



# Bachelor nursing students' and their educators' experiences of teaching strategies targeting critical thinking: A scoping review

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## ABSTRACT

**Aim:** The objective of this scoping review was to review the published literature on existing teaching strategies targeting bachelor nursing students' critical thinking and explore how these strategies are described by students and educators. The research questions were: (i) Which teaching strategies are described in the literature targeting critical thinking among nursing students? and (ii) How are these teaching strategies described and experienced by students and/or nurse educators?

**Background:** Critical thinking is integrated in the many clinical assignments and responsibilities with which registered nurses are faced. Therefore, it is important that nurse educators implement teaching strategies supporting bachelor nursing students' development of critical thinking to prepare them for their professional responsibilities.

**Design:** Scoping review, Open Science Framework (OSF) registries DOI: 10.17605/OSF.IO/D89SB.

**Methods:** The scoping review followed the six steps of Arksey and O'Malley (2005). Systematic searches were conducted using the databases PubMed, CINAHL, ERIC, ERC and PsycINFO. Eligible studies were quality assessed and text excerpts answering the research questions were analysed by a thematic analysis.

**Results:** Our findings represent 19 published studies and can be understood according to two themes: *the importance of the educational conditions* and *the impact of implemented teaching strategies*. The first theme reflected not only the descriptions of important traits in the educational milieu facilitating the development of critical thinking but also the importance of how the content targeting such skills were delivered and organised. The second theme mirrored descriptions of how the students, through the teaching strategies, realized the need for collaboration to facilitate critical thinking. Further, it showed how the teaching strategies fostered professional growth and learning adaptation, by encouraging the students to question their knowledge and facilitating their development of clinical knowledge.

**Conclusions:** The strategies used in the facilitation of critical thinking need to incorporate collaboration and student-centredness, creating a relaxed climate where the educators can assist through guidance and support. This calls for the implementation of teaching strategies whereby both educators and students are active in facilitating the learning environment.

## 1. Introduction

Critical thinking in nursing is considered essential for delivering

quality care and reflects the professional accountability of registered nurses (Chang et al., 2011). It is also a vital part of the clinical assignments and responsibilities nurses are expected to manage. Additionally,

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nurses' critical thinking has the potential to influence the outcomes of care, both positively and negatively. Therefore, it is of the utmost importance that nursing education incorporates teaching strategies focusing on developing bachelor nursing students' (hereinafter referred to as students) critical thinking to prepare them for their professional responsibilities (Papp et al., 2014).

According to Scheffer and Rubenfelds (2000) Delphi study, critical thinking in nursing is twofold: habits of the mind (affective components) and skills (cognitive components). Critical thinking can also be seen as a successive four-step process beginning with gathering information, followed by questioning and analysis and, lastly, involving the application of theory (Chan, 2013b). Victor-Chmil (2013) and Alfaro-LeFevre (2017) highlighted that the term "critical thinking" is often used interchangeably with the related terms "clinical reasoning" and "clinical judgement." Both authors state, however, that the terms are not interchangeable and that it is important to understand the difference between them. Clinical reasoning is described as the analytical process used to solve clinical problems and clinical judgement refers to the actions and decisions made concerning patient care. In contrast, critical thinking is a broader umbrella term which includes both clinical reasoning and clinical judgement (Alfaro-LeFevre, 2017). It involves the entire clinical problem-solving process and therefore is the chosen term in the current study.

Critical thinking is a skill that nursing students need to foster throughout their nursing education to prepare themselves to deliver high-quality care after graduation (Whiffin and Hasselder, 2013). However, it has been shown that nursing students are educationally limited in their ability to apply critical thinking in the clinical context (Banning, 2006). Therefore, educational faculty need to implement teaching strategies that encourage students' critical thinking development (Nelson, 2017). These teaching strategies should be integrated in the curricula early on in the educational process and continue throughout the nursing education to encourage both the development and practice of critical thinking (Burrell, 2014; Chang et al., 2011; Von Colln-Appling and Giuliano, 2017).

Previous research in the area appears to have focused solely on teaching strategies in a clinical setting (Peixoto and Peixoto, 2017) or to have investigated mixed populations, including either nursing students combined with midwifery students (Carter et al., 2016) or working nurses and managers (Zuriguél Pérez et al., 2015). Other reviews have included studies exclusively on the effect of teaching strategies targeting critical thinking (Carvalho et al., 2017; Oliveira et al., 2016). Since critical thinking is an essential part of nurses' professional responsibility and clinical problem solving, it is important to focus on how this capacity is taught to nursing students, both in educational and clinical settings and how these teaching strategies are experienced. To our knowledge, this review is the first one with this focus. The objective of this scoping review was to review the published literature on existing teaching strategies targeting nursing students' critical thinking and explore how these are described by students and educators.

