

The Journey of Cultivating Critical Thinking: Exploring the Development of Critical Thinking Skills in Nursing Students

Abstract

Background: Critical thinking is essential in nursing education as it equips students with the skills needed to make informed and effective clinical decisions. Understanding how these skills develop in real educational and clinical contexts is crucial for designing effective teaching strategies.




Aim: This study aims to explore the development of critical thinking skills in nursing students.

Methods: A grounded theory approach was employed in 2024. A total of 22 nursing students and faculty members were involved. Data were collected through in-depth semi-structured interviews and field notes until data saturation was achieved. Data analysis was conducted using the Corbin and Strauss method in 1998.

Results: The data analysis revealed one core theme (the journey of cultivating critical thinking) and four subthemes: self-preparedness, exposure to situations, action/reaction, and encountering the unexpected. In the process of developing critical thinking skills, both instructors and students engage in self-preparation. Instructors review relevant materials, while students familiarize themselves with the ward's objectives. This is followed by exposure to clinical situations, where both groups gain insights into the learning environment and reflect on expectations and goals. In the action/reaction phase, instructors model professional thinking, provide feedback, and employ various teaching strategies to assess and guide students. Unexpected situations then challenge both instructors and students to adapt and respond effectively, reinforcing the importance of critical thinking in nursing education.

Conclusion: This study highlights the essential role of developing critical thinking skills in nursing students. The findings emphasize the importance of creating an adaptive learning environment that fosters the cultivation of these skills within nursing education.

Keywords: Critical thinking, education, grounded theory, nursing students

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Introduction

The rapid advancement of technology, the continuous evolution of healthcare knowledge, and the increasing complexity of clinical environments have significantly heightened the demand for nurses to provide care that is not only safe and effective but also grounded in the most current and reliable scientific evidence.¹⁻⁴ In response to these challenges, nursing education has assumed a critical role in preparing highly qualified graduates capable of accurately assessing and addressing the diverse and often complex needs of patients. This ensures that they are well-equipped to deliver optimal care in an ever-evolving healthcare landscape.^{5,6}

This growing demand underscores the vital importance of critical thinking (CT) as a core competency for nurses. CT enables nurses to engage in logical and creative problem-solving, which are essential for making well-informed, sound decisions in unpredictable and high-pressure clinical situations. As a result, fostering and developing CT skills has become a central objective in nursing education worldwide, directly impacting nurses' ability to navigate complex clinical challenges and provide the highest standard of patient care.^{7,8}

Critical thinking is deeply rooted in the fundamental principles of the nursing process, scientific reasoning, and problem-solving. It involves a combination of logical analysis, innovative strategies, and creative thinking, all of which are cultivated through a blend of theoretical knowledge and practical experience.⁹ CT requires ongoing assessment, self-reflection, and a continuous commitment to both personal and professional development. This process enhances nurses' decision-making capabilities and enables them to adapt to the dynamic nature of healthcare. As a result, CT has become a hallmark of advanced professional education and is recognized as a primary goal in nursing curricula worldwide. The American Nursing Association (ANA) has emphasized the importance of CT, identifying it as a critical criterion for nursing school graduation. Similarly, the International Council of Nurses (ICN) recognizes CT as a core professional competency essential for delivering safe, effective, and ethical nursing care in complex healthcare environments.¹⁰ In line with global trends, promoting and developing CT is also a central objective in nursing education programs in Iran. This underscores its significance in preparing nursing graduates to manage complex clinical situations and provide high-quality patient care.^{11,12}

Despite these efforts, the development of CT skills among nursing students remains a challenge. Research indicates inconsistencies in the progression of CT skills throughout academic training. For instance, some studies have reported no significant difference in CT abilities between first-year and final-year students in

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nursing and related disciplines. This stagnation has been attributed to traditional teaching methods and an insufficient emphasis on CT within the curriculum.¹³ Conversely, other studies have found higher CT scores among upper-year students, particularly in areas such as deductive and inductive reasoning. These mixed findings underscore the need for innovative teaching strategies to effectively foster CT skill development.¹⁴

