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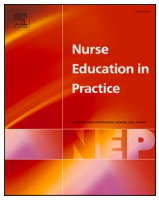

The meaning and application of student-centered learning in nursing education: An integrative review of the literature

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ABSTRACT

Aim: The aim of this study was to review empirical articles to explore the meaning and the application of student-centered learning in nursing education.
Background: Teachers in higher education are encouraged to adopt student-centered learning principles, but research shows that many still apply teacher-centered methods. There is therefore a need to clarify the meaning of student-centered learning, including how it is performed and the reasons to apply it in nursing education.
Design: This study employed an integrative review method, following Whittemore and Knafl's framework.
Methods: The databases CINAHL, Education Database and Education Research Complete were searched for related literature published from 2010 to 2020. The initial search located 308 articles. After screening and checking for eligibility, 25 articles were critically appraised. Data were extracted from the articles and displayed in matrices to be categorized and compared.
Results: Three themes with attendant sub-themes emerged through the analysis: *foundation*, using core concepts to define and explain student-centered learning, *eligibility*, enhancing student knowledge, developing student abilities and supporting student self-reliance and *realization,* learning in interaction with peers, learning individually and learning in interaction with the teacher.
Conclusion: Student-centered learning in nursing education is an approach where the teacher is a facilitator of student learning and students are empowered to take control of their own studies. Students study together in groups; they are listened to by the teacher and their needs are taken into consideration. The main reasons to apply student-centered learning are to enhance students' theoretical and practical learning; to improve their generic competencies, such as problem-solving and critical-thinking abilities; and to strengthen students' self-reliance.

1. Introduction

There has been a shift in higher education in Europe since the turn of the millennium, from a teacher-centered, knowledge-dissemination educational approach to a student-centered approach that is more focused on learning experiences (Rege Colet, 2017). The number of students enrolled in higher education has increased, as has the diversity of the students, including in relation to age. There has also been an enhancement in the technology used in health care and nursing education and an increase in the quantity of the information being taught. To manage these challenges, teachers in nursing education are adopting new ideologies that are more focused on student-centered learning (Stanley and Dougherty, 2010).

The history of nursing education started with Florence Nightingale, who opened a nursing school in London in 1860, at which the nursing students were expected to fulfill the Victorian female ideal of the

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time—to be faithful, loyal and submissive (Holmdahl, 2019). The Nightingale Home and Training School for Nurses was dedicated to communicating the philosophy and practice of its founder and patron, Florence Nightingale. Later, nursing education was administered at universities, in the United States (US) as early as 1909. In other countries, such as Sweden, nursing education became integrated into universities about 70 years later, in 1977. This transition to universities occurred, in part, because of the view that the prior nursing training was too vocational in nature and the educational methods did not challenge the students enough (Furåker, 2001). The transformation to universities meant a change in nursing education from being occupational preparation to being an educational program based on research; thus, nursing became an academic subject. Nursing education now aims to develop students' self-awareness, critical thinking, ability to initiate change and ability to fulfill a professional role (Holmdahl, 2019).

To support nursing students' learning there is a need to understand how adults learn and what conditions support efficient learning strategies. Adult students are better able to take ownership and responsibility for their own learning, with the intrinsic motivation to learn for their own personal and professional growth (Rege Colet, 2017). Learning does not stop at adulthood and the concept of andragogy—helping adults to learn—has become more accepted and contains many different learning models. Learning should not only be to remember something and being able to recite it later, as this represents surface-level learning. Learning in higher education should also be deep, giving students a real understanding of the content (Marton and Booth, 2000). According to Marton and Booth (2000), the pattern of variance and invariance in the object of learning, as it is experienced by students, is the secret to learning. When students learn something, it leads to a transformation of their experience of the world (Marton and Booth, 2000).

Since the 1990 s, research in pedagogy has become more focused on student learning and less on the teacher's perspective (Rege Colet, 2017). Despite this change there is still no uniform definition of "student-centered learning," but within this method, according to Rege Colet (2017), students learn through social interaction and peer teaching, within learning partnerships. According to the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), students should be active in creating the learning process (ESG, 2015). They should be able to influence their own learning, because when students are expected to stay silent, they tend to feel disempowered and to distrust their own knowledge (Palmer, 2017).

Despite research showing the benefits of student-centered learning, much of nursing education is still focused on the acquisition of knowledge and skills in a teacher-centered way instead of a student-centered way (Mackintosh-Franklin, 2016). Students need to be involved in co-creating learning plans to foster mutual respect between teachers and students, as this gives students greater motivation and a better understanding of the content of nursing education (Disch, 2012). The project Quality and Safety Education for Nurses (QSEN; QSEN Competencies, n. d.) described six competencies that students in nursing education are required to learn: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety and informatics. The core competencies seek to clarify what is required of nurses' education to achieve high quality health care (Leksell and Lepp, 2019). Disch (2012) drew a parallel between the first competency, patient-centered care and student-centered learning: just as patients should be respected and involved in their care, students should be respected and involved in their studies and just as help is provided to patients to enhance their health literacy, a system should be in place to support students to develop their curricular literacy.