## 2. Methods

The choice of a scoping review was deemed suitable as the study aim was to examine and summarise previous research, identify knowledge gaps and direct further research, in accordance with Arksey and O'Malley (2005), Colquhoun et al. (2014) and Munn et al. (2018). We followed the six-stage method described by Arksey and O'Malley (2005). More recent development of the methodology, such as the emphasis on the team approach, quality assessment and the necessity of breaking down the analysis process in distinct steps (Daudt et al., 2013; Levac et al., 2010), has informed the planning of this study. The reporting of the study was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018). The current review is registered at Open Science Framework (OSF) registries with DOI: 10.17605/OSF.

IO/D89SB and preceded by a protocol (Westerdahl et al., 2020).

### 2.1. Identifying the research question

The overarching aim of this study was broad in nature to cover a breadth of evidence and to aid the structure, a PICOS (Population, Intervention, Comparison, Outcome and Study Setting) was developed (Table 1) inspired by Mheta and Mashamba-Thompson (2017).

The following three research questions guided our inclusion of literature:

- (i) Which teaching strategies are described in the literature targeting critical thinking among nursing students? (Question 1)
- (ii) How are these teaching strategies described and experienced by students and/or nurse educators? (Question 2)
- (iii) Which outcomes are described in the literature that are used to assess critical thinking? (Question 3)

During the review process, question 3 was removed and described under *study selection*.

### 2.2. Identifying relevant studies

Systematic searches were conducted between December 2019 and February 2020, using the databases PubMed, CINAHL, ERIC, ERC and PsycINFO to cover a comprehensive sample of literature concerning health care and educational research. The search strategy was developed in cooperation between the research team and an experienced librarian. In each database, both database specific headings (e.g., Medical Subject Headings (MeSH), CINAHL headings), keywords and synonyms were used and combined in search blocks using the Boolean operators AND and OR. The search strategy for PubMed is presented in supplementary file 1. The inclusion criteria were primary studies, regardless of their design, that were published in peer-reviewed journals and the population was bachelor nursing students and educators. Studies were excluded if the population was not identifiable, published in other languages than English or if the extraction of qualitative and quantitative data was not possible, as in the case of mixed methods studies.

### 2.3. Study selection

All titles were screened for relevance (Fig. 1). The first (FW) and last (GB) author independently screened the first 200 titles in PubMed and then compared their selected titles. The comparison revealed an 81.6% percentage correspondence, and it was decided that the first author would continue the screening. The duplicate control and the first screening of abstracts was carried out in the reference manage software ENDNOTE by the first author (FW), followed by a more thorough second abstract screening in the web application Rayyan (Ouzzani et al., 2016). At this point, a decision was made to exclude the research question on

**Table 1**  
Overview of the search strategy.

Criteria	Determinants
Population	Nursing students and/or nurse educators at any semester of study/ educational year.
Intervention	Teaching strategies Educational strategies Learning strategies
Comparison	NA*
Outcome	Critical thinking, and/or critical thinking skills, abilities, dispositions.
Study setting	Nursing programmes leading to a Bachelor of Nursing offered worldwide at any higher educational institutions [HEI] Academic context (i.e., during theoretical studies) and clinical context (i.e., during clinical placement)

