AN INTEGRATIVE REVIEW OF SUPPORTIVE CLINICAL LEARNING ENVIRONMENT STRATEGIES FOR UNDERGRADUATE STUDENTS IN HEALTH SCIENCES

BY

Annelie Magrietha Orton

Student number: 1994099123

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SUPERVISOR: Ms. M.A. Pienaar

CO-SUPERVISOR: Prof. Y. Botma

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DECLARATION

I, Annelie Magrietha Orton, declare that the dissertation that I herewith submit for the degree, Magister Societatis Scientiae in Nursing at the University of the Free State, is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education.

Signed **Date**

03/09/2020

Annelie Magrietha Orton
Student number: 1994099123

LANGUAGE EDITOR CERTIFICATE

To whom it may concern

This is to state that the Master's degree dissertation titled *An Integrative Review Of Supportive Clinical Learning Environment Strategies For Undergraduate Students In Health Sciences* by Annelie Magrietha Orton has been language edited by me, according to the tenets of academic discourse.

A. du Preez
B.Bibl.; B.A. Hons. (English)
27-08-2020

DEDICATION

I would hereby like to dedicate this dissertation to my parents, Peter and Annatjie Jordaan.

Thank you for the foundation you lay in my life and for teaching me the value of endurance. Thank you, Dedda, for introducing me to the world of literature. Thank you, Mamma, for always believing in me.

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ABSTRACT

The clinical learning environment is essential for the development of healthcare students' clinical training, clinical competence and professional identity. A supportive clinical learning environment is needed to provide the opportunity for students to integrate their theoretical knowledge with the clinical practice.

The aim of the study was to critically synthesise the best available evidence describing strategies for a supportive clinical learning environment for undergraduate students in health sciences. An integrative review was chosen as research method, as studies with various methodologies can be incorporated in an integrative review. The researcher followed the five stages as stated by Whittemore and Knafl (2005:548-552), namely problem identification, literature search, data evaluation, data analysis and presentation. The PICO-format (Population, Intervention, Comparative intervention and Outcome) was used to compile the review question, which again led the integrative review. EBSCOHost served as a platform to search for electronic data in 13 databases. Google Scholar was also used as a database to allow for the identification of relevant grey literature. The electronic database search strategy identified 500 potential studies, and after the filtering process, 11 studies were identified for critical evaluation. A critical evaluation was conducted in the form of a round table consensus by the researcher, the supervisor, the co-supervisor and a senior reviewer with experience in conducting integrative reviews. During the critical evaluation, 10 studies were selected for analysis. The selected studies were heterogenous and so a meta-analysis was not feasible.

The results of the thematic analysis culminated in a conceptual framework of a supportive clinical learning environment. Three concluding statements, as stated below, summarise the findings of the study:

1) A variety/network of student supporters, who have been carefully selected, may be allocated specific clinical responsibilities while supporting the undergraduate student in the clinical learning environment.

2) The relationship between the student, the student supporter and the clinical staff is crucial to create a sense of belonging, self-efficacy and self-directedness. The relationship depends on the roster and ratio of students per student supporter, as well as appropriate learning opportunities.

3) Higher education institutions and healthcare providers (such as healthcare facilities) should support students through formal collaboration/partnerships, with student supporters employed by the institutions, and these institutions should support the student supporters in various ways.

A few recommendations made by the researcher include:

1) Higher education institutions and healthcare providers should attempt to forge beneficial relationships in order to support the students.

2) Higher education institutions should support student supporters in the clinical learning environment with adequate and timely information regarding student placement, the students' level of competence and the students' outcomes, and also with training and support regarding student problems.

3) Healthcare providers should assist the higher education institutions by providing placement, opportunities for students to learn, and by supporting the students in clinical learning.

4) Student supporters should have certain qualities that enhance clinical teaching and student supporters should be willing to spend time with students.

The comprehensive synthesis of the best available evidence has led to new insights regarding creating and maintaining supportive clinical learning environment strategies for undergraduate students in health sciences. These strategies may be implemented in innovative ways to provide the students with the best clinical learning opportunities.

Key terms: *Health sciences, integrative review, strategies, supportive clinical learning environment, undergraduate students*

ABBREVIATIONS

AHPCSA	Allied Health Professions Council of South Africa
ALN(s)	Academic liaison nurse(s)
CASP	Critical Appraisal Skills Programme
CBI	Capacity building intervention
CLE(s)	Clinical learning environment(s)
CLN(s)	Clinical liaison nurse(s)
CM	Cluster model
CPPM	Clinical partnership placement model
DEU	Dedicated education unit
HCP(s)	Healthcare provider(s)
HEI(s)	Higher education institution(s)
HPCSA	Health Professions Council of South Africa
MMAT	Mixed methods appraisal tool
PAL	Peer-assisted learning
PDT(s)	Placement development teams
PEF	Practice education facilitators
PICO	Population, Intervention, Comparative intervention and Outcome
RCT(s)	Randomised controlled trials
RN(s)	Registered nurse
SANC	South African Nursing Council
SCLE(s)	Supportive clinical learning environment(s)
UCPC	University campus placement coordinator

CONCEPTUAL AND OPERATIONAL DEFINITIONS

Health sciences: Health science is the application of science to health. This includes the study of medicine, nursing, nutrition, occupational health, physiotherapy, as well as all other studies related to the health of humans (University of Wisconsin, 2018:Online). In this study, students studying in the field of occupational therapy, dentistry, medicine, nursing, physiotherapy, dietetics, pharmacy, radiography, biokinetics, optometry and speech therapy were included.

Integrative review: An integrative review is a review based on the evidence collected from multiple studies to answer a clearly formulated question. It uses integrative and clear methods to critically evaluate the literature extracted from the primary research. Relevant data from the studies are extracted, rigorously analysed and synthesised. The research should be done in such a way that it can be reproduced and verified (Polit & Beck, 2017:43; Botma, Greeff, Mulaudzi & Wright, 2010:241; Moule & Goodman, 2009:249). In this study, the researcher was guided by the five stages as set out by Whittemore and Knafl (2005:548-552) during the process of the integrative review.

Strategies: According to the Oxford South African Concise Dictionary (2010:1173), strategies are “plans designed to achieve a particular long-term aim”. The researcher will be guided by this definition in order to identify supportive clinical learning environment strategies for undergraduate students in health sciences.

Supportive clinical learning environment: A supportive clinical learning environment is an interactive environment in the clinical setting where the theoretical components of the curriculum can be transformed into professional skills and attitudes within a safe emotional environment. It includes everything that involves the student and his/her professional development and behaviour (Botma & MacKenzie, 2016:105;

Papastavrou, Dimitriadou, Tsangari & Andreou, 2016:2). The researcher will use this definition as guide in this study.

Undergraduate students: Undergraduate students are students who are enrolled at a college or university and who have not yet obtained their first diploma or degree (Oxford South African Concise Dictionary, 2010:1295). The researcher will be guided by this definition.

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CHAPTER 1

Overview of the study

1.1 INTRODUCTION AND BACKGROUND

Clinical training plays a critical part in the training of students in healthcare sciences (Manninen, Henriksson, Scheja, & Silén, 2015: Online; O'Mara, McDonald, Gillespie, Brown & Miles, 2014:208). During clinical training, the clinical competencies and professional identity of healthcare students are formed (O'Mara *et al.*, 2014:208; Changiz, Malekpour & Zargham-Boroujeni, 2012:399; Dadgaran, Parvizy & Peyrovi, 2012:330). Clinical learning environments [CLE(s)] are meant to support healthcare students in reaching these outcomes (Manninen *et al*., 2015: Online).

Various quality assurance bodies such as the South African Nursing Council (SANC), the Allied Health Professions Council of South Africa (AHPCSA) and the Health Professions Council of South Africa (HPCSA) control the competence levels, code of conduct, education and registration of professionals, and the number of clinical hours that have to be accrued during education (*Nursing Act 2005 c.2; Allied Health Professions Act 1982 c.2; Health Professions Act 1974 c.2*). The acts that regulate the clinical learning of healthcare students, all state that students must practice their skills under supervision (*Nursing Act 2005 c.2; Allied Health Professions Act 1982 c.2; Health Professions Act 1974 c.2*).

Supervision is defined as the observation and direction of a person performing a task (Oxford South African Concise Dictionary, 2010:1192) and is a complex phenomenon in the CLE. The role of the supervisor and how supervision should be utilised are taxing on healthcare educators and clinical staff. Supervisors should support students to link their theoretical and clinical knowledge as well as develop their clinical skills. The main goal of supervision is to help students to work independently and responsibly. Supervision is an essential part of the learning process, and should be student-centred

and focused on supporting the student in gaining new understanding and skills (Manninen *et al*., 2015:Online).

A supportive clinical learning environment (SCLE) is needed to provide the opportunity for students to integrate the theoretical knowledge obtained in class with clinical practice. The CLE is dynamic and complex with several variables (King, Russell & Bulsara, 2017:49; O'Mara *et al.*, 2014:208). Various factors within the CLE influence students' learning experience, such as the quality of the clinical setting, the availability of equipment, supportive staff, good care of patients and the availability of clinical supporters (Papastavrou *et al.*, 2016:2; Smedley & Morey, 2009:77; Papp, Markkanen & Von Bonsdorff, 2003:263).

In previous studies, students have identified the following elements that contribute to a SCLE: teamwork, positive staff morale, staff who have a positive attitude towards patient care, quality care, patient-centred care, and good role models (King *et al.*, 2017:49; O'Mara *et al.*, 2014:208). Healthcare students value being welcomed in the ward (Ford, Courtney-Pratt, Marlow, Cooper, Williams & Mason, 2016:99), being appreciated (Kilcullen, 2007:100; Papp *et al.*, 2003:265) and being recognised (Papp *et al.*, 2003:265). Quality supervision and good support in the ward are important to students (King *et al.*, 2017:49; O'Mara *et al.*, 2014:208). Supportive learning relationships contribute to the students' feeling of belonging to the team (Kilcullen, 2007:100; Papp *et al.*, 2003:265). Students who are supported in a positive way, support each other in the clinical environment. This reduces feelings of isolation and incompetence (King *et al.*, 2017:49).

Elements that contribute to an unsupportive CLE are rigid, hierarchical or poor protocols and guidelines, or even their absence. Other elements include clinical staff that are not aware of students' needs, their levels of competence or their learning outcomes (O'Mara *et al*., 2014:208). The attitude of clinical staff towards the students also plays an important role in the CLE (King *et al*., 2017:49). The complexity of the rich social and cultural diversity of hospitals are hard for outsiders to understand and difficult to change (King *et al.,* 2017:49). O'Mara *et al*. (2014:210) identified two main concerns in the CLE, namely the relationship with clinical staff and the students' ability to build these relationships, and the way in which learning occurs in the CLE.

Higher education institutions [HEI(s)], healthcare providers [HCP(s)] and students all play a role in clinical learning (Botma, Brysiwiecz, Chipps, Mthembu & Phillips, 2014:127-131). It is therefore logical to deduct that in addition to the physical environment, the staff from both institutions and the students themselves influence the learning atmosphere, and students' attitude toward learning and the support of students. This triad and the interactions between the triad partners complicate the process of clinical learning and creating and maintaining a SCLE. At present, there are no integrative reviews on SCLE strategies for undergraduate students in health sciences.

1.2 PROBLEM STATEMENT

The quality of the CLE impacts on students' functioning and learning in the clinical setting, as well as on the development of the different healthcare professions. Students spend a large amount of their time in the clinical setting, but the nature of clinical learning is not well defined (Dadgaran *et al.*, 2012:331).

Clinical learning or experiential learning is the process of learning work-related skills (Billings & Halstead, 2012:189) and is a crucial component of any healthcare profession curriculum. Clinical exposure and supervised clinical practice are required for licensure by all healthcare professions' governing bodies, including the SANC, AHPCSA and HPCSA (*Nursing Act 2005 c.2; Allied Health Professions Act 1982 c.2; Health Professions Act 1974 c.2*). SCLE(s) contribute to staff recruitment and retention. Hence, positive learning and work environments are not only necessary for training purposes, but also for staffing and organisational performance. However, various authors such as Botma and MacKenzie (2016:108), Poto (2016:103) and Xaba (2014:107) reported that students find the CLE abusive and unsupportive. The resulting question is therefore: "What strategies can be implemented to create and maintain a SCLE in various healthcare settings for undergraduate students in health sciences?"

1.3 AIM

The aim of the study is to critically synthesise the best available evidence describing strategies for a supportive clinical learning environment for undergraduate students in health sciences.

1.4 PARADIGMATIC PERSPECTIVE

The decisions that a person makes in life and in practice are determined by one's world view, which in turn influences the approach to answer the review question (Polit & Beck, 2017:9). Thomas Kuhn (1922-1996) defined paradigm as a set of beliefs that guides research. A paradigm defines what should be studied, which questions should be asked, how they should be asked and what rules should be followed, and it differentiates scientific communities (Polit & Beck, 2017:9; Botma *et al.*, 2010:39-40).

In this study the paradigm of pragmatism is used. The Oxford South African Concise Dictionary (2010:926) defines pragmatism as "an approach that evaluates theories or beliefs in terms of the success of their practical application". Pragmatism leads to diversity in research methods, which encourages multiple styles of inquiry that prefer practice and encourage a variety of understandings of world views (Polit & Beck, 2017:9; Pratt, 2016:509). In pragmatism, the review question drives the research and is more important than the methods used. Induction and deduction are encouraged in pragmatism (Polit & Beck, 2017:578).

The researcher supports the use of pragmatism in this study, because of its focus on what works in practice and on problem solving. The researcher is also interested in diversity in research, in practice and in world views. The review question will be used to make inductive and deductive conclusions.

Ontology, epistemology and research method are three philosophical assumptions on which research paradigms are based.

1.4.1 Ontology

Ontology is concerned with how one views the world. It is defined as a branch of philosophy dealing with the nature and characteristics of what is being studied. The questions asked will influence subsequent decisions made by the researcher (Polit & Beck, 2017:9; Botma *et al.,* 2010:40).

The researcher understands that we live in a physical world which is influenced by social and psychological interactions. The focus of this review is on reality. The clinical environment is a physical environment that is influenced by several factors. The inclusion and exclusion criteria applicable to this study are clearly stated in the research methods.

1.4.2 Epistemology

Epistemology has to do with what it means to know and deals with the nature of knowing. The focus is more on the format of knowledge than on its content. Epistemology refers to methods, theories, concepts, rules and procedures that are used in a research project and looks at the relationship between the researcher and those being researched (Polit & Beck, 2017:9, Neuman, 2014:93; Botma *et al.*, 2010:40).

The researcher will extract information from literature that focusses on the CLE where healthcare students are supposed to integrate their knowledge into practice-based learning. The focus is on the CLE, and a specific question will guide the process.

1.4.3 Research method

The research method refers to how the research will be done. Research methods includes rules, methods, approaches and policies that the researcher needs to follow to conduct the study (Polit & Beck, 2017:10; Neuman, 2014:14; Botma *et al.*, 2010:41).

The researcher believes that an integrative review is the most appropriate way to answer the review question and to analyse existing literature regarding the CLE. The researcher will use the five stages as presented by Whittemore and Knafl (2005:548-552) in the execution of the integrative review.

1.5 RESEARCH DESIGN

The research design refers to the map of how the review question, aims and objectives of the study will be answered (Polit & Beck, 2017:56; Moule & Goodman, 2009:168). The design chosen for this study is an integrative review, as it is descriptive in nature. An integrative review is a review based on the best evidence synthesised from multiple studies to answer a clearly formulated question (Polit & Beck, 2017:43; Botma *et al.*, 2010:241; Moule & Goodman, 2009:249). The integrative review includes evidence from studies with a range of designs that will result in a comprehensive synthesis of available literature, and could assist in creating new knowledge and perspectives regarding the strategies used to create and maintain a SCLE for undergraduate students in health sciences.

1.6 RESEARCH METHOD AND DATA COLLECTION

In this review the researcher makes use of the five stages as stated by Whittemore and Knafl (2005:548-552), and a brief description of each stage follows. Figure 1.1 illustrates the five stages.

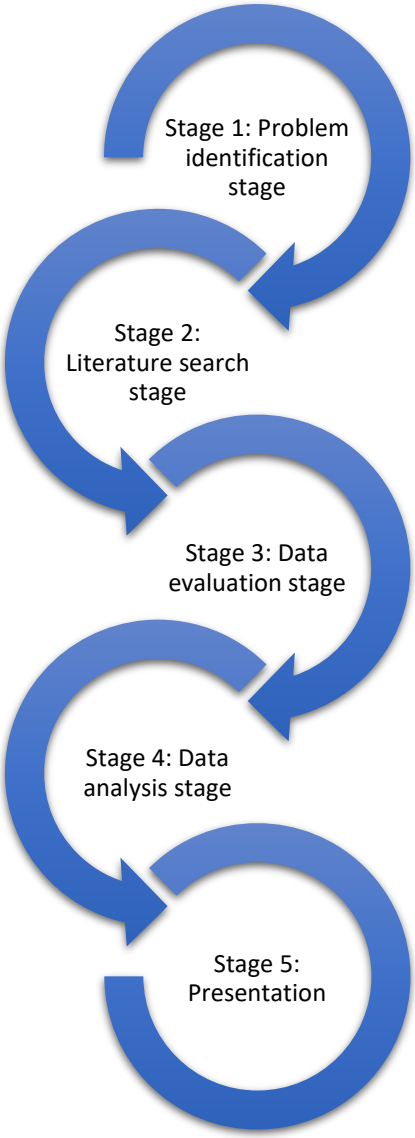

FIGURE 1.1: Adapted summary of the stages followed in an integrative review (Whittemore & Knafl, 2005:548-552)

1.6.1 Stage 1 – Problem identification stage

The question guiding the integrative review must be of such a nature that it can be searched and answered (Whittemore & Knafl, 2005:549). The PICO (Population, Intervention, Comparative intervention and Outcome) format is mostly used in integrative reviews and assists the researcher in framing the review question (Polit & Beck, 2017:33; Moule & Goodman, 2009:254). Table 1.1 presents the application of the PICO format used in this integrative review to frame the review question.

