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Critical Thinking in Nursing: An Integrative Review

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Abstract

Aim. This integrative review aimed to review studies on critical thinking and how it is essential in nursing education. The research question that guided this integrative review was: What teaching strategies positively influence critical thinking development in new graduate nurses?

Background. Critical thinking is an essential skill in the nursing profession which helps nurses to prioritize and perform life- saving interventions for the patient. This desirable competency is an expected outcome upon graduating from nursing school. However, there is growing concern that new graduate nurses lack this essential skill.

Data Sources. Articles were located by searching electronic data bases including PubMed, CINAHL Plus, Medline Complete, Scopus and Ebsco Host electronic databases. The studies examined learning styles, problem-based learning (PBL), unfolding case studies, and simulation as teaching strategies that may influence critical thinking development in nursing students.

Review Method: Whittemore and Knafel's (2005) framework for data collection and synthesis was used for this integrative review.

Results: Two main themes and three subthemes identified were:

1. Teaching strategies may directly or indirectly impact critical thinking in nursing students.

Subthemes included: PBL, unfolding case studies, and simulation as they were noted to influence critical thinking in nursing students.

2. Learning styles may influence critical thinking in learners.

Conclusion. Further research is needed to further understand learning styles and PBL, unfolding case studies and simulation as teaching strategies that may influence critical thinking in nursing students.

Keywords: Critical thinking, nurses, new graduate nurses, nurse education

Critical Thinking in Nursing Education: An Integrative Review

As a concept critical thinking does not have one linear definition. Rather, in nursing it is a combination of reasoning and problem -solving skills as well as attitudes and the ability to adapt rapidly to changing situations in the clinical area. Alfaro-LeFevre (2019) discussed that critical thinking is characterized by being organized, structured, and specific, inquisitive about the intentions, facts and reasons behind an idea or action, and involves formulating questions to gain a deeper understanding of what is happening and why. Additionally, Carvalho et al. (2017), described critical thinking as the ability to reason, deduce, and induce based on current research and practice findings. Nurses utilize critical thinking to analyze information and prioritize the care they provide to patients. These desirable competencies are essential to effectively manage complex patient conditions and promote better patient outcomes.

Critical thinking is an essential skill in the nursing profession that helps nurses to prioritize and perform life- saving interventions for the patient. As an essential skill in nursing Wahl and Thompson (2013) revealed that newly graduated registered nurses showed a lack of critical thinking skills to inform their clinical decision-making abilities. Moreover, Van Nguyen and Liu (2021) noted that the lack of critical thinking skills can directly impact the care provided to patients and has also been identified as a factor in patient recovery and patient outcomes. Therefore, it is critical that nursing students acquire and develop clinical reasoning corroborated with theoretical concepts of nursing. Nurse educators must help nursing students obtain proficiency at analyzing and interpreting changes in patients. Wahl and Thompson (2013) further noted that as a skill and an ability in nursing, critical thinking entails the use of risk-taking creatively to decide based on knowledge resulting from analysis, synthesis, and evaluation. Critical thinking is an important part of nursing education. Therefore, it requires that nurse

educators prepare learning content and implement teaching strategies to help develop critical thinking in nursing students.

Background

The essential skill of critical thinking has many vital components that helps nurses to provide safe and competent care to patients. Nurses use this skill to assess, analyze, examine, and perform effective and safe interventions that can help detect patient deterioration, and improving patient outcomes. As a concept, critical thinking does not have one linear definition because it does not have a definite skill set. Instead, it is a combination of reasoning and problem-solving skills and attitudes and the ability to adapt rapidly to changing situations in the clinical area. Carvalho et al. (2017) described critical thinking as the ability to reason, deduce, and induce based on current research and practice findings. Alfaro-LeFevre (2019) discussed that critical thinking is characterized by being organized, structured, and specific, inquisitive about the intentions, facts and reasons behind an idea or action, and involved formulating questions to gain a deeper understanding of what is happening and why.

Particular aspects of critical thinking have been identified as crucial especially in patient safety and patient recovery. However, as highlighted by several studies (Kavanagh& Swevda 2017; Van Nguyen & Liu, 2021; Myers et al., 2010) critical thinking in new graduate nurses is still lacking. Kavanagh and Swevda (2017) completed a study of more than 5,000 newly graduated nurses with only 23 nurses meeting the competencies of an entry level nurse. They further noted that new graduate nurses may not be prepared to effectively care for patients. Additionally, Myers et al. (2010) discussed that there were several hospital concerns about patient safety related to new graduate nurses' inability in identifying complex patient problems. This is because challenging patient problems require nurses to rapidly identify, analyze, and act

on the problem. Critical thinking is not obtained from an individual lecture or an individual clinical experience. Rather, it is developed throughout the duration of the nursing program in lectures and in clinicals. In these learning environments, various teaching strategies are utilized to teach concepts of nursing and the practice of nursing. It is important to determine if there is a specific teaching strategy that can be effective in teaching critical thinking to nursing students.

Critical thinking is noted to be a major theme in the outcomes by accrediting agencies for schools of nursing. The American Association of the Colleges of Nursing (AACN) and The National League for Nursing (NLN) highlight the importance of critical thinking in the standards set for nursing programs (AACN, 2008; NLN, 2016). Critical thinking is expected as an outcome for new graduate nurses upon graduation. Additionally competent thinking in new graduate nurses is necessary due to the nature of the fast-paced health care industry and complex patient conditions. However, there are gaps that exist when it comes to nursing practice and critical thinking in new graduate nurses. Therefore, there is a need to identify where the literature gaps exist when it comes to critical thinking in new nurse graduates. This integrative review analyzes teaching strategies that may directly and positively influence critical thinking in undergraduate nurses. It seeks to answer the question: Are there specific teaching strategies that can be used to develop and improve critical thinking in undergraduate nurses?

Methods

Whittemore and Knafl (2005) approach was used for the integrative review process. Following an extensive search 350 articles were collected, synthesized, and presented. Screening of the studies was done using the John Hopkins Evidence Based (JHEBP) quality appraisal review checklist (Dang & Dearholt, 2017).

Search Strategy

A literature search was conducted using PubMed, CINAHL Plus, Medline Complete, Scopus, and Ebsco Host electronic databases. Each article was categorized by the methodology used for the research along with elements of the study that included sample, data collection, design and setting of the study. The five stages of the integrative approach framework according to Whitemore and Knafl (2005), problem identification, literature search data analysis, data evaluation and presentation were used. Further key search words used to conduct a rigorous search online for articles were critical thinking, nurses, new graduate nurses, nurse education. From the search, multiple studies with various designs emerged. Inclusion criteria for studies included: (a) articles published between 2010-2020 (b.) written in English (c.) other integrated reviewed that focused on critical thinking in nursing and nursing education; and (d.) articles that were accessible in full text. Articles not written in English, published before 2010 and not in full text were excluded. Similarly, articles that did not focus on critical thinking in nursing and nursing education were also excluded. Articles that were identified for further analysis were saved using RefWorks, a digital reference management software.

Search Outcome

The initial search yielded 350 articles. Following a title search, 300 articles were eliminated. Thereafter an analysis of the remaining 50 articles 30 were eliminated after reading the abstracts of the studies. The remaining 20 were extensively analyzed and eight articles were selected based on the predetermined criteria and after meeting the good quality appraisal level as shown in Figure 1. Using color coding studies with similar topics were coded with specific colors for further analysis.

Data Analysis

The selected studies were further analyzed, and recurrent themes were identified. Afterwards studies were re-read to enhance understanding of the identified themes. Two main themes identified were:

1. Teaching strategies may directly or indirectly impact critical thinking in nursing students.
2. Learning styles may influence critical thinking in learners.

The first theme was further split into three subthemes identified as problem-based learning, unfolding case studies and simulation. These were noted to influence critical thinking in nursing students.

Results

The studies analyzed if there was critical thinking development in nursing students when specific teaching strategies were used. Five studies (Choi et al., 2014; Shin et al., 2015; Martyn et al., 2014; Lin et al., 2015; Englund, 2020) were completed on baccalaureate of nursing students. The studies found that critical thinking was not significantly impacted. Further, several articles (Andreou et al., 2014; Martyn et al., 2014, Lee et al., 2020; Lin et al., 2015) revealed that individual traits of a learner may directly influence critical thinking development. Consequently, the articles were further explored, and thematic analysis was conducted. Further investigation of the eight articles continued to identify common findings.

Theme1: Teaching Strategies May Directly or Indirectly Influence Critical Thinking in Nursing Students

In reviewing the literature various strategies are offered to enhance critical thinking abilities. From the first main theme, three sub themes emerged as positively influencers of critical thinking in nursing students: PBL, unfolding case studies and simulation.

Jahn and Kenner (2018) noted that strategies utilized by teachers to conduct classes could influence students' thinking immensely. Belecina and Ocampo Jr. (2018) discussed that varied experiences in clinical and lecture over a period of time may help in developing critical thinking in nursing students. Nurse educators must find innovative teaching strategies to effectively teach critical thinking. Success in teaching critical thinking requires creative strategies. Several researchers (Andreou et al., 2014; Martyn et al., 2014, Lin et al., 2015) discussed that certain teaching strategies may have had an impact on critical thinking.

Problem Based Learning

Problem based learning is a teaching strategy used in nursing schools through which the teacher facilitates problem-solving. Complex problems presented to the student do not have one correct answer and can be solved using several strategies (Saputra et al., 2019). According to Wynn and Okie (2017) problem-based learning aims to assist students in developing rich cognitive models of the problems they encounter. The primary role of an educator is to develop the student intellectually, emotionally and enhance their practical independence. One of the essential characteristics is that knowledge is cumulative because the PBL method repeatedly reintroduces material more deeply. It is also integrated, progressive, and consistent. A student engages in active listening and problems solving activities. The student is also able to reason critically, collaborate productively with team members, and be creative.

Problem based learning promotes the development of critical thinking skills, knowledge acquisition and understanding, deductive reasoning, independent learning, interpersonal skills, and clinical problem-solving skills. (Choi et al., 2014; Martyn et al., 2014). These two authors discussed that critical thinking levels improved in participants where PBL was utilized as a

teaching strategy. Additionally positive learning outcomes were mostly experienced by participants where PBL was used a teaching strategy.

Unfolding Case Studies

Similarly unfolding case studies have been shown to improve critical thinking in undergraduate nursing students (Goodstone et al.,2013; Li et al.,2019; Englund 2020). Unfolding case studies present patient information sequentially rather than the traditional static case study. Thereafter learners analyze information and take the appropriate action necessary to treat the patient. Englund (2020) discussed how unfolding case studies improved mean examination scores for the intervention group more than the group that utilized static case studies. The examinations questions required critical thinking skills because they were written at the “apply” level according to Bloom’s taxonomy for teaching, learning and assessment. Unfolding case studies support students critical thinking development by continuously encouraging students to analyze and examine information presented to them.

Simulation

Simulation in nursing can be defined as occurrences or events that are set to mimic real clinical events (Jensen,2013). Three studies (Goodstone et al.,2013; Choi et al., 2014; Shin et al., 2015) discussed simulation as a teaching strategy that enhanced critical thinking in participants. They found that repeated exposure to simulation helped improve critical thinking in nursing students. Shin et al. (2015) used instruments such as Health Sciences Reasoning Test (HSRT) and California Critical Thinking Disposition Inventory (CCTDI) to measure analysis and inquisitiveness, which are elements of critical thinking, in the study of nursing students after simulation. The results indicated a slight improvement in these specific elements of critical thinking after simulation.

Theme 2: Learning styles may influence critical thinking in learners

The findings from three articles (Andreou et al., 2014; Martyn et al., 2014; Lin et al., 2015) discussed learning styles and individual perceptions influence critical thinking in nursing students. Learners possess unique learning styles that may directly influence critical thinking development. A systemic review by Andreou et al., (2014) discussed that learning styles positively or negatively affected critical thinking development. Their analysis indicated that learning styles might be determinants of critical thinking development. Additionally personal attributes like inquisitiveness and open-mindedness were noted as positive influences in the development of critical thinking. Inquisitiveness in a learner leads to deep learning (Martyn et al., 2014; Lin et al., 2015) and could enhance the development of critical thinking in nursing students. Though some attributes are intrinsic, educators can use learner-centered teaching strategies that promote inquisitiveness and promote more than surface level learning in nursing students. Problem-based learning, simulation and unfolding case studies require the learner to examine and analyze information presented encouraging deep learning.

Discussion

A review of literature builds on the evidence that some inconsistencies exist in some new nurses critical thinking abilities. Multiple studies revealed that critical thinking skills are vital in the nursing profession. The studies analyzed for this integrated review ranged between 2010-2020 and included those that focused on the literature gap regarding the most effective teaching strategies to improve critical thinking in nursing students. Personal attributes such as inquisitiveness and open-mindedness may positively influence the development of critical thinking in nursing students. However, paucity in critical thinking achievement still exists in new graduate nurses. Further analysis of the studies for this integrative review revealed that PBL,

unfolding case studies and simulation were noted to enhance critical thinking in nursing students when used over time. Though these individual teaching modalities were found to positively influence critical thinking, there may not be a specific teaching strategy to effectively teach critical thinking. Nevertheless, a combination of PBL, unfolding case studies and simulation utilized over time may enhance the development of this desirable competency in nursing students. Problem based learning, unfolding case studies and simulation promote deep learning by requiring learners to use elements of critical thinking examine, analyze, and take appropriate actions for the presented problem. These actions in the clinical area can help with rapid identification of a patient problem and promotes patient safety. Therefore, nurse educators must continue to use teaching strategies that are found to promote critical thinking development in nursing students in addition to influencing motivation for deep learning.

Strengths and Limitations

In this review one of the strengths that was noted was the recognition of the lack of critical thinking in new nurses. Moreover, it was noted that this problem is experienced globally by entry level nurses. As a result, studies completed at nursing schools both outside and in the United States were analyzed. There was current and relevant data available to identify the problem, evaluate, analyze, and present the findings from selected articles.

Limitations that were noted were the key term critical thinking may have lacked specificity because it may be referred to as clinical reasoning which was not used as a search term. Additionally, seven of the eight articles selected were completed in nursing schools not located in the United States. Differences in curriculum, learner characteristics and culture may have lessened application to nursing schools in the United States. Two studies were multi-site

designs that had varied simulation fidelity and different school curriculums. Sample size and sample quality were also noted as limitations in two studies.

Implications

The findings from this integrative review have indicated that there are teaching strategies that positively influence critical thinking in nursing students. Several authors (Englund 2020; Choi et al., 2014; Goodstone et al., 2013; Martyn et al., 2014; Shin et al. 2015) highlighted an improvement in critical thinking for participants where unfolding case studies, PBL and simulation were used as a teaching strategy. However, the enhancement in critical thinking came with repeated exposure to the varied teaching strategies. This review revealed that elements of critical thinking, such as open-mindedness and inquisitiveness improved in learners where unfolding case studies, PBL, and simulation were used as teaching strategies. Therefore, it is essential that nurse educators continue to find and utilize innovative teaching strategies that would enhance the development of critical thinking in nursing students.

Conclusion

In nursing education critical thinking is a desired competency. It is weaved through the expected outcomes for nursing students. However, weak critical thinking has continually been noted in nursing students and novice nurses. As patient conditions become complex, it is essential that nursing education continue to identify and use innovative strategies to teach critical thinking. There may be some teaching strategies that have a positive influence on critical thinking development. Additionally, learning styles may affect critical thinking in nursing education. Individual attributes of learners may positively or negatively affect the development of critical thinking in nursing students. Therefore, further studies are needed to identify and understand if there are teaching strategies that significantly improve critical thinking in nursing

education. Additionally further studies are needed to understand how learning styles may impede or propel critical thinking development in nursing students.

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Figure 1
PRISMA Flow Diagram

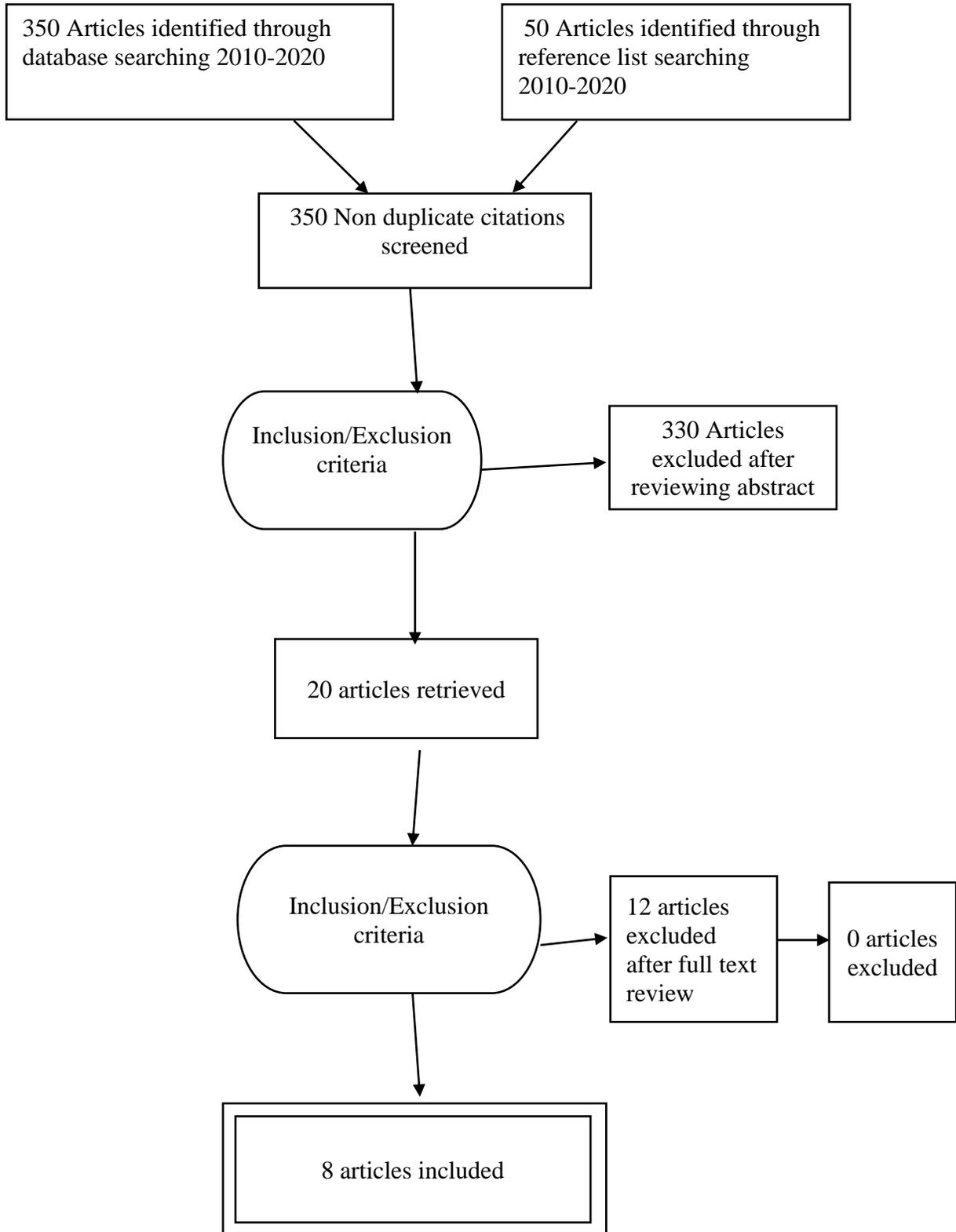


Table 1
Summary of Findings

Author/Pub/Date	Research/ Design	Sample/ Setting	Study findings that help answer the EBP question	Limitations	Level of Evidence
<p>Andreou, C., Papastavrou, E., & Merkouris, A. 2014 Learning styles and critical thinking relationship in baccalaureate nursing education: A systematic review. <i>Nurse Education Today</i>, 34(3), 362-371</p> <p>To identify the potential relationships between learning styles and critical thinking in baccalaureate nursing students.</p>	Systematic review	N/A	<p>The study established that learning styles have a great influence on critical thinking. Findings were grouped under four key themes: predominant learning styles, critical thinking scoring, critical thinking evolution across academic progress and learning styles-critical thinking correlations. Learning styles' diversities, weak critical thinking and inconsistent evolution through academic progress were revealed across studies.</p>	Language bias due to limiting articles to English and Greek	Level V