Teachers in nursing education are now often encouraged to use student-centered learning to meet the pedagogical requirements of the 21st century. There is an increasing number of students in nursing education classrooms, including students with more diverse needs and students of all ages. There is also a need to manage an increasing amount of scientific information in nursing education. To be able to practice student-centered learning and to adhere to research and policy documents, there is a need to further clarify the meaning and use of student-centered learning. Without knowing what student-centered learning involves, it is not possible to practice, evaluate, or further develop the concept in nursing education.

2. Study aim

The aim of this study was to review empirical articles to explore the meaning and the application of student-centered learning in nursing education. The research questions that guided this study were as follows:

1. What is the meaning of student-centered learning in nursing education?
2. Why is student-centered learning applied in nursing education?
3. How is student-centered learning applied in nursing education?

2.1. Methods

2.1.1. Study design

An integrative review of the literature was conducted to gain a comprehensive understanding of student-centered learning. An integrative review is the broadest type of research review method, as it can include both qualitative and quantitative research (Whittemore and Knafl, 2005). Including different types of studies allows for various perspectives to be explored and enables a better understanding of the phenomena under review. The integrative review method suggested by Whittemore and Knafl (2005) includes five stages: problem identification, literature search, data evaluation, data analysis and presentation. In the problem identification stage, there is a need to clearly state the review's purpose to extract appropriate data from the sources.

2.2. Search strategy

When conducting a search of the literature for research on a particular subject, computerized databases are efficient and effective tools (Whittemore and Knafl, 2005). The search process employed should be clearly documented, including the search terms, databases and additional search strategies used, as well as the inclusion and exclusion criteria applied. In this study, a pilot search was conducted across various databases and the three databases that rendered the most results were chosen for the search. The literature search was conducted in April 2020 using the databases CINAHL, Education Database and Education Research Complete. The search terms used were "student-centered" and "learner-centered" (with the variant spellings "student-centred" and "learner-centred") in combination with "nursing education." In this review, the terms were used as synonymous to define the broader concept of student-centered learning. The terms "student-centered" and "learner-centered" appear to be used in the same way; this review found no patterns—that is, neither chronological nor geographical—in the usage of the terms. However, there is a slight distinction between "student," which refers to a person studying at a university or college and "learner," which is a person learning continuously, in any setting, with or without a teacher. The search terms were combined using the Boolean operators AND, OR in the following combination: student-centered OR student-centred OR learner-centered OR learner-centred AND "nursing education."

2.3. Inclusion and exclusion criteria

According to Whittemore and Knafl (2005), sampling decisions must be justified and made explicit. To find answers to the three research questions in this study, the inclusion criteria were as follows: peer-reviewed articles published from 2010 to 2020 and written in English were included in the study, including both qualitative and

quantitative empirical articles related to student-centered aspects of nursing education. Articles dealing with the dynamics in a nursing education course, such as the interaction between students and teachers and that between students and peers, were included. Excluded from this study were articles related to broad issues that are dealt with in committees that tend to feature only one or a few student representatives, articles related to curriculum development, articles related to the education of nurse educators and articles authored by students in Doctor of Philosophy in Nursing Education programs.

2.4. Search outcome and quality assessment

The search of empirical articles resulted in 308 hits, as illustrated in Fig. 1. After duplicates were removed, 187 articles remained and the next round of selection was performed by reading their titles and abstracts and applying the inclusion and exclusion criteria. The remaining 76 articles were read in full, to explore the extent to which they could help answer the three research questions. As a result of this selection process, 25 articles were finally selected for the review (Tables 1 and 2). The search process is illustrated below (Fig. 1) using a Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) flow diagram (Moher et al., 2009). The reference management system Zotero was also used, as it allows for the easy organizing of references (Harding, 2013).

Whittemore and Knafl (2005) concluded that, due to the complexity of using diverse primary sources, the way quality is evaluated in an integrative review will vary depending on the sampling frame. In this study, the quality of the primary sources (i.e., the 25 selected articles) was evaluated using the Mixed Methods Appraisal Tool (MMAT; (Hong et al., 2018)). The MMAT was designed and tested for reviews that include qualitative, quantitative and mixed-methods studies (Pace et al., 2012). Through this evaluation, it was found that all articles had a high level of methodological rigor and none had to be excluded based on the data evaluation. All questions in the MMAT were answered positively (see Table 3). In addition, the articles all received ethical approval.

2.5. Data analysis

Data that could help provide answers to the 3 research questions were extracted from the 25 selected articles. According to Whittemore and Knafl (2005), primary sources need to be divided into subgroups to facilitate analysis. Therefore, for each included study, a data matrix was developed to display the extracted data, categorized according to the three research questions. Data from each of the three categories were then transferred to a different data sheet, in three separate documents. As such, each data sheet contained extracted data from the 25 selected studies that helped to answer one of the three research questions. According to Whittemore and Knafl (2005), this organization of the literature facilitates the systematic comparison of primary sources. The documents of each category were then searched for variations and relationships, with relationships being coded by similar colors. Sections appearing in similar colors were then compiled and compared with search for patterns and themes. The process of drawing patterns must be isolated, commonalities must be identified and conclusions must be revised before new conceptualizations can be confirmed (Whittemore and Knafl, 2005).