Critical thinking is actively integrated into nursing education through a variety of teaching and learning approaches. Effective CT education requires nursing instructors to adopt novel strategies, deliver engaging content, and create interactive learning environments. Methods such as problem-based learning, self-directed learning, and evidence-based practice have demonstrated potential in enhancing CT skills. Nursing programs frequently utilize Problem-Based Learning (PBL), simulation exercises, case studies, clinical practicums, and reflective journaling to immerse students in real-life scenarios that demand critical analysis and decision-making.¹⁵⁻¹⁸ However, several barriers hinder the effective implementation of these strategies. These include a shortage of adequately trained instructors, insufficient time for strategy development, and students' preference for traditional lecture-based learning formats.^{1,19,20}

Despite its recognized importance, the development of CT skills remains inadequately understood, particularly within the context of Iranian nursing education. Previous research suggests that CT skills are often underdeveloped among medical science students across all levels of education.^{7,21} While alternative teaching methods such as problem-solving, workshops, and evidence-based learning have shown promising outcomes, there is still debate about the most effective approach to teaching CT.¹

Given the complexity of CT education and the challenges associated with it, gaining a deeper understanding of how these skills develop is essential. Understanding the development of CT in real educational and clinical contexts is crucial for designing effective teaching strategies. Qualitative methodologies, such as grounded theory, provide valuable insights into the underlying dynamics and barriers. According to Corbin and Strauss,²² grounded theory facilitates the exploration of phenomena, enabling researchers to uncover processes and generate actionable knowledge to address challenges. Therefore, this study aims to explore the development of critical thinking skills in nursing students within the Iranian context.

Study Question

What are the experiences of nursing students in developing critical thinking skills throughout their nursing education?

Materials and Methods

Design

This study adopted a qualitative research design based on grounded theory methodology, as developed by Strauss and Corbin in 1998²²⁻²⁴ Grounded theory, originally rooted in sociology, particularly within the framework of Symbolic Interactionism, draws on the social tradition of American Pragmatism. The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used to document the data collection and reporting process.

Study Sample

The study was conducted in 2024 at the Faculty of Nursing, Shiraz University of Medical Sciences. A purposive sampling method was employed. After obtaining national ethical approval, participants were selected based on their relevance to the research topic. Eligibility criteria included: nursing instructors with a minimum of one year of teaching experience, and senior nursing students in their final academic year who possessed relevant knowledge in the subject. All participants were required to have an interest in the subject and the ability to discuss it meaningfully. A total of 22 participants were included in the study: five clinical instructors (PhD-qualified nurses supervising students in clinical settings), 12 full-time faculty members (PhD-level academics employed permanently by the nursing school), and five senior nursing students in their 7th and 8th semesters (Table 1).

Data Collection Tool

The semi-structured questionnaire included the following questions:

“How do you incorporate the development of critical thinking skills into your teaching practices, both in the classroom and clinical settings?”

“What challenges do you face when trying to help students develop critical thinking skills?”

Questions for students included:

“Can you describe a situation during your education where you felt you used or improved your critical thinking skills?”

“What teaching methods or experiences helped you the most in learning to think critically?”

“What factors influence your learning of critical thinking?”

To elicit more detailed responses and clarify participants' answers, probing questions such as *“Please describe more,”* *“Can you give an example?”* and *“What is your feeling about it?”* were also used. At the end of each interview, participants were invited to share any additional comments or ask questions. Additional follow-up questions were asked during interviews based on participants' initial responses and emerging themes relevant to the research objectives.