\* Not applicable

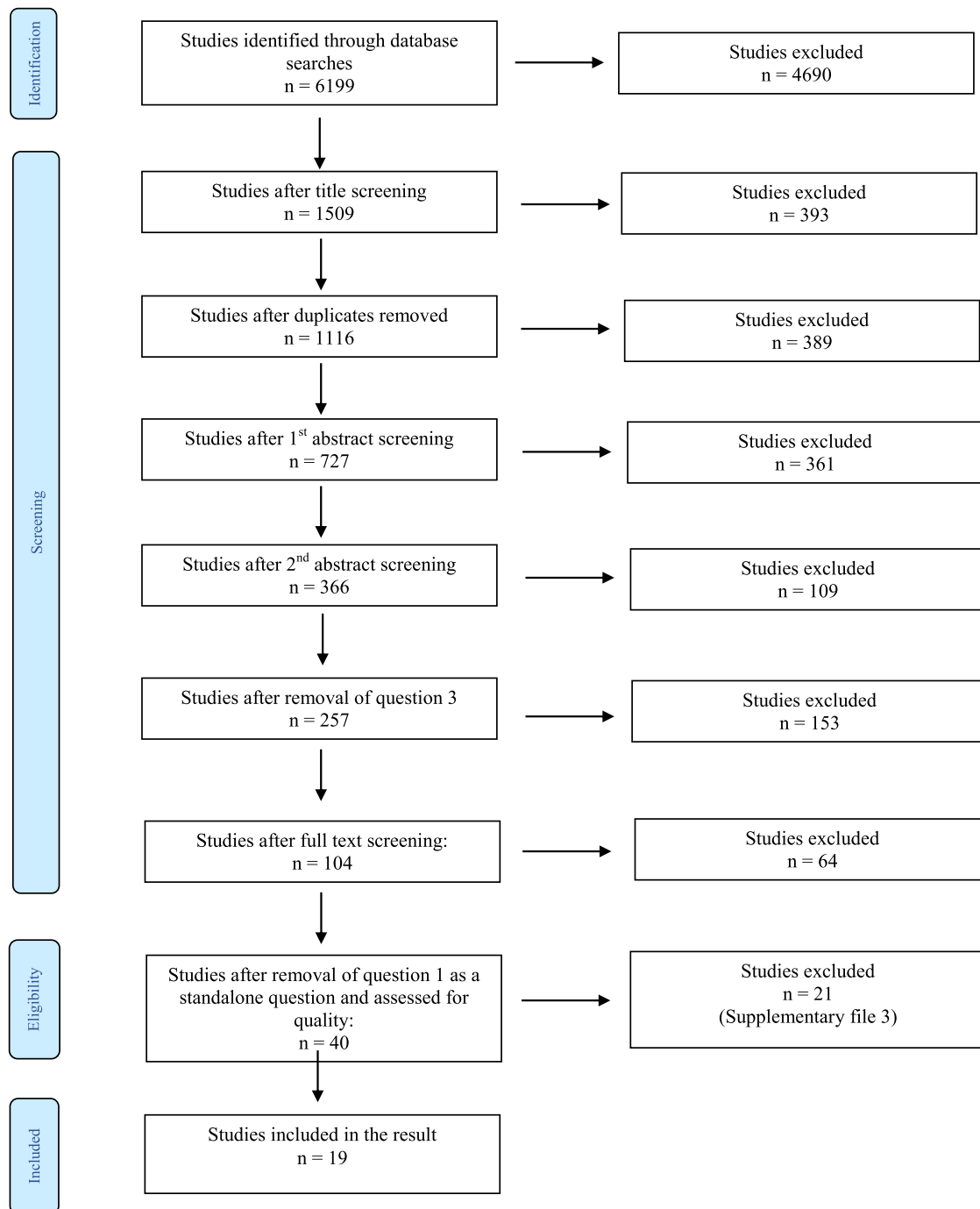


Fig. 1. PRISMA flow chart inspired by Moher et al. (2009).

outcome assessment (question 3) to enable a more focused and coherent result. During full-text screening, the first author (FW) read all the included studies ( $n = 257$ ) and the remaining research team read 10% ( $n = 25$ ) each. In the case of disagreement, a third author from the research team was assigned to make the final decision. After full-text screening, 104 studies remained. A further decision was made to mainly focus on question 2 and the strategies mentioned there as being part of their experience. This left 40 studies, the reference lists of which were screened by the first author and no new references were added.

The included studies were quality assessed since it has been suggested that methodological updates (Daudt et al., 2013; Levac et al., 2010) make the findings more useful for current practice and future research, easier to interpret and increase the uptake of the findings

(Grant and Booth, 2009). The included studies ( $n = 40$ ) were quality assessed using the Critical Appraisal Skills Programme (CASP) for qualitative and randomised controlled studies (RCT), the Joanna Briggs Institute (JBI) for cross-sectional and quasi-experimental studies and, lastly, the Mixed Methods Appraisal Tool (MMAT) for mixed-method studies. The first author quality assessed all studies in tandem with the other authors (studies were evenly distributed among them). No studies were excluded due to quality since the aim of our review was to present a broad overview of the current research field. The studies were, however, graded between low and good quality. In the case of disagreement, a third author in the research team stepped in. During the critical appraisal process, 10 studies were excluded, leaving 30 for the next step (supplementary file 3).

## 2.4. Charting data

Extracted data were presented in an Excel document (supplementary file 2). The charting file was developed by the first author and validated through discussions with the last author. Inspired by Weingarten et al. (2004), in a substantial effort to raise the ethical awareness of the review, all included articles were assessed according to ethical considerations through a five-question form (Westerdahl et al., 2020). However, as only four studies (Chan, 2013a; Lin et al., 2015; Makhene, 2019; Pucer et al., 2014) were assessed as meeting the five ethical criteria, the initial plan of excluding such papers was dismissed (Westerdahl et al., 2020).

## 2.5. Collating, summarising and reporting the results

To answer research question 1 (Q1), identified teaching strategies were deductively analysed and narratively described in accordance with Banning (2005), who outlined three different perspectives of teaching strategies: (i) the didactic perspective, which primarily involves lectures and is teacher-centred; (ii) the facilitative perspective, aimed at self-directed learning supporting the students to articulate their knowledge and, finally, (iii) the Socratic perspective, which uses objective questioning from the educator and stresses student-centredness.

To answer research question 2 (Q2), extracted data on the experiences of the teaching strategies was analysed by the reflexive thematic analysis of Braun and Clarke (2006, 2019). We chose thematic analysis as it is a flexible method and suitable for broad and varied data. The first author repeatedly read the included papers and the text excerpts answering our research questions. The excerpts were thereafter coded on a latent level, followed by the organisation of the codes under the themes. This phase, executed by the first and last authors, also included the process of identifying the relationships between the themes and the different levels of themes, as well as avoiding overlapping and collating too diverse codes. As a last step, the second and third authors were invited to critically review and discuss the analysis. During this more scrutinising analysis, 11 studies were excluded, leaving a result based on 19 studies (supplementary file 3).

## 2.6. Consultation stage

To enhance the methodological rigour of the findings (Arksey and O'Malley, 2005; Colquhoun et al., 2014; Levac et al., 2010), our tentative result was presented to five experienced nurse educators in a research group. They were asked to comment on whether the result was clearly presented, recognisable and usable in their teaching practice and their experiences of teaching critical thinking to students. The consulted nurse educators stated that the result was clear and recognisable in their practice and that one way of facilitating critical thinking is to use structured learning activities preferentially in the clinical practice. The idea was further raised that critical thinking can be connected to and used in teaching leadership to future nurses.

## 3. Results

The research questions in this review were: which teaching strategies are described in the literature targeting critical thinking among nursing students (Q1) and how are these teaching strategies described and experienced by students and/or nurse educators (Q2)? In the results section, the term "educator" will be used synonymously with the terms found in the included studies i.e., preceptor, lecturer, faculty, instructor and academic nursing staff. The included studies will be presented here in accordance with their search identification number (supplementary file 2).

## 3.1. Narrative description of the studies and identified teaching strategies

This scoping review includes 19 published studies (supplementary file 2) conducted with various designs: qualitative design (n = 12), multi-method design (n = 6) and mixed methods design (n = 1). The studies originated from the United States (n = 9), Canada (n = 2), Turkey (n = 2), Hong Kong (n = 2), South Africa (n = 1), China (n = 1), Taiwan (n = 1) and Slovenia (n = 1). Fifteen of the studies focused on nursing students, one on educators and three had mixed populations. Our findings are based on about 1634 nursing students and 24 educators. Two studies (6, 11) did not account for their exact number of participants. The teaching strategies described in the included literature as targeting critical thinking among students (Q1) represented a variety of different strategies (Box 1).

In most included studies (n = 18), the teaching strategies were categorised as matching Banning's (2005) description of the facilitatory perspective. Here, a wide variety of different teaching strategies were described targeting students' critical thinking, such as problem-based learning (3, 28): case studies, scenarios and vignettes (4, 10, 11, 14, 20); concept mapping (2, 6, 12, 14) and reflective writing (19, 25). Four of the included studies (2, 10, 13, 14) described having used a blend of teaching strategies i.e., didactic-facilitative perspectives and facilitative-Socratic perspectives. Makhene (2019) (15) was the only study solely using the Socratic perspective. Four of the included studies in the current review presented a pedagogical framework or theory on which the teaching strategies were based (11, 12, 25, 27). Eleven studies presented a definition of critical thinking on which they based the research (supplementary file 2).

## 3.2. Descriptions and experiences of the teaching strategies

Nursing students and/or the educators' descriptions and experiences of teaching strategies targeting critical thinking (Q2) can be understood according to the two main themes: *the importance of the educational conditions* and *the impact of implemented teaching strategies*, with their associated subthemes (Table 2).

### 3.3. The importance of the educational conditions

This theme with its related subthemes, *significant traits of the learning environment* and *right educational strategy at the right timing*, reflected the students' and educators' descriptions of different important traits in the educational setting perceived as facilitating the development of critical thinking among the nursing students. The theme also mirrored their experiences of the different teaching strategies concerning the content and delivery used to enhance critical thinking.

#### 3.3.1. Significant traits of the learning environment

In this subtheme, students (4, 13) as well as educators (15) described that the atmosphere and climate in the educational setting during facilitatory and Socratic teaching (Box 1) should be open, non-threatening and non-judgemental to facilitate the development of critical thinking. Further, as described by the students in Lin et al. (2015) (14), a collaborative and respectful partnership between students and educators was experienced as an important requirement of the learning environment while participating in blended teaching strategies. Such partnership meant an open sharing of ideas in an environment where everyone's opinion was equally valued, which was raised by both the students (14) and educators (15). Additionally, the educators expected the learning environment during Socratic inquiry to challenge the students to rethink their assumptions and thoughts (15). Furthermore, the educators should be engaged, stimulating debate and supporting students with feedback to become independent critical thinkers, which was significant when using the facilitatory and Socratic teaching approaches (13–15).