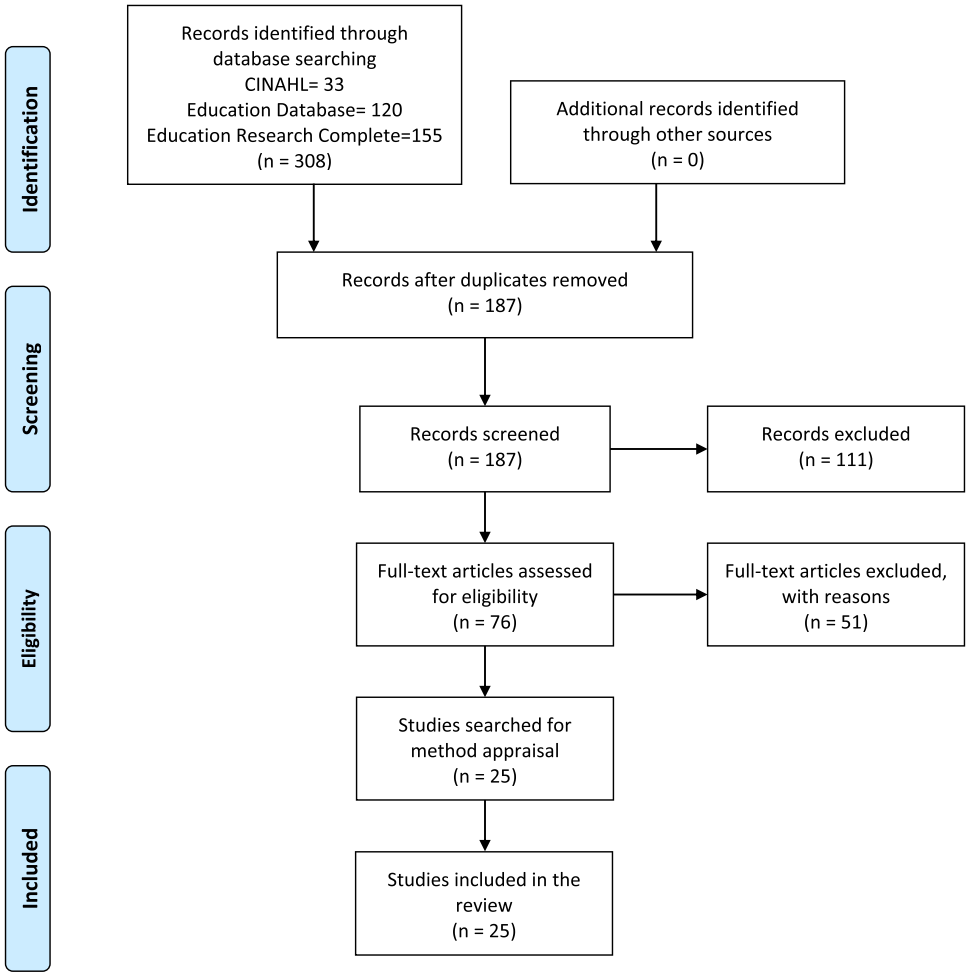

Fig. 1. PRISMA flow diagram (Moher et al., 2009).

Table 1
Search strategy for relevant articles.

Date for search	Search terms	Limits	Inclusion criteria	Exclusion criteria	Database	Result
April 2020	student-centered OR student-centred OR learner-centered OR learner-centred AND "nursing education"	Peer-reviewed Published 2010–2020 Published in English	Articles dealing with the dynamics within a nursing education course, such as the interaction between students and teachers and that between students and peers	Articles related to broad issues that are dealt with in committees that tend to feature only one or a few student representatives, articles related to curriculum development, articles related to the education of nurse educators, and articles authored by students in Doctor of Philosophy in Nursing Education programs.	CINAHL Education Database Education Research Complete	33 articles 120 articles 155 articles

3. Results

Three main themes emerged through the data analysis of the articles: *foundation*, *eligibility* and *realization*. The included 25 articles were conducted in the US (9), Sweden (3), South Korea (2) and Turkey (2), with 1 study each being conducted in Australia, Canada, Hong Kong, Iran, Lebanon, Norway, Taiwan, Thailand and UK. Students in Bachelor of Nursing programs were included in 24 articles and, 1 article related to students pursuing an Associate Degree in Nursing.

3.1. Theme: foundation

The first theme, *foundation*, relates to descriptions and definitions of "student-centered learning" in nursing education. Although all 25 articles stated their studies to be related to student-centered learning, 19 did not present a definition of the concept but instead described the methods and approaches applied in the studies as being "student-centered." The six articles that defined "student-centered learning" were Falk et al. (2016), Gazarian and Pennington (2012), Geist et al. (2015), Hofsten et al. (2010), Morgan (2019) and Puplampu (2017).

In each of these six studies, "student-centered learning" was defined with reference to other studies; none of the articles presented their own definition of the concept. Geist et al. (2015) referred to Bransford et al. (2000) and concluded that, in student-centered learning, teachers consider students' needs, individuality and former experiences and knowledge. Hofsten et al. (2010) referred to Ramsden (2003), who explained that within student-centered learning, teachers consider how students learn and, instead of transferring knowledge, try to facilitate student activity and meaning orientation. Morgan (2019) referred to Attard et al. (2010) and Puplampu (2017) referred to Lea et al. (2003), who noted that, in student-centered learning, students receive continuous feedback and there is mutual respect in the relationship between student and teacher. Puplampu (2017) also referred to Taylor (2013), stating that there is a transfer of power from the teacher to the student, such that the ownership of learning now belongs to the student. Falk et al. (2016) referred to Biggs and Tang (2007) and Marton and Bowden (1999), while Gazarian and Pennington (2012) referred to Weimer (2002); these definitions considered students in student-centered learning to be active recipients of knowledge who take responsibility for planning and evaluating their learning experiences. Falk et al. (2016) also referred to Lea et al. (2003), according to whom students gain increased autonomy and accountability in student-centered learning and the outcome is a deep approach to learning and an enhanced understanding among students, as well as better preparation for the professional world.

3.2. Theme: eligibility

The second theme, *eligibility*, relates to the reasons student-centered learning is applied in nursing education and the desired student outcomes. The following three sub-themes emerged in the analysis: *student knowledge*, *student abilities* and *student self-reliance*.

3.2.1. Student knowledge

In many of the articles, student-centered learning was applied to enhance student knowledge in relation to both theoretical and practical issues (Bingen et al., 2019; Cheng et al., 2014; Falk et al., 2016; Geist et al., 2015; Gould et al., 2015; Göktepe et al., 2018; Hofsten et al., 2010; Im and Jang, 2019; Kantar and Massouh, 2015; Kaylor and Strickland, 2015; Kim et al., 2016; Klunklin et al., 2011; Lynn and Twigg, 2011; Morgan, 2019; Strickland and Kaylor, 2016; Zarifsanaiey et al., 2016). Student-centered learning also helped students take a deeper approach to learning and led to deeper understanding of the content instead of relying on memorization (Geist et al., 2015; Hofsten et al., 2010; Kim et al., 2016; Klunklin et al., 2011; Tang and Chow, 2020; Zarifsanaiey et al., 2016). Students discussed problems together and developed their abilities to decide what was important to learn (Kim et al., 2016; Klunklin et al., 2011). Student-centered learning was also used to promote lifelong learning, enabling students to adapt to a dynamic work environment after graduation (Falk et al., 2016; Gazarian and Pennington, 2012; Piper et al., 2019).

3.2.2. Student abilities

Another reason to apply student-centered learning that was mentioned in the articles was to enhance students' abilities, such as their reasoning skills, problem-solving ability and critical-thinking skills (Geist et al., 2015; Göktepe et al., 2018; Harmon and Thompson, 2015; Hofsten et al., 2010; Isbir and Ozan, 2018; Kim et al., 2016; Klunklin et al., 2011; Morgan, 2019; Puplampu, 2017; Tang and Chow, 2020; Zarifsanaiey et al., 2016). These abilities were improved using collaborative activities such as discussing patient care scenarios. The students were encouraged to verbalize and test their ideas, thinking and exploring together and brainstorming solutions (Tang and Chow, 2020; Zarifsanaiey et al., 2016). Student-centered learning was also applied to increase students' social competences, such as communication and collaboration abilities (Cheng et al., 2014; Göktepe et al., 2018; Hofsten et al., 2010; Isbir and Ozan, 2018; Kaylor and Strickland, 2015; Morgan, 2019; Puplampu, 2017; Savage et al., 2011; Tang and Chow, 2020). Through the analyzed case studies, it was shown that students learned to show respect for others' views, practiced active listening and engaged in collective decision-making (Hofsten et al., 2010). Using collaborative interaction, students developed greater trust in the competence of the group and its members and, through this, were able to realize their own limitations and develop the courage to ask other group members for help (Savage et al., 2011).

3.2.3. Student self-reliance

It was shown that, by applying student-centered learning, students' self-reliance could be strengthened (Falk et al., 2016; Gazarian and Pennington, 2012; Im and Jang, 2019; Isbir and Ozan, 2018; Kantar and Massouh, 2015; Lynn and Twigg, 2011; Morgan, 2019; Piper et al., 2019; Savage et al., 2011; Zarifsanaiey et al., 2016). Kantar and

Table 2
Summary of included studies.