Data Collection

Verbal and written informed consent were obtained from all participants prior to the interviews. Semi-structured interviews were conducted in a quiet setting within the Nursing School. With participants' permission, all interviews were audio-recorded. The only exclusion criterion was unwillingness to participate; however, all selected individuals agreed to take part. Sampling was conducted using purposive and theoretical methods. New participants were selected based on the analysis of earlier interviews. The data collection process continued until all key concepts were defined, categories were developed, and a grounded theory emerged, at which point no new information was being added.^{23,25} Each interview lasted approximately 30 to 60 minutes, depending on the depth of the participant's responses. All interviews were conducted in a quiet room within the School of Nursing to ensure privacy and minimize distractions, providing a comfortable and confidential environment for participants. The interviews were conducted by the primary researcher, who is experienced in qualitative interviewing and well-acquainted with the context of nursing education.

Rigor

Trustworthiness in qualitative research was ensured using Lincoln and Guba's criteria, which include credibility, dependability, confirmability, and transferability.²⁶ Internal validity is achieved when the accuracy of both the data and the researchers' interpretation can be trusted. In other words, the data must be meaningful and valid not only for the participants but also for the readers.²⁶ In this study, validity was enhanced by using data from multiple sources (i.e., different participants), conducting member checks by sharing data with participants, and incorporating their feedback through. Auditability and quality control refer to the consistency of data over time and across various conditions. These are established when the data's validity is confirmed, raising the broader question of how reliable the study's findings are.²² To ensure dependability, the researcher submitted the

Table 1. Summary of participant demographics (n=22)

Group	n	%	Sex [% female]	Age [years] mean±SD (min-max)	Certification [% within group]	Working history [years] Mean±SD (min-max)
Faculty members	12	54.5	100.0	43.2±3.3 (38-48)	PhD: 100.0	19.1±3.0 (14.0-24.0)
Instructors	5	22.7	100.0	38.0±5.7 (32-44)	MSc.: 80.0 PhD student: 20.0	15.0±5.6 (8.0-20.0)
Students	5	22.7	60.0	20.2±0.8 (19-21)	BSc. student: 100.0	-

SD: Standard deviation

data to an external observer for auditing. Confirmability was achieved through this auditing process. Transferability, also known as external validity or fittingness, addresses whether the study's findings can be applied to other contexts. This was supported by ensuring a sufficient number of participants, promoting diversity within the sample, and using a purposive sampling method. Participant qualifications were established through the attainment of data saturation, with consideration given to ensuring diversity within the sample. Purposive sampling further reinforced the transferability of the results. However, the researchers acknowledge that while they can offer a detailed description of the study's context and processes, the responsibility for determining the transferability of the findings to other settings ultimately rests with the reader, not the researchers.^{22,25} Therefore, the researcher aimed to provide a detailed description to facilitate transferability for the reader. To ensure transparency in the data analysis process, an example is provided to illustrate how primary codes were developed and organized into broader categories and themes. For instance, the codes "*Engaging with current literature*," "*Updating teaching content with evidence*," and "*Ongoing academic preparation*" were grouped under the category Self-preparedness of Instructor. Similarly, the codes "*Ongoing self-improvement*," "*Balancing learning and self-assurance*," "*Strengthening existing competencies*," and "*Confidence in current abilities*" were categorized under Self-preparedness of Student. These two categories shared a common focus on individual readiness and professional growth and were thus combined under the subtheme *Self-preparedness*. This subtheme contributed to the development of the corresponding main theme within the framework of critical thinking education. The stepwise analytical process—from raw data to codes, then to categories, subthemes, and overarching themes—reflects the inductive nature of the qualitative analysis employed in this study.

