing practice.

**Figure 1:** Identification of studies via databases and registers



PRISMA 2020 flow diagram

**Table 1: systematic review included 14 articles.**

Study Reference	Country	Methodology	Participants	Key Findings and Implications
(Nes et al., 2022)	Brazil	Theoretical reflection descriptive cross-sectional study	Brazilian undergraduate nursing students N=89	poor levels in students' critical thinking domains may negatively affect their learning outcomes. Further studies should be carried out to confirm our results and investigate teaching methods that encourage and ensure the development of student's critical thinking skills during nursing education.
(Jin & Ji, 2021)	China	A quantitative and cross-sectional descriptive study.	3,047 five-year vocational nursing students	The overall metacognitive ability of nursing students was not high; SDL and CT abilities were both at a medium level. Health educators need to pay attention to cultivating and developing the core competencies.
(Tong et al., 2023)	China	descriptive cross-sectional study	692 undergraduate nursing students	Critical thinking significantly mediates the relationship between interest in learning and caring. Nursing colleges and instructors should consider students' interest in learning and critical thinking as potential intervention elements to enhance caring.
(Christodoulakis et al., 2024)	Greece	longitudinal study	82 nursing students	The findings suggest that nurse educators persevered, adapted, and maintained the quality of the learning environment despite the pandemic. Moreover, using an online learning environment may have led to enhanced enjoyment and engagement for students, potentially resulting in improved learning outcomes.
(AlOtaibi et al., 2023)	Saudi Arabia and Egypt	online survey	75 Saudi undergraduates and 105 Egyptian nursing students	This study demonstrates that using motivational methods for online learning encourages students to engage in critical thinking and cognitive processing strategies in psychiatry and mental health care courses, even in two different settings.
(Thomas & Isobel, 2019)	Australia	Quasi-experimental	85 nurses	There was a notable improvement in nurses' critical thinking skills and aspects of engagement, cognitive maturity, and innovativeness following the implementation of CRD based on the Graham Gibbs Cycle ( $p < 0.05$ ).
(Nguyen et al., 2023)	Vietnam	Muti Center cross-sectional study	533 senior nursing students	The results underscore the continuous requirement to bolster critical thinking

Study Reference	Country	Methodology	Participants	Key Findings and Implications
				attitudes and abilities among nursing students in Vietnam. Nursing educators should devise suitable strategies to enhance nursing students' critical thinking attitudes and skills.
(Nemati-Vakilabad et al., 2023)	Iran	Qualitative non-participant observation.	246 nursing students	The study emphasizes the importance of prioritizing the teaching of critical thinking skills in clinical settings within nursing education programs. Enhanced clinical critical thinking is crucial for improving nursing student performance in clinical practice, especially considering the significant changes in nursing clinical environments—attributes and university-wide factors/administrative backing. Class sizes varied from 34 to 162 students, averaging 95 students.
(Boso et al., 2023)	South Africa	qualitative study	11 participants comprising students, educators, and preceptors	The study structured its findings into a framework showing interconnected concepts crucial for fostering critical thinking (CT) skills among nursing students. These concepts encompass authentic student-facilitator collaboration, impactful facilitation, a questioning and reflective learning environment, active participation, curriculum updates, and contextual relevance.
(İlaslan et al., 2023)	Turkey	pretest-posttest, quasi-experimental design	56 first-year students	The study concluded that synchronous and asynchronous online distance education showed no superiority over each other regarding critical thinking and clinical decision-making levels among first-year nursing students.
(Sternner et al., 2023)	Sweden	Quasi-experimental, one-group pretest and post-test design	Sixty-one nursing students	The study found that blended simulation-based education enhances nursing students' critical thinking abilities. This underscores the importance of simulation in developing and fostering critical thinking skills in nursing education.
(O'Halloran, 2022)	USA	qualitative case study	Unknown	Despite initial challenges such as uncertainty and confusion, students perceived the combined pedagogies as valuable for developing critical thinking skills when consistently applied throughout the

Study Reference	Country	Methodology	Participants	Key Findings and Implications
				program. Integrating concept maps into simulation design offered challenges and opportunities for immersive learning.
(Berger et al., 2021)	Chile	analytical–correlational, cross-sectional	478 nursing students.	Academic factors such as problem-based learning, professor motivation, and integrating critical thinking (CT) and metacognitive thinking (MCT) into nursing subjects contribute to their development. Implementing and periodically evaluating strategies to enhance CT and MCT from early in a nursing career is crucial. Faculty training to encourage critical thinking among students is also essential.
(Ahmady & Shahbazi, 2020)	Iran	quasi-experimental research and pre-test and post-test design	2 groups; experimental (n = 20) and control (n = 20)	The study suggests structured social problem-solving training can enhance cognitive problem-solving, critical thinking, and decision-making skills. Based on this, nursing education should adopt innovative and varied approaches, moving away from traditional methods.

**Table 2: Influence of the Education System and Atmosphere on Critical Thinking in Nursing Education**

Study Reference	Country	Methodology	Participants	Key Findings
(Mousazadeh et al., 2021)	Iran	a cross-sectional descriptive study	196 nursing students	positively and significantly associated with the total score of critical thinking disposition and scores of innovations and maturity
(Sacgaca et al., 2022)	Saudi Arabia	a cross-sectional correlational design	67 student nurses	The student nurses did not exhibit notable critical thinking skills. Additionally, no significant variations in critical thinking skills concerning age, nursing pathway, or year level were observed. Furthermore, no discernible correlation was discovered between academic performance and the components of HSRT.
(Van Nguyen & Liu, 2021)	Vietnam	A cross-sectional design	20 nurses students	Gender was a statistically significant predictor of critical thinking ability.
(Pour & Havva, 2017)	Turkey	A cross-sectional design	89 nursing students	The study's findings indicate inadequate levels of critical thinking among nursing students. Key factors influencing critical thinking skills during the first and fourth years included insufficient duration of clinical practice, absence of conferences in clinical settings, and lack of respect from hospital staff towards students.