First Author, Year (Country)	Purpose	Design (Sample)	Student-Centered Pedagogic Method or Approach	Findings
Bingen, 2019 (Norway)	To explore how nursing students describe their experiences with off-campus activities when learning physiology within a flipped classroom	Qualitative; focus groups conducted, students' reflective notes analyzed by systematic text condensation and activity system analysis (23 students)	Flipped classroom	Students needed time to adapt to the new learning approach.
Cheng, 2014 (Taiwan)	To employ the team-based learning (TBL) approach in a maternal/child nursing course and to evaluate its effects on learning outcomes	Quantitative; one group compared pretest/posttest (207 students)	TBL	The TBL design led to more active engagement and teamwork.
Falk, 2016 (Sweden)	To evaluate the effects of sequencing clinical practice prior to theoretical studies on students' experiences of self-directed learning readiness and students' approach to learning	Mixed methods; two groups of students compared by scale, questionnaire results, and students' written reflections (123 students)	Clinical practice prior to theoretical studies	Students were sensitive and adaptable to their learning contexts.
Gazarian, 2012 (US)	To incorporate real-world clinical information into the classroom	Qualitative; surveys, focus groups, and informal discussions conducted (1 course)	Clinical teleconferencing	Knowledge was translated from and applied to practice.
Geist, 2015 (US)	To determine if there is a difference in content knowledge acquisition between traditional and flipped classroom methods	Quantitative; compared pretest/posttest results of a nonequivalent control group with a quasi-experimental design (86 students)	Flipped classroom	Students gained knowledge and gave positive responses.
Gould, 2015 (US)	To examine the change in content knowledge after participation in an online problem-based learning (PBL) module versus after traditional instruction	Quantitative; employed a quasi-experimental design with nonequivalent groups (124 students)	Online PBL	Online PBL was effective in promoting content knowledge change.
Göktepe, 2018 (Turkey)	To determine the contribution of TBL to the learning experience of students participating in a nursing leadership course	Qualitative; conducted action research, with continuous collaboration between researchers and participants to improve practice (2 cycles, 57 students)	TBL	TBL made positive contributions to student learning.
Harmon, 2015 (US)	To determine whether collaborative activities are effective in improving clinical reasoning skills	Quantitative; employed a quasi-experimental, one-group time-series research design (17 students)	Collaborative learning	Students' overall scores for clinical reasoning increased.
Hofsten, 2010 (Sweden)	To describe students' experiences of learning in case seminars	Qualitative, descriptive; analyzed written data from students using content analysis (69 students)	Case seminars	Students deepened their understanding and critical thinking.
Im, 2019 (South Korea)	To verify the effectiveness of the flipped learning method when applied to a mental health nursing practicum	Quantitative; involved a retrospective survey of a control group and an experimental group (70 students)	Flipped learning	Academic processes and core competencies improved.
Isbir, 2018 (Turkey)	To evaluate nursing and midwifery students' experiences with different educational techniques used in the Course on Infertility and Assisted Reproductive Techniques	Qualitative, descriptive; conducted focus groups (75 students)	Active Learning in Nursing Education (ALINE)	Theoretical knowledge, emotional and psychosocial viewpoint, and attitude improved.
Kantar, 2015 (Lebanon)	To explore the perceptions of nursing students who have used case-based learning, in order to identify the professional skills that may be gained by this instructional approach	Qualitative; conducted focus groups (16 students)	Case-based learning	Professional attributes emerged from the study findings.
(Kaylor, 2014) (US)	To adapt cognitive load theory to meet various student needs	Qualitative, descriptive; gathered formal student feedback (compared 2 semesters, 192 students)	Cognitive load theory	The strategies received positive student feedback.
Kaylor, 2015 (US)	To describe a technique for using unfolding case studies to incorporate evidence-based practice in the teaching of novice nursing students	Qualitative, descriptive; gathered student feedback (96 students)	Unfolding case studies	The use of unfolding case studies was an effective instructional strategy.
Kim, 2016 (South Korea)	To examine the effects of TBL on problem-solving ability and learning outcomes (i.e., knowledge and clinical performance) of Korean nursing students	Quantitative; conducted a randomized controlled trial (63 students)	TBL	Problem-solving ability, knowledge, and clinical performance improved.
Klunklin, 2011 (Thailand)	To seek the perspectives of undergraduate nursing students about PBL to inform future curriculum development and implementation	Qualitative; conducted interviews and performed content analysis (25 students)	Problem-based learning	The students' ability to solve problems and think critically increased.
Lynn, 2011 (US)	To redesign a clinical remediation program to focus on a student-centered approach	Qualitative; created a report based on clinical faculty observations and measured the rate of clinical failures compared to the year before (1 year)	Clinical remediation process	Professional learning, confidence, and abilities increased.
(Mennenga, 2013) (US)	To compare TBL and traditional lectures with regard to student engagement and performance on examinations	Quantitative; implemented a quasi-experimental student survey and assessment instrument (143 students)	TBL	Students' were more engaged using TBL.
(Morgan, 2019) (UK)	To explore the use of seminars as a teaching method in undergraduate nurse education	Qualitative; measured student satisfaction and feedback from an external examiner (120 students)	Seminars	The students were supported in their personal and academic growth.
Piper, 2019 (Australia)	To improve the process of student-centered feedback by including a self-assessment component in an assessment task	Mixed methods; two-phased, explanatory, sequential approach that involved the analysis of assessed marks using SPSS, semi-structured interviews, and focus groups (754 students)	Self-assessment	Students self-review of work enabled them to improve work prior to submission.
(Puplampu, 2017) (Canada)	To explore nursing students' and faculty members' experiences of comfort during their transition to a context-based learning program	Qualitative, exploratory, descriptive; conducted focus groups, field observations, and a review of	Context-based learning	It was found that adjustment might be needed for a smooth

(*continued on next page*)

Table 2 (*continued*)

First Author, Year (Country)	Purpose	Design (Sample)	Student-Centered Pedagogic Method or Approach	Findings
		documents (26 students, 17 faculty members)		transition when context-based learning is introduced.
Savage, 2011 (Sweden)	To describe the student–teacher–professional organization, learning, and leadership (OLL) collaboration and to explore students' experiences	Qualitative; conducted a content analysis and reviewed student self-reflections, student survey results, and perceived relevance by nurse educators (13 students, 16 nurses)	Learning through contribution	Students exceeded the course outcome levels and gained confidence.
Strickland, 2016 (US)	To describe the theoretical basis for the integration of gaming in nursing education and to discuss aspects related to the implementation of the "Race for Nursing Student Success" game	Qualitative; compared students' results on an examination to the results from the year before (112 students)	Educational gaming	Students and faculty members gave positive responses; students performed better on the examination following the use of educational gaming.
Tang, 2020 (Hong Kong)	To evaluate the effect of challenge-based learning on approaches to learning among nursing students	Quantitative; involved quasi-experimental, nonequivalent groups, measured by a questionnaire (209 students)	Challenge-based learning	It was found that challenge-based learning might facilitate deep learning in nursing students.
Zarifsanaiey, 2016 (Iran)	To compare the effects of integrated training (i.e., simulation and critical-thinking strategies) and simulation-based training on the performance level and critical-thinking ability of nursing students	Quantitative; involved a quasi-experimental, nonequivalent group, compared pretest/posttest (40 students)	Integrated simulation and critical-thinking strategies	The students' performance level increased.

Table 3
Screening questions Mixed Methods Appraisal Tool (MMAT), version 2018.

S1. Are there clear research questions?
S2. Do the collected data allow to address the research questions?
1. Qualitative
1.1. Is the qualitative approach appropriate to answer the research question?
1.2. Are the qualitative data collection methods adequate to address the research question?
1.3. Are the findings adequately derived from the data?
1.4. Is the interpretation of results sufficiently substantiated by data?
1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?
2. Quantitative randomized controlled trials
2.1. Is randomization appropriately performed?
2.2. Are the groups comparable at baseline?
2.3. Are there complete outcome data?
2.4. Are outcome assessors blinded to the intervention provided?
2.5 Did the participants adhere to the assigned intervention?
3. Quantitative nonrandomized
3.1. Are the participants representative of the target population?
3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?
3.3. Are there complete outcome data?
3.4. Are the confounders accounted for in the design and analysis?
3.5. During the study period, is the intervention administered (or exposure occurred) as intended?
4. Quantitative descriptive
4.1. Is the sampling strategy relevant to address the research question?
4.2. Is the sample representative of the target population?
4.3. Are the measurements appropriate?
4.4. Is the risk of nonresponse bias low?
4.5. Is the statistical analysis appropriate to answer the research question?
5. Mixed methods
5.1. Is there an adequate rationale for using a mixed methods design to address the research question?
5.2. Are the different components of the study effectively integrated to answer the research question?
5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?
5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?
5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?

Massouh (2015) described using case-based learning to help students gain greater self-confidence and autonomy. A clinical remediation program described by Lynn and Twigg (2011) instilled and reinforced confidence in students by meeting students' individual needs with a variety of learning strategies. Motivation and engagement were also increased when student-centered learning occurred (Cheng et al., 2014; Gould et al., 2015; Göktepe et al., 2018; Hofsten et al., 2010; Isbir and Ozan, 2018; Kim et al., 2016; Mennenga, 2013; Morgan, 2019; Savage et al., 2011; Strickland and Kaylor, 2016; Tang and Chow, 2020). Savage et al. (2011) highlighted reflection and feedback as other important tools to enhance motivation. Student-centered learning enabled faculty members to meet students' different needs (Im and Jang, 2019; Kaylor, 2014; Lynn and Twigg, 2011). Several articles also described students taking control of their own studies (Cheng et al., 2014; Falk et al., 2016; Gazarian and Pennington, 2012; Isbir and Ozan, 2018; Morgan, 2019; Kantar and Massouh, 2015; Kaylor and Strickland, 2015; Klunklin et al., 2011; Piper et al., 2019; Savage et al., 2011; Strickland and Kaylor, 2016). When students developed their own competencies and effective studying techniques, they gained the confidence to ask for help and to handle competing priorities (Gazarian and Pennington, 2012). Falk et al. (2016) found that when students took responsibility for their learning, it improved their ability to learn. Last, the use of self-assessment was described in some of the studies; students initiated and took ownership of their own self-regulation and were able to improve their work prior to submission (Isbir and Ozan, 2018; Kantar and Massouh, 2015; Piper et al., 2019).

3.3. Theme: realization

The third theme, *realization*, encompasses the different ways, described in the studies, that student-centered learning was applied in nursing education. The results are presented in relation to the following sub-themes: *learning in interaction with peers*, *learning individually* and *learning in interaction with the teacher*.