Data Analysis

In qualitative research involving contextual theory, data analysis is conducted concurrently with data collection.^{25,26} This study employed the method developed by Strauss and Corbin, which consists of three main phases: open coding, axial coding, and selective coding. During the open coding phase, the data were broken down into smaller components and examined for similarities and differences. Similar actions, events, and experiences were grouped into abstract concepts. The primary categorization of the data was established during the axial coding phase. In this stage, the researcher worked to connect the codes using both analogical and inductive reasoning. A process of constant comparison was employed, in which the codes and categories generated during open coding were compared with one another. Related categories were grouped together, and similar codes were integrated into broader conceptual themes. The categories developed during axial coding were further refined during the selective coding phase to construct the emerging theory. The purpose of selective coding was to identify the central category and establish connections among all categories, thereby revealing the foundational framework of the theory. In this phase, the main variable or key process identified in the data, along with its stages and consequences, were clearly defined.^{22,26} It is important to note that the researcher employed memoing throughout the data analysis process. Memoing played a crucial role in the analysis, enabling the researcher to document emerging ideas and potential relationships during both data collection and analysis. These memos were recorded promptly to capture thoughts and insights as they arose. MaxQDA 10 software was used to analyze the data.

Ethical Consideration

Ethical considerations in this study included ensuring informed consent, confidentiality, and the voluntary participation of all participants. Prior to data collection, all nursing instructors and students received detailed information about the study's purpose, procedures, and potential risks. Participants were informed of their right to withdraw from the study at any time without penalty. Confidentiality was maintained by anonymizing all collected data and ensuring that no personal identifiers were linked to participants' responses. The study adhered to established ethical guidelines for research involving human subjects, prioritizing participants' rights, dignity, and well-being throughout the research process. Prior to the commencement of the study, ethical approval was obtained from Ethics Committee of Shiraz University of Medical Sciences [Approval Number: IR.SUMS.REC.1398.920, Date: 09.10.2019]. The research was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Results

Data analysis revealed one central theme (*the journey of cultivating critical thinking*) along with four major themes: *self-preparedness*, *exposure to situations*, *action/reaction*, and *encountering the unexpected*. These themes are described in detail in the following sections [Table 2].

Main Theme 1: The Journey of Cultivating Critical Thinking

Subtheme 1: Self-preparedness

The subtheme of self-preparedness includes two key categories: the *self-preparedness of instructors*, which involves background review and engagement with literature; and the *self-preparedness of students*, which encompasses their motivation for improvement and confidence in their existing knowledge. At the beginning of the CT skill development process, both instructors and students engage in self-preparation. Instructors take an active role by reviewing relevant background information and scientific literature. They assess the learning objectives and the conditions necessary to achieve them, evaluate their own ability to guide students toward these goals, reflect on their conclusions, and take actions based on these insights, such as referring students to credible scientific sources and designing optimal learning scenarios. One instructor described their self-preparation process:

"I prepare myself whenever I teach by getting involved with the environment, connecting with the head nurse and ward staff, visiting patients, and selecting learning topics based on the goals. Then, I reflect on how students can achieve those targets."

Similarly, self-directed students prepare for new situations by reviewing theoretical lessons and reliable sources. They familiarize themselves with the ward's learning objectives, their instructors, and the expectations placed upon them. However, some students engage in the learning process without prior preparation, relying solely on their previous knowledge. As one student shared:

"Instructors told us about CT... In general, I learned that I shouldn't do anything without thinking first. Their focus is on thoughtful action based on the nursing process. When I enter a new ward, I review the theoretical lessons so that I can think critically and perform the nursing process effectively."

Subtheme 2: Exposure to Situation

The subtheme *exposure to situations* consists of two main categories: orientation and adaptation. Orientation involves recognizing and aligning with the student's existing knowledge, clearly communicating expectations and goals, and activating the learner. Adaptation focuses on tailoring the educational environment to the learner's needs and placing them in appropriate contexts for learning. In this stage of CT skill development, both orientation and adaptation take place as instructors and students are exposed to the clinical or educational environment. Through this exposure, they gain a comprehensive understanding of the context. This process enables the instructors to recognize the student's abilities and track their learning progress. At the same time, cognitive engagement is stimulated through initial assessments. The student is introduced to expectations and goals and begins participating in learning activities with an emphasis on thoughtful reflection. As one instructor explained:

"I conduct an orientation session, administer a pretest, and outline the goals and learning objectives. In the first few days, I focus on understanding the types of students I'm working with... not all of them are the same. For some, I have to think about how to create a situation that helps them meet their goals and ensures they don't fall behind the others."

After the instructor gains insight into the student's abilities, the learning situation is adapted, and an educational scenario is designed to align with the student's capabilities. The student then begins to engage actively, using constructive reflection to enhance the experience and develop greater awareness of their own learning progress. As one student noted:

"The orientation programs planned by the instructor are really helpful in understanding the expectations in the ward. With this knowledge, we are able to study and enter the ward with better preparation."

Table 2. Hierarchical structure of themes: from primary codes to main themes in critical thinking development

Main theme	Subthemes	Categories	Primary codes
The journey of cultivating critical thinking	Self-preparedness	Self-preparedness of instructor	Engaging with current literature Updating teaching content with evidence Ongoing academic preparation
		Self-preparedness of student	Ongoing self-improvement Balancing learning and self-assurance Strengthening existing competencies Confidence in current abilities Recognizing student potential Setting personalized goals Facilitating active student participation Goal-oriented student engagement Empowering learners through expectations Individualized learning adaptation Contextualizing education based on learner ability Matching teaching strategies to student readiness Creating appropriate learning conditions
	Exposure to situations	Orientation	Instructor as primary role model Skilled staff as professional examples Peer learning from experienced classmates Modeling professional behavior through diverse role models Ongoing assessment of cognitive and practical skills Providing formative feedback to guide learning Monitoring student thinking and behavior Using feedback to improve learning outcomes
		Adaptation	Explicitly demonstrating reasoning processes Encouraging thinking through verbal expression Requesting feedback to refine thought processes Promoting reflective practice and continuous improvement
	Action/reaction	Modeling	Personalizing instruction based on student diversity Providing responsive teaching to meet individual needs Using differentiated instruction techniques Addressing diverse learning styles and capabilities
		Situation performance	Managing unpredictable classroom dynamics Responding to situational disruptions Using adaptive problem-solving strategies during teaching Maintaining learning continuity during unexpected events
	Encountering unexpected situations	Changing demonstration	Managing communication challenges across professional boundaries Promoting collaboration across healthcare teams Ensuring clear communication with patients and families Strengthening intra- and interprofessional communication skills
		Management of different student	
		Management of unexpected background events	
		Management of communication issues	

Subtheme 3: Action/Reaction

The subtheme action/reaction comprises three categories:

1. *Modeling*, which involves the instructor serving as a role model, supported by skilled staff as comprehensive examples, and experienced classmates as additional role models;
2. *Situation performance*, which entails assessing the student's actions and providing continuous feedback; and
3. *Changing demonstration*, which focuses on illustrating thought processes with evidence, developing demonstrations of critical thinking, and encouraging students to seek and respond to feedback.

The *action/reaction* phase represents a critical stage in the process of teaching professional thinking to nursing students.

Professional thinking in nursing education encompasses more than isolated clinical reasoning. While clinical reasoning centers on decision-making in patient care, and reflective judgment focuses on learning from experience, professional thinking integrates these elements with ethical practice, the formation of professional identity, and long-term responsibility in care delivery. It requires the ability to think critically, anticipate consequences, make context-sensitive decisions, and uphold professional standards. Thus, professional thinking can be conceptualized as the integration of cognitive, ethical, and experiential knowledge that guides nursing students toward becoming competent, autonomous professionals. In this phase, the instructor demonstrates their own thinking strategies as a model for students and also highlights other suitable role models, such as ward nurses or self-directed peers. The instructor evaluates each student's progress, poses thought-provoking questions, guides their responses, and provides constructive feedback. To support this process, instructors use a variety of teaching techniques tailored to the student's learning needs, such as simulation, ev-

idence-based practice, and problem-solving approaches. Active students show engagement by asking more questions and taking initiative in completing tasks. However, when a student is less active, the instructor continues to monitor and support them until the desired level of performance is achieved. One faculty member explained their approach to modeling:

"I show the student what to do to help them think professionally. For example, when I take care of a patient, I think through each step of the nursing process—diagnosis, planning, and intervention. This approach helps the student understand how to think and act systematically."