**Table 3: Strategies to Foster Critical Thinking**

Study Reference	Country	Strategy	Participants	Key Findings
(Carbogim et al., 2019)	Brazil	Case report	Unknown	implementing the Active Teaching Model to Promote Critical Thinking (MEAPC) associated with Problem-Based Learning (PBL)
(Popil, 2011)	USA	Case studies	Unknown	Using case studies in teaching will assist nurse educators in promoting active learning. It will help students to make meaning of knowledge in practical settings, allow them to link theory to practice and help them in developing critical thinking skills
(Kaddoura, 2013)	USA	Think-Pair-Share	86 nursing students	The study's results confirmed the hypothesis that students who received education through the Think-Pair-Share (TPS) strategy demonstrated more significant development in critical thinking compared to homogeneous students who did not receive TPS-based education.
(Kaddoura, 2011)	USA	Compared lecture-based teaching and CBL programs in terms of CT development	103 participant	The researcher's conclusion suggests that incorporating Case-Based Learning (CBL) into nursing curricula is recommended to foster the critical thinking skills necessary for learners. This could potentially influence nursing care and lead to improved patient outcomes.

## DISCUSSION

The predominant focus of studies on critical thinking (CT) in nursing education within Western countries highlights a significant gap in understanding cultural nuances and perspectives, with limited representation from Asian educators and students. Insights from Japanese and Thai educators offer unique viewpoints not often addressed in Western studies, such as the influence of traditional values on conflict avoidance and happiness as a critical thinking component. This emphasizes the necessity for more qualitative studies across diverse cultural contexts to develop a global understanding of CT and inform culturally sensitive teaching strategies.

Despite the American Philosophical Association's definition of CT and ideal characteristics for critical thinkers, varied interpretations and definitions persist within nursing studies. While commonalities such as analytical and evaluative skills are recognized, recent studies have introduced new dimensions like emotional regulation and happiness as integral to CT. This evolving concept underscores the

dynamic nature of CT in nursing education, necessitating ongoing exploration and consolidation to establish a universal definition and avoid conceptual confusion.

While previous reviews primarily focused on teaching strategies and interventions, our review identified influential factors shaping CT development in nursing education. These factors encompass students, educators, the education system, and the learning environment. Cultural backgrounds, attitudes, and educator knowledge significantly influence CT implications, emphasizing the pivotal role of educators in fostering CT skills. However, variations in educator CT skills highlight the need for ongoing faculty development and a learner-centric approach to CT teaching.

Our review also unveils a breadth of teaching methods to promote CT, aligning with existing literature on problem-based learning, reflective writing, simulations, and case studies. Additionally, new suggestions like art-based approaches and cross-cultural experiences further enrich the repertoire of CT interventions. This



collective effort reflects the nursing education sector's commitment to integrating CT effectively and enhancing students' CT skills.

## CONCLUSION

The factors influencing CT development in nursing education are multifaceted, encompassing students, educators, the education system, and the learning environment. While many studies offered suggestions and interventions to promote CT, challenges arise from educators' varying perspectives and potential gaps in CT knowledge. This highlights the importance of enhancing educators' CT competence to effectively teach and assess students' CT outcomes.

Furthermore, factors like self-esteem and state anxiety may impact CT learning, emphasizing the need for a holistic approach that addresses student and educator factors. While this review provided insights into existing teaching strategies and innovations, further research is warranted to evaluate their efficacy comprehensively and explore additional teaching methods that may enhance CT development.

Teaching CT to nursing students is crucial, given its role in improving clinical performance and patient outcomes. Initiating CT development early in nursing education can equip students with the cognitive skills to navigate complex healthcare scenarios effectively.

In conclusion, this review underscores the dynamic nature of CT in nursing education, highlighting the need for ongoing research, faculty development, and innovative teaching approaches to nurture CT skills among nursing students and educators alike.

## DECLARATION SECTION

### Acknowledgments

Not applicable.

### Ethical Considerations

In the systematic review titled "**Critical Thinking Skills in Nursing Education**," several ethical considerations were carefully addressed to ensure the integrity and validity of the research process. The selection of studies followed transparent and inclusive criteria to avoid bias and promote a comprehensive understanding of the topic. Proper citation and acknowledgment of sources were prioritized throughout the review to respect intellectual property rights and academic integrity. Additionally, efforts were made to safeguard participant confidentiality and privacy, mainly when data from primary studies were included. Transparency and disclosure were central to the ethical conduct of this systematic review. Any potential conflicts of interest among the review authors or contributors were disclosed to maintain transparency and trust in the findings. Furthermore, the review adhered to established guidelines, such as PRISMA, to ensure

methodological rigor and transparency in reporting. These ethical considerations were essential in upholding the standards of research integrity and credibility throughout the systematic review process in nursing education.

### Conflict of interest

None to be declared.

### Funding:

None to be declared.

### Data availability:

Data are available by contacting the corresponding author by email.

### Authors contribution

All authors have read and approved the manuscript.

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