

Abstract

Aim: Critical thinking is essential to quality health care and patient outcomes in the acute care setting. It is important for educators to understand and apply teaching and learning strategies to promote critical thinking of nursing students and junior nurses in acute care.

Design: We followed Arksey and O'Malley's 2005 framework to undertake a scoping literature review to find out how critical thinking is promoted among nursing learners (i.e., nursing students and junior nurses) in acute care.

Methods: Between September and October 2018, four databases were searched: Medline, CINAHL, Eric, and Google Scholar. Search terms included: rapid, teaching, methods, nursing, promote, critical thinking, and acute setting. A descriptive thematic analysis was undertaken.

Results: Twenty-three articles were included for review. Three main themes were identified from the analysis: learner-teacher relationship, reflection, and inquiry. Strong relationships promoted positive role modelling and effective feedback – both contributing to the teaching of critical thinking. Reflection strategies such as concept mapping and journaling were frequently utilised, while active student inquiry further promoted critical thinking in the acute setting.

Conclusions: The acute setting affords opportunities and challenges to promote critical thinking. Teachers/clinicians should incorporate learner-centred pedagogy and encourage reflective practice to embed critical thinking in teaching and clinical practice.

Keywords: nurse education; critical thinking; learning; acute care; scoping review

Introduction

Critical thinking is defined as reflective thinking that affords individuals to decide what to believe and what to do. A critical thinker is open to alternatives, well informed, and can judge the credibility of information (Ennis, 2011). In the health care setting, critical thinking involves analysis and discrimination of evidence-based research to guide practices; synthesis of information, creativity, reflective thinking, and keeping an open mind (Adams, 1999). Effective patient care requires healthcare professionals to engage in critical thinking, and this is nowhere more obvious than in the acute care setting. Healthcare professionals are often required to undertake this work rapidly, while also demonstrating professionalism and empathy towards patients and their families (Scheffer and Rubenfeld, 2000). How do they learn to do this? How do busy nurses in acute care settings foster such learning among junior staff and nursing students? We undertook a scoping review to find out how critical thinking is promoted among nursing learners (i.e., nursing students and junior nurses) in acute care.

Teaching and learning in the hospital setting

The power of clinical teaching lies in learners' situational holistic experiences of actual practice (Spencer, 2003). Nursing learners spend time with patients and participate in decision making and treatment. While learners may repeat a skill countless times, they do so with unique patients who each have biological and psycho-social idiosyncrasies that inform how learners practise the skill and treat patients (Young et al, 2014). With experience comes more knowledge – including logical, inter-personal, emotional, behavioural, and sensory – that forms the cognitive foundation upon which critical thinking is based (D'Souza et al, 2013; Young et al, 2014). Clinical decision making involves critical thinking and is often restricted by time pressure and limited resources. Skill building in this area takes time and nurse learners build skills most effectively when they are in a supportive learning context within the clinical environment.

However, several barriers to learning present themselves in the acute care setting. These include: time restrictions, continual interruptions, healthcare professionals having varying skill levels and little organisational support for learning (Chinai et al, 2018). Additionally, patients in acute care are often less predictable than those found in lower acuity care areas, such as aged care. The acute setting is fast-paced and unpredictable. The implementation and design of work-place based learning needs to have clearly defined learning outcomes, aligned with straightforward teaching instructions that can be achieved within a few minutes (i.e., rapid and brief), without compromising patient safety (Irby and Wilkerson, 2008).

Critical thinking in acute care nursing education

Active participation and problem-based learning are strategies used to promote critical thinking in the clinical environment (Distler, 2007). Carter, Creedy and Sidebotham (2016) reviewed teaching tools to promote critical thinking in nursing and midwifery students. Seven of the 28 reviewed studies suggest using problem-based learning to achieve positive growth in learner critical thinking. Concept mapping, reflective writing, critical reading and narrative pedagogy, videotaped vignettes, and grand rounds all displayed a tendency to increase critical thinking (Carter et al, 2016). Simulation training has been used to support learner critical thinking (Carvalho et al, 2017). Reflective learning is another way to promote critical thinking and self-evaluation in the clinical environment (Di Vito-Thomas, 2005). However, in acute care and nursing in general, it can be especially difficult to establish time and organizational support that promotes effective reflection and reflective writing (Mantzoukas and Jasper, 2004).

The scoping review

Advancing critical thinking enhances nursing learners' professional practice in the acute setting, which has a direct impact on the quality of patient care. Our research question was:

Which teaching and learning strategies are used to promote critical thinking of nursing learners (i.e., nursing students and junior nurses) in acute care?

Methods

Scoping reviews provide a systematic approach to a broad topic and identify deficits in research, especially when the topic under investigation has not been well researched by others, such as how to teach critical thinking to nursing learners in the acute setting, and often systematic reviews will follow a scoping review to evaluate the quality and rigour of the evidence available (Grant and Booth, 2009; Peters et al, 2015). We undertook a scoping literature review, following the five-stage search and appraisal framework outlined by Arksey and O'Malley (2005; i.e., 1: identifying the research question, 2: identifying relevant studies, 3: study selection, 4: charting the data, 5: collating, summarizing, and reporting the results). In stage 1, we identified the research question for the scoping review and set the parameters for the literature search to focus on nursing education in acute setting. In stage 2, we developed an algorithm to search for research evidence via several electronic databases, and the searches were undertaken during September to October 2018. Reference checking and hand-search of key journals were also carried out. Key terminologies were defined, and inclusion and exclusion criteria were developed in stage 3 to select relevant studies for the review (see Table 1 for more detail). Both qualitative and quantitative research studies and grey literature were included for this review. In stage 4, we synthesized and interpreted (charted) the key findings for each paper in terms of our research question. Lastly (stages 4 & 5), we undertook a descriptive thematic analysis in accordance to Braun and Clarke's (2016) framework to synthesize the evidence and report here the key findings.