Another faculty member shared:

"I pose questions that the student can't easily answer. They must use their prior knowledge and search the texts. This search process helps them think, act, and learn continuously. We teach them to be independent, rather than just providing them with the answers."

Subtheme 4: Encountering Unexpected Situations

The subtheme *encountering unexpected* situations includes three key categories:

1. *Management of different students*, which involves recognizing individual differences and tailoring the learning environment to meet each student's needs;
2. *Management of unexpected background situations*; and
3. *Management of communication problems*, which encompasses interdisciplinary and intra-disciplinary communication, as well as managing relationships with patients and their families.

In the process of teaching CT to nursing students, *encountering unexpected situations* holds particular significance. Unanticipated events in clinical settings can disrupt the systematic thinking and actions of both instructors and students. Effectively recognizing and managing these situations is essential for meaningful learning. One instructor shared an experience:

"I can't always plan everything perfectly because unexpected situations arise. For instance, I assigned a patient in stable condition to a student, but the patient's condition worsened suddenly. The student became anxious. I expected him to respond thoughtfully, but he froze, and I had to change his patient."

A faculty member also highlighted the challenges associated with communication management:

"It's challenging to maintain communication with everyone. Often, the ward isn't receptive to nursing students or instructors. Communication issues arise, and we must handle them effectively to ensure there are no disruptions for students or instructors. If we fail to manage these situations, we won't be able to support the students, especially in developing critical thinking, which is a crucial aspect of professional nursing education."

The process of modifying and adjusting to such situations begins with recognizing them. The educational environment is dynamic and continuously evolving, requiring careful management to effectively support CT education and learning. In such settings, managing interdisciplinary and intra-disciplinary communication, as well as interactions with patients and their families, is essential. One student shared:

"When the instructor criticizes me in front of others, I feel anxious and can't think, let alone focus on CT... Some instructors' relationships with students are really poor..."

The core variable emerged after identifying the main concerns expressed by participants. This variable serves as the central theme that connects all categories to the primary challenge of CT skill development. The findings indicated that instructors focus on creating an optimal learning environment by designing it thoughtfully, modeling professional thinking, assessing students' cognitive and behavioral development, and managing negative factors that hinder learning. As a result, the central variable—the *journey of cultivating critical thinking*—was identified as the essential process in teaching CT skills.

Discussion

This study highlights the importance of establishing an effective learning environment to foster CT skills in nursing students. Key to this process is the role of instructors in modeling professional thinking and managing various challenges that arise during teaching. However, the concept of professional thinking remains somewhat ambiguous, underscoring the need for clearer definitions and improved instructional strategies. Scholars have noted that the identity of CT is fluid and subject to interpretation. As a result, attempts to define it may lead to misconceptions. Hence, some experts suggest that educators should remain in a state of ongoing inquiry. Nursing educators often face difficulties in teaching CT due to their limited or contradictory interpretations of this concept.¹

Our results indicate that the self-preparation phase is crucial for both instructors and students in the development of CT skills. Instructors actively engage in preparation by reflecting on learning objectives and designing appropriate educational scenarios. Similarly, some students demonstrate initiative by reviewing theoretical knowledge to better adapt to new clinical environments. However, variability in student preparedness underscores the need to promote consistent, self-directed learning strategies to enhance CT skills and ensure readiness for real-world clinical situations. The primary goal of educational institutions should be to equip students with the ability to develop reflective and critical thinking skills. In this context, instructors are encouraged to adopt reflective and critical perspectives on their own teaching practices while fostering an educational environment that encourages students to engage with the world around them with compassion, understanding, and fairness.²⁷ One study found that students' self-directed learning skills ranged from poor to average, with a high level of dependency on instructors to engage in the learning process. It was also reported that students had insufficient knowledge about self-directed learning and CT. Nevertheless, final-year students exhibited a more positive disposition toward CT, which was attributed to their increased clinical experience.²⁸