3.3.1. Learning in interaction with peers

Nearly all the articles explained that the students practiced teamwork and collaboration with their peers. Only three of the studies did not involve group activities (Falk et al., 2016; Lynn and Twigg, 2011; Piper et al., 2019). Students were expected to lead and participate in group discussions, taking turns to be team leaders (Göktepe et al., 2018). Many articles described students discussing patient scenarios, where a group of students were given a scenario to review, which would help in identifying their learning needs (Cheng et al., 2014; Gazarian and Pennington, 2012; Gould et al., 2015; Göktepe et al., 2018; Harmon and Thompson, 2015; Hofsten et al., 2010; Im and Jang, 2019; Kantar and Massouh, 2015; Kaylor and Strickland, 2015; Kim et al., 2016; Klunklin et al., 2011; Puplampu, 2017). In some cases, the scenarios were based

on students' experiences from their medical/surgical practice (Harmon and Thompson, 2015), while in other cases, they were created by the students themselves (Kaylor and Strickland, 2015). Im and Jang (2019) described engaging students in activities such as small-group topical debates, gamification, simulations and role-play to practice the course content. Kaylor (2014) described playing a game as an opening activity to help the teacher assess students' prior knowledge. Playing games was also used to comprehensively review a semester's content (Strickland and Kaylor, 2016).

3.3.2. *Learning individually*

Several of the articles indicated that students prepared individually before coming to class (Bingen et al., 2019; Cheng et al., 2014; Gazarian and Pennington, 2012; Geist et al., 2015; Göktepe et al., 2018; Hofsten et al., 2010; Im and Jang, 2019; Kantar and Massouh, 2015; Kaylor and Strickland, 2015; Kim et al., 2016; Mennenga, 2013; Morgan, 2019; Puplampu, 2017). This preparation sometimes to the form of reading assignments related to the class topic (Cheng et al., 2014). Geist et al. (2015) explained that students viewed the teacher's videotaped lecture at their own pace before coming to class. Students could also have access to different exercises with accompanying solutions via the learning management system (Bingen et al., 2019). In an article by Kantar and Massouh (2015), students' individual preparation was to review a patient scenario and develop an analysis along with possible solutions, before the scenario was discussed with peers in class.

The use of self-assessment was described in some of the articles (Bingen et al., 2019; Cheng et al., 2014; Isbir and Ozan, 2018; Kim et al., 2016; Lynn and Twigg, 2011; Mennenga, 2013; Piper at al., 2019; Strickland and Kaylor, 2016). Students could set goals for each subject and determine individually if they had achieved the course objectives each week (Isbir and Ozan, 2018). Peer assessment was also used in some cases for individual assessment, where every student in a group assessed every other group member. During simulation exercises, a grading rubric was sometimes used as a basis for self-evaluation (Lynn and Twigg, 2011). In addition, students were given formative feedback on both their individual work (Piper et al., 2019) and group work (Morgan, 2019). Some articles described how teachers could address the individual needs expressed by students (Bingen et al., 2019; Gazarian and Pennington, 2012; Geist et al., 2015; Gould et al., 2015; Kaylor and Strickland, 2015; Lynn and Twigg, 2011; Puplampu, 2017; Savage et al., 2011; Tang and Chow, 2020). For example, students were asked to pose questions and those questions then formed the basis of the classroom experience (Gazarian and Pennington, 2012). One study explained how students were prompted to brainstorm a patient scenario that could help in identifying and addressing their learning needs (Gould et al., 2015). Similarly, in the study by Tang and Chow (2020), students built their own learning scenario through discussion and brainstorming to identify challenges, leading to a project geared entirely toward the needs of the group members.

3.3.3. *Learning in interaction with the teacher*

In many of the articles, the role of the teacher in student-centered learning was described as that of a facilitator (Cheng et al., 2014; Gazarian and Pennington, 2012; Göktepe et al., 2018; Harmon and Thompson, 2015; Hofsten et al., 2010: Isbir and Ozan, 2018; Kantar and Massouh, 2015; Kaylor and Strickland, 2015; Lynn and Twigg, 2011; Morgan, 2019; Piper et al., 2019; Puplampu, 2017; Savage et al., 2011; Tang and Chow, 2020; Zarifsanaiey et al., 2016). Kaylor and Strickland (2015) described how teachers refrained from intervening in group work and only gave assistance when requested by the students. The quality of the relationship between the students and the teacher determined students' attitude, behavior and motivation (Piper et al., 2019). Puplampu (2017) described how teachers guided students in their learning, with the aim of having students create their own knowledge. Teachers acknowledged students' previous experiences, co-created knowledge with students and learned from students on some occasions. Savage et al. (2011) explained that course leaders taught only when students asked for help and worked to approach students as equals, believing that everyone had expertise that they could contribute.

4. Discussion

The integrative method employed in this study enabled the inclusion of a large number of studies, providing a fuller understanding of the role of student-centered learning in nursing education. However, this review of the literature did not include any theoretical articles— only articles describing empirical studies; this might have limited the answers that could be gleaned, especially to the first research question (i.e., what student-centered learning is in nursing education), as the identified studies contained a limited number of answers on this point.