Data collection

We conducted an electronic literature search of English-language articles in *CINHAL*, *MEDLINE*, *ERIC*, *SCOPUS*, *Web of Science* and *Google Scholar* (limited to first 5 pages of search results). The following search terms and derivatives were used: Rapid AND teaching AND method AND promote AND critical thinking AND nursing AND acute setting. Due to the poor results when teaching and rapid were combined (along with the derivatives of these two terms), structure was altered using a Boolean search operator to incorporate adjacency; for example (teach* OR learn*) adj5(rapid OR brief OR quick OR short OR fast). A full list of key terms and derivatives are shown in Table 1. All references were imported to RefWorks Citation Manager for further screening.

[Please insert Table 1 here]

Data extraction and charting information

We followed the PRISMA-ScR checklist (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) (Tricco et al., 2018) to guide the article selection process (see Figure 1 and Appendix 1).

[Please insert Figure 1 here]

The first author developed the search strategies with the help of a subject librarian, searched the databases, and completed the screening process. The second and third authors reviewed the search strategies and checked the eligibility of included articles at each screening stage. We included articles focusing on both nursing students and practicing junior nurses, because in the acute setting both groups may be operating at a similar level due to a lack of prior exposure to emergency care. See Table 2 for our inclusion and exclusion criteria.

[Please insert Table 2 here]

Once the final set of articles were identified, we summarised each article by charting relevant information relating to author name(s), article title, publication date, location of research, teaching method identified, study design, study aim, and summary of key findings.

Data analysis

We decided to conduct a thematic analysis to identify key themes that describe the characteristics and utility of various teaching methods. This inductive approach also allowed us to extract the key findings to answer our research question based on available literature.

We followed a six-phase approach to undertaking thematic analysis (Braun and Clarke, 2006). This involved 1) reading the included articles closely to become familiar with the data, 2) generating initial codes based on the information generated in the summary table, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing a report where findings are understood under broad themes. In phases two and three we searched for common codes across several (rather than only within individual) articles. Phases three, four and five were conducted consistently in relation to our research question, so that in phase five we selected themes based on how effectively they answered the research question. Although we charted the design of each study, we did not evaluate their methodological rigour or levels of evidence as we were interested in scoping out the extent of the literature rather than the quality of available evidence.

Results

Twenty-three articles were included for review. Most of the studies were conducted in the USA (n=13) and Canada (n=5). Among the remaining articles, two were conducted in Australia, two in Asia, and one in the Middle East (see Appendix 2 for details of included studies). Table 2 shows the three key themes and their sub-themes that were identified through the thematic analysis.

[Please insert Table 3 here]

Theme 1: Learner-teacher relationship

Nineteen articles discussed the student-teacher relationship as a factor influencing the teaching and learning of critical thinking in an acute setting. In our review, we refer to nursing educators/supervisors/preceptors as teachers, while nursing students and newly-graduated nurses were referred to as learners. Three sub-themes were identified: 1) teacher being viewed as competent (Babenko-Mould et al, 2012; D'Souza et al, 2013), 2) role modelling (D'Souza et al, 2013; Jetha et al, 2016; Kelly, 2007), 3) feedback (Distler, 2007; Myrick, 2002; Randall et al, 2007; Tanner, 2006).

Teacher viewed as competent

Learners considered inclusiveness and engagement as important elements in competent teaching (Woodley, 2020). An inclusive learning environment values cultural diversity and respects learners' points of view by engaging them in active discussions (Bleich et al., 2015; Smith, 2017). Teachers with this competence encouraged critical thinking among learners (Babenko-Mould et al, 2012; D'Souza et al, 2013; Jiang et al, 2018). They also assessed gaps in learner clinical knowledge (Chinai et al, 2018). Learner-centred teaching was deemed important towards informing learner comfort and self-assurance to develop their critical thinking skills in the clinical setting (Distler, 2007). Two studies recommended development of nurse teaching skills to strengthen the learner-teacher relationship (Jetha et al, 2016; Mangena and Chabeli, 2005).

Role modelling

Fast-paced acute environments can induce stress and self-doubt in those new to them and limit their ability to think critically. McAllister and McKinnon (2009) suggest that through role modelling, clinical teachers demonstrate effective coping strategies and aspects of

socialisation that allow nursing learners to become familiar with the clinical culture and to develop personal characteristics (such as resilience) to cope with the intensive demands of the clinical environment. This socialisation process may also reduce the cognitive load on learners, which affords them to use their prior learning and situational awareness to synthesize available evidence and to develop an action plan – both are crucial aspects of critical thinking in the acute setting. Learning to deal with stress enables learners to be more open and able to build critical thinking. In addition, good role models display personal characteristics such as sense of fairness, lack of bias, reflectiveness, mutual respect, and sound interpersonal skills (Babenko-Mould et al, 2012; Kelly, 2007; Shoulders et al, 2014). Role modelling leadership opens occasions for learners to participate in decision-making and coach learners in manoeuvring through the politics of the clinical environment. When done well, learners become champions of change and directors within the workplace in the future (Babenko-Mould et al, 2012). Furthermore, role modelling can occur between senior and junior nursing students, often referred to as peer coaching (McQuiston and Hanna, 2015), as it overcomes the generational and knowledge gaps between senior practitioners and junior nurses/students (Benner et al, 1992). Peer coaching promotes reflection and integration of knowledge about patient care, leading to critical thinking and clinical reasoning by both students and their peer mentors.

Feedback

Feedback involves coaching clinical knowledge and building learners' ability to reflect on their learning and emotions (McAllister and McKinnon, 2009; Tanner, 2006). Clear expectations need to be established between the teacher and the learner (Chinai et al, 2018), so that the teacher can provide feedback to achieve balance between supporting and encouraging independence and safe practice by the learner, while stimulating/challenging them to reflect and consider different ways of thinking (Myrick, 2002). Unfortunately, providing quality feedback in the acute care setting is not straightforward. Learners are likely to receive feedback on procedural tasks or practising a skill, rather than spending time with the teacher to reflect on their experience to encourage critical thinking (Brunt, 2005). Brunt (2005) estimates that nursing students remain task focused for the first five months of a

clinical placement, and suggested causation due to one or multiple factors, including experienced staff supplying a set answer as feedback to any query and thereby discouraging further critical thinking. Within the acute clinical environment, staff encourage learners to engage with the practice of skills and procedures while discouraging them from practicing “nonclinical” tasks such as speaking with patients. This occurs particularly in the acute setting when learners can feel judged on their ability to produce factual knowledge and develop their skill base rather than their thinking process (Randall et al, 2007).

To be successful in promoting critical thinking, the teacher needs to give learners continual, positive reinforcement for their independent and creative thinking, so that learners perceive that the act of thinking about alternative solutions is a desired outcome (Adams, 1999).

Furthermore, problem-based learning may improve teachers’ ability to provide quality feedback, especially when the assessment criteria were clearly identified for the learners (Distler, 2007).

Theme 2: Reflection

Fifteen articles discussed reflection as a teaching method to promote critical thinking in the acute setting. Reflection is defined as active learning through reviewing of practice in accordance with knowledge, action, and feedback (Randall et al, 2007). Three sub-themes were identified: 1) concept mapping (Adema-Hannes and Parzen, 2005; Chan, 2013; Herrman, 2002; Jiang et al, 2018; Shoulders et al, 2014), 2) journaling and reflective writing (Chan, 2013; D’Souza et al, 2013; Degazon and Lunney, 1995; Distler, 2007; Herrman, 2002) and 3) conversation (Babenko-Mould et al, 2012; Chinai et al, 2018; Kelly, 2007; McAllister & McKinnon, 2009; McQuiston & Hanna, 2015; Randall et al, 2007).

Concept mapping

Concept mapping uses visual tools to explain the thinking process and moves learners to an active learning process (Adema-Hannes and Parzen, 2005). It is considered an effective teaching strategy to promote critical thinking in nursing education (Chan, 2013; Shoulders et al, 2014). In an acute paediatric setting, concept mapping provided teachers a clear way to assess learners' knowledge, preparedness and overview of the patient; it also gave learners guidance, rather than straight directions, to plan their clinical practice in real time (Adema-Hannes and Parzen, 2005). Jiang et al (2018) note that concept mapping is particularly helpful in explaining the rationales behind different health practices. For example, when viewing a patient's treatment, concept mapping can help explain the rationale for choosing between alternative treatments (i.e., traditional Chinese medicine practice versus current Western medical practice). Concept mapping creates transparency around the thinking process and leads to a supported reflective conversation to make further conceptual links (Adema-Hannes and Parzen, 2005). As a result, learners could build a picture of patient care and incorporate it into their prior knowledge. With a clearer understanding of patient care and connections, the learner has a better ability to triage treatment and most importantly, to think in a critical manner about patient care. Whilst concept mapping proved beneficial, benefits only occurred once both learner and teacher became familiar with the concept and its practice as it draws on high levels of cognition and practical skills to make learning explicit (Adema-Hannes and Parzen, 2005).

Journaling and reflective writing

Reflective writing, such as with journaling or other forms of narrative medicine, has been shown to enhance writer's abilities to develop their thinking based on experiences. As a process, it encourages the writer to review an experience from different angles, and by so doing, gain insights (Craft, 2005; Sorrell, 1994). Chan's (2013) systematic review revealed that when used in combination with guidelines and specific questions, reflective writing has

proven effective in promoting critical thinking. Reflective writing can serve as an effective space in which people can identify moments of insight and own learning needs (Distler, 2007; Herrman, 2002). While Degazon and Lunney (1995) found reflective journaling effective in promoting critical thinking in learners, they suggest its value is increased through guidance for writing and active peer review of writing. They caution that peer reviewers need to be cognisant of own biases during review processes.

Critical Conversations

Literature signals the importance of conversations to learning. Critical conversations need to occur in a positive learning environment to encourage reflection and to promote critical thinking (McAllister and McKinnon, 2009). This subtheme focuses on teachers' role in facilitating conversations with learners as a means to encourage reflection. Babenko-Mould et al (2012) suggest that teachers promote critical thinking when they provide information to learners during a conversation and question them about their thinking. Chinai et al (2018) reviewed seven structured teaching models, including the One-Minute Preceptor model, SNAPPS, MiPLAN, ED STAT!, Aunt Minnie, SPIT, and Activated Demonstration. Despite having different pedagogical lenses, these teaching models all promote learning within structured conversations between teachers and learners. Using conversations for learning additionally supports teamwork and supports learners to assimilate into their clinical settings (Herrman, 2002). Randall et al (2007) explored the use of critical questioning to focus on the thinking around decision making. First, during a conversation the teacher concisely describes what happened in the clinical experience. This ensures transparency and offers an opportunity for both learner and teacher to reflect. Second, the teacher draws connections between the experience, the needs of the patient, and future practice. This ensures the learner has a better understanding of how and why certain practices took place, or were relevant. As the process continues, the teacher becomes a less dynamic partner in the conversation and allows the

learners to voice their reflections on how the experience has or can shape their practice. This process further encourages the learner to alter or embed their thinking.

Theme 3: Inquiry

Inquiry can be described as a thirst for knowledge or curiosity about the world around you. In the case of the critical thinking, inquiry occurs around ways of knowing and thinking. Inquiry encompasses the two subthemes – proactive questioning (Chan, 2013; D’Souza et al., 2013; Herrman, 2002; Randall et al., 2007; Shoulders et al., 2014) and multiple approaches to teaching (Adams, 1999; Brunt, 2005; Chan, 2013; Chinai et al., 2018; Herrman, 2002; Randall et al., 2007; Shoulders et al., 2014).

Proactive questioning

Proactive questioning characterises learners with critical thinking (Chan, 2013). This subtheme focuses on learners’ involvement in asking curious questions proactively, which in turn influences teaching methods. In the acute care setting, critical questioning acts as a prompt for teachers and learners to restructure their thoughts to form new learning (Forneris and Peden-McAlpine, 2006). Once being asked by learners, the teacher acts as a guide for the learner to reflect on their knowledge in the clinical situation, review possibilities to locate further knowledge, or develop further questions (Randall et al, 2007). Proactive questioning increases learners’ levels of curiosity, and the teacher provides enough guidance on the critical thinking process to ensure the learner is practicing safely (Chan, 2013). Furthermore, proactive questioning contributes to learners’ experiential learning and their ability to connect knowledge with practice (D’Souza et al, 2013).