The *exposure to situation* phase emphasizes the importance of orientation and adaptation in fostering a deeper understanding of the learning environment. As both instructors and students become familiar with the context, instructors can tailor their teaching strategies to meet the diverse needs of students. By adapting the learning scenario to match students' capabilities and providing clear guidance, instructors promote greater student engagement and reflection, enhancing both the learning experience and preparation for real-world clinical situations. The rethinking process used by instructors involves questioning their own performance and examining assumptions about both their own actions and those of their students. This habit of reflective thinking leads to more informed action, adds meaning to the educational experience, and fosters the creation of a dynamic and inclusive classroom environment.²⁷ Given that students' levels of CT vary,^{29,30} instructors should tailor educational situations to match students' individual abilities, enabling them to acquire and further develop essential skills.

The *action/reaction* phase is pivotal in teaching professional thinking, as it involves modeling critical thinking processes and guiding students through active problem-solving. By demonstrating systematic thinking and encouraging self-directed learning, instructors help students develop their own analytical skills. The use of diverse teaching methods, such as simulation and evidence-based approaches, further supports students in engaging deeply with the material and enhances their ability to think independently, promoting continuous learning and professional growth. Raymond et al.³¹ in 2018 emphasize that critical thinking is a key factor in student learning and an essential component of undergraduate nursing education. They highlight fundamental aspects of nursing instruction, including fostering strong instructor-student relationships, modeling CT, integrating educational resources, and managing the various factors that influence CT development among nursing instructors. It is important to note that if CT is applied in a rigid or dogmatic manner, it may not effectively support the nursing process. Instead, nursing instructors are responsible for creating a comprehensive clinical education framework that actively stimulates CT.³² Research further indicates that effective teaching methods play a crucial role in CT development. For example, Poodineh Moghadam et al.⁵ found that evidence-based education is a powerful tool for enhancing CT skills in nursing students, as it actively engages learners in the learning process.

The findings of this study parallel several established international strategies used to foster critical thinking in nursing education. A strong body of evidence supports PBL as an effective method; one meta-analysis of 19 studies involving 1,996 nursing students reported a significant improvement in critical thinking skills.³³ Additionally, blended learning, which integrates online instruction with face to face clinical activities, has been shown to substantially enhance critical thinking ability. A recent systematic review and meta-analysis of 26 studies (2,823 students) found a large effect size for critical thinking improvements achieved through blended learning compared to traditional methods.³⁴ In contrast, our study emphasizes strategies such as instructor modeling, situational exposure, tailored feedback, and adaptive responses to unexpected events within the Iranian context. These findings suggest that while global pedagogies like PBL and blended learning are indeed effective, the integration of culturally grounded educational strategies—such as hands-on instructor involvement and real-world adaptability—may provide more robust frameworks for developing critical thinking. Future research should therefore explore how these international methodologies might be harmonized with localized practices to foster critical thinking across diverse settings.

The *encountering unexpected situations* phase is crucial in developing CT skills, as clinical environments often present unanticipated challenges that can disrupt planned learning. Instructors must support students in managing these disruptions, encouraging thoughtful responses while preventing anxiety. Communication breakdowns between instructors, students, and ward staff can further complicate the situation, requiring careful management to maintain a positive learning environment. Students' reactions to unpredictable scenarios highlight the importance of supportive relationships and effective communication in fostering the development of reflective and adaptive critical thinking skills. To effectively implement CT development strategies, the promotion of instructor qualifications and the management of existing barriers must be addressed. Instructors should consider various obstacles to CT learning, including those related to the instructor, student, education system, and the overall learning environment. Assessment of strategies, barriers, and facilitating factors is essential for improving CT education. For example, a student's cultural context can act as both a facilitator and a barrier to CT development. Additionally, low self-esteem and student anxiety negatively affect CT learning.³⁵ It is also evident that educator characteristics and contextual factors, such as teaching difficulties and lack of managerial support, are recognized barriers to CT development among instructors.³⁶

While this study highlights a generally positive process for developing critical thinking, some participants noted challenges, such as managing unexpected situations and communication barriers. Some students also reported anxiety related to instructional methods, which may hinder the development of critical thinking. These differences reflect the complexity of clinical teaching and the influence of contextual factors. We also acknowledge the potential for researcher bias. Strategies such as peer review were used to reduce its impact; however, future studies may benefit from incorporating external analysis.

The central theme identified in this study, "*the journey of cultivating critical thinking*," underscores the crucial role of instructors in shaping the learning environment and fostering CT skills in nursing students. Instructors are not only responsible for creating optimal learning situations but also for modeling professional thinking and evaluating students' cognitive development. However, the ambiguity surrounding the definition of professional thinking reveals a gap in its conceptualization and instructional methods. This uncertainty highlights the need for greater clarity and instructor training to effectively integrate professional thinking into CT education, ensuring that students develop the skills necessary for reflective and systematic decision-making in clinical practice.

Limitations

While this study provides valuable insights into the development of critical thinking skills within the Iranian nursing education context, certain limitations should be acknowledged. First, although the inclusion of five senior nursing students enriched the data and complemented the perspectives of educators, the small sample size may limit the depth of student experiences captured. Second, the cultural and institutional context of Iranian nursing education may influence the transferability of the findings. While several core processes—such as self-preparedness, situational exposure, and reflective engagement—are relevant across educational settings, further research in different cultural or institutional contexts is recommended to enhance generalizability. Additionally, while this study highlights positive aspects of

critical thinking development, most participant views were affirming, which may reflect desirability bias. Educators might have emphasized ideal practices, and senior students may have been reluctant to critique faculty or teaching methods. Alternative perspectives, such as challenges or barriers, were less frequently expressed, possibly due to hierarchical dynamics within academic and clinical settings. Future research should aim to include a more diverse participant pool and encourage critical viewpoints to provide a more comprehensive understanding.

Conclusion

In conclusion, this study highlights the importance of creating an effective learning environment and providing strong instructional support to foster CT skills among nursing students. The core theme, "*the journey of cultivating critical thinking*," underscores the vital role of instructors in modeling professional thinking, assessing students' progress, and managing challenges that may hinder learning. While the process includes key stages, such as self-preparation, exposure to situations, action/reaction, and encountering unexpected situations, the study also reveals that the concept of professional thinking remains somewhat unclear for some instructors. This indicates a need for further clarification and the development of more effective teaching strategies. To enhance the teaching of CT, it is essential for educators to address these uncertainties and continue adapting their instructional approaches to support students in becoming independent, reflective practitioners. The findings of this study have significant implications for nursing education practice. Instructors should prioritize creating a supportive and adaptable learning environment that fosters CT by modeling professional thinking, employing varied teaching strategies, and effectively addressing unexpected situations. By continuously assessing students' progress and providing constructive feedback, educators can guide students in developing both their professional thinking and CT skills. Additionally, clear definitions of professional thinking should be established, and instructors must refine their teaching methods to help students effectively bridge theory and practice in real-world clinical settings. This approach will better prepare nursing students to navigate complex clinical situations, ultimately leading to improved patient care outcomes.

Ethics Committee Approval: The study was approved by the Shiraz University of Medical Sciences Ethics Committee [Approval Number: IR.SUMS.REC.1398.920, Date: 09.10.2019].

Informed Consent: Verbal and written informed consent was obtained from all participants prior to the interviews.

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