**Box 1**  
Teaching strategies categorized according to [Banning \(2005\)](#).

Teaching strategies	Included studies (author, year, study number)
Didacticism	
Teacher led lecture (i.e., Power Point presentation) about concept maps	<a href="#">Bilik et al. (2020)</a> (2)
Faciliatory style	
Problem based learning	<a href="#">Chan 2013</a> (3); <a href="#">Tiwari et al. (2006)</a> (28).
Simulations	<a href="#">Ertmer et al. (2010)</a> (8); <a href="#">Guhde (2011)</a> (9); <a href="#">Rush et al. (2008)</a> (23).
Reflective writing	<a href="#">Naber et al. (2014)</a> (19); <a href="#">Sedlak et al. (2003)</a> (25)
Concept maps	<a href="#">Bilik et al. (2020)</a> (2 <sup>1</sup> ); <a href="#">Daley et al. (1999)</a> (6); <a href="#">Hicks-Moore and Pastirik (2006)</a> (12); <a href="#">Lin et al. (2015)</a> (14 <sup>1</sup> )
Case, case studies, scenarios, and vignettes	<a href="#">Chau et al. (2001)</a> (4); <a href="#">Haffer and Raingruber (1998)</a> (10 <sup>1</sup> ); <a href="#">Heiney et al. (2019)</a> (11); <a href="#">Lin et al. (2015)</a> (14 <sup>1</sup> ); <a href="#">Pucer et al. (2014)</a> (20).
Peer review through student led clinical rounds	<a href="#">Sedlak and Doheny (1998)</a> (24).
Critical thinking course containing journal keeping, individual, group and whole class activities	<a href="#">Kaya et al. (2011)</a> (13 <sup>1</sup> ).
Classroom response system and online discussion forum	<a href="#">Swart (2017)</a> (27).
Socratic style	
Socratic inquiry	<a href="#">Makhene (2019)</a> (15); <a href="#">Lin et al. (2015)</a> (14 <sup>1</sup> ).
Questioning about the reasoning in scenarios	<a href="#">Haffer and Raingruber (1998)</a> (10 <sup>1</sup> ).
Discussions requiring critical thinking	<a href="#">Kaya et al. (2011)</a> (13 <sup>1</sup> ).
<sup>1</sup> Describe the use of more than one teaching strategy,i.e., blended learning strategies	

**Table 2**  
Overview of subthemes and themes.

Subthemes	Themes
<i>Significant traits of the learning environment</i>	<b>The importance of the educational conditions</b>
<i>Right educational strategy at the right timing</i>	
<i>Supporting knowledge awareness by joint activities</i>	<b>The impact of implemented teaching strategies</b>
<i>Supporting learning and personal development</i>	
<i>Supporting clinical preparedness</i>	

**3.3.2. Right educational strategy at the right timing**

In this subtheme, the students mentioned various experiences concerning when to implement the teaching strategies. In the case of simulations (8) and a critical thinking course (13), the students experienced that the teaching strategies should be integrated and taught in all courses throughout the nursing programme. However, other students in [Kaya et al. \(2011\)](#) (13) described that critical thinking should be taught as a separate course, while concept mapping (6) was described as the most facilitative if introduced early in the education. In the case of facilitatory and Socratic teaching, the students described a preference for teaching strategies carried out in smaller groups (13) and in Haffer and Raingruber’s (1998) (10) study, strength was designated by the fact that it was based on real-life nursing scenarios. Further, computerised scenarios were experienced as an obstacle for the facilitation of critical

thinking, since it was claimed that personal contact with patients was a necessity (20). The students also described that teaching strategies combining classroom and online interaction (27) ought to include focused assignments and be broken up into smaller pieces to facilitate critical thinking, but also that the variation in the teaching strategies as such was experienced as stimulating.

Nursing students participating in problem-based learning described that they wanted to be active during class (28) and the education adjusted to their level of knowledge to facilitate critical thinking (3). However, active participation in discussions was not exclusively experienced as positive, since it could cause stress whilst striving for the opportunity to speak and get attention (3). On the other hand, teaching strategies that included online discussions as a follow-up and the opportunity to practice critical thinking via a computer programme were



not described as stressful, but rather as time-demanding (27). Concept mapping was also experienced as demanding more preparation time compared with plain lectures and it was particularly stressful when conducted in the clinical context (2, 6, 12). Another perspective on the timing was the possibility to process knowledge and apply critical thinking through, for example, online discussion forums (27). Additionally, without the time for a proper introduction from the educators, teaching strategies such as vignettes were experienced as difficult to understand and the students missed how they were supposed to be performed (4).

### 3.4. The impact of implemented teaching strategies

This theme with its related subthemes, *supporting knowledge awareness by joint activities*, *supporting learning and personal development* and *supporting clinical preparedness*, included how the students, through the teaching strategies, described the need for collaboration to facilitate critical thinking. Further, it described how the teaching strategies made them grow personally and change their way of learning through questioning their knowledge, including their clinical knowledge around patient care.

#### 3.4.1. Supporting knowledge awareness by joint activities

In this subtheme, the students described how teaching strategies such as scenarios (10), reflective writing (19) and simulations (9) heightened their awareness of the importance of teamwork both among nurses and the interprofessional team. These teaching strategies also highlighted the nurse's role as the head of the patients' nursing care. Additionally, teaching strategies with a facilitatory and Socratic perspective (Box 1) often required students to work in pairs or groups, which was described to further their critical thinking through the sharing of knowledge (3, 10, 19, 24, 27, 28) and, as a result, they were able to see their own knowledge through others' perspectives and thereby question it (10, 13, 14, 23, 24). The sharing of knowledge was described as leading to new insights concerning nursing care through watching co-students' acting during simulations (23) and peer-review rounds (24). Further, teaching strategies with a facilitatory and Socratic perspective focusing on critical thinking were experienced as enhancing the students' ability to give feedback to other students and to respect others and their opinions (13, 14, 24). The described communication with co-students also trained the students in how to ask critical questions and form a rationale for asking questions (14, 24), which was practised through the teaching strategies, including the questioning and argumentation that was facilitated by educators (14). However, the attendance of an educator also could be experienced as counterproductive. The students described the communication between co-students during peer-review rounds as less threatening than with the educators and therefore more facilitative of critical thinking (24).

#### 3.4.2. Supporting learning and personal development

In this subtheme, the students experienced that through teaching strategies with a facilitatory and Socratic perspective targeting critical thinking, they gained a reflective ability, which made them question themselves and develop a new perspective on themselves and others (10, 11, 14, 23, 25, 28). This was further described by the students as giving them an increased self-awareness and self-insight, which could be used for reflection on their nursing actions (8, 10, 13, 19, 23–25, 27). This personal growth led to strengthened self-confidence (10, 23–25) and security, which the students experienced as enabling them to speak up for themselves (10, 14) and handle stressful situations (10). Moreover, the students perceived that teaching strategies such as critical thinking courses not only made them grow as future registered nurses but also influenced them to use critical thinking in their personal life (13).

The students, as well as the educators, experienced that teaching strategies that departed from the didactic and facilitatory perspective targeting critical thinking enabled the students to structure and see parts

and links concerning their nursing knowledge and, as a consequence, to see the whole picture (2, 9, 12–14, 23, 24, 27). Further, the students learned to use vocabulary to question their knowledge, motivate their decisions and argue for their point of view (4, 12, 14, 20, 23, 27). Blended learning strategies (14, 27) and Socratic inquiry (15) forced the students to go beneath the surface of their knowledge and focus on the important parts, which in blended learning (2, 27) and peer-review rounds (24) was experienced as motivating and stimulating, as well as increasing their learning. The students who took part in problem-based learning (28) and simulations (8) experienced, on the other hand, that it demanded them to actively participate in the teaching, which, in turn, stimulated their learning. Seen from another perspective, the educators described that concept mapping clarified the students' knowledge and learning development. It was therefore easier for them to understand and evaluate the students' reasoning through the teaching strategies and offer useful support in the facilitation of critical thinking (6, 12).

#### 3.4.3. Supporting clinical preparedness

In this sub theme, the students and, in one case, the educators (4), described how teaching strategies focusing on developing the students' critical thinking, such as concept mapping (12), simulation (9, 23), scenarios and vignettes (4, 10) could positively influence the students' nursing and caring capabilities in clinical practice. Such strategies were described as moving the nursing students closer to the clinical context and better preparing them for clinical practice, regardless of whether such strategies were used on campus or in clinical practice. Other teaching strategies, for example, problem-based learning (3) and reflective writing (19, 25), were described by the students as opportunities to practise how to apply clinical nursing knowledge. In the study by Pucer et al. (2014) (20), where scenarios were used, the students experienced an increased awareness of the consequences of their nursing decisions and actions. In the same way, the students described that concept mapping helped them understand the rationale behind nursing interventions (12) and classroom response systems facilitated their asking themselves "why" before acting clinically (27).

The students additionally described how some of the different facilitatory teaching strategies (Box 1) also stimulated reasoning and decision making in the clinic. The students learnt to assess patient data, link data and prioritise and plan patient care (8, 10–12, 14, 19, 24). The same experience was also described by the educators in the studies of Hicks-Moore and Pastirik (2006) (12) and Bilik et al. (2020) (2), who used blended learning with both the didactic and facilitative perspectives of the teaching strategies. Facilitatory teaching strategies targeting critical thinking were also experienced by the students, resulting in them focusing more on the patient's perspective, safe care and the complexity of patient care (3, 11, 14, 19, 23, 25). Teaching strategies such as problem-based learning (3) and reflective writing (19) also led to descriptions of an increased ethical awareness and understanding of the importance of empathy in care i.e., understanding the patient's experience.

## 4. Discussion

This scoping review aimed to explore which teaching strategies were described in the literature targeting critical thinking among nursing students (Q1) and how these teaching strategies were described and experienced by students and/or nurse educators (Q2). Below we will first discuss the most pertinent findings from the deductive analysis followed by the findings from the thematic analysis.

The findings related to our first question (Q1) demonstrated that the most frequently used teaching strategy promoting critical thinking was the facilitative perspective, either alone or in combination with the Socratic perspective. This indicates a focus on student-centredness and an effort to encourage the students to articulate and process their knowledge rather than passively receive knowledge from the educators. Interestingly, only four included studies based their teaching strategies

on a pedagogical theory or framework, which is in line with Smith and Baikš (2021) observation that research in education often includes pedagogical advice not grounded in theory. Additionally, even though seven studies were conducted with more than one method (quantitative and qualitative), none of them used a design able to answer what works and for whom it works, that is an experimental design. Highlighting the need for future research in this topic. Such research should focus on the development and testing of theoretically underpinned educational interventions as a mean to contribute to an evidence-based teaching practice regarding nursing students' critical thinking. The fact that most studies were conducted in North America ( $n = 11$ ) and Europe ( $n = 3$ ) implies that a focus on teaching strategies facilitating critical thinking might be culturally related. For example, Manalo (2013) has suggested that there are culturally associated factors in the disposition to use critical thinking. However, Manalo (2013) found a variance among student's use of critical thinking that not could be explained by cultural factors. Even so it seems of importance to gain more knowledge on how culture might influence critical thinking dispositions among students as well as the educator's choice of teaching strategies to promote such dispositions outside North America and Europe.

The findings related to our second question (Q2) reflected that students and educators experience of teaching strategies targeting critical thinking could be understood from two overarching themes, *the importance of the educational conditions and the impact of implemented teaching strategies* with their belonging sub-themes.

The first theme reflected that in the facilitation of critical thinking, educators focused on teaching strategies enabling an open and collaborative learning environment which in turn supported a shared decision making. This was contrasted with a teacher-centred approach where knowledge mainly were transferred to the students. These finding is supported by Biesta (2004, 2013) as well as by Stanley and Dougherty (2010). They suggested that this might be an effect of the last decades educational paradigm shift, stemming from political and societal changes, where the emphasis is on the individual's own choices and an active learning known to promote critical thinking (Biesta, 2004; Stanley and Dougherty, 2010). This paradigmatic shift might also be explained by the fact of the new generation — generation Z born in the mid-1990 s to 2012 — having entered the higher educational institutions. These students are described as digital natives born into a world where interactions almost solely exist online and which favours individualised, technological and visually based learning strategies (Chicca and Shellenbarger, 2018; Cilliers, 2017). Thus, this generation of students might present different experiences, demands and expectations than earlier students regarding teaching strategies for critical thinking. This first theme also reflected that digital media, such as online forums, positively facilitated students' information processing and critical thinking. On the other hand, our finding also mirrored how digital media, such as computerised patient scenarios, were described by the students as impeding critical thinking, since real contact with patients was seen as a requirement for developing this skill. Another aspect of generation Z, raised by Mohr and Mohr (2017), is that they are used to the vast amount of information provided via the Internet. However, they require assistance from educators to sort, evaluate and synthesise this vast amount of information, which is associated with the ability to think critically. Our findings support the idea that to meet the new generation's unique needs, the new role of the educator is not foremost to transfer knowledge to the students but to guide and support them to facilitate their critical thinking. This highlights a need of innovative teaching strategies, for example, problem-based learning and simulations in combination, where educators are facilitators in the development of critical thinking.

In the second theme *the impact of implemented teaching strategies* teaching strategies involving student collaboration appeared to be less threatening and stressful for the students. Our findings indicated that through the teaching strategies combining a facilitatory and Socratic perspective, the students realised the importance of collaboration in the

development of critical thinking. A further advantage with such teaching strategies was that the students saw their own knowledge in the light of others and could reflect on it. These findings are supported by pedagogical models including strategies for student collaboration, for example, peer learning (Boud et al., 2001). Boud et al. (2001) stated in his classic reference that co-operation between two students at the same educational level can be experienced as less threatening and more relaxed compared with situations where an educator is involved. One plausible explanation for this could be that when an educator is concerned students are likely to experience a hierarchical factor, whether the educator is the one grading or not. Particularly as the educator is, in many cases, seen as someone more knowledgeable and experienced. Stenberg and Carlsons (2015) study corroborates our findings, here students participated in peer learning during clinical practice and described the collaboration with another student as less stressful and conducive of a safe environment for asking questions and having discussions. In such relaxed climate described in this theme, students could both develop critical thinking and share their experiences. This highlights the importance of implementing strategies involving student co-operation while planning how to deliver subjects within the nursing programmes.

In this theme - *the impact of implemented teaching strategies* - it was also reflected that critical thinking and the nursing process were experienced as interconnected, particularly as the individual stages of the process could be viewed as similar and as proceed in parallel. Teaching strategies such as simulation, concept mapping, scenarios and vignettes were described to strengthen the student's clinical preparedness while also teaching them how to assess, prioritise and plan patient care, thus, equivalent to the stages of the nursing process. Wilkinson (2011) highlighted this connection, claiming that critical thinking is the vehicle driving the nursing process and that critical thinking is integrated in all its stages. Additionally, using the nursing process as a problem-solving tool while making clinical decisions are known to require critical thinking abilities and skills (Ballantyne, 2016; Wilkinson, 2011). Yildirim and Ozkahraman (2011) as well as Fertelli (2019) concluded that teaching the nursing process to students had assisted the students in both practising and applying critical thinking. Our findings taken together with others indicates that facilitatory teaching strategies such as the use of scenario together with a combination of a strategic implementation of critical thinking and the nursing process are likely to support the students theoretical as well as clinical abilities and skills, thus preparing the students for their coming profession as a registered nurse.

## 5. Methodological considerations

Choosing a scoping review for the current study can be considered a strength since it is a flexible method allowing for an iterative process, in that our research questions were adjusted in number and extent after familiarisation with the literature. One limitation of the current study, however, is that no exclusion was made due to quality, which implies that studies of poor quality might have had an impact on parts of the result. This might question the use of the study in informing practice (Carroll and Booth, 2015). However, one of the reasons to quality assess was to increase the usability of the findings and guide future research. In this case, the quality deficiencies could indicate that more high-quality research is required, including educational research, as well as highlight the need to apply reporting guidelines in the publication process. Another methodological decision important to acknowledge is our deductive analysis according to Banning's (2005) categorisation of common teaching strategies. Since the descriptions of teaching strategies in the included studies were vaguely described this supported us to make some sense of these imprecise descriptions despite Banning's (2005) categorisation can be considered rather crude and general. It would be useful for future research to further develop her categorisation as it offers a theoretical departure point.

A strength of this review is the ethical assessment of the included

studies, which is supported by Vergnes et al. (2010) and Weingarten et al. (2004). In the previous discussion on protocol, it was stated that studies not meeting the ethical criteria should be excluded. However, this requirement had to be modified since only four studies fulfilled the criteria, leaving a result based on studies with ethical deficiencies. A solution suggested by Vergnes et al. (2010) and Weingarten et al. (2004), which was applied in this study, was to assess all the included studies and be transparent in the reporting of ethics. This decision implies the need for a strengthened focus on ethical awareness and a reporting around ethical issues in future educational research.

## 6. Conclusions and implications for future research

Teaching strategies aiming at facilitating critical thinking need to be i) student-centred, ii) involve cooperation in-between the students and the educators and iii) and take place in an open milieu and student active educational environment. Our findings revealed both pros and cons with the described teaching strategies aiming at facilitating critical thinking among nursing students. For example, beneficiary where those strategies that on one hand encompassed an open climate and a supportive partnership between educators and students and additionally that made the students aware of their knowledge and clarified knowledge which eased the educators' assessment. Further the collaboration with co-students enabled sharing of knowledge and the strategies increased the students' self-awareness and ability to reflect. On the other hand, cons when they included computerised learning as it then could be experienced as restricting critical thinking and causing stress in relation to the time needed to prepare and to actively participate. One insight this review highlights is that only four out of the 19 included studies used a pedagogical theory or framework from which the teaching strategies departed. Therefore, more attention is required in nursing education to provide teaching strategies which are a grounded in pedagogical theories and frameworks. Moreover, the included studies focused on the experiences of the teaching strategies as such, not on the components of the strategies which facilitated critical thinking. Thus, there is a need to look more deeply into the pedagogical building blocks and components of the teaching strategies. This can be connected to the need for increased attention to evidence-based teaching practice. More experimental studies are required to identify which pedagogical theories and strategies are effective concerning critical thinking and for whom. Future research in the area also needs to take a firmer standpoint concerning how critical thinking is defined. In this review, only 11 studies included a definition of critical thinking on which the research was based. This leaves it unknown to the reader what the authors expect the students to accomplish in relation to competencies i.e., the specific building blocks and components of critical thinking.

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## Conflict of interest

None.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.nepr.2022.103409.

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