Three themes, along with attendant sub-themes, emerged through the analysis. The first theme, *foundation*, examined the meaning of student-centered learning in nursing education. The theme expressed that teachers engaging in student-centered learning seek to consider students' ways of learning and desired learning outcomes, to empower them to take control of their own studies. To define "student-centered learning," the articles referred to sources published between 1999 and 2014, with most referring to sources published around the turn of the millennium. The foundation of the changes that occurred throughout higher education around the millennium shift rests on research carried out in the 1990 s (Rege Colet, 2017). For example, understanding how students learn became a principle for effective teaching and teachers started to empower students by supporting self-authorship, encouraging collaborative learning and creating democratic learning environments. When teachers empower nursing students, they set the foundation for them to become confident nurses with the ability to manage their own lifelong learning.

The theme of *eligibility* examined the purposes of using student-centered learning in nursing education. One of these purposes was to guide students to become lifelong learners. According to Stanley and Dougherty (2010), changes in healthcare delivery and information technology, along with the demands for evidence-based practice, have increased the sheer amount of course content in nursing education. To cover all this material, students must become lifelong learners, continuing to learn after graduation. The improvement of students' generic competencies was highlighted in many of the articles. Chan et al. (2017) described the need to implement generic competencies into higher education because they are associated with career success and are vital for the betterment of society. Working together in groups in an educational environment gives students the opportunity to practice working in teams, one of the core competencies of nurses.

Many of the reviewed articles identified the need to improve students' ability to think critically and to enhance their problem-solving abilities. According to Attard et al. (2010), student-centered learning should aim to initial a transformational process in students that is focused on empowering and developing critical ability. Students who increase their critical-thinking and problem-solving skills can probably develop a greater capacity to practice the core competencies of safety, evidence-based practice and quality improvement.

The third theme, *realization*, examined how student-centered learning is applied in nursing education. The analysis showed that, most often, students learned through group work, such as discussing patient scenarios. Marton (2014) argued that the discussion of differences in students' perceptions of a learning object can lead to a better understanding of that learning object. Therefore, teachers should not introduce concepts by listing abstract principles or describing solutions but should instead start with the entity, the problem, itself. In nursing education, the problem might be a patient scenario, as described in several of the reviewed studies. According to Palmer (2017) students are more motivated to learn in group settings and will not embarrass themselves by letting the group down. Further, learning through patient scenarios means that knowledge is not being presented in isolated

pieces. The various pieces of information about a patient case with which students are presented connect to each other, mimicking the complexity of real patient cases. This might also make new information easier to remember, as it is connected to a person (even if the person is fictional), rather than being presented in the form of disjointed facts in a book.

Nearly half of the articles described students preparing individually before coming to class. In particular, it was noted that students who needed more time to absorb information benefit from this approach. When teachers engage in student-centered learning, they must focus on students' learning instead of their own teaching; this causes teachers' power to decrease, which could be a challenge in the transition to student-centered learning (Puplampu, 2017). Yet students can be afraid to contribute and speak up in classrooms where the teacher holds the power. Thus, teachers need to abandon control and give their students a voice (Palmer, 2017). Klunklin et al. (2011) raised this as a particular challenge for students in Thailand, where respect for the teacher has been considered vital. The study emphasized that students need support in their struggle to become problem-solvers who are also not afraid to ask questions.

4.1. Patient-centered care

In this analysis of student-centered learning in nursing education, it was found that teachers must listen to their students and let go of the power of being solely responsible for students' learning; rather, they make an effort to empower and strengthen their students. In this way, the concept of student-centered learning resembles the concept of patient-centered care in nursing. If students are exposed to the approach of student-centered learning in their nursing studies, the transition to caring for patients in a patient-centered way might be facilitated.

5. Conclusion

"Student-centered learning," as applied in nursing education, is an approach where students are listened to and empowered and where their different experiences and needs are taken into consideration. Student-centered learning aims to enhance students' knowledge, develop their abilities and support their self-reliance. Students' academic learning, critical-thinking ability and capability to take control of their own studies are vital. The learning process consists of collaboration in groups, often solving realistic patient scenarios. In this approach, students prepare individually in advance or between class sessions and use self-evaluation to gain control of their learning process. The students and the teacher are expected to be respectful partners and the teacher is seen as a facilitator of students' learning.

5.1. Implications

As a result of this study, the following implications arise with regard to the meaning and application of student-centered learning in nursing education:

- When teachers take student diversity into consideration, listen to students and acknowledge their different challenges and experiences, students are more motivated to learn and gain a learning experience that is more tailored to their needs, leading to enhanced academic learning.
- Empowering students and communicating with them in a respectful way facilitates their ability to take control of their own studies.
- Using realistic patient scenarios facilitates students as they prepare to become competent practitioners.
- Providing students with opportunities to work together allows them to practice social competencies, which enhances their ability to work in teams after graduation.

5.2. Limitations

The search for articles to review as part of this study was completed in April 2020. Due to complications arising from COVID-19 pandemic, it has taken longer than anticipated to process the results.

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CRediT authorship contribution statement

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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