<p>Choi, E., Lindquist, R., & Song, Y. (2014). Effects of problem-based learning vs. traditional lecture on Korean nursing students' critical thinking, problem-solving, and self-directed learning. <i>Nurse Education Today</i>, 34(1), 52–56</p> <p>The objectives of this study are to examine outcome abilities</p>	Quasi-experimental design	<p>The study used a multi-site, pre-test, post-test design.</p> <p>90 first year nursing students at a university in Korea</p>	<p>Learning outcomes were significantly positively correlated, however outcomes were not statistically different between groups. Students in the PBL group improved across all abilities measured, while student scores in the traditional lecture group decreased in problem-solving and self-directed learning.</p> <p>The gains in students' CT scores varied according to</p>	Varied fidelity of simulation at the different sites	Level 11

<p>including critical thinking, problem-solving, and self-directed learning of nursing students receiving PBL vs. traditional lecture, and to examine correlations among these outcome abilities.</p>			<p>their numbers of exposures to the simulation courseware. With a single exposure, there were no statistically significant gains in CT, whereas three exposures to the courseware produced significant gains in CT.</p>		
<p>Englund H. (2020). Using unfolding case studies to develop critical thinking skills in baccalaureate nursing students: A pilot study. <i>Nurse Education Today</i>, 93, 104542.</p> <p>The aim of this study was to determine how the use of unfolding case studies as a learning modality affected baccalaureate students' critical thinking skills in their Adult Health Theory course. The researcher compared course examination scores earned by nursing students who were taught using traditional case studies to scores obtained by nursing students who completed unfolding case studies.</p>	<p>Non-experimental correlation design</p>	<p>202 baccalaureate students in 3rd semester of a 5-semester nursing program at a university in Wisconsin.</p> <p>The control group consisted of students enrolled in the academic year 2016-2017.</p> <p>The intervention group included students enrolled in the academic year 2017-2018.</p>	<p>From the study, results indicate the use of unfolding case studies can enhance critical thinking skills in students</p>	<p>Limited academic outcomes that measure critical thinking skills. Another limitation is lack of a tool to directly measure critical thinking skills in nursing students rather than an indirect measure such as performance on course examinations.</p>	<p>Level 11</p>

<p>Goodstone L. Goodstone, M.S., Cino, K., Glaser, C.A., Kupferman, K., & Dember-Neal, T. (2013) Effect of simulation on the development of critical thinking in associate degree nursing students. <i>Nursing Education Perspectives</i>, 34(3), 159-162</p> <p>The purpose of this study was to explore the development of critical thinking for students who received instruction using high-fidelity patient simulation (HFPS) versus low-fidelity simulation (instructor-written case studies).</p>	<p>Quasi-experimental design</p>	<p>A convenience sample of 42 first-semester associate degree nursing students participated. One group of students received weekly HFPS patient simulations and the other group received weekly case studies. Both groups took a pre- and posttest using the Health Studies Reasoning Test</p>	<p>The participants depicted an increase in critical thinking skills. However, the research failed to find any statistically significant variance between the case study and HFPS.</p>	<p>Randomization of the sample would have strengthened the study</p>	<p>Level 11</p>
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<p>Lin, C. C., Han, C. Y., Pan, I. J., & Chen, L. C. (2015). The teaching-learning approach and critical thinking development: a qualitative exploration of Taiwanese nursing students. <i>Journal of Professional Nursing, 31</i>(2), 149-157.</p> <p>This study uses a qualitative approach to explore how teaching strategy affects the development of critical thinking (CT) among Taiwanese baccalaureate-level nursing students.</p>	<p>Qualitative</p>	<p>Information gathered from 109 Taiwanese baccalaureate-level nursing students</p>	<p>The study results emphasize participants' perceptions of becoming a critical thinker, turning into an active learner, and eventually achieving self-confidence. These learning effects invest the wisdom of teaching-learning with a far-reaching significance.</p>	<p>Large sample size</p>	<p>Level 1</p>
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<p>Li, S., Ye, X., & Chen, W. (2019). Practice and effectiveness of “nursing case-based learning” course on nursing student's critical thinking ability: a comparative study. <i>Nurse Education in Practice, 36</i>, 91-96.</p> <p>The study aimed to explore the effect of "nursing case-based learning" course on the critical thinking ability of nursing student.</p>	<p>Quasi-experimental</p>	<p>80 junior BSN nursing students at a university in China</p>	<p>The study findings established that there was no statistical relationship among the different groups of students.</p>	<p>There were too many external factors, impeding an exploration of the long-term effects of intervention. Nursing students were assigned to different hospitals to participate in clinical.</p>	<p>Level 11</p>
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<p>Martyn, J., Terwijn, R., Kek, M. Y., & Huijser, H. (2014). Exploring the relationships between teaching approaches to learning and critical thinking in a problem-based learning foundation nursing course. <i>Nurse Education Today</i>, 34(5), 829-835</p> <p>This paper presents the findings of a study exploring the relationships between nursing students' individual characteristics and perceptions of learning environments, teaching in PBL mode, approaches to learning, and critical thinking skill readiness</p>	<p>Descriptive research design</p>	<p>Surveys were administered to all first year University of Queensland nursing students enrolled in Responsible Nursing Practice in May/June of Semester 1 in 2010 (N = 301). The response rate was 72.42% (n = 218).</p>	<p>The results through hierarchical linear modelling, revealed that aspects of the PBL approach to teaching influenced the approaches to learning students adopt, and thus their critical thinking skill readiness.</p>	<p>The research concluded that undergraduate nursing programs are responsible for providing teaching and learning that develops students' knowledge, skills, and attitudes in alignment with contemporary nursing standards and healthcare demands.</p>	<p>Level IV</p>
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<p>Shin, H., Ma, H., Park, J., Ji, E.S., Kim, D. (2015). The effect of simulation courseware on critical thinking in undergraduate nursing students: Multi-site pre-post study. <i>Nurse Education Today</i>. 35, (4), 537-542. This study examined the effect of an integrated pediatric nursing simulation used in a nursing practicum on students' CT abilities and identified the effects of differing numbers of simulation exposures on CT in a multi-site environment.</p>	<p>Multi-site Pre-test/post test</p>	<p>A total of 237 BSN nursing students at three universities enrolled in a pediatric practicum participated in this study from February to December 2013.</p>	<p>Results of this study suggest that unfolding case studies more effectively develop students' critical thinking skills than do a more traditional, static case study.</p>	<p>This study limitation involved the different school curriculums and simulation environments encountered in study.</p>	<p>Level 11</p>
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