Although proactive questioning is a positive teaching and learning activity, it can be viewed negatively by learners (Herrman, 2002) when they perceive the teacher’s responses and/or subsequent follow-up queries as finding fault with their practice or thinking. Questioning is

also bound by culture and may not be desirable in cultures which consider questioning senior authorities as a form of disrespect (Chan, 2013). As argued by Shoulders et al (2014), to enable critical thinking, the individual learner must build an inquiring manner that becomes a habit, leading to openness to ideas and new practice.

Multiple approaches to teaching

This subtheme synthesizes available teaching methods that are used to promote critical thinking in the acute setting. In the current climate, with its particular focus on learner-centred teaching, a number of teaching methods are being used to promote critical thinking. The literature chosen for this scoping review emphasises the importance of teachers utilising multiple teaching approaches to foster critical thinking in students (Chinai et al., 2018; Herrman, 2002; Shoulders et al., 2014).

Adams (1999) reviewed the effects of teaching strategies to improve critical thinking of professional nursing students. Of the 20 articles reviewed, none identified any strong evidence for improvements in critical thinking. Similarly Shoulders et al. (2014) recommends using a variety of teaching methods to promote critical thinking. Chan (2013) further reiterates the notion that no one type of learning provides the solution to issues in nursing education, and further, multiple types of knowledge can co-exist.

Chinai et al. (2018) reviewed seven teaching models for use in the clinical setting. Each model is based on a mnemonic, offering different approaches to suit different skills and varying levels of learner competence. For example, the activated demonstration method is more appropriate for teaching a skill, whereas other models emphasise ways of thinking, such as the usefulness of pattern recognition (e.g., Aunt Minnie), and encourage learner-centred teaching (e.g., SNAPPS – summarize, narrow, analyze, probe, plan, & select). Not all teaching models (e.g., SPIT – serious, probably, interesting, treatable) have been formally

evaluated for their effectiveness in teaching critical thinking in the acute setting, and clinical teachers need to select teaching models that suit their environment and learner needs.

Herrman (2002) researched brief teaching strategies that work in a variety of settings.

Thirteen strategies were identified for use in clinical settings, namely: one-minute care plans, grand rounds, field trips, clinical questioning, ah-haa journals, V-8 post conferences, student led discussion, pass the problem, quick-write, active reading, group concept mapping, and debate and learn from each other. The aim of each is to enhance critical thinking, priority setting and the amalgamation of knowledge and practical skills. No one strategy is seen as a stand-alone answer or more important than the others. Each may be better suited to a particular clinical setting, depending on the specific clinical situation.

The clinical settings of today represent a constantly changing and challenging world for learners (Babenko-Mould. et al., 2012). To meet learner needs and to provide effective education, teachers need to evolve alongside the clinical environment, which requires flexibility and adaptability in teaching style and approaches (Chinai et al., 2018).

Discussion

Our scoping review of 23 articles found that the learner-teacher relationship fundamentally shapes teaching and learning in acute care nursing. Reflection and inquiry are widely used to promote critical thinking of nursing students and junior nurses in acute care. Nursing teachers and learners both play vital roles in promoting critical thinking in the clinical environments. Teachers need to apply learner-centred pedagogical strategies to scaffold learners' cognitive processing, such as using concept mapping, guiding learners to reflect on their thinking to explore alternative solutions, and being proactive in enquiring learners' decision making process rather than their actual behaviour. To maximise learning opportunities, learners need to be active learners in the clinical setting and develop a continual learning habit of reflective

practice and active enquire. Working together in the acute clinical setting, nursing students and clinical teachers need to take advantage of the different in-situ learning opportunities to reflect on, which then allows for possible changes in practice and the development of critical thinking.

We did not find any convincing argument favouring one teaching method over others for improvements in critical thinking in the acute setting. Instead, the literature emphasised the importance of clinical teachers utilising multiple teaching approaches to foster critical thinking in nursing students (e.g., Chan, 2013; Chinai et al, 2018; Herrman, 2002; Shoulders et al, 2014). Concept mapping, in which visual tools are used to explain the thinking process, moves learners into an active learning process and enhances their critical thinking (Adema-Hannes and Parzen, 2005; Chan, 2013; Shoulders et al, 2014). Structured models, such as 'Aunt Minnie' which instructs the students to present core information about the patient (e.g., patient history and main diagnosis) to the supervisor to get feedback on (Chinai et al, 2018), can be deliberately incorporated into teaching sessions. This approach enhances pattern recognition and reduces the burden of cognitive load on learners, so that they can focus more on the thinking process. Furthermore, learners often find it stressful to work in the acute setting and the anxiety and stress could further burden their ability to think critically. Therefore, it is helpful for teachers to look beyond learner behaviours and allow time for them to reflect on their actions, thoughts, and emotions as part of their learning (Distler, 2007; Herrman, 2002). Our review set out to scope the teaching and learning methods for promoting critical thinking in acute care, rather than to appraise their *effectiveness*. Such appraisal is an obvious next research step. We note, however, that some methods are easier to implement than others. For instance, encouraging active questioning could be introduced as a key teaching method during student/new staff orientation to formalise teaching as part of

service delivery, whereas reflective journal writing might require more organizational support and staff buy-in to make it sustainable.

Our review discovered some barriers to promote the teaching of critical thinking at bedside in the acute setting. Given the fast-paced nature of the workplace, clinical teachers tend to give extensive feedback on learners' actions rather than guiding them to examine the reasons behind their actions and explore alternative solutions (Brunt, 2005; Randall et al, 2007). Peer coaching could be a way forward as it removes the intergenerational barrier between the teacher and the learner (McQuiston and Hanna, 2015). Time is another factor hindering the development of critical thinking in the acute setting, and some learners may require more training to get into the habit of being a reflective practitioner (Degazon and Lunney, 1995). Innovative teaching techniques such as flipped classroom and e-learning could become part of clinical placement (Pucer et al, 2014). Prior to the bedside teaching session, learners could review online modules and participate in discussion board to learn about clinical skills. These teaching innovations could reduce the cognitive load of the learner when applying knowledge to clinical practice, equip the learner with some fundamental clinical knowledge, which in turn facilitates active inquiry, promotes collaborative learning among peers, and increases learners' engagement with the teaching material.

The literature highlights the need to provide positive reinforcement to promote independent thinking, which is a precursor of critical thinking. Achieving this in the acute setting that is under resourced and time critical is a challenge. More research around teaching styles specific to acute clinical areas and their effectiveness needs to be instigated. In conjunction with this, there is a need for learning institutions to look at how they could work with clinical workplaces to provide a structure for learners and teachers with which they can become both familiar and comfortable to engage in critical thinking.

Limitations

The majority of the studies included in this review were based on nursing students' or junior nurses' experiences. Therefore, findings may not be generalizable for registered nurses already in practice. Furthermore, we may have limited the scope of this review by including only published articles, as it is possible that unpublished literature may offer further insights into our enquiry. Lastly, it was beyond the purpose of a scoping review to assess the quality of evidence available. A systematic review should be conducted to compare the efficacy of various teaching methods for increasing critical thinking among nurses in the acute care setting.

Conclusions

Acute care offers many unique learning opportunities, but also presents challenges to learning and embedding critical thinking. The relationship between nursing learners and teachers intrinsically shapes learners' critical thinking. Learners need to actively engage in strategies to develop their critical thinking, such as through active inquiry and critical reflective practice. Clinical teachers – including practicing nurses – must also keep pace with learner needs so they can foster effective supportive learning environments.

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Figure 1

Flow diagram for database searches

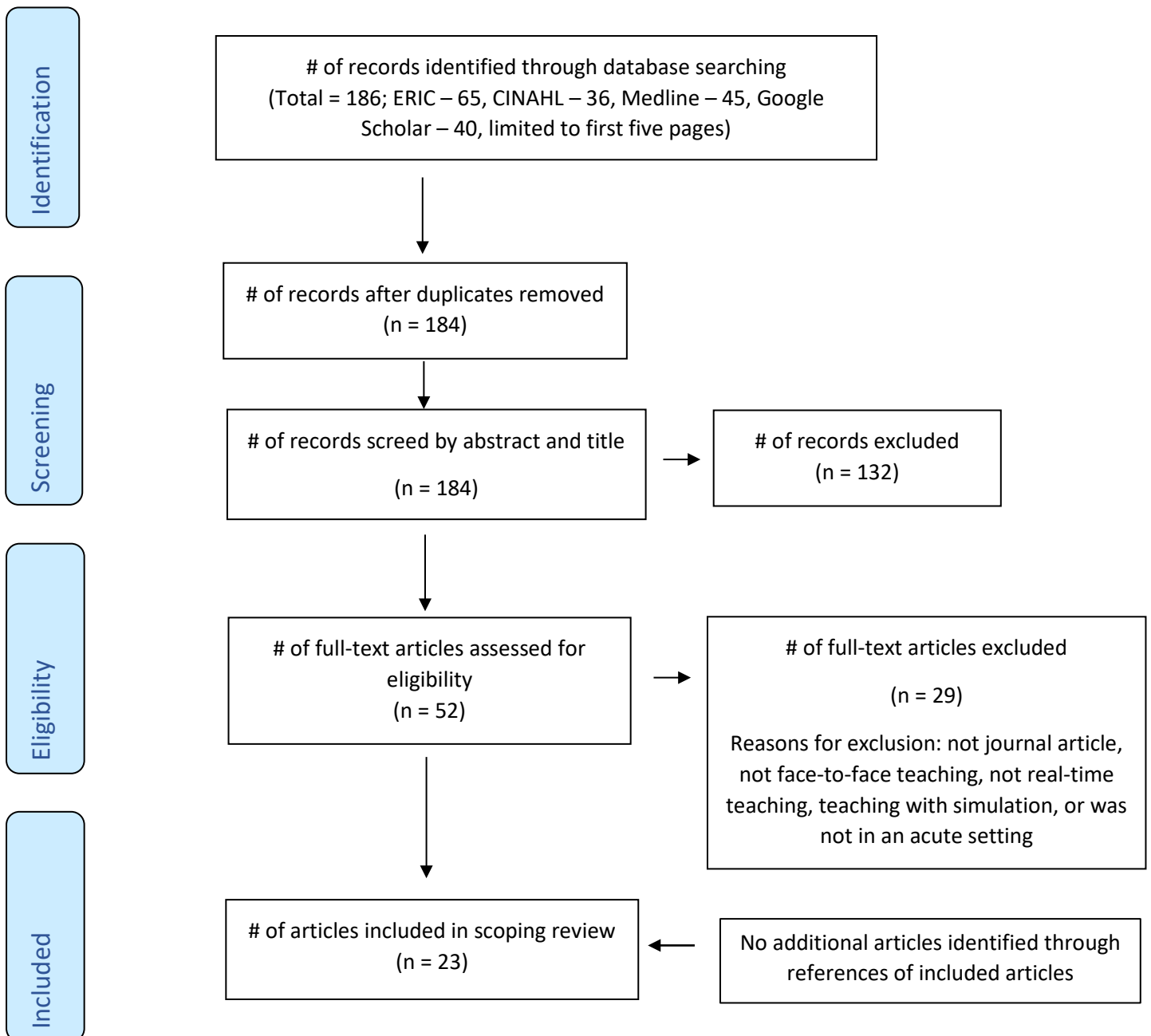


Table 1. Search Strategy

Search terms:
(teach* OR learn*) adj5(rapid OR brief OR quick OR short OR fast AND Method OR moment OR framework OR structure AND Promote OR increase OR grow OR enhance AND Critical thinking OR proactive thinking OR connected thinking OR clinical reasoning AND Nursing AND Acute setting OR critical care OR emergency care OR high pressure

Table 2. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none">• English language• Clinical, face-to-face teaching in real time• Concerned with teaching critical thinking in an acute setting for nursing students and junior nurses	<ul style="list-style-type: none">• Concerned with teaching in a simulation setting• Not in an acute setting• Not real time teaching• Not face-to-face teaching• Not a journal article

Table 3. Key Themes and Sub-Themes Identified in the Review

Key Theme	Sub Theme
1. Learner-teacher relationship	1a. Teacher viewed as competent 1b. Effective role modelling 1c. Feedback
2. Reflectiveness	2a. Concept mapping 2b. Journaling and reflective writing 2c. Critical conversations
3. Inquiry	3a. Proactive questioning 3b. Multiple approaches to teaching

Appendix 1. Preferred Reporting Items for Systematic reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	n/a
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	4
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	5
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Appendix 2
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	n/a
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	5
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with	5

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		reasons for exclusions at each stage, ideally using a flow diagram.	
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Appendix 2
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	n/a
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Appendix 2
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	5-13
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	13
Limitations	20	Discuss the limitations of the scoping review process.	16
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	16
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N/A

Appendix 2. Summary Table of Articles Included in Scoping Review

Author, Title & Year	Location	Teaching Method Identified	Study Design, Aim, Summary of Key Findings
Adams, B.L. <i>Nursing Education for Critical Thinking: an integrative Review.</i> 1999	USA	No specific teaching method identified. Looked at nursing education as a whole	Design: Integrated literature review Aim: To see if nursing education increases critical thinking. <ul style="list-style-type: none"> • Weakness in results may be due to lack of clear definition of critical thinking and one specific tool with which to measure critical thinking. • Nurses may need “real experience “to activate critical thinking. • Traditional teaching may improve analytical thinking rather than critical thinking. • Due to the nature of beginner practitioner, students want specific responses to situations rather than the freedom to form their own opinions through creative thinking. • Correlation between critical thinking and education of nurses was undetermined in this study.
Adema-Hannes, R. & Parzen, M. Concept Mapping: Does it Promote Meaningful Learning in the Clinical Setting? 2005	Canada	Concept Mapping	Design: Observational/cohort study Aim: Viability of using concept mapping in clinical practice. <ul style="list-style-type: none"> • Students and teachers positive experience in using concept mapping. • Provided visible way to connect ideas. • Patient centred - Able to relate any enquiry to patient condition therefore provide scaffold for learning.

			<ul style="list-style-type: none"> • Allow student and teacher transparency around thinking process on both sides, through daily discussion and reflection.
<p>Babenko-Mould, Y., Iwasiw, C.L., Andrusyszyn, Spence Laschinger, H.K, Weston, W.</p> <p>Nursing students ‘perceptions of clinical Teachers’Use of Empowering Teaching Behaviours: Instrument Psychometrics and application.</p> <p>2012</p>	Canada	<p>Constructivist Teaching</p> <ul style="list-style-type: none"> • conversations. • reflection 	<p>Design: Survey</p> <p>Aim: Students impression of teacher ‘s behaviour to develop them as students.</p> <p>Previous studies show teachers’ use of empowering teacher behaviours is minimal.</p> <p>No instrument available specific for acute care setting used leadership empowerment behaviours.</p> <p>Tool used measured five aspects of teaching that permit student growth –</p> <ul style="list-style-type: none"> • Enhancing meaningfulness of work • Fostering opportunity for student decision making • Expressing confidence in high performance • Facilitating goal accomplishment • Providing autonomy from bureaucratic constraints <p>Student and teacher need to discuss bureaucracy and its role in the clinical setting.</p> <p>New reflective tool to guide teacher’s behaviour and enhance student experience.</p> <p>Use of empowering behaviour enables students to become effective leaders in clinical practice.</p>
<p>Brunt, B. A.</p> <p><i>Critical Thinking in Nursing: An integrated Review.</i></p> <p>2005</p>	USA	<p>No specific teaching method.</p> <p>General review of critical thinking within nursing</p>	<p>Design: Literature review</p> <p>Aim: Review critical thinking in the nursing arena.</p> <ul style="list-style-type: none"> • Over half the studies included related to nursing students rather than practicing nurses.

			<ul style="list-style-type: none"> • Nurse educators need a consistent, clear definition of critical thinking to allow comparison for research results. • Lack of nursing specific tool to develop and validate critical thinking. • Literature on critical thinking in nursing practice and education small and inadequate. • Socialisation into nursing profession once graduated acts to focus the nurse on logic thinking and task rather than promoting critical thinking. • Need for teachers to research the most effective methods to promote critical thinking.
<p>Chan, Z, C.Y. <i>A systematic review of critical thinking in nursing education.</i> 2013</p>	<p>Hong Kong</p>	<ul style="list-style-type: none"> • Enquiry • Reflection • Case studies • Mentors • Mind maps • Art based activities. 	<p>Design: Systematic review Aim: Explore critical thinking in relation to teaching strategies and the obstacles that occur.</p> <ul style="list-style-type: none"> • Critical Thinkers are not passive. They gather and seek information which they interpret and apply • Four factors affecting teaching and learning of critical thinking in the nursing domain: <ol style="list-style-type: none"> 1. Students – culture of students and confidence affect learning. 2. Teachers- attitude, education knowledge and behaviour 3. The education system – traditional teaching methods do not promote critical thinking. Critical thinking should be its own subject within the education programme. 4. Context of learning – should be encouraging and safe.

			<ul style="list-style-type: none"> • Promoting critical thinking through education programmes that include – enquiry (4 studies), reflective writing (6 studies) , case studies (6 studies), excellent mentors, mind maps and art-based activities. • Questioning, reflection and mentoring are teaching activities which may be applicable to acute care setting.
<p>Chinai, S. A., Guth, T. Lovell, E., Epter, M. <i>Taking Advantage of the Teachable Moment: A Review of Learner-Centred Clinical Teaching Models.</i> 2018</p>	USA	<p>Seven structured teaching methods</p> <ul style="list-style-type: none"> • One-minute preceptor • SNAPPS • MiPLan • ED STAT! • Auntie Minnie • SPIT • Activated Demonstration 	<p>Design: Literature review Aim: Contrasting seven different teaching models which use structured format for education.</p> <ul style="list-style-type: none"> • All applicable to acute setting. • Little to no evaluation of structures in the literature. • One - minute preceptors only structure to mention being used by nursing faculty. Seen as successful in this arena. • Identified need for more research around all structures in the acute nursing field. • Useful structures for faculty development in teaching role. • All structures use mentoring which includes reflection, enquiry, feedback.
<p>Degazon, C. E., & Lunney, M. Clinical Journal: A Tool to Foster Critical Thinking for Advanced Level of Competence 1995</p>	USA	Journaling	<p>Design: Discussion paper Aim: Review Journaling role in enhancing practice for advanced nurses.</p> <ul style="list-style-type: none"> • Reflection on clinical l experiences provides opportunity for improvement of practice. • Journaling provides self-monitoring/ direction of practice.

			<ul style="list-style-type: none"> • journaling conforms to doctrine of adulting education. • journaling specifically for improvement in critical thinking should highlight the thinking development. • The ability to focus on the thinking process enhanced by the ability to get feedback for the journaling to guide future performance.
<p>Distler, J.W. Critical thinking and clinical competence: Results of the implementation of student-centered teaching strategies in an advanced practice nurse curriculum. 2007</p>	USA	<ul style="list-style-type: none"> • Problem based learning • Clinical logs 	<p>Design: Discussion paper Aim: To incorporate student based learning into curriculum.</p> <ul style="list-style-type: none"> • Required more educator and faculty input at the beginning • Increased sense of achievement and confidence in practice for student. • Journaling of clinical practice requires feedback that is reflective in nature.
<p>D'Souza, M.S., Venkatesaperumal, R., Radhakrishnan, J., Balachandran, S. Engagement in clinical learning environment among nursing students: Role of nurse educators. 2013</p>	Oman	<ul style="list-style-type: none"> • Reflective practice • e-learning • simulation • Journaling 	<p>Design: Narrative review article Aim: Gain student perspective of effectiveness of learning in the clinical setting.</p> <ul style="list-style-type: none"> • Key to student success in clinical placement is influenced strongly by the clinical environment. • Role of educator is to provide diverse experience, with plenty of shared learning opportunities and active learning, student-teacher interaction. • All teaching experiences promote improved clinical experience and learning.

<p>Ebright, P. Patterson, E. Chalko, B. Render, M. <i>Understanding the Complexity of Registered Nurse Work in Acute Care Settings.</i> 2003</p>	USA	Teaching environment- Acute care setting	<p>Design: Microethnographic study –mixed method. Aim: Investigate the components that make up an acute care setting for registered nurses.</p> <ul style="list-style-type: none"> • Environment of constant change. • Gap identified in research of complex working environment. • Work environment attributes which add to complexity – equipment issues, repetitive travel, multiple interruptions, delay in systems, difficulty accessing resources, communication difficulties, location of individual patients in relation to workload. • Cognitive drivers for nurses – patient safety, patient satisfaction, decrease escalation of situation, time pressure, peer opinion, appearance of “coping” to other workers. • Knowledge components for decision making – singular patient information, typical patient presentation and unit routine. • Sample of 8 RN too small to allow generalisations.
<p>Fero, L., Witsberger, C., Wesmiller, S., Zullo, T.& Hoffman, L. <i>Critical thinking ability of new graduate and experienced nurses.</i> 2009</p>	USA.	Identifying learning needs for nurses	<p>Design: Observational/cohort study Aim: Determine education requirements in relation to critical thinking for practicing nurses.</p> <ul style="list-style-type: none"> • Nurses should have continual assessment and professional development through mentoring and coaching • More clinical experience leads to better decision making.

			<ul style="list-style-type: none"> • Nurses with 1 year or less experience have critical thinking deficits. • Need for new ways to identify learning need and test teaching strategies for effectiveness.
Herrman, J. <i>The 60-Second Nurse Education: Creative Strategies to Inspire Learning.</i> 2002	USA	<p>Clinical teaching Strategies:</p> <ul style="list-style-type: none"> • One-minute care plan • Grand rounds • Clinical questioning • Reflective journal • Active reading • Concept mapping • Learn from each other through active discussion 	<p>Design: Discussion paper.</p> <p>Aim: Brief teaching strategies presented to work in large or small classroom or clinical setting.</p> <ul style="list-style-type: none"> • Clinical setting must be a balance between student independence and learning. • New strategies for teaching should have solid preparation and not be used as a single method. • No specific care setting identified; discussed as applicable to clinical teaching in general
Jetha, F., Boschma, G., Clauson, M. <i>Professional development Needs of Novice Nursing Clinical Teachers: A rapid Evidence Assessment.</i> 2016	Canada	<ul style="list-style-type: none"> • Mentoring • Reflection practice • Professional development. 	<p>Design: Literature review.</p> <p>Aim: Investigate the needs of new clinical teachers.</p> <p>Expert nurse does not equal expert teacher. Teaching skill needs to be developed.</p> <p>To develop new nursing clinical teachers, they need:</p> <ul style="list-style-type: none"> • Socialisation • Professional development • Self -reflection and confidence building <p>To support these in a novice teacher:</p> <ul style="list-style-type: none"> • Allow teaching in familiar environment • Prior exposure to teaching • Good orientation • On -going professional development • Opportunity to reflect • Assign mentor

<p>Jiang, J., Zeng,L., Kue,J.,Li, H., Shi, Y.,Chen, C. Effective teaching behaviours in the emergency department: A qualitative study with Millennial nursing students in Shanghai. 2018</p>	<p>China</p>	<ul style="list-style-type: none"> • Preceptoring • Online education and resources • Concept mapping 	<p>Design: Qualitative study based on semi-structured interviews Aim: Millennial Students Identify effective teaching within the emergency department. Students' perception of teaching qualities:</p> <ul style="list-style-type: none"> • Need an effective relationship with student which is supportive by showing respect, caring, trust and encouragement. • Teacher must be competent in their skills and practice as well as the use of IT resources such as apps. • Being emphatic for teaching – have a passion, be part of team and able to reflect. • More effective when use variety of methods to encourage enquiry.
<p>Kelly, C. <i>Student's perceptions of effective clinical teaching revisited.</i> 2007</p>	<p>Canada</p>	<ul style="list-style-type: none"> • Discussion • Role modelling • Feedback 	<p>Design: Qualitative descriptive study Aim: investigate what embodies effective clinical education. Effective teachers use a dynamic process that contains a variety of teaching methods. Students should be set clear outcomes and expectations and learn through active processes such as questioning and discovery. Excellent clinical teacher:</p> <ul style="list-style-type: none"> • Good interpersonal skills • Can give feedback well • Clinically competent • Good role model • Mutual respect with student

<p>McAllister, M. & McKinnon, J. <i>The importance of teaching and learning resilience in the health disciplines: A critical review of the literature.</i> 2009</p>	Australia	<ul style="list-style-type: none"> • Discussion • Reflection • Mentoring/coaching • Role models 	<p>Design: Literature review Aim: Discuss how resilience can be part of nursing education. Resilience needed with chaotic nursing environment – especially in traumatic area such as emergency department. Learn Resilience through:</p> <ul style="list-style-type: none"> • Discussion • Reflection • Mentoring/coaching.
<p>Myrick, F. <i>Preceptorship and Critical Thinking in Nursing Education.</i> 2002</p>	Canada	<p>Preceptorship including</p> <ul style="list-style-type: none"> • Role modelling • Questioning • Feedback 	<p>Design: Qualitative study based on semi-structured interviews Aim: Understand how preceptorship can grow critical thinking.</p> <ul style="list-style-type: none"> • Preceptor behaviour can directly or indirectly affect promoting of critical thinking. • The environment and other staff response to the preceptor affect critical thinking of student. • Preceptors direct critical thinking by questions. They ask lower level questions of the student. • Preceptors essential to developing critical thinking strategies in students and can also monitor its development. Also offer one on one teaching.
<p>Phillips, N. & Duke, M. <i>The questioning skills of clinical teachers and preceptors: a comparative study.</i> 2001</p>	Australia	Questioning	<p>Design: Observational/cohort study Aim: Contrast preceptor to clinical teacher question techniques for students.</p> <ul style="list-style-type: none"> • Significantly the clinical teachers questioned the students more. • From the questions asked the preceptors used more surface level questions than teachers.

			<ul style="list-style-type: none"> • Both groups used mainly knowledge level questions with the teachers displaying more advanced questioning. • Students perceived the advance questioning as more useful.
Raines, D.,A. Nurse Preceptors’ Views of precepting Undergraduate Nursing Students. 2012	USA	Preceptorship includes <ul style="list-style-type: none"> • Guidance & supervision • Role modelling 	Design: Qualitative study based on semi-structured interviews Aim: Investigate preceptor experience of precepting students. <ul style="list-style-type: none"> • Preceptors would like to see more connection with education faculty. • Preceptors would like their efforts acknowledged. • The experience is dependent on the student themselves and the ability to form a relationship
Randall, C., Tate, B. and Lougheed, M. <i>Emancipatory Teaching-Learning Philosophy and Practice Education in Acute Care : Navigating Tensions.</i> 2007	USA	Questioning	Design: Discussion paper Aim: Understand how teaching and learning works within an acute care setting. <ul style="list-style-type: none"> • Within acute care setting constant dynamic between action and reflection. • To allow reflection in this environment must have teachers that not only provide critical questions but look at the students “being” as a nurse.
Shoulders, B., Follett, C. & Eason, J. <i>Enhancing Critical Thinking in Clinical Practice. Implications for Critical and Acute Care Nurses.</i> 2014	USA	<ul style="list-style-type: none"> • Problem- based learning-simulation • Concept Mapping • Thinking aloud technique • Story telling • Self-directed learning formats • Interdisciplinary rounds participation 	Design: Discussion paper Aim: Investigate critical thinking and what methods improve it in acute care setting. <ul style="list-style-type: none"> • Student attributes for critical thinking – open minded, critical, reflective and enquiring. • Experience increases critical thinking especially if learning environment has supportive faculty. • Decrease in critical thinking when nurse depends on protocol alone.

		<ul style="list-style-type: none"> • Case review 	<ul style="list-style-type: none"> • Preceptor increases critical thinking. • Lack of research and tools for measuring and identifying deficiency in critical thinking • All teaching methods mentioned opposite work to promote critical thinking. • Workplace enhancers of critical thinking are supportive staff, patient continuity and variation in experience.
<p>McQuiston, L.S. &Hanna, K. <i>Peer Coaching: An Overlooked Resource.</i> 2015</p>	USA	Peer coaching	<p>Design: Observational survey study Aim : Review effectiveness of new peer coaching initiative.</p> <ul style="list-style-type: none"> • Senior student nurses coach junior in patient care • Positive effect on bridging knowledge into practice. • Senior student positive role model and present environment in positive manner. • Increased reflective practice on both sides • Need for development of peer coaching role through orientation as nurse not automatic teacher.
<p>Tanner, C. <i>Thinking Like a Nurse: A Research-Based Model of Clinical Judgement in Nursing.</i> 2006</p>	USA	Reflection in-action	<p>Design: Literature review Aim: Investigate the topic of clinical judgement in relation to nursing.</p> <ul style="list-style-type: none"> • Clinical decision making is influenced by the nurse's own traits, experience, context and patient/nurse relationship. • Workplace culture also influences judgement

			<ul style="list-style-type: none">• Uses clinical judgement model to identify opportunities for feedback and teachable moments in clinical decision process.• Coaching student through reflective process increases the likelihood the student will develop reflection as a habit.
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