TABLE 1.1: Application of the PICO format

Acronym	Description	Review question
P	Population	Undergraduate students in health sciences
I	Intervention	Strategies to create or maintain a supportive clinical learning environment
C	Comparative intervention	None
O	Outcome	A supportive clinical learning environment

The review question will therefore be: “What strategies can be implemented to create and maintain a SCLE in various healthcare settings for undergraduate students in health sciences?”

1.6.2 Stage 2 – Literature search stage

Searching the literature will entail the following: selecting inclusion and exclusion criteria, relevant search words and data sources. The identified literature was then filtered against the inclusion and exclusion criteria and well-defined review question to identify the relevant studies in order to answer the review question.

1.6.2.1 Inclusion criteria

The inclusion criteria will be studies:

- On undergraduate students in health sciences
- That promote a SCLE
- Of various methodologies
- From the year 2000 to 2018
- In various languages with abstracts in English

1.6.2.2 Exclusion criteria

The exclusion criteria will be studies:

- On transfer of learning in simulation and high-fidelity simulation
- On the transfer of learning in the classroom
- Before the year 2000, because the disease profile in the world started changing with the increase of HIV/AIDS. The focus of healthcare in the world moved to primary healthcare.

1.6.2.3 Search words/strings

The search string to be used in the electronic database search are indicated in Table 1.2.

TABLE 1.2: Search string used in the electronic database search

Population	(Undergrad* or student* or baccalaureate*) and (“health science*” or medic* or “health profession*” or nurs* or “occupational therap*” or physio* or “physical therap*” or dentist* or optom* or “speech therap*” or biokinetic* or pharmac* or radiograph* or diet* or nutrition*) **AND**
Intervention	(interven* or support* or assist* or facilitat*) **AND** (plan or plans or planning or strateg* or policy or policies or approach* or action* or standards or standard or guideline* or "best practice*") **AND**
Comparative interventions	None
Outcome	(teamwork* or “quality care” or “practice guideline*” or “good communication” or “supportive relationship*” or “learning outcome*” or self-direct* or metacognit* or “critical thinking” or “clinical reason*” or “staff attitude*” or “staff morale” or “interprofessional relationship*” or “transfer climate*” or “professional standard*” or “organisation* climate*” or “organization* climate*” or “practice placement” or “experiential learning” or “work integrated learning” or “clinical learning environment*” or “clinical setting*” or (nurs* n2 competen*) or ((theor* and clinical) n2 integrat*))

Table 1.3 indicates the search string that will be used in the Google Scholar search. Fewer keyword synonyms will be used because Google Scholar cannot accommodate lengthy search strings.

TABLE 1.3: Search string used in Google Scholar search

Population	"undergraduate students in health sciences" **AND**
Intervention	"strategies" **AND**
Comparative interventions	None **AND**
Outcome	"supportive clinical learning environment"; -classroom; -climate change; -simulation

1.6.2.4 Data sources

The researcher will use various sources of data such as electronic databases and grey literature and will search through the reference lists of included studies, in order to identify relevant studies. A health sciences librarian at the University of the Free State will assist in the electronic database search. A number of databases on the EBSCOHost platform will be used to search for information, as well as Google Scholar.

1.6.2.5 Filtering process

The relevant studies will be filtered in four steps, namely 1) removing duplicate studies, 2) filtering the title, 3) filtering the abstract, and 4) assessing the full text against the well-defined review question based on the title of the research, as well as the inclusion and exclusion criteria. This filtering process will be conducted by the researcher and the supervisor.

1.6.3 Stage 3 – Data evaluation stage

In this stage, the quality of the chosen studies must be assessed (Moule & Goodman, 2009:256). The researcher will use tools specific to the research design of each selected study.

The researcher, supervisor, co-supervisor and a senior reviewer will conduct the critical evaluation of the studies. Consensus discussion will be held regarding the inclusion or exclusion of the evaluated studies. Data extraction will then follow.

The Centre for Reviews and Dissemination (2009:28) describes data extraction as "the process by which researchers obtain the necessary information about study findings from the included studies." In this stage all the relevant findings which meet the selection criteria, will be combined to form the body of evidence, in order to answer the review question.

1.6.4 Stage 4 – Data analysis stage

The data from the reviewed studies will be critically synthesised. Thematic analysis is the most common form of analysis used in synthesis in an integrative review. The thematic analysis process will identify themes from the findings. The process that will be followed is: data reduction, data display, data comparison, conclusion drawing and verification (Whittemore & Knafl, 2005:552). Figure 1.2 displays the data analysis process. Data analysis will be carried out by the researcher, supervisor and co-supervisor, which increases the credibility of the study.

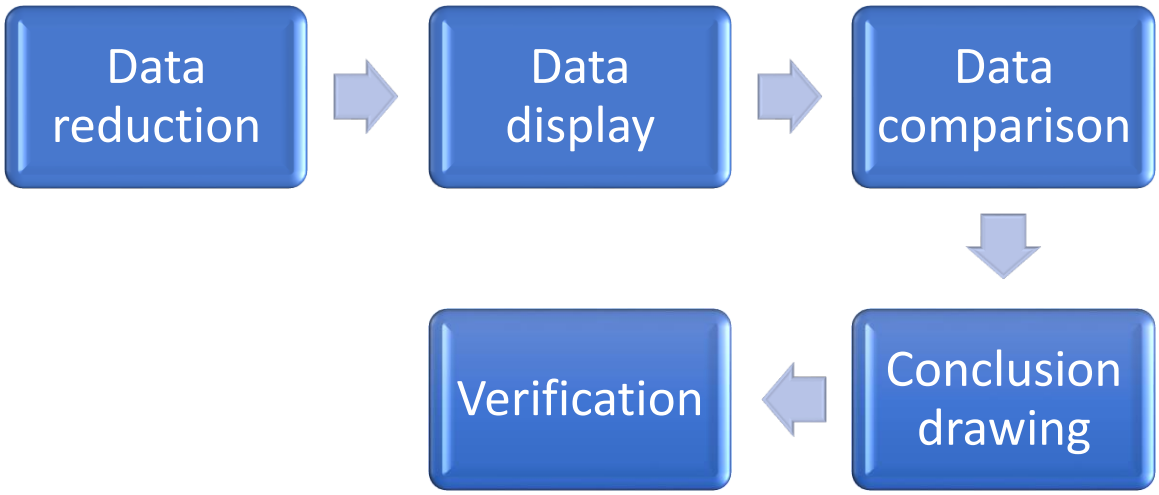

FIGURE 1.2: **Adapted summary of the process followed to analyse the data (Whittemore & Knafl, 2005:550-552)**

1.6.5 Stage 5 – Presentation

According to Whittemore and Knafl (2005:552), the conclusions of the integrative review can be reported in the form of tables, figures or diagrams. Tables, figures and diagrams will be used to display data throughout the review. The researcher will provide details from primary sources, and conclusions will be supported by evidence to prevent the conclusions from exceeding the evidence.

1.7 RIGOUR

The study will uphold the criteria of truth value, applicability, consistency, neutrality and authenticity (Botma *et al.,* 2010:233-234; Moule & Goodman, 2009:132).

1.7.1 Truth value

Truth value determines whether the researcher has established confidence in the truth of the findings and the context in which the research was undertaken (Botma *et al.*, 2010:233; Moule & Goodman, 2009:132). The researcher will aim for this objective by being disciplined and following the tightly controlled steps in the process of an integrative review. The researcher will conduct the review in detail and with strict accuracy.

1.7.2 Applicability

Applicability refers to the degree to which the research can be applied to different groups and in different contexts (Polit & Beck, 2017:164; Botma *et al.*, 2010:233). The findings of this review can be applied to healthcare students, HEI(s), HCP(s) and society in general.

1.7.3 Consistency

Consistency refers to whether the findings will be consistent if the study was run again (Polit & Beck, 2017:164; Botma *et al*., 2010:233). A record will be kept for the duration

of the study regarding the inclusion and exclusion criteria, relevant search words/strings, search platforms, databases, and the filtering process of the studies. A record will also be kept regarding the evaluation, analysis and interpretation of data and the maintenance of the research records. This will enable the study to be duplicated. The researcher will give a detailed description of the research method.

1.7.4 Neutrality

Neutrality indicates freedom from bias both during the research process and in the description of the results. The findings should be solely based on the information and the conditions of the research and not on biases, motives or perspectives (Polit & Beck, 2017: 161-162; Botma *et al.,* 2010:233). The researcher will follow the tightly controlled steps in the process of the integrative review.

1.7.5 Authenticity

Authenticity refers to the extent to which the researcher fairly and faithfully presents a range of different realities (Polit & Beck, 2017:161; Botma *et al*., 2010:234). The selected studies were analysed by the researcher, supervisor and co-supervisor. The supervisor and co-supervisor have experience in integrative reviews and different methods of research.

1.8 ETHICAL CONSIDERATIONS

Ethics comprise the moral principles that directs a person's conduct. It should be visible throughout the whole research process (Neuman, 2014:143; Botma *et al*. 2010:4). Ethics approval will be obtained from the University of the Free State's Health Science Research Ethics Committee (HSREC) prior to the commencement of the integrative review (see Addendum A). The study will uphold the ethical principles of veracity, justice, non-maleficence and beneficence.

1.8.1 Veracity

This refers to “telling the truth” (Pera & Van Tonder, 2013:333; Botma *et al*., 2010:26; Moule & Goodman, 2009:57). The researcher has the responsibility to conduct and report research ethically and honestly (Polit & Beck, 2017:153-154). As far as possible, all existing research on the topic will be included in the review. Honesty and integrity will be reinforced by documenting the entire process of information searching, the elimination process and the critical evaluation process.

According to Botma *et al.* (2010:277), ethical research implies that the researcher should respect the intellectual work of other researchers, and that the researcher should guard against plagiarism. The researcher will respect the intellectual property of other authors by citing their work and guarding against plagiarism. Plagiarism will be prevented by ensuring that all referencing is done accurately in order for the research to be traceable and reproducible.

The researcher will take responsibility for the effective use of fiscal and material resources, and will ensure that financial assistance is not used for any other purpose than that of the research.

1.8.2 Justice

The studies included in this review will be selected based on predetermined inclusion and exclusion criteria. All sources have an equal chance to be selected (Polit & Beck, 2017:141; Department of Health, 2015:14; Steneck *et al*., 2010:Online; Moule & Goodman, 2009:57).
Articles and studies from other researchers, which are publicly known, will be used to generate data. This will be kept safely by storing information on paper and on memory sticks in a locked, fireproof cabinet. The electronically kept data will be password protected. It will also be protected by a firewall, and be kept safe from viruses and spyware. The information will be kept for five years.

1.8.3 Non-maleficence

The principle of "doing no harm" will be followed throughout the research process. The researcher will try, as far as possible, to prevent social and economic harm (Polit & Beck, 2017:139; Department of Health, 2015:14; Steneck *et al*., 2010:Online; Moule & Goodman, 2009:57). No harm is foreseen as the researcher will only use previously published articles and studies of other researchers.

1.8.4 Beneficence

The intent of the research is to benefit healthcare students, the HEI, the HCP and society in general, and to minimise harm (Polit & Beck, 2017:139; Department of Health, 2015:14; Botma *et al*., 2010:21; Moule & Goodman, 2009:57). A sound research design will be followed, and the researcher will be assisted by the supervisor, co-supervisor and senior reviewer from the University of the Free State. These researchers will assist with the identification of relevant literature, the critical evaluation of research, the data extraction and the data analysis.

1.9 DELINEATION OF THE STUDY REPORT

A layout of the study report is provided in Table 1.4.

TABLE 1.4: Layout of the study report

Chapter	Brief description	Addendum
Chapter 1 Overview of the study	This chapter gives a brief overview of the background, the problem statement, the review question and the aim of the study. The paradigmatic perspective of the study is described. An overview of the research design and research method is provided. The chapter is concluded by a description of the principles of rigour and ethical considerations applied in the review.	Addendum A: Ethics approval
Chapter 2 Research method	In this chapter the first three stages of the integrative review are discussed: Stage 1: Problem identification Stage 2: Literature search Stage 3: Data evaluation	Addendum B: Critical evaluation and data extraction of included studies
Chapter 3 Analysis and synthesis	In this chapter the fourth stage of the integrative review is discussed: Stage 4: Data analysis	Addendum C: Mixed methods appraisal tool version 2018

	Five steps were followed in data analysis. The first three steps were discussed in this chapter: Step 1: Data reduction Step 2: Data display Step 3: Data comparison	(Hong, Pluye, Fàbregues, Bartlett, Boardman, Cargo, Dagenais, Gagnon, Griffiths, Nicolau, O'Cathain, Rosseau & Vedel, 2018:1) Addendum D: Checklist for quasi-experimental studies (non-randomised experimental studies) (Tufanaru, Munn, Aromataris, Campbell & Hopp, 2017:Online) Addendum E: Critical Appraisal Skills Programme (CASP) checklist for qualitative research (Critical Appraisal Skills Programme, 2018a:Online) Addendum F: CASP checklist for systematic review (Critical Appraisal Skills Programme, 2018b:1), as appropriate.
Chapter 4 Conclusion, recommendations and limitations	In this chapter the last two steps of the data analysis stage are discussed, as well as the last stage of the integrative review: Step 4: Conclusion drawing Step 5: Verification Stage 5: Presentation	

1.10 CONCLUSION

This chapter provided a brief overview of the integrative review. It also provided a summary of the manner in which the integrative review will be conducted. The background gave a brief overview of the CLE and this led to the problem statement, the aim of the review and the review question. The researcher gave a brief description of the paradigmatic perspectives and a concise summary of the research method of the integrative review. The criteria used to uphold rigour and ethical principles were discussed.

The research method of the integrative review will be discussed in detail in the next chapter.

CHAPTER 2

Research method

2.1 INTRODUCTION

In the previous chapter, a brief overview of the research study was presented. In this chapter, the researcher will discuss the integrative review as a research method. This will be followed by a discussion of the first three stages of the integrative review, which relate to problem identification, the literature search and data evaluation. The measures taken to ensure rigour in each step will also be described.

2.2 INTEGRATIVE REVIEW AS RESEARCH METHOD

It is a challenge for healthcare professionals and academics to have an accurate and current understanding of the information relevant to his/her area of expertise and/or research due to the increased amount of available literature. However, they need to keep up to date with the most recent innovations and research to make the best decisions (Russell, 2005:8). Furthermore, not all literature published is of a high standard in terms of research method, adequate sample size and good statistical analysis. Individuals also do not always have the time or the necessary skills to identify, critically evaluate and summarise the vast amount of literature available in order to make the best decisions (De Souza, Da Silva & De Carvalho, 2010:102; Evans, 2007:137; Akobeng, 2005a:837; Whittemore & Knafl, 2005:546-547). Reviews of literature are done to identify, critically evaluate and summarise this vast amount of information.

Most of the reviews of research literature focus on randomised controlled trials [RCT(s)] (Evans, 2007:137). There has been a growing interest in methods to identify, evaluate and integrate the findings on a range of different types of research. More concise methods were needed to synthesise knowledge and to make the results of significant studies, where diverse research methods were used, available (Soares,

Hoga, Peduzzi, Sangaleti, Yonekura & Silva, 2014:Online; De Souza *et al.,* 2010:102; Whittemore & Knafl, 2005:546-547). The integrative review was identified as a review method where different types of research methods could be included in the research process.

Several terms are loosely associated with an integrative review (Russell, 2005:8). These terms include literature reviews, systematic reviews and realist reviews. Each one of these reviews, however, has its own specific purpose, sampling frame, definition and analysis type (Whittemore & Knafl, 2005:547). An integrative review is defined as "one in which past research is summarised by drawing overall conclusions from many studies" (Russell, 2005:8). The integrative review was chosen for this study, because of the varied sampling frame and the potential to combine complex concepts and theories. It is the broadest class of research reviews and includes theoretical, experimental and non-experimental research, which is used to answer the review question (Evans, 2007:137; Whittemore & Knafl, 2005:548). The researcher capitalised on the strengths of this research method.

2.3 STRENGTHS OF THE INTEGRATIVE REVIEW

The strengths of the integrative review are as follows:

- A well conducted integrative review represents current research and includes experimental and non-experimental research for a more comprehensive insight into the problem (Bandara, Furtmueller, Gorbacheva, Miskon & Beekhuyzen, 2015:156; Soares *et al.,* 2014:Online; Crossetti, 2012:12-13; De Souza *et al.,* 2010:102; Evans, 2007:137, Russell, 2005:8, Torraco, 2005:356; Whittemore & Knafl, 2005:547). Therefore, an integrative review aims to enhance the understanding of the phenomena or problem being studied in order to answer a specific review question (Bandara *et al*., 2015:156; Soares *et al*., 2014:Online; Crossetti, 2012:12-13; De Souza *et al.,* 2010:102; Evans, 2007:137, Torraco, 2005:356; Whittemore & Knafl, 2005:547).

- Provides clear and thorough methods of analysis and synthesis. It is characterised by replication, clarity, transparency and scientific rigour (Soares

et al., 2014:Online; Crossetti, 2012:12; De Souza *et al.,* 2010:102; Whittemore & Knafl, 2005:547). Methodological rigour in this study was enhanced by the critical evaluation being conducted by the researcher, the supervisor, co-supervisor and a senior reviewer in the form of a round table consensus discussion. The supervisor, co-supervisor and a senior reviewer have expertise in different fields and methodologies, and experience in doing integrative reviews. Critical information regarding the research process is clearly presented in tables.

- Can identify where evidence in research is still lacking and make recommendations on how to close those gaps (Soares *et al.,* 2014:Online; Crossetti, 2012:12). The need for future research can be identified while interpreting the results (Soares *et al*., 2014:Online ; Evans, 2007:139; Russell, 2005:8).

- Reduces the time and expertise it would take to locate, evaluate and synthesise individual studies (Bettany-Saltikov, 2012:8). The review evaluates the strength of the scientific evidence. It can identify central issues and build a bridge between related areas of research. It can also identify which research methods had been most successful (Russell, 2005:8).

- Develops the researcher in different ways. Through the course of this study the researcher learned how to apply the steps of the integrative review, and this developed the researcher's critical thinking skills. A broader range of research methods, such as quantitative, qualitative and mixed method studies, were explored and the researcher will be able to apply this knowledge to future independent research.

The researcher is aware of the fact that the integrative review has inherent weaknesses. These weaknesses and measures to counteract it, will be discussed next.

2.4 WEAKNESSES OF THE INTEGRATIVE REVIEW

The weaknesses include:

- The inclusion of studies with different methodologies makes an integrative review complex and this can lead to a lack of rigour, lack of consistency, inaccuracy and bias (Soares *et al*., 2014: Online; Whittemore & Knafl, 2005:547). In order to counteract this weakness, the researcher, the supervisor, co-supervisor and a senior reviewer, conducted the critical evaluation in the form of a round table consensus.

- Systematic bias and errors can occur at any stage of the research process if specific and systematic steps are not followed throughout (Whittemore & Knafl, 2005:548). Consequently, conclusions may be drawn prematurely or based on weak evidence (Soares *et al.,* 2014: Online). The researcher, supervisor, co-supervisor and a senior reviewer were involved during different stages of the review in order to reduce systematic bias and errors.

- An absence of consistent focus can influence the quality and strength of the evidence of the included studies (Soares *et al*., 2014:Online). This can lead to a lack of coherence in the organisation of the results applicable to the review question (Soares *et al.*, 2014:Online). The researcher, the supervisor and co-supervisor monitored the process in order to ensure a high level of quality and strength in the organisation of the results.

2.5 METHODOLOGICAL STAGES OF THE INTEGRATIVE REVIEW

The researcher, supervisor, co-supervisor and a senior reviewer approached the process of conducting the integrative review with the same scientific rigour as when conducting a primary study, hence they meticulously followed the five stages suggested by Whittemore and Knafl (2005:548-552). Figure 2.1 illustrates the stages that the researcher followed. The next section will include a detailed discussion of the first three stages.

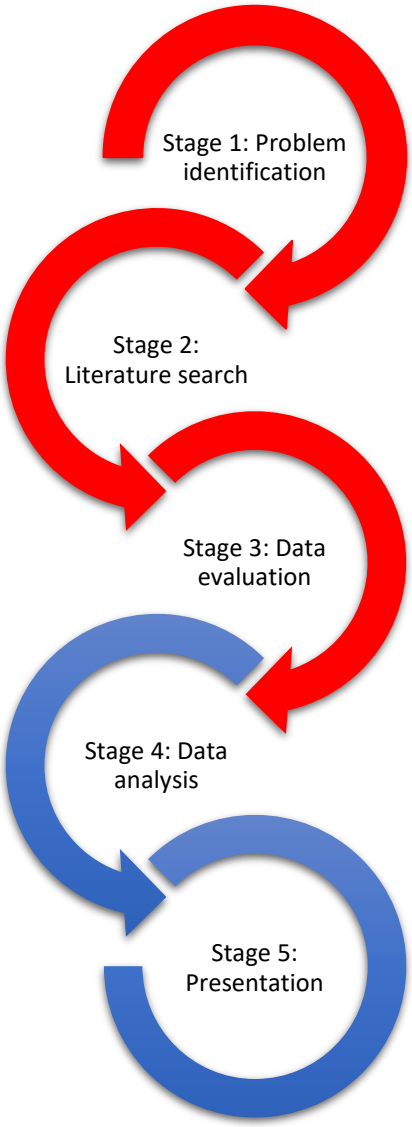

FIGURE 2.1: Adapted summary of the stages followed in an integrative review (Whittemore & Knafl, 2005:548-552)

2.5.1 Stage 1 – Problem identification

The researcher began the review by defining the problem under study, the review question and the aim in order to focus the integrative review. The aim of the study was to critically synthesise the best available evidence describing strategies for a supportive clinical learning environment for undergraduate students in health sciences. The identified problem was translated into an answerable question that was well formulated, clear and focused. Table 2.1 presents the application of the PICO format used in this integrative review to frame the review question (Polit & Beck,

2017:33; Hagen-Zanker & Mallet, 2013:7; Moule & Goodman, 2009:254; Akobeng, 2005a:838).

TABLE 2.1: Application of the PICO format

Acronym	Description	Review question
P	Population	Undergraduate students in health sciences
I	Intervention	Strategies to create or maintain a supportive clinical learning environment
C	Comparative intervention	None
O	Outcome	A supportive clinical learning environment

The review question therefore is: “What strategies can be implemented to create and maintain a SCLE in various healthcare settings for undergraduate students in health sciences?”

2.5.2 Stage 2 – Literature search

A well-defined literature search strategy is important in an integrative review because it increases the rigour and decreases bias. Ideally, all relevant literature on the topic or problem of interest should be included in the sample (Crossetti, 2012:12; Callahan, 2010:301; Evans, 2007:141; Whittemore & Knafl, 2005:548). The search for literature can include searches on computerised databases, searching for relevant articles from reference lists, journal hand searching, networking and searching on research registries (Whittemore & Knafl, 2005:549).

2.5.2.1 Scoping search

The researcher and the health sciences librarian at the University of the Free State did a scoping search that revealed that literature was available on the topic. The researcher added keywords of relevant articles to the Boolean search string.

2.5.2.2 Literature search

The literature search included the identification of inclusion and exclusion criteria, relevant search words/strings and data resources. The search process was well documented.

2.5.2.2.1 Inclusion criteria

The inclusion criteria were studies:

- On undergraduate students in health sciences
- That promote a SCLE
- Of various methodologies
- From the year 2000 to 2018
- In various languages with abstracts in English

2.5.2.2.2 Exclusion criteria

The exclusion criteria were studies:

- On transfer of learning in simulation and high-fidelity simulation
- On the transfer of learning in the classroom
- Before the year 2000, because the disease profile in the world started changing with the increase of HIV/AIDS. The focus of healthcare in the world moved to primary healthcare.

2.5.2.2.3 Search words/strings

The researcher broke the review question down into PICO as illustrated in Table 2.1. In order to include all healthcare students, the concept was further broken down into specific healthcare disciplines, for example occupational therapy, dentistry, medical practitioners, nursing, physiotherapy, dietetics, pharmacy, radiography, biokinetics, optometry and speech therapy. Table 2.2 indicates the search string used in the electronic database search.

TABLE 2.2: Search string used in the electronic database search

Population	(Undergrad* or student* or baccalaureate*) and (“health science*” or medic* or “health profession*” or nurs* or “occupational therap*” or physio* or “physical therap*” or dentist* or optom* or “speech therap*” or biokinetic* or pharmac* or radiograph* or diet* or nutrition*) **AND**
Intervention	(interven* or support* or assist* or facilitat*) **AND** (plan or plans or planning or strateg* or policy or policies or approach* or action* or standards or standard or guideline* or "best practice*") **AND**
Comparative intervention	None
Outcome measures	(teamwork* or “quality care” or “practice guideline*” or “good communication” or “supportive relationship*” or “learning outcome*” or self-direct* or metacognit* or “critical thinking” or “clinical reason*” or “staff attitude*” or “staff morale” or “interprofessional relationship*” or “transfer climate*” or “professional standard*” or “organisation* climate*” or “organization* climate*” or “practice placement” or “experiential learning” or “work integrated learning” or “clinical learning environment*” or “clinical setting*” or (nurs* n2 competen*) or ((theor* and clinical) n2 integrat*))

The area allowed for search strings on Google Scholar was too limited to allow for the search strings used for EBSCOHost as indicated in Table 2.2. Table 2.3 provides the search string used for the Google Scholar search. The search for grey literature was included in the Google Scholar search.

TABLE 2.3: Search string used in Google Scholar search

Population	“undergraduate students in health sciences” **AND**
Intervention	“strategies” **AND**
Comparative intervention	None **AND**
Outcome measures	“supportive clinical learning environment”; -classroom; -climate change; -simulation

2.5.2.2.4 Data sources

The researcher used electronic platforms, grey literature and searched through reference lists of included studies, in order to identify relevant studies. Table 2.4 provides a breakdown of the total number of search results yielded per database to identify sources. The EBSCOHost search delivered 269 possible sources. Google Scholar was also searched and delivered 231 possible sources. These platforms, databases or combination of databases were chosen based on their accessibility and comprehensiveness.

TABLE 2.4: Electronic platforms and data bases used to identify sources

Platform	Data bases	Number of abstracts obtained
EBSCOHost National and international journal articles	MEDLINE with Full Text	70
	CINAHL with Full Text	58
	Academic Search Ultimate	42
	PsycINFO	40
	Health Source: Nursing/Academic Edition	23
	ERIC	14
	Africa-Wide Information	7
	OpenDissertations	4
	CAB Abstracts	4
	MasterFILE Premier	2
	SocINDEX with Full Text	2
	SPORTDiscus with Full Text	2
	PsycARTICLES	1
Google Scholar International search engine of journal articles and grey literature		231
Total		**500**

2.5.2.3 Filtering process

Figure 2.2 reflects the searching and filtering process leading to the selection of eligible studies. The studies were filtered in four steps, as illustrated by the PRISMA flowchart, namely: 1) removing duplicate studies, 2) filtering the title, 3) filtering the

abstract and 4) assessing the full text against the well-defined review question based on the title of the research, as well as the inclusion and exclusion criteria.

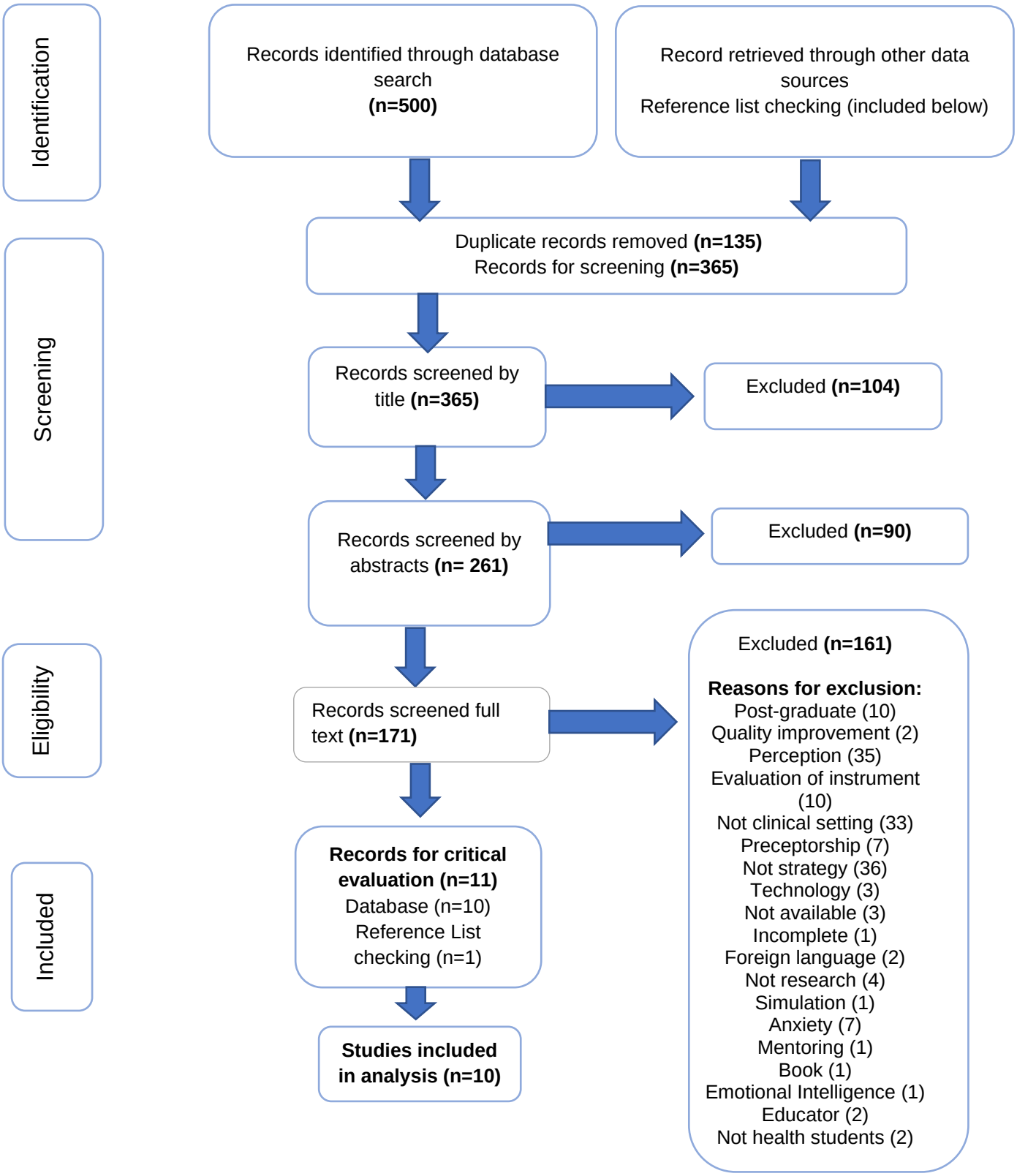

FIGURE 2.2: **Summary of the process followed during sifting of articles (Adapted from Prisma flow chart [Moher, Liberati, Tetzlaff & Altman, 2009:Online])**

The search on EBSCOHost delivered 269 studies and the Google Scholar search delivered 231 studies, with a total of 500 studies collected in the electronic search. Firstly, a total of 135 studies were removed, as they were duplicate studies. Duplicate studies in this research refer to the exact same studies that were found on the different databases. It was not possible to remove these studies electronically as the platform did not allow for this function.

The studies were secondly screened according to title. During the second step, 104 studies were excluded, because they were either irrelevant to this study or did not meet one or more of the inclusion criteria.

The third step was to screen the abstracts of the selected studies against the set criteria. Ninety studies were excluded based on an evaluation of the abstracts. Excluded studies did not meet the set inclusion criteria or were irrelevant to this study.

The fourth step comprised the screening of the remaining 171 full-length articles. Of these, 161 were excluded.

The researcher checked the reference lists of the remaining studies and one was eventually included in the final list of studies for critical evaluation.

Eleven studies were therefore ultimately included for critical evaluation (10 from electronic sources and 1 from the reference lists). This filtering process was conducted by the researcher and supervisor.

2.5.3 Stage 3 – Data evaluation

The third stage entailed the evaluation of the 11 studies. The process of evaluating the quality of published articles is complex (Moule & Goodman, 2009:256; Evans, 2007:142; Whittemore & Knafl, 2005:549). The complexity of this process increases when sources with a variety of research methods are included in the integrative review (Whittemore & Knafl, 2005:549).

The researcher, the supervisor, co-supervisor and a senior reviewer conducted the critical evaluation. This was done in the form of a round table consensus discussion. Hong *et al.* (2018:1) discourage the calculation of an overall score from the ratings of the different criteria, as suggested by other authors. They advise that a more detailed presentation of each criterion's ratings allows for a more comprehensive decision on the quality of the study (Hong et al., 2018:1). The researcher, the supervisor, co-supervisor and a senior reviewer agreed to adopt this perspective, so an overall rating for each study was not done. Criteria considered during data evaluation included: clear research questions, representation of the target population, collected data that address the research question, the appropriateness of the method answering the research question, appropriateness of collection methods, adequate findings derived from collected data, substantiation of findings by data, generalisability and validity. Studies of low quality were included in the review, as the Mixed Methods Appraisal Tool (MMAT) (*Hong et al.,* 2018:1) discourages the exclusion of studies with low methodological quality.

The included studies were methodologically heterogeneous. Methodological heterogeneity may influence the rigour of the study (Soares *et al.,* 2014:Online; Whittemore & Knafl, 2005:547). Therefore, the researcher, supervisor, co-supervisor and senior reviewer used evaluation tools specific to the research design of each study. The following evaluation tools were used:

- MMAT version 2018 (Hong *et al*., 2018:1)
- Checklist for quasi-experimental studies (non-randomised experimental studies) (Tufanaru *et al*., 2017:Online)
- Critical Appraisal Skills Programme (CASP) checklist for qualitative research (Critical Appraisal Skills Programme, 2018a:Online)
- CASP checklist for systematic review (Critical Appraisal Skills Programme, 2018b:1), as appropriate.

One study was excluded and 10 studies were included. Table 2.5 provides a summary of the bibliographic information of the included studies in alphabetical order of first author. The excluded study had a mixed methods design. The reasons for exclusion were that the research question was not clear and the abstract and the study aim were

inconsistent (Newton, Jolly, Ockerby & Cross, 2012:2331). Table 2.6 provides information regarding the excluded study.

TABLE 2.5: Bibliographic information of included studies

Author	Year	Title	Country	Design
Bourgeois, S., Drayton, N. & Brown, A.	2011	An innovative model of supportive clinical teaching and learning for undergraduate nursing students: The Cluster model (CM).	Australia	Qualitative research
Carey, M.C., Chick, A., Kent, B. & Latour, J.M.	2018	An exploration of Peer-assisted learning (PAL) in undergraduate nursing students in paediatric clinical settings: An ethnographic study.	United Kingdom	Qualitative ethnographic study using non-participant observations
Crawford, R., Jasonsmith, A., Leuchars, D., Naidu, A., Pool, L., Tosswill, L., Trezise, K. & Wordsworth, A.	2018	"Feeling part of a team" a mixed method evaluation of a Dedicated education unit (DEU) pilot programme.	New Zealand	Mixed method descriptive evaluation design
Croxon, L. & Maginnis, C.	2009	Evaluation of clinical teaching models for nursing practice.	Australia	Mixed method approach
Henderson, A., Twentyman, M., Eaton, E., Creedy, D., Stapleton, P. & Lloyd, B.	2009	Creating supportive clinical learning environments (SCLE): an intervention study.	Australia	Quasi experimental design
Jokelainen, M., Turunen, H., Tossavainen, K., Jamookeeah, D. & Coco, K.	2011	A systematic review of mentoring nursing students in clinical placements.	United Kingdom, Australia, Scotland, Hong Kong, Finland, Ireland	Systematic review
Newton, J.M., Cross, W.M., White, K., Ockerby, C. & Billet, S.	2014	Outcomes of a clinical partnership model (CPM) for undergraduate nursing students.	Australia	Longitudinal design using a mixed method approach
Roxburgh, M., Bradley, P. & Lauder, W.	2011	The development, implementation and evaluation of demonstration projects of new approaches to providing practice placements in the pre registration nursing programmes: Contemporising practice placements for undergraduate student nurses: Are 'hub and spoke' models the future?	Scotland	Multi method approach
Williamson, G.R., Callaghan, L., Whittlesea, E.,	2011	Longitudinal evaluation of the impact of Placement development teams [PDT(s)]	United Kingdom	Longitudinal qualitative research

Mutton, L. & Heath, V.		on student support in clinical practice.		
Zentz, S.E., Kurtz, C.P. & Alverson, E.M.	2014	Undergraduate Peer-assisted learning (PAL) in the clinical setting.	United States of America	Descriptive Multi-method

TABLE 2.6: Bibliographic information of excluded studies

Author	Year	Title	Country	Design
Newton, J.M., Jolly, B.C., Ockerby, M & Cross W.M.	2012	Student centredness in clinical learning: the influence of the clinical teacher.	Australia	Mixed method

The Centre for Reviews and Dissemination (2009:28) describes data extraction as "the process by which researchers obtain the necessary information about study findings from the included studies." Data extraction was carried out by the researcher, supervisor, co-supervisor and a senior reviewer in a round table consensus form. The researcher read through the articles and extracted all relevant findings. Addendum A provides the critical evaluation and data extraction of the included studies.

2.6 STEPS TAKEN TO ENSURE RIGOUR

The researcher has taken the following steps to ensure rigour:

2.6.1 Stage 1 – Problem identification

The researcher formulated a clearly defined question to lead the review. The PICO format was used to assist in framing the review question. The review question is: "What strategies can be implemented to create and maintain a SCLE in various healthcare settings for undergraduate students in health sciences?"

2.6.2 Stage 2 – Literature search

A health sciences librarian at the University of the Free State assisted the researcher in the literature search. Multiple data sources were used in the search. Clearly defined inclusion and exclusion criteria guided the search. All of these strategies were well documented during the process (Whittemore, 2007:151). The data selection process

was presented on the PRISMA flow chart. The filtering process was carried out by the researcher and the supervisor.

2.6.3 Stage 3 – Data evaluation

The process of evaluating the methodological quality of the studies were undertaken by the researcher, supervisor, co-supervisor and senior reviewer. The data evaluation was done in the form of a round table consensus process. The instruments used were specific to each type of research design.

Hong *et al.* (2018) discourage the calculation of an overall score from the ratings of the different criteria. They advise that a more detailed presentation of each criterion's ratings allows a more comprehensive decision on the quality of the study. The researcher, supervisor, co-supervisor and senior reviewer agreed to adopt this perspective, so an overall rating for each study was not made, as suggested by other authors.

Studies of low quality were included in the review, as the MMAT (Hong *et al*., 2018:1) discourages the exclusion of studies with low methodological quality.

2.7 CONCLUSION

This chapter aimed to provide an overview of the integrative review as a research method by reflecting on its background, strengths, weaknesses and characteristics. The first stage of the integrative review, namely problem identification, was explained, and emphasis was placed on the importance of a well-formulated review question that can focus the integrative review process. In stage two, the search strategy, the inclusion and exclusion criteria, the relevant search words/strings and data sources, were identified. In stage three, the data evaluation was discussed. During this stage the critical evaluation and data extraction of the studies were done. Ten studies, which are heterogeneous, were included for analysis, while one study was excluded. The next stage, namely data analysis, will be discussed in the next chapter.

CHAPTER 3

Analysis and synthesis

3.1 INTRODUCTION

The researcher strived to critically synthesise the best available evidence describing strategies for a SCLE for undergraduate students in health sciences. This review was guided by the following review question: “What strategies can be implemented to create and maintain a SCLE in various healthcare settings for undergraduate students in health sciences?”

The previous chapter provided a comprehensive discussion of the first three stages of the integrative review, namely problem identification, literature search and data evaluation. It concluded with the critical evaluation of 11 studies to determine their methodological quality. This chapter describes the next stage of the integrative review as illustrated in Figure 3.1, namely data analysis.

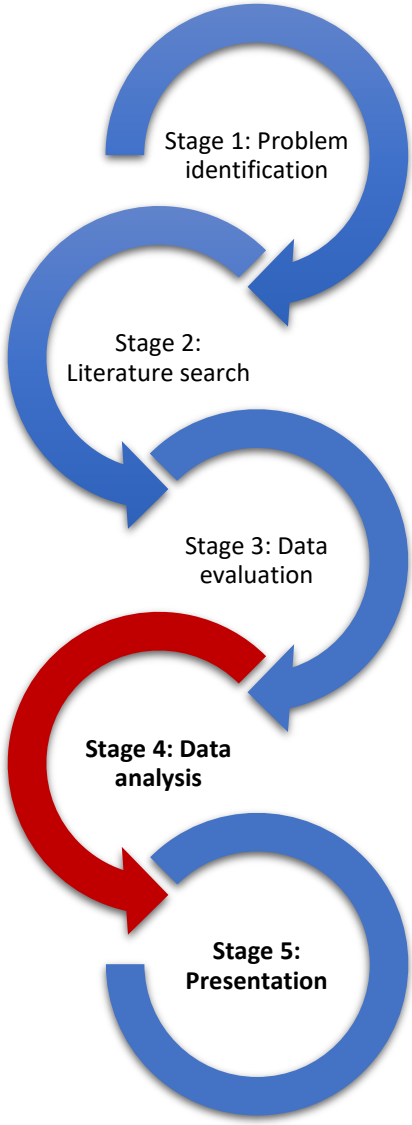

FIGURE 3.1: Adapted summary of the stages followed in the integrative review (Whittemore & Knafl, 2005:548-552)

The researcher followed the data analysis process as suggested by Whittemore and Knafl (2005:550-552). Figure 3.2 displays the data analysis process that consists of five steps, which include data reduction, data display, data comparison, conclusion drawing and verification. The first three steps will be discussed in this chapter.

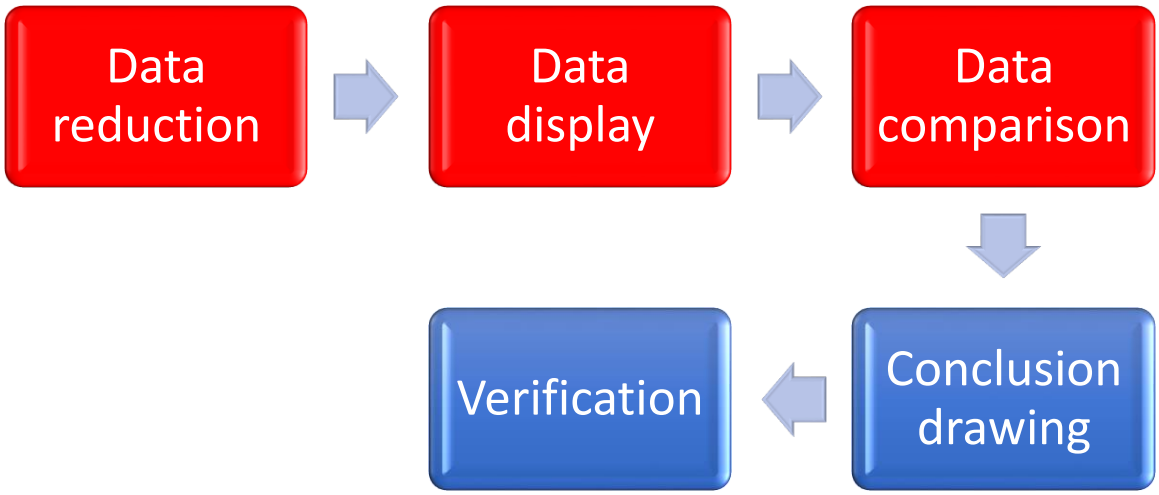

FIGURE 3.2: **Adapted summary of the process followed to analyse the data (Whittemore & Knafl, 2005:550-552)**

3.2 STAGE 4 – DATA ANALYSIS

A meta-analysis was not feasible, as the studies selected were heterogeneous, hence a thematic analysis was conducted. Table 3.1 indicates the different ways in which the strategies were implemented in the various studies, and the evidence of how each strategy contribute to a SCLE. During the data analysis stage, relevant findings were categorised and summarised in order to compile a thorough and unbiased integration and synthesis of the primary data.

TABLE 3.1: Summary of the outcomes of the review question of studies

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
Bourgeois, S., Drayton, N. & Brown, A. 2011. An innovative model of supportive clinical teaching and learning for undergraduate nursing students: The cluster model. *Nurse Education in Practice*, 11(2011):114-118. **Australia.**	Cluster model (CM)	The strategy was implemented in six wards in the Nepean Hospital in Sydney, Australia. The population for the study consisted of registered nurses [RN(s)] who worked in the six wards, and first, second and third year Bachelor of Nursing students from two university campuses, placed in the six wards. The RN(s) who were interested in participating were shortlisted and interviewed. They were selected based on their interest in clinical teaching, their clinical experience and qualifications, and the characteristics necessary for clinical teaching. An experienced RN was allocated as the clinical teacher to eight undergraduate students during their placement. The RN's role in the ward was taken over by another nursing staff member during student placement. Each ward had two to three clinical teachers who could rotate. Workshops were presented to the students.	**Belonging** Students were welcomed as part of the community and verbalised a sense of belonging that facilitated learning. **Practice support** The interaction between the clinical teacher and the clinical staff increased the clinical staff's interest in the students' learning needs. The clinical teacher was always available to assist them. **Professional development** The students believed that they contributed to the care of patients. Students felt that they had increased opportunities to practice under supervision. They could link theory and practice. **Self-development** Students were given opportunities to take responsibility for their practice. They felt more confident following their placement, and their time management improved. **Peer learning** Students supported each other by sharing their workload and discussing their experiences. They tried to find solutions to problems and issues together. The environment was less threatening when working in a group.
Carey, M.C., Chick, A., Kent, B. & Latour, J.M. 2018. An exploration of peer-assisted learning in undergraduate nursing students in paediatric clinical settings: An ethnographic study. *Nursing Education Today*, 65 (2018):212-217.	Peer-assisted learning (PAL)	The strategy was implemented in a range of inpatient paediatric clinical settings across two teaching hospitals located in one region in England. First, second and third year paediatric nursing students enrolled in a Bachelor of Nursing Programme, who were placed in inpatient paediatric clinical settings, participated in the study. Students at different year levels provided guidance to each other through active help. In the clinical settings, RN mentors were regularly updated about PAL during monthly mentor updates with university lecturers in order to assist students.	**Development of learning** Peers supported each other through informal teaching by giving advice and guidance. Peer pairs discussed and reinforced their understanding of various tasks through questioning. Students planned clinical and academic assessments together. **Development of clinical practice and delivery of care** Peer interactions assisted with the development of students' clinical practice through sharing learning experiences of providing care to patients in order to aid their understanding, develop their learning and assist each other. **Networking and developing working structure** Students assisted each other to navigate the clinical environment by discussing the structure of the CLE in order to understand where they fit in as students. They had social

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
United Kingdom.			interactions where they could offload their stress and seek emotional support from each other.
Crawford, R., Jasonsmith, A., Leuchars, D., Naidu, A., Pool, L., Tosswill, L., Trezise, K. & Wordsworth, A. 2018. "Feeling part of a team" a mixed method evaluation of a dedicated education unit pilot programme. *Nurse Education Today*, 68(2018):165-171. **New Zealand.**	Dedicated education unit (DEU)	The DEU was implemented in three clinical areas of one District Health Board in New Zealand. A general surgical and vascular unit, a regional heart and lung unit and a rehabilitation unit at an outlying hospital were utilised. The population consisted of RN(s), enrolled nurses, nurse managers, a nurse educator, a Clinical liaison nurse (CLN), an Academic liaison nurse (ALN) and nursing students working in the DEU. The DEU was based on a partnership between HEI(s) and HCP(s) in order to provide clinical training for undergraduate nursing students. The model was led by academics and RN(s) working in the clinical environment. RN(s) undertook the clinical teaching of the students and were supported by their academic colleagues. Each unit had a CLN and each HEI an ALN. The CLN was a senior RN experienced in supporting clinical learning. The ALN was a RN working in an HEI. Nursing students in each unit worked alongside RN preceptors for daily support, with the CLN an ALN working collaboratively to facilitate clinical learning and complete summative assessments of student learning.	**Relationships** Most of the nurses and students responded that they experienced a positive relationship. **Student support** The DEU provided more student support than other models. The clinical areas could provide more students with clinical support even though there was a mix from three different programmes. There was improved monitoring of student progress. Documentation was more manageable for the RN(s). **Teamwork** Students felt that they were part of the team. **Supportive and flexible learning structure** Clinical staff were approachable and supportive, and provided the students with a nurturing learning environment. The students preferred to work with the same patients. Students had an allocated person who could manage issues. The CLN valued the flexibility that the unit provided to enable them to respond to students' learning needs, as well as the needs of patients and clinical staff. Students were given the opportunity to learn and to take responsibility for their patients. **Learning partnership** The students enjoyed the partnership between the different members of the DEU. The relationship with the CLN was important to the students.
Croxon, L. & Maginnis, C. 2009. Evaluation of clinical teaching models for nursing practice. *Nurse Education in Practice*, (2009)9:236-243. **Australia.**	Cluster or group model and Preceptor model	**Cluster or group model** The population was second year undergraduate nursing students, enrolled in a Bachelor of Nursing course, who completed their acute care nursing. A RN from the clinical setting where the students were placed acted as a clinical teacher or clinical facilitator to eight students. The university provided the funds for the RN. **Preceptor model** Students worked under the supervision of a RN who was part of the clinical staff in a nursing area. The health service employed the RN. They had a one-to-	CLUSTER OR GROUP MODEL **Opportunity to achieve clinical objectives of the placement** Students could complete their objectives. **Opportunity to practice clinical skills** The facilitators could observe the students' clinical skills and give direction as needed. **Degree of support from clinical facilitators/ preceptors** Students had access to someone if clinical staff could not assist them, as facilitators were immediately available and willing to teach them.

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
		one relationship with the students while they accepted a normal workload.	**Opportunity for one-to-one instruction from the clinical facilitators/preceptors** There was a high degree of satisfaction with one-to-one instruction from the clinical facilitator/preceptor. **Clinical staff interaction and clinical staff attitudes in the clinical setting** The willingness of clinical staff to welcome students positively influenced their learning. Time was an important factor to determine clinical staff's willingness to assist students. **Self-development** Working with peers assisted in building their self-confidence. The module assisted in developing team skills. PRECEPTOR MODEL **Opportunity to achieve clinical objectives** Students could complete their clinical objectives. **Opportunity to practice clinical skills** Students could practice their clinical skills. **Support from clinical facilitators/preceptors** The students indicated that there was some degree of support. **Opportunity for one-to-one instruction from the clinical facilitators/preceptors** Students had one-to-one instruction. **Clinical staff interaction and clinical staff attitudes in the clinical setting** The willingness of clinical staff to welcome students positively influenced their learning. Time was an important factor to determine clinical staff's willingness to assist students. **Student confidence** Students experienced an increase in self-confidence.
Henderson, A., Twentyman, M., Eaton, E., Creedy, D., Stapleton, P. & Lloyd, B. 2009. Creating supportive clinical learning environments: an intervention	Capacity building intervention (CBI)	Capacity building occurred in two acute surgical wards in a tertiary referral hospital in South-East Queensland, Australia. The wards specialised in vascular, plastic and head and neck surgery. Students and RN(s) working in the two wards participated in the study. Students worked alongside RN(s). The students and RN(s) received assistance from a supernumerary clinical facilitator, who was funded by the university. The ratio of clinical facilitator to students was one to eight. The clinical facilitators directly supervised and assessed the	**Satisfaction** Students could engage in tasks. During the intervention period there was a notable increase in the satisfaction of the psycho-social elements of the learning environment. **Student involvement, innovation and personalisation** RN(s) engaged with students as individuals, encouraged their participation and recognised their unique needs.

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
study. *Journal of Clinical Nursing*, 19:177-182. **Australia.**		students while incorporating feedback from the RN(s). An experienced educator conducted capacity building activities with the RN(s). The educator visited the wards every second day during the six-week intervention and in-service training was conducted during these visits.	
Jokelainen, M., Turunen, H., Tossavainen, K., Jamookeeah, D. & Coco, K. 2011. A systematic review of mentoring nursing students in clinical placements. *Journal of Clinical Nursing*, 20:2854-2867. **United Kingdom, Australia, Scotland, Hong Kong, Finland, Ireland.**	Mentoring	A clinical nurse supervised, taught and assessed student nurses in placements during their clinical practice period.	**Facilitating students' learning in clinical placements** Students were familiarised with the placement as a working environment. Teamwork was emphasised. Mentoring ensured that the nursing students could study based on personal learning plans and could develop by evaluating learning. Mentoring focused on increasing students' responsibility to work independently and helping them to grow from observers into independent workers. Regular and constructive feedback was given in real time. **Strengthening students' professionalism** Professional attributes and identity were developed by the mentors working with students in a professional relationship and by implementing actions that promoted growth in the profession. Students appreciated being treated as colleagues. Other issues included showing empathy towards the students during the clinical practice period by showing interest in, caring for and understanding students and trusting them. Students were exposed to different types of activities, working alongside mentors. Mentors familiarised students with the field of nursing by acting as role models and presenting different aspects and functions in the work of nurses. Mentoring facilitated students' emotional development by helping them to understand their own feelings and emotions, as well as those of the patients in their care. Mentoring assisted in training the student to improve their practical clinical and communication skills. Students were advised on how to use different methods in actual care situations. Mentoring was also described as enabling improvement of theoretical skills by enhancing students' understanding and knowledge of relevant care processes, linking theory to practice, and encouraging life-long learning. It deepened the development of critical and reflective thinking. Mentoring further involved encouraging students to consciously reflect on procedures and their own learning. Mentoring was

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
			also used to facilitate the development of problem-solving and decision-making skills by helping to clear up difficult situations.
Newton, J.M., Cross, W.M., White, K., Ockerby, C. & Billet, S. 2014. Outcomes of a clinical partnership model for undergraduate nursing students. *Contemporary Nurse*, 39(1):119-127. **Australia.**	Clinical partnership placement model (CPPM)	CPPM was implemented across a healthcare organisation in a variety of clinical settings. The population included Bachelor of Nursing degree students in the second or third year of their degree. They had to participate in the clinical training model where they should have completed all their placements scheduled in the partner healthcare organisation. This model was underpinned by preceptorship. The preceptor supervised, supported, role-modelled, identified and met individual student learning needs. Students were expected to work the same roster as their preceptors, including weekends. Partnership was supported by the healthcare organisation and the university's nursing school through deployment of a clinical nurse educator who facilitated the relationship between the students and the preceptor. The ratio was one teacher to eight students.	**Organisational familiarity** The model provided students with a degree of familiarity with the organisation. They were equipped with knowledge of the policies and procedures of the organisation, documentation and the ward layout. This led to a degree of confidence and created a sense of continuity. **Continuity** The students valued the ongoing relationship they developed with their preceptors and other clinical staff working with them in the placements. This appeared to make it easier for the students to engage in their learning. It provided a platform of familiarity with the setting that promoted student readiness. **Social participation** Social participation contributed to the students' sense of belonging.
Roxburgh, M., Bradley, P. & Lauder, W. 2011. The development, implementation and evaluation of demonstration projects of new approaches to providing practice placements in the pre registration nursing programmes: Contemporising	Hub and spoke models	The strategy was implemented in National Health Services acute hospital facilities with general practitioner clinics and community hospitals in community health partnerships, mobile units and telemedicine facilities. The population consisted of first year students registered in the Common Foundation programme at the University of Stirling over three campuses and mentors, senior charge nurses and personal tutors. A student was allocated to a mentor (hub), who allocated the student to other mentors (spoke). The spoke-mentors provided feedback and assessments to the hub. mentors Three broad types of hub and spoke models were implemented, namely 1) the internal spoke model, 2) the facilitated spoke model and 3) the fixed spoke model. 1) In the internal spoke model, it was the mentor's responsibility to plan, arrange and report on student	**Belonging** Students reported that they felt positive because they were part of the interdisciplinary team. **Continuity** Students were confident when returning to a ward as they experienced a clearer integration of theory and practice. **Continuous support** Students were supported by clinical staff in the wards.

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
practice placements for undergraduate student nurses: Are 'hub and spoke' models the future? University of Stirling, NHS Forth Valley, NHS Highland, NHS Western Isles. Scotland:1-110. **Scotland.**		progress. The student had input into the planning and had weekly contact with the mentor. 2) In the facilitated spoke model, the responsibility for planning and communication was shared between the Practice education facilitators (PEF) for the hub clinical area, the hub and spoke mentors, and the students. 3) In the fixed spoke model, the University campus placement coordinator (UCPC) was responsible for planning and reporting student progress. The students had no input in the planning. Hub mentor contact was arranged on an informal basis. The spoke mentor communicated mainly by means of written communication in the spoke booklets. In all models the spoke mentors communicated with the hub mentors through meetings, telephone conversations and written documentation.	
Williamson, G.R., Callaghan, L., Whittlesea, E., Mutton, L. & Heath, V. 2011. Longitudinal evaluation of the impact of placement development teams on student support in clinical practice. *The Open Nursing Journal*, 2011(5):14-23. **United Kingdom.**	Placement development team [PDT(s)]	Third year physiotherapy students, adult nursing students, podiatry students, occupational therapy students, midwifery and dietetics students and first year paramedics working in 16 National Health Services Trusts in the south west peninsula of England were included in the strategy. Staff members included academic leads, practice leads, directors of nursing and strategic health authority managers. PDT(s) include academic and clinical staff working together in all placement areas. They aim to deliver supportive activities to students and mentors in clinical practice. These activities include mentor preparation, visits to placement areas in order to support mentors and students, performing quality assurance audits, designing action plans with placement areas and providing profession specific advice in the multidisciplinary settings. PDT(s) involve interdisciplinary teams who support all students in practice. They provide interpersonal and structural support. Mentors act as teachers and supervisors who support, assess and monitor performance.	**Communication** Students generally viewed communication as efficient and positive. They valued the provision of timely information and having a contact person in the CLE who welcomed them. Good communication between the HEI and the CLE was important to the students. Students felt that mentors were well prepared through university and PDT courses. There was good quality, timely and open communication between all parties. The PDT(s) staff's physical presence was key to the communication between mentors, students, the Trust and HEI. The PDT(s)' roles and responsibilities were communicated clearly so that individuals knew where to go for support. Mentors reached out to the PDT(s) for support. **Supportive behaviour of staff** Students believed that they were well supported by all staff. They valued being able to direct their own learning, while still having access to support as they needed it. Autonomy in learning and assessment were very important to paramedic students. Students appreciated the opportunity to work on a supernumerary basis. **The effect of peers on the placement experience**

Author information and context	Strategy used	How the strategy was used	Evidence of a supportive clinical environment
			Students verbalised that they received emotional support from their peers by discussing their experiences. Support from peers from other professions consolidated learning.
Zentz, S.E., Kurtz, C.P. & Alverson, E.M. 2014. Undergraduate Peer-assisted learning in the clinical setting. *Journal of Nursing Education*, 53(3):S4-S10. **Unites States.**	Peer-assisted learning (PAL)	The strategy was implemented at a college of nursing within a private university in the mid-western United States. The specific clinical area where students were placed, were not indicated. Second year and senior students enrolled in Bachelor of Nursing were involved in the peer-assisted strategy. Senior students assisted in the clinical portion of the fundamentals course. Senior students assisted for one session in the simulation laboratory and another session in the clinical setting. In the simulation laboratory, two senior students were assigned to assist a group of 25 second year students. In the clinical setting, one to two peer teachers were assigned to eight to ten second year students. Clinical instructors provided senior students with direction regarding how they could assist the second year students. Senior students also attended pre- and post-conferences.	**Sharing knowledge and skills** Second year students appreciated the opportunity to ask senior students about patient care. **Sharing personal experiences** Senior students shared their personal experiences about the nursing courses and how to be successful. **Accessibility** Students could ask senior students for assistance when mentors and clinical teachers were not available. **Decreased anxiety and increased confidence** Second year students were more comfortable and less intimidated by senior students. The interaction with senior students built their confidence. They experienced an increase in learning. They agreed that working with senior students decreased their anxiety, and increased their confidence and learning. **Self-reflection** Senior students had an increased awareness of their own personal and professional development. **Teaching** It increased the senior students' abilities and created an interest in nursing education. **Helping others** They could motivate and inspire other students, which increased their confidence in the CLE. They could effectively demonstrate the professional role as teacher, lifelong learner, caregiver, manager and research consumer.

Nine strategies were identified, namely Cluster model (CM), Peer-assisted learning (PAL), Dedicated education unit (DEU), Preceptor model, Capacity building intervention (CBI), Mentoring, Clinical partnership placement model (CPPM), Hub and spoke models, and Placement development teams [PDT(s)]. PAL was used in two studies in different ways. One study used peers from different year levels to assist each other, while the other study used senior students to assist second year students. Two of the studies implemented the CM.

The researcher identified characteristics of a SCLE in each study as indicated in Table 3.1. It was later possible to group the similar characteristics of the various studies together to create themes and subthemes, Table 3.2. Thematic analysis of the categorised data culminated into a conceptual framework.

TABLE 3.2: Data reduction and synthesis of characteristics of each model

	Cluster model (CM)	Peer-assisted learning (PAL)	Dedicated education unit (DEU)	Cluster or group model	Preceptor model	Capacity building intervention	Mentoring	Clinical partnership placement model (CPPM)	Hub and spoke models	Placement Development Team [PDT(s)]	Peer-assisted learning (PAL)	Total
Support for students												
Registered nurse (RN)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		10
Academic staff			✓							✓		2
Students provided guidance to each other		✓									✓	2
Total for support for students												**14**
Support for clinical student supporters												
Academic colleagues			✓					✓				2
Clinical facilitators						✓						1
Educators visited the wards every second day during the intervention						✓						1
Experienced educators conducted capacity building activities						✓						1
In-service training						✓						1
Mentors' responsibility to plan, arrange and report on student progress									✓			1
Registered nurse (RN) mentors were updated in clinical settings during monthly mentor updates with university lecturers		✓										1
The Practice education facilitators (PEF) and hub and spoke mentors were responsible for planning and communication									✓			1
The University campus placement coordinator (UCPC) was responsible for planning and reporting student progress									✓			1
Placement development teams [PDT(s]) prepared mentors, visited placement areas, performed quality assurance audits, designed action plans with placement areas and provided profession specific advice.										✓		1
Workshops	✓											1
Total for support for clinical student supporters												**12**
Ratio of student supporters to students												

	Cluster model (CM)	Peer-assisted learning (PAL)	Dedicated education unit (DEU)	Cluster or group model	Preceptor model	Capacity building intervention	Mentoring	Clinical partnership placement model (CPPM)	Hub and spoke models	Placement Development Team [PDT(s)]	Peer-assisted learning (PAL)	Total
1:8	✓			✓		✓		✓				3
1:1					✓							1
1-2:8-10											✓	1
2:25											✓	1
Total for ratio of student supporters to students												**6**
Responsibilities of student supporters in wards												
Accepted normal workload					✓							1
Clinical facilitators were supernumerary						✓						1
Clinical teachers were withdrawn from ward responsibilities	✓											1
Clinical teachers were replaced by other registered nurses (RN) who took over their responsibilities during this time	✓											1
Seniors assisted for one session in a simulation laboratory and one session in the clinical setting											✓	1
Two to three clinical teachers who could rotate	✓											1
Total for responsibilities of student supporters in wards												**6**
Collaboration/Partnership												
A partnership between tertiary education institutions and clinical providers	✓		✓				✓			✓		4
CLN and ALN worked together to facilitate clinical learning and manage summative assessments of student learning			✓									1
Total for collaboration/partnership												**5**
Funded by												
University				✓		✓						2
Health services					✓							1
Total for funded by												**3**

	Cluster model (CM)	Peer-assisted learning (PAL)	Dedicated education unit (DEU)	Cluster or group model	Preceptor model	Capacity building intervention	Mentoring	Clinical partnership placement model (CPPM)	Hub and spoke models	Placement Development Team [PDT(s)]	Peer-assisted learning (PAL)	Total
Selection criteria of student supporters												
Characteristics necessary for clinical teaching	✓											1
Interest in clinical teaching	✓											1
Clinical experience and qualifications	✓											1
Total for selection criteria of student supporters												**3**

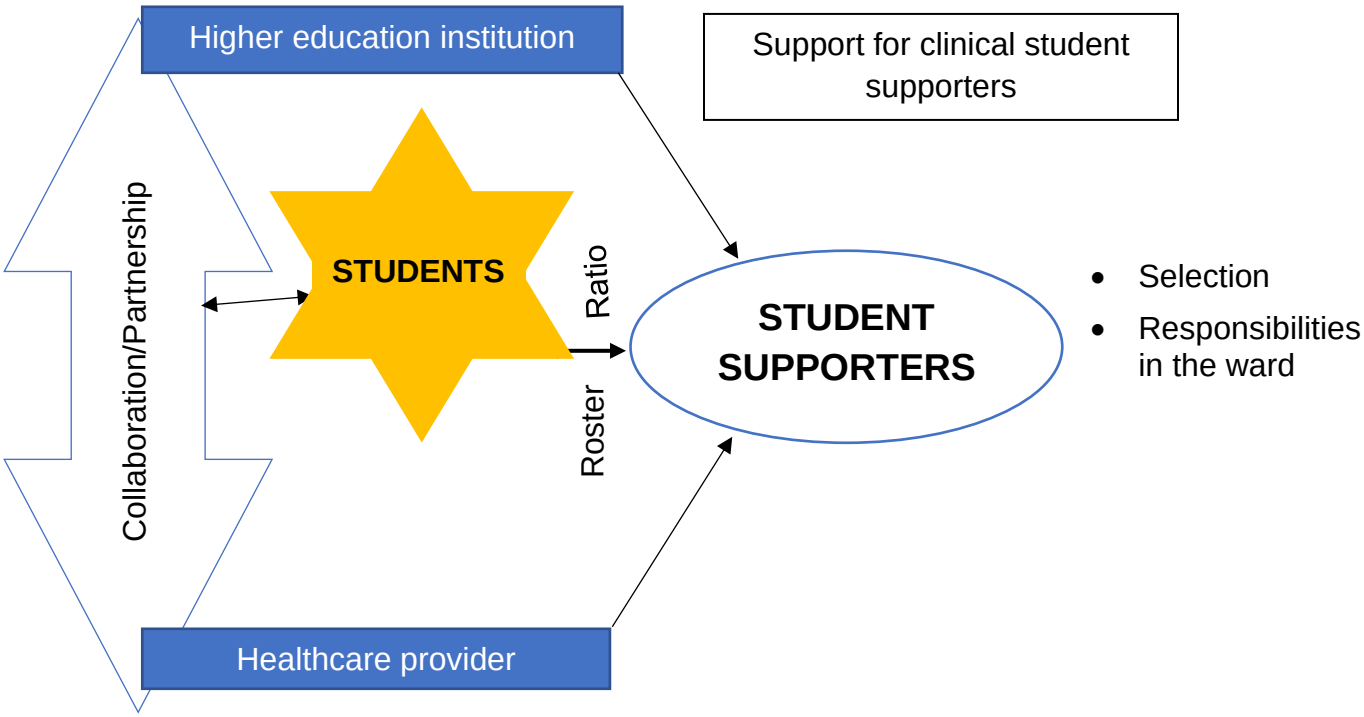

FIGURE 3.3: **Diagram of shared characteristics of models to maintain and improve the clinical learning environment**

The researcher compiled a diagram (Figure 3.3) in order to identify patterns, themes and relationships from the data obtained in Table 3.2. Similar variables were grouped together, and themes were identified that enabled the researcher to determine the relationship between the different themes.

A partnership between the HEI and the HCP is important for supporting the student in the CLE. The DEU, for example, made use of a Clinical liaison nurse (CLN) in each unit and an Academic liaison nurse (ALN) at each HEI provider/programme to facilitate a beneficial collaboration/partnership.

The HCP provided the students with student supporters. These student supporters included registered nurses [RN(s)] working in the clinical setting. **The HCP also provided the clinical setting where students can learn. The HEI provided educators who teach the students and support them in the wards. Senior students and peers were also used in the CLE to assist junior students.** The supporters of the students in the ward played an integral role in education in the clinical setting.

The CM pointed to **criteria for the selection of student supporters.** The criteria included an interest in clinical teaching, certain characteristics needed in a student supporter, as well as required clinical experience and qualifications. This was not mentioned in the other models.

In the preceptor model, the student supporter accepted a **normal workload** while also accepting the responsibility of supporting students. In the Capacity building intervention, a clinical facilitator was **appointed on a supernumerary level** and assisted the student supporters in the wards. In the CM the student supporter was withdrawn from his/her duties and allocated to the students for support. His/her position and ward responsibilities were taken over by another RN in order for patient care to continue. In PAL, senior students assisted for one session in the simulation laboratory and one session in the clinical setting.

The cluster/group model and the Capacity building intervention were **funded by the HEI** and the preceptor model was **funded by the HCP**. The other models did not comment on funding.

Support for the student supporter was mostly provided by the HEI in the form of clinical facilitators, nurse educators, in-service training, mentors, Practice education facilitators (PEF) and hub and spoke mentors, University campus placement coordinators (UCPC), PDT(s) and workshops. These individuals had a dual function as student supporter and providing support to the student supporters in the HCP.

In the cluster/group model, the Capacity building intervention and the CPPM, the **ratio of clinical supporter to student** was one to eight. The preceptor model allowed for a ratio of one student supporter to one student. In the PAL model the ratio of senior students to junior students in the simulation laboratory was one to two senior students to eight to ten junior students. In the clinical area the ratio of senior students to junior students was two to 25. The other models did not report on the ratio.

In the DEU and the CPPM, the students had to **work alongside the clinical supporters, working the same roster.**

3.3 EVIDENCE OF A SUPPORTIVE CLINICAL LEARNING ENVIRONMENT

Table 3.3 displays the evidence of a SCLE as identified from the shared characteristics of the strategies identified in Table 3.1. The elements were then grouped together to form themes. Six themes were identified as evidence of a SCLE, namely relationship with student supporter, peer support, sense of belonging, learning opportunities, self-efficacy and self-directedness.

TABLE 3.3: Data reduction and synthesis of evidence of a supportive clinical learning environment

	Bourgeois, *et al.*, 2011	Carey, *et al*, 2018.	Crawford, *et al.*, 2018.	Croxon & Maginnis, 2009. (Cluster or group model)	Croxon & Maginnis, 2009. (Preceptor model)	Henderson, *et al.*, 2009.	Jokelainen, *et al.*, 2011	Newton, *et al.*, 2014.	Roxburgh, *et al.*, 2011.	Williamson, *et al.*, 2011	Zentz, *et al.* 2014.	Number of sources
Relationship with student supporter												
Student supporters supported students' learning needs	✓		✓	✓			✓		✓	✓		6
Student supporters were approachable and supportive			✓	✓	✓		✓			✓		5
Student supporters showed interest in students	✓			✓	✓		✓			✓		5
Student supporters were accessible to students	✓			✓	✓	✓				✓		5
Increased opportunities to practice under supervision	✓		✓	✓	✓		✓					5
Mutual, trusted communication and interaction			✓	✓	✓		✓			✓		5
Positive relationship between clinical staff and students			✓	✓	✓		✓			✓		5
Student supporters were willing to assist students		✓		✓	✓		✓					4
Regular and constructive feedback in real time							✓					1
Flexibility				✓								1
Total for relationship with student supporter												**42**
Peer support												
Peers discussed their experiences	✓	✓		✓						✓	✓	5
Emotional support		✓	✓							✓	✓	4
Peers gave advice and guidance		✓		✓							✓	3
Peers supported each other	✓	✓									✓	3
Peers planned clinical and academic assessments together		✓									✓	2
Peers shared workload	✓	✓										2
Students discussed problems and issues together	✓											1

	Bourgeois, *et al.*, 2011	Carey, *et al*, 2018.	Crawford, *et al.*, 2018.	Croxon & Maginnis, 2009. (Cluster or group model)	Croxon & Maginnis, 2009. (Preceptor model)	Henderson, *et al.*, 2009.	Jokelainen, *et al.*, 2011	Newton, *et al.*, 2014.	Roxburgh, *et al.*, 2011.	Williamson, *et al.*, 2011	Zentz, *et al.* 2014.	Number of sources
Peers created a less threatening working environment	✓											1
Support from peers from other professions										✓		1
Total for peer support												**22**
Sense of belonging												
Welcomed in ward	✓		✓	✓	✓		✓	✓	✓	✓		8
Regarded as member of team	✓	✓	✓	✓			✓	✓				6
Navigated the clinical environment		✓						✓		✓		3
Working the same roster as student supporter								✓	✓			2
Treated as nursing colleagues							✓					1
Total for sense of belonging												**20**
Learning opportunities												
Increased clinical learning	✓	✓	✓	✓	✓							5
Contributed to patient care	✓		✓		✓		✓					4
Students completed clinical objectives				✓	✓						✓	3
Sufficient practice experience	✓				✓	✓						3
Increased learning opportunities	✓		✓									2
Linking theory and practice	✓						✓					2
Total for learning opportunities												**19**
Self-efficacy												
Increased confidence	✓			✓	✓		✓	✓	✓	✓	✓	8
Development of life-long learning							✓				✓	2

	Bourgeois, *et al.*, 2011	Carey, *et al*, 2018.	Crawford, *et al.*, 2018.	Croxon & Maginnis, 2009. (Cluster or group model)	Croxon & Maginnis, 2009. (Preceptor model)	Henderson, *et al.*, 2009.	Jokelainen, *et al.*, 2011	Newton, *et al.*, 2014.	Roxburgh, *et al.*, 2011.	Williamson, *et al.*, 2011	Zentz, *et al.* 2014.	Number of sources
Development of critical and reflective thinking							✓					1
Development of problem-solving and decision-making skills							✓					1
Increased independence							✓					1
Professional growth							✓					1
Peer supporters had increased awareness of own personal and professional development											✓	1
Peer supporters' teaching abilities increased											✓	1
Time management skills	✓											1
Total for self-efficacy												**17**
Self-directedness												
Students took responsibility for own learning and development	✓				✓					✓		3
Students could learn independently/autonomously					✓					✓		2
Total for self-directedness												**5**

Figure 3.4 illustrates a conceptual framework of the complexity of the CLE as seen from the identified themes. The data collected from the studies indicate that the largest component of the CLE involves the support provided by the student supporters (mentors/preceptors/peers) as reflected in Table 3.3. Learning opportunities also play an important role. Students want to be involved with patient care, and reaching the clinical outcomes plays an important role. Students want to be regarded as full members of the team, and teamwork and professional relationships are important to them. During the clinical placement, students need to develop their skills, as well as grow professionally. They want to have control over their learning and development. These components cannot exist in isolation and all of them are important for the students to reach their goals.

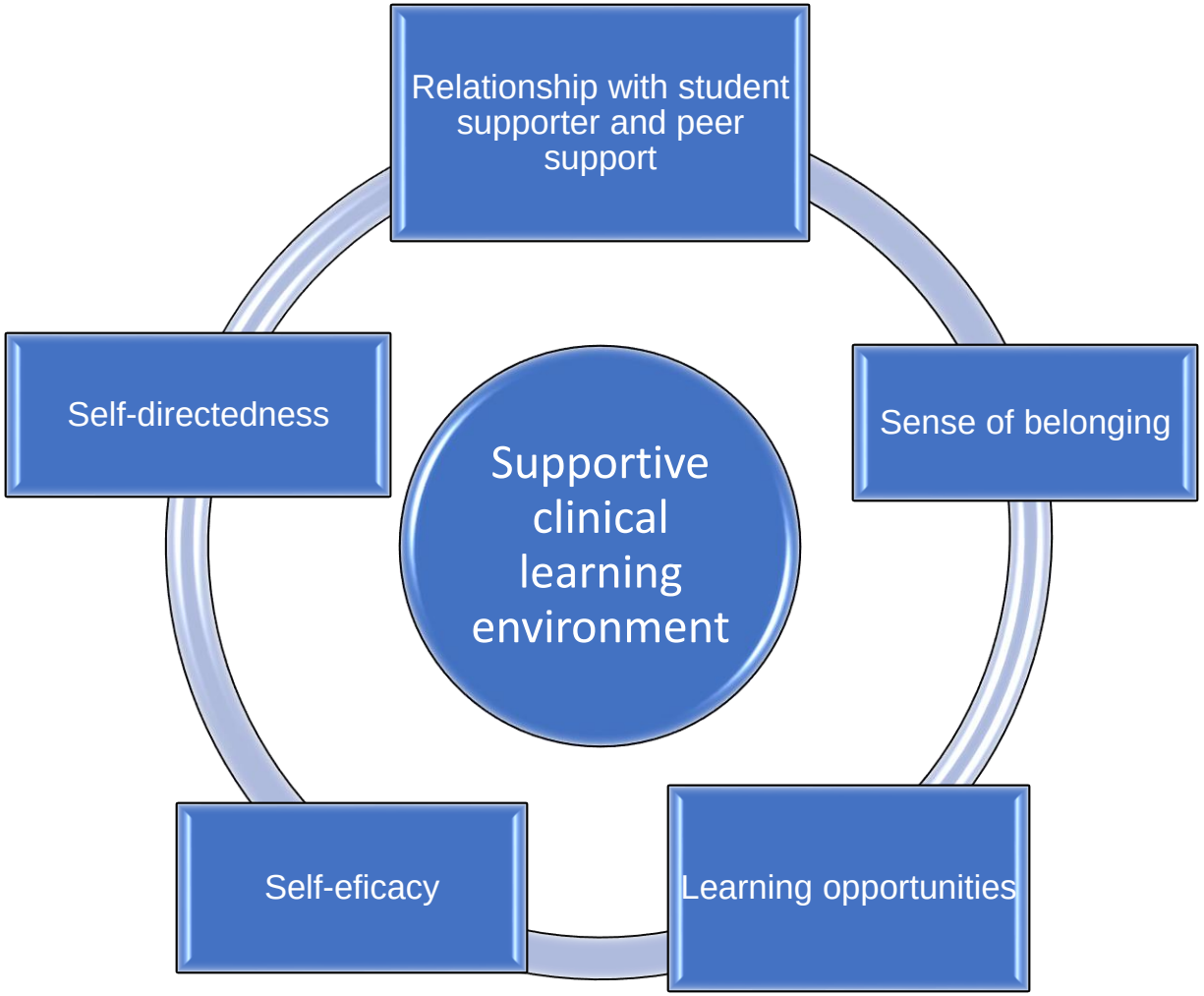

FIGURE 3.4: Conceptual framework of a supportive clinical learning environment of models

3.4 STEPS TAKEN TO ENSURE RIGOUR

The researcher followed the data analysis process as suggested by Whittemore and Knafl (2005; 550-552). The data were systematically organised, as the researcher identified elements that were then organised into themes. The primary sources were consulted during this process to ensure accuracy, and the researcher was assisted by the supervisor and co-supervisor to prevent subjectivity and bias. The researcher described and documented the entire process.

3.5 CONCLUSION

This chapter aimed to provide an overview of the first three steps of data analysis. Shared characteristics among the models were identified. The identified characteristics of each model were support for students, support for clinical student supporters, the ratio of student supporters to students, the responsibilities of the student supporters in the wards, collaboration/partnership, by whom the student supporters are funded and the selection criteria of student supporters. The data were then further analysed to identify whether or not the strategies contributed to a SCLE, namely the relationship with the student supporter, peer support, a sense of belonging, learning opportunities, self-efficacy and self-directedness. The entire process was presented in tables, figures and diagrams. In the next chapter the last two steps in the analyses of the data process, namely conclusion drawing and verification, will be discussed, as well as the last stage of the integrative review, namely presentation.

CHAPTER 4

Conclusion, limitations and recommendations

4.1 INTRODUCTION

The researcher aimed to critically synthesise the best available evidence describing strategies for a SCLE for undergraduate students in health sciences.

The previous chapter provided a comprehensive discussion of the first three steps of the data analysis process, namely data reduction, data display and data comparison. The last two steps of data analysis are conclusion drawing and verification, and will be discussed in this chapter, as illustrated in Figure 4.1. The last stage of the integrative review, namely presentation, will also be discussed (Figure 4.2). This chapter concludes the study with a discussion of the limitations and recommendations of the integrative review.

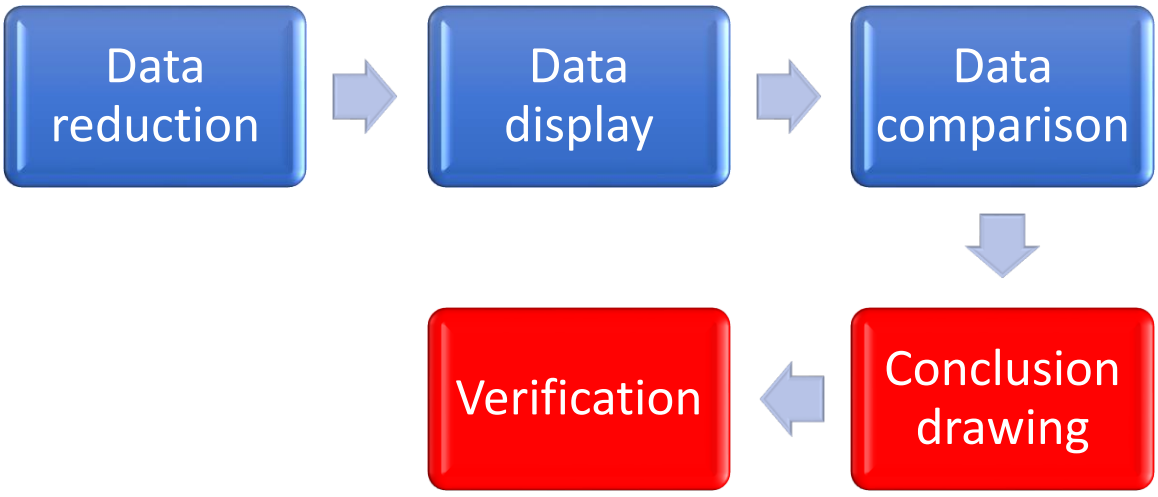

FIGURE 4.1: **Adapted summary of the steps followed to analyse the data (Whittemore & Knafl, 2005:550-552)**

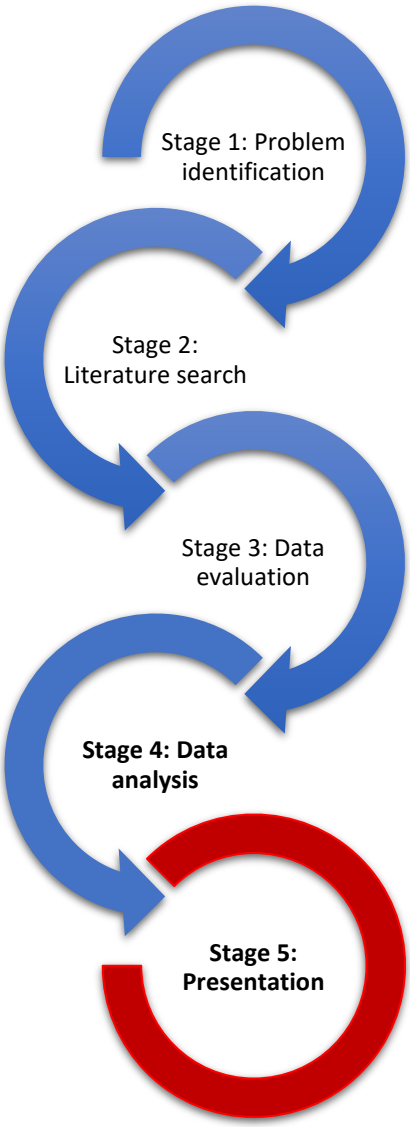

FIGURE 4.2: **Adapted summary of the stages followed in an integrative review (Whittemore & Knafl, 2005:548-552)**

By comparing data in Chapter 3, the researcher identified shared characteristics and evidence of a SCLE among the models. The relationships between these shared characteristics and evidence of a SCLE are indicated in Figure 4.3, which is presented in this chapter as it forms the basis of the concluding statements and verification of statements.

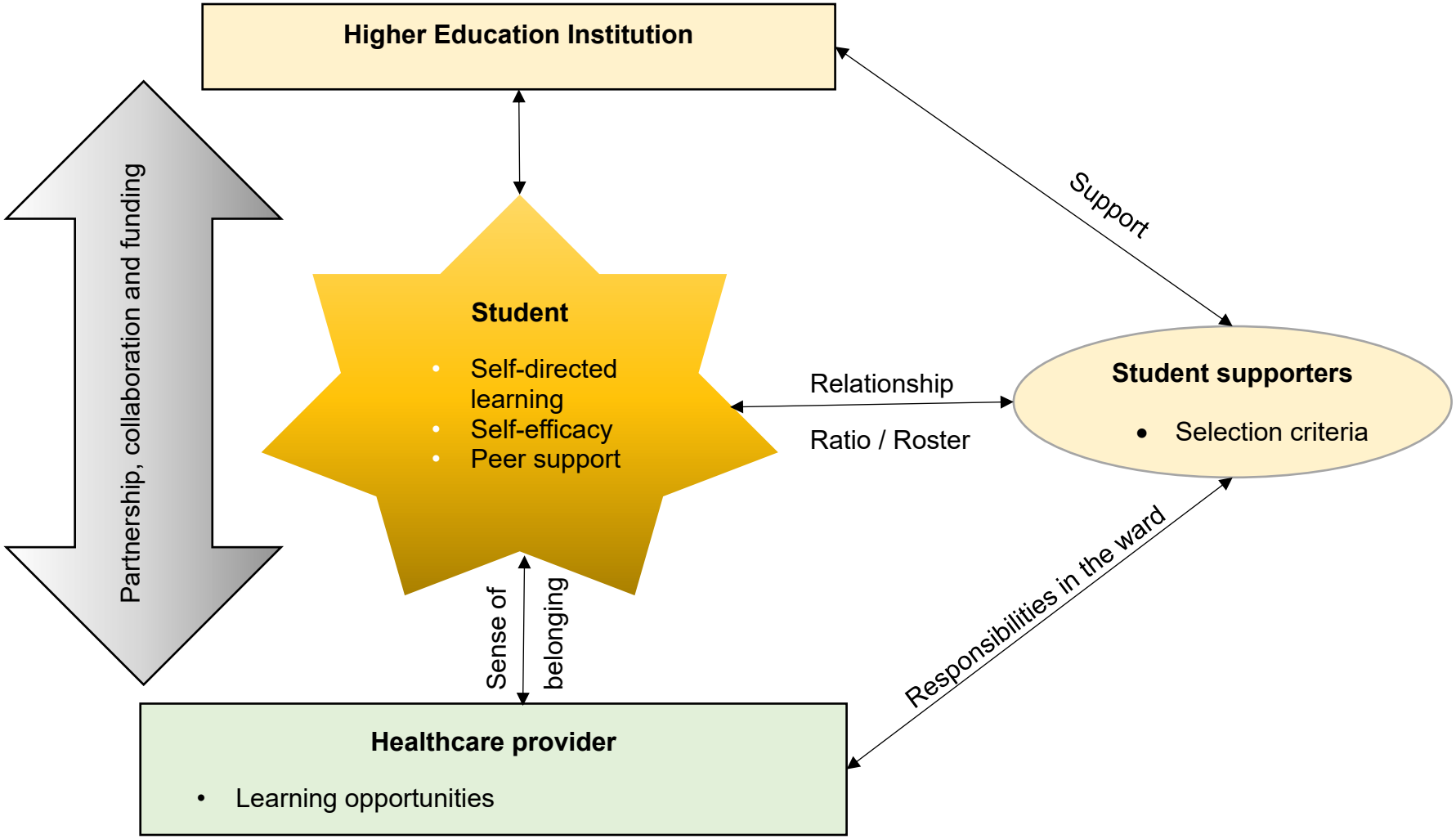

FIGURE 4.3: **Diagram of shared characteristics and evidence of a supportive clinical learning environment of models to maintain and improve the clinical learning environment**

4.2 CONCLUDING STATEMENTS AND VERIFICATION

The analysis and synthesis process enabled the researcher to summarise the findings by formulating concluding statements, with literature verifying the statements.

4.2.1 Student supporters

Concluding statement 1: A variety/network of student supporters, who have been carefully selected, may be allocated specific clinical responsibilities while supporting the undergraduate student in the clinical learning environment.

A variety/network of student supporters were identified in the integrative review. For students to acquire skills and knowledge in the CLE, there must be someone who can support them (Lambert & Glacken, 2005:666). Different student supporters in the CLE were identified, and these included **registered nurses (RN)** (Pålsson, Mårtensson, Swenne, Ädel & Engström, 2017:82; Ford *et al*., 2016:98; Hegenbarth, Rawe, Murray, Arnaert & Chambers-Evans, 2015:304; Vinalis, 2015:50; Henderson & Tyler, 2011:289; Newton, Billet, Jolly & Ockerby, 2009:319; Udlis, 2008:20; Henderson, Heel & Twentyman, 2007:94; Robinson, Andrews-Hall & Fassett, 2007:369; Papp *et al*., 2003:265), **academic staff** (Pålsson *et al*., 2017:82) and **students who provided guidance to each other** (Holst, Ozolins, Brunt & Hörberg, 2017:7; Pålsson *et al*., 2017:82; Bennet, O'Flynn & Kelly, 2015:599; Dennison, 2010:340; Brooks & Moriarty, 2009:37; Roberts, 2008:36). Literature also indicated other supporters, such as **staff nurses** (Lawal, Weaver, Bryan & Lindo, 2016:36; Asadizaker, Abedsaeedi, Abedi, Alijanirenani, Moradi & Jahani, 2015:85; Kotera & Matsuda, 2012:2; Mulready-Shick, Kafel, Banister & Mylott, 2009:716; Robinson *et al*., 2007:369), **clinical staff** (Dean & Levis, 2016:367; Dale, Leland & Dale, 2013:2; Kapucu & Bulut, 2011:1150; Kilcullen, 2007:97; Dickson, Walker & Bourgeois, 2006:417), **doctors** (Kandiah, 2017:160; McKee & Markless, 2017:276; Burch, Seggie & Gary, 2006:430; Seabrook, 2004:660), **educational facilitators** (Hutchings, Williamson & Humphreys, 2005:950), **physiotherapists acting as clinical educators** (Vågstøl & Skøien, 2011:74) and **team**

supervision (Papastavrou, Lambrinou, Tsangari, Saarikoski & Leino-Kilpi, 2010:179-180).

Student supporters should be carefully selected, and should possess certain qualities associated with clinical teaching and student support. Stakeholders should take this into consideration when supporters are selected. The qualities that student supporters should have include**: an interest in clinical teaching** (Kilcullen, 2007:97; Papp *et al*., 2003:265), **clinical competence** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:98; Dale *et al*., 2013:3; Vågstøl & Skøien, 2011:74; Burch, Seggie & Gary, 2006:430), **appropriate qualifications** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:98; Bennet *et al*., 2015:599; Dale *et al*., 2013:3; Vågstøl & Skøien, 2011:74; Burch *et al*., 2006:430), **empathy** (Hemberg & Sjoblom, 2018:692), **interpersonal skills** (Kotera & Matsuda, 2012:2), **self-knowledge** (Hemberg & Sjoblom, 2018:692), **professionalism** (Happell, 2009:375; Papp *et al*., 2003:265) and **teaching skills** (Ford *et al*., 2016:98; Dale *et al*., 2013:3). Managers interviewed in a study by Carnwell, Baker, Bellis and Murray (2007:925) confirmed the importance of selecting the correct student supporters. If supporters were not interested in their role, students experienced the CLE as negative (Papp *et al*., 2003:265).

Supporters often have responsibilities in the CLE while supporting the undergraduate student in various ways. Student supporters either had a **normal patient care load along with the role of supporter** (Dale *et al*., 2013:2; Henderson & Tyler, 2011:289; Carnwell *et al*., 2007:926; Henderson *et al*., 2007:94; Kilcullen, 2007:100-102), or the student supporters **worked on a supernumerary level** (Papastavrou *et al*., 2016:3; Dickson, Walker & Bourgeois, 2006:417). Role conflict between patient care demands and mentor responsibilities was experienced by student supporters who accepted a normal patient load (Holst *et al*., 2017:10; Bos, Silén & Kaila, 2015:5; Carnwell *et al*., 2007:926-927), while supporters working on a supernumerary level had more opportunities to devote his/her full attention to students (Papastavrou *et al*., 2016:3; Dickson *et al*., 2006:41). According to McKee and Markless (2017:276), doctors experienced pressure to meet service targets and did not have enough time to support the medical students. This led to

medical students often experiencing feelings of isolation and a lack of support. The role of the student supporter is complicated by **staff shortages** (Botma & MacKenzie, 2016:108; Papastavrou *et al*., 2010:177, Edmond, 2001:256), **erratic staffing practices** (Edmond, 2001:256), **high turnover of staff and patients** (Botma & MacKenzie, 2016:108, Edmond, 2001:256), **heavy workloads** (Bos *et al*., 2015:5; Papastavrou *et al*., 2010:177; Kilcullen, 2007:100-102; Edmond, 2001:256), **insufficient time** (Holst *et al*., 2017:10, Ford *et al*., 2016:99; Papastavrou *et al*., 2010:177; Kilcullen, 2007:100-102), **the changing clinical environment** (Edmond, 2001:256), **responsibility for patient care** (Papastavrou *et al*., 2010:177) and a **lack of training and support** (Bos *et al*., 2015:4; Papastavrou *et al*., 2010:177; Kilcullen, 2007:100-102). These factors all have a negative effect on student learning in the CLE.

Clear job descriptions should be allocated to the different student supporters to prevent role confusion in the CLE. Student supporters were responsible for **teaching** (Kilcullen, 2007:97), **negotiating learning opportunities** (Kilcullen, 2007:97), **assisting students to set goals in order to achieve outcomes** (Kilcullen, 2007:97), **assessing competencies** (Dale *et al*., 2013:3; Kilcullen, 2007:97), **giving constructive feedback** (Kilcullen, 2007:97), **supporting students in the CLE** (Carnwell *et al*., 2007:925; Kilcullen, 2007:97), **assisting students in their learning process** (Pålsson *et al.*, 2017:82), and **ensuring patient safety** (Pålsson *et al*., 2017:82).

4.2.2 The relationship between the student supporter and the students

Concluding statement 2: The relationship between the student, the student supporter and clinical staff is crucial to create a sense of belonging, self-efficacy and self-directedness. The relationship depends on the roster and ratio of students per student supporter as well as appropriate learning opportunities.

The relationship between students and the student supporter and clinical staff plays an important role in the students' satisfaction with the CLE and their professional development (Hemberg & Sjoblom, 2018:692; Papastavrou *et al*., 2016:3). Students want

to have a student supporter (Hemberg & Sjoblom, 2018:692; Pitkänen, Kääriäinen, Oikarainen, Tuomikoski, Elo, Ruotsalainen, Saarikoski, Kärsämänoja & Mikkonen, 2018:148; Papastavrou *et al.,* 2016:3; Dale *et al.,* 2013:5) with whom they can have regular meetings (Pitkänen *et al.,* 2018:148; Papastavrou *et al*., 2016:3; Dale *et al*., 2013:5). One factor that improved the CLE was open, friendly and flexible student supporters (Dale *et al.,* 2013:3). In order for the relationship to be successful, there should be mutual respect and trust between student supporters and the students. Students need to understand the student supporters' need to organise their time between the students and patient care. The student supporters and clinical staff should in turn also respect the students' need for instruction and inclusion (Dale *et al.,* 2013:5). Students see the ideal student supporter as someone who supports their learning by **knowing their scope and level of practice** (Ford *et al*., 2016:100), **negotiating learning objectives** (Kilcullen, 2007:100), **setting objectives at an appropriate level** (Ford *et al.,* 2016:100; Kilcullen, 2007:100), **allowing students some room to practice independently while supervising them** (Ford *et al*., 2016:100), **facilitating learning** (Ford *et al*., 2016:100), **challenging them** (Dale *et al*., 2013:4) and **giving constructive feedback** (Kilcullen, 2007:100). Dale *et al*. (2013:5) indicate that the relationship between the student supporter and the student should be one of mutual openness and constructive, respectful dialogue. Constructive feedback from a student supporter leads to a positive CLE (Dale *et al*., 2013:5; Kilcullen, 2007:100).

Names synonymous with student supporters included **mentors** (Papastavrou *et al.,* 2016:5; Hyatt, Brown & Lipp, 2008:37; Carnwell *et al.,* 2007:925; Kilcullen, 2007:97; Clarke, Gibb & Ramprogus, 2003:107; Papp *et al.,* 2003:265), **preceptors** (Pålsson *et al*., 2017:82; Sedgwick & Yonge, 2008:2) and **education facilitators** (Hutchings *et al*., 2005:950).

The integrative review showed that it was important for students to feel accepted, included and valued in the CLE. A sense of belongingness is influenced by all clinical staff and not only by the student supporters. Acceptance influences the students' level of questioning and information seeking and can increase or decrease their clinical learning (Ford *et al*.,

2016:99; O'Mara *et al*., 2014:212). Students need someone to welcome them in the ward in order for them to have a positive clinical learning experience. Providing the student with a named student supporter plays an important role in allowing the students to feel welcome (Hemberg & Sjoblom, 2018:692; Pitkänen *et al*., 2018:148). Students expected student supporters to be prepared for their arrival (Dale *et al*., 2013:3), but often experienced that clinical staff were surprised to see them, were unprepared, and even showed negative reactions on the first day of placement (Dale *et al*., 2013:2; Kilcullen, 2007:100). Clinical staff need to support students and understand that students have a right to be in the clinical environment. Students want to have a connection with the clinical staff (Ford *et al*., 2016:99) and felt appreciated when they were included in the healthcare team (Kilcullen, 2007:100; Papp *et al*., 2003:265). Students measured their conduct as successful or not by the feedback they received from clinical staff. Inclusion in the healthcare team assisted with the integration of theory and clinical practice (Levett-Jones, Lathlean, Higgings & McMillan, 2008:12-14; Kilcullen, 2007:100; Papp *et al*., 2003:265). A feeling of inclusion is obtained when student supporters and clinical staff share their experiences, thoughts and opinions with students (Dale *et al.,* 2013:5). Feeling unwanted, and that student supporters were too busy to support them, negatively affected students' feelings of belonging (Ford *et al*., 2016:99; Papp *et al*., 2003:266-267). The experience of not feeling welcome causes **suffering** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:99) and **affects the students' performance** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:99) and **their experience of the CLE** (Hemberg & Sjoblom, 2018:692; Ford *et al.,* 2016:99; Kilcullen, 2007:100; Papp *et al*., 2003:265), and **has a negative impact on their self-image** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:99) and **their view of themselves as professionals** (Hemberg & Sjoblom, 2018:692; Ford *et al*., 2016:99; O'Mara *et al*., 2014:212).

The CLE plays an important role in the development of healthcare students' confidence and self-motivation (Dale *et al*., 2013:3; Löfmark, Thorkildsen, Råholm & Natvig, 2012:167). A key feature of a successful CLE for students is the opportunity to develop competence and build confidence through practicing skills (Ford *et al*., 2016:100). Students' previous practice experiences influenced their level of competence and their

self-confidence. Difficult, bad, stressful and challenging situations where they did not feel comfortable and then failed, resulted in a negative perception of the CLE as a whole and influenced their confidence (Dale *et al*., 2013:3-4). Students felt that self-directedness involved being aware of one's limitations and strengths, as well as having a sense of responsibility and being enthusiastic (Papp *et al.,* 2003:266).

The best learning experiences in the CLE are those that were planned and carried out without any haste. Learning opportunities should be varied and according to each student's level (Papp *et al*., 2003:266). The clinical environment should be patient-centred (Papp *et al*., 2003:266) as students enter the world of the patient and learn through the patient's experience. Students develop empathy with and for the patient through interacting with the patient, and interpreting and reacting to the patient's non-verbal cues (Stockhuasen, 2005:10). A positive CLE is one where appropriate opportunities are available (Ford *et al*., 2016:100; Löfmark *et al*., 2012:167; Papp *et al*., 2003:265), and where students can reach their objectives (Löfmark *et al*., 2012:167; Papp *et al*., 2003:265). Learning opportunities provide students with the opportunity to link theory and practice (King *et al*., 2017:49; Ford *et al*., 2016:100; Franklin, 2013:35). The student supporters played an important role in exposing students to skills and opportunities to practice skills (Ford *et al*., 2016:100). Dale *et al*. (2013:4) found that students need to clarify the outcomes for themselves, together with the student supporters, right from the start of the placement in order to be successful. Students need to understand that their achievement largely depends on their own willingness, curiosity and efforts to seek new learning opportunities (Löfmark *et al*., 2012:167; Papp *et al*., 2003:265).

Students want continuity during their clinical placement (Robinson *et al*., 2007:374). Continuity is enhanced when students and their student supporters share a work roster (Pålsson *et al.,* 2017:83; Ford *et al*., 2016:98; Courtney-Pratt, FitzGerald, Ford, Marsden & Marlow, 2011:1383; Kapucu & Bulut, 2011:1150; Brooks & Moriarty, 2009:37; Mulready-Schick *et al*., 2009:717; Udlis, 2008:20; Henderson *et al*., 2007:94; Dickson *et al*., 2006:417).

Stakeholders should communicate with each other to find the best ratio for optimal learning and cost containment. Different ratios of student supporters to students are used throughout the world. Ratios that were identified were **one supporter to one student** (Pitkänen *et al*., 2018:148; Pålsson *et al*., 2017:83; Hegenbarth *et al*., 2015:304; Kotera & Matsuda, 2012:2; Cooper Brathwaite & Lemonde, 2011:1; Courtney-Pratt *et al*., 2011:1383; Dennison, 2010:341; Brooks & Moriarty, 2009:37; Udlis, 2008:20; Sedgwick & Yonge, 2008:2; Carnwell *et al*., 2007:925; Henderson *et al*., 2007:94), **one supporter to two students** (Pålsson *et al*., 2017:83; Brooks & Moriarty, 2009:37), **one supporter to five students** (Papastavrou *et al*., 2016:3), **one supporter to eight students** (Kapucu & Bulut, 2011:1150; Dickson *et al*., 2005:417), **one supporter to eight - 12 students** (Ford *et al*., 2016:98; Courtney-Pratt *et al*., 2011:1383), **two supporters to one student** (Hutchings *et al*., 2005:950), **two supporters to two students** (Cooper Brathwaite & Lemonde, 2011:2) and **four supporters to two - three students** (Cooper Brathwaite & Lemonde, 2011:2). Martin, Morris, Moore, Sadlo and Crouch (2004:195) found that the majority of students prefer the ratio of one student supporter to two students. The ratio of one student supporter to two students had the advantage of a student sharing the experience with another student and experiencing the expertise of the student supporter (O'Connor, Cahil & McKay, 2014:282; Martin *et al*., 2004:195). It also increased the time of student support and decreased the workload of the supporters (Dale *et al*., 2013:2; Hutchings *et al*., 2005:950). Students supervised by a team were not satisfied with this model, because they did not have a personal student supporter relationship (Papastavrou *et al*., 2010:181). Robinson *et al*. (2007:374) indicated that working with different student supporters during clinical placement had a negative effect on students' clinical learning.

4.2.3 Relationship between higher education institutions and service providers

Concluding statement 3: Higher education institutions and healthcare providers (such as healthcare facilities) should support students through formal collaboration/partnerships, with student supporters employed by the institutions, and these institutions should support the student supporters in various ways.

It is the joint responsibility of the HEI and the HCP to support students through a formal partnership. The importance of a partnership was emphasised in the integrative review. Happell (2009:375) indicates that the relationship between the student and the student supporter cannot be considered in isolation from the HEI(s) and the HCP(s). HEI(s) and HCP(s) should acknowledge that the production of skilled graduates is a shared responsibility (Pitkänen *et al*., 2018:144, 148; Lawal *et al.,* 2016:36; Happell, 2009:375; Papp *et al*., 2003:266-267; Van Eyk & Baum, 2002:267).

Henderson *et al*. (2007:93) indicate that the purpose of a partnership between the HEI and the HCP is to develop shared formal agreements and commitments in order to provide students with the best clinical learning experience. Such an agreement should be based on what each partner can offer to the partnership, and the expectations of each partner (Papp *et al*., 2003:266; Van Eyk & Baum, 2002:266). Henderson *et al*. (2007:95) state that establishing and maintaining a partnership can be difficult, time consuming and resource intensive. The HCP or the HEI can employ student supporters in the CLE. Both stakeholders should provide the necessary resources (Lawal *et al*., 2016:36; Happell, 2009:375; Papp *et al*., 2003:266-267; Van Eyk & Baum, 2002:267).

The partnership between the student supporters from the HEI and the student supporters from the HCP is very important for the effective clinical learning of students (Kotera & Matsuda, 2012:9). Student supporters appointed by HEI(s) (link supporters) served as a link between HEI(s) and HCP(s) (Dean & Levis, 2016:368; Papastavrou *et al*., 2016:5). These link supporters **informed student supporters in the CLE of student placements**

(Hugo, Botma & Raubenheimer, 2018:88; Dean & Levis, 2016:368; Dale *et al.,* 2013:2), **established strong relationships between the HEI(s) and the HCP(s)** (Hugo *et al.,* 2018:88; Dean & Levis, 2016:368; Dale *et al*., 2013:2), and **maintained academic support** (Hugo *et al*., 2018:88; Holst *et al*., 2017:7; Dean & Levis, 2016:368; Dale *et al*., 2013:2) and **quality assurance and audits** (Courtney-Pratt *et al*., 2011:1386; Henderson *et al*., 2007:93-94). Student supporters in the healthcare environment were supported by link supporters in the following ways: student supporters were updated on educational changes, preparation programmes, student outcomes and the assessment process. The link supporters also assisted with student problems (Courtney-Pratt *et al*., 2011:1386; Mulready-Shick *et al*., 2009:716; Henderson *et al.,* 2007:93-94).

The supporters in the CLE should be familiar with the HEI's curriculum and guidelines, student outcomes and the CLE (Ford *et al*., 2016:98; Courtney-Pratt *et al*., 2011:1383; Henderson *et al*., 2007:94; Dickson *et al*., 2006:417). Students expect student supporters to be consistent, know the level of the students' competencies and give regular, constructive feedback (Happell, 2009:375).

Students indicated that the student supporters in the CLE were often not informed about their arrival. Clinical teachers were often not updated about the curricula, important education documents, the names of the students or the students' level of skills (Hemberg & Sjoblom, 2018:692; Dale *et al*., 2013:3).

4.3 STAGE 5 – PRESENTATION

Tables, figures and diagrams were used to display data throughout the review. The researcher provided details from primary sources, and conclusions were supported by evidence from literature.

4.4 LIMITATIONS

The impact of the researcher's inexperience with the integrative review research method was reduced by the support and guidance from the supervisor and co-supervisor, who are experts in the research field.

A small number of studies were included in this review. However, important characteristics were identified in creating a SCLE for healthcare students. The findings of the study can assist HEI(s) and HCP(s) to provide SCLE(s).

The inclusion criteria stated that articles in English and abstracts in English would be included in the review. This may have led to a language bias, as important research in other languages could have been missed.

The most common type of study found was qualitative studies. Studies higher in the evidence pyramid could be used in future to investigate the different models available for clinical learning (Polit & Beck, 2017:25).

The studies included in this review are all from first world countries. South Africa is a third world country and studies from similar countries could have been more informative. Despite this, the conclusions of this review are valuable and may still be implemented at the HEI(s) and HCP(s). The identified themes are however generalisable within the contextual constraints.

Most of the studies included in this review focused on nursing students. Only one study included healthcare students from other disciplines. The selection of studies focusing on nursing occurred despite the inclusion criteria that indicated all healthcare students.

A limitation of the review is that new studies related to the review question may have been generated since the cut-off date on the review. However, an update of the integrative review will be conducted as soon as possible.

4.5 RECOMMENDATIONS

The following recommendations are made for the relevant stakeholders based on the findings of the integrative review:

4.5.1 Higher education institutions and Healthcare providers

- The HEI(s) and the HCP(s) should collaborate to support the students (Sedgwick & Yonge, 2008:9; Carnwell *et al*., 2007:931).

- The HEI(s) and the HCP(s) should attempt to form beneficial relationships in order to support the students.

- Contracts where both institutions contribute to the clinical learning of the students should be negotiated.

- The number of placements needed and available, the number of student supporters available and needed, and the ratio of student supporter to student, according to the available resources in both the HEI(s) and the HCP(s), should be negotiated.

- The healthcare providers should assist the higher education institutions by providing placements, opportunities for students to learn and supporting the students in clinical learning.

- Since students are important for the future of healthcare, elements of an effective partnership between the HEI(s) and HCP(s) need to be explored.

4.5.2 Student supporters

- Funding needs to be sourced in order to ensure enough student supporters.

- Specific qualities that enhance clinical teaching should be considered when selecting student supporters and student supporters should be willing to spend time with students.

- The carefully selected student supporters should work on a supernumerary level to be able to support the students more effectively (Cooper Brathwaite & Lemonde, 2011:5). If it is not possible for the student supporters to work on a supernumerary level, reducing the workload while students are in placement should be negotiated (Sedgwick & Yonge, 2008:9).

- The roles and responsibilities of the student supporters in both the HEI(s) and the HCP(s) should be clarified in order to prevent role confusion. Roles should be divided between supporters from the HEI(s) and the HCP(s). Role division will assist student supporters to find the time to spend with students (Cooper Brathwaite & Lemonde, 2011:5; Carnwell *et al*., 2007:931), to support students in the CLE in different ways (Cooper Brathwaite & Lemonde, 2011:5; Carnwell *et al*., 2007:931; Stockhausen, 2005:13), and to prevent the burnout of student supporters (Cooper Brathwaite & Lemonde, 2011:5; Carnwell *et al*., 2007:931).

- The higher education institutions should support the student supporters in the clinical learning environment with adequate and timely information regarding student placement, the students' level of competence, the students' outcomes, training and support with student problems.

4.5.3 Research

Based on the study findings, there may be evidence in support of further research.

- The different models identified in this review need to be explored further. A comparative study of the different models can identify each model's strong and weak points.

- The included research mostly focused on the perceptions of the students, while the insights from other stakeholders were not included. Further research on the perceptions of all stakeholders could give significant insight into the complexity of the CLE and the struggles that all stakeholders face.

- It is further recommended that this integrative review should be revisited in time as healthcare education and the CLE evolves.

4.5.4 Link tutors

- Link tutors could assist the relationship between the HEI(s) and HCP(s) by communicating the needs of the HCP(s) to the HEI(s), and vice versa.

- The link tutor can assist with identifying the needs of student supporters and communicate this need to the HEI. The HEI can then support the student supporters by providing the needed information and training (Courtney-Pratt, Ford & Marlow, 2015:516; Sedgwick & Yonge, 2008:9). Such information may include: student supporter preparation programmes (Carnwell *et al*., 2007:929) and student outcomes (Carnwell *et al*., 2007:929).

- The HEI(s)'s policies and placement needs can be communicated to the HCP.

- The link tutor should be working on a supernumerary basis or the workload should be decreased (Sedgwick & Yonge, 2008:9; Carnwell *et al*., 2007:930).

4.6 CONCLUSIONS OF THE STUDY

The integrative review explored the different strategies available to enhance a SCLE for undergraduate students in health sciences and led to new insights regarding supportive clinical learning environment strategies for undergraduate students in health sciences.

Multiple factors needed to support the healthcare student in the CLE were identified. These factors provided insights into the complexity of a SCLE.

A good relationship between the HEI and the HCP forms the basis of this complex phenomenon. The HEI should support the student supporters in the HCP with adequate and timely information regarding student placements, the students' level of competence, the students' outcomes, training, and support with student problems. The student supporters in the HCP should assist the HEI by providing placements, opportunities for students to learn, and supporting the students in clinical learning. It is important that student supporters have certain qualities that enhance clinical teaching, and that they are willing to spend time with students.

Different models for clinical support are available and each one has its advantages and disadvantages. It is often difficult to implement these strategies due to human and financial constraints. The principles identified in these models can however be implemented in the CLE in innovative ways to provide students with the best clinical learning opportunities.

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ADDENDUM A

Ethical Clearance

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

29-Apr-2019

Dear **Annelie Orton**

Ethics Clearance: **An integrative review of supportive clinical learning environment strategies for undergraduate students in health sciences.**

Principal Investigator: **Annelie Orton**
Department: **School of Nursing Department (Bloemfontein Campus)**

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.
Your ethical clearance number, to be used in all correspondence is:**UFS-HSD2019/0305/2805**
The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.
We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.
A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.
The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.
For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.
Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00006240; REC 230408-011; IORG0005187; FWA00012784

Block D, Dean's Division, Room D104 | P.O. Box/Posbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa
www.ufs.ac.za

ADDENDUM B

Critical evaluation and data extraction of included studies

CRITICAL EVALUATION AND DATA EXTRACTION OF INCLUDED STUDIES

Bibliographic details and context	Research method	Data collection and data analysis	Strategy that was used	Study findings	Critical evaluation (Quality)
1. Bourgeois, S., Drayton, N. & Brown, A. 2011. An innovative model of supportive clinical teaching and learning for undergraduate nursing students: The cluster model. *Nurse Education in Practice*, 11(2011):114-118. **Australia**	**Aim:** To discuss a supportive model of clinical practicum teaching and learning as used for undergraduate nursing students. **Design:** Qualitative research **Setting:** Six wards in Nepean Hospital in Sydney, New South Wales, Australia. **Population**: Registered nurses [RN(s)] from the six wards that agreed to participate in the study. First, second and third year Bachelor of Nursing students from two university campus locations, placed in the six wards that agreed to participate. **Recruitment:** RN**(s)** who were interested were short-listed and interviewed. The clinical teachers were selected based on their interest in clinical teaching, their clinical experience and qualifications, and the necessary characteristics for clinical teaching. **Sample:** Number of clinical	**Data collection:** **1. Questionnaires:** Open-ended questionnaires were given to students to complete at the end of their placement. **Data analysis:** The evaluations were analysed by the researchers for recurring themes. The identified themes were belonging, practice support, positive experiences, improvements, peer learning and challenges.	**Cluster model** Experienced RN(s) from the wards were assigned to the role of clinical teacher. These nurses' positions in the ward roster were replaced by casual nursing staff during student placement periods to prevent compromised patient care. Six wards agreed to participate. Each ward had two to three clinical teachers, which allowed for the rotation of clinical teachers. Eight students were allocated to each participating ward per week during clinical placement.	**Findings** **1. Belonging:** Students were welcomed as part of the community and verbalised a sense of belonging that facilitated learning. **2. Practice support:** The interaction between the clinical teachers and the clinical staff increased the clinical staff's interest in the students' learning needs. The clinical teachers were always available to assist them. **3. Experiences:** They believed that they contributed to the care of patients. Students felt that they had increased opportunities to practice under supervision. **4. Improvements:** Students had the opportunity to take responsibility for their practice. They felt more confident following their placement, they linked theory and practice, and their time management improved.	**Critical evaluation instrument used:** Critical Appraisal Skills Programme (CASP) (Qualitative research) Checklist There was a clear statement of the aims of the research. The qualitative research method was appropriate for the study. The research design was appropriate to address the aims of the study. The data was collected in a way that addressed the research issue. Data saturation was not reported. The relationship between the researcher and participants was not reported. Ethical approval and ethical considerations were not mentioned. There was a clear statement of the findings. **Included:** Valuable to research. **Level of evidence:** Low

	teachers were not reported. Number of students participating in the study was not stated clearly, but eight students were allocated to each participating ward per week during clinical placement. **Duration:** Five years			**5. Peer learning:** Students supported each other by sharing their workload and discussing their experiences. They enquired into problems and issues together. The environment was less threatening working in a group. **Negative findings:** There was not enough room in the ward to accommodate the extra students during lunch and tea breaks. Students complained that they could not hear well during handovers, because of the limited space in the rooms. **Limitations:** Not reported **Recommendations:** Clinical teachers should inform clinical staff of the students' practice abilities. Regular meetings are suggested. A scope of practice poster should be put up in every ward. Students should take responsibility for their own learning. A different model of funding might be considered in order to reduce the group size.	

2. Carey, M.C., Chick, A., Kent, B. & Latour, J.M. 2018. An exploration of peer-assisted learning in undergraduate nursing students in paediatric clinical settings: An ethnographic study. *Nursing Education Today*, 65 (2018): 212-217. **United Kingdom**	**Aim:** To report on the findings of a study to explore Peer-assisted learning (PAL) in undergraduate nursing students, studying children's health, in the paediatric clinical setting. **Design:** Qualitative ethnographic study using non-participant observations. **Setting:** Range of inpatient paediatric clinical settings across two teaching hospitals located in one region in England. **Population:** First, second and third year paediatric nursing students enrolled in a Bachelor of Nursing Programme, placed across the two sites. **Recruitment:** A third-party academic person approached the students, as the researchers were known to the students. **Sample:** The students were purposefully selected. A sample size of 20 students were identified. Seventeen students agreed to participate in the study. **Duration:** Two years	**Data collection:** The student participants were observed by the primary researcher over a period of two weeks at each site. Interactions between groups of students from all levels of study were recorded for periods of 1 - 5 hours using audio recordings and field notes while the students were working. **Data analysis:** Framework analysis was used to analyse the data. A seven-step process was utilised to analyse over 35 hours of raw data in order to draw key themes together. This process was undertaken by the primary researcher. A second coder was utilised to ensure clarity and transparency during the analysis of the data. The findings were developed into a working framework model that could be utilised to analyse the data from site two and to synthesise it into a more trustworthy framework model. At site two, another 32 hours of observations were collected. Within the findings, the student commentary was coded	**Peer-assisted learning (PAL)** Students acquire skills and knowledge through the active help provided by other students of the same year level. The process of PAL starts with clinical skills development in the simulation laboratory. In the clinical setting RN mentors have been regularly updated about PAL during monthly mentor updates with university lecturers. In this study researchers defined matched equals as nursing students within the same programme and not by the same year of study.	**Findings:** Three main themes were identified: **1. Peers as facilitators to develop learning when engaging in PAL** Peers supported each other through informal teaching by giving advice and guidance. Peer pairs discussed and reinforced their understanding of various tasks through questioning. Students planned clinical and academic assessments together. **2. Working together to develop clinical practice and deliver care** Peer interactions assisted with the development of students' clinical practice through sharing learning experiences of providing care to patients in order to aid their understanding, develop their learning and assist each other. **3. Positive support and interaction from peers to enhance networking and**	**Critical evaluation instrument used:** CASP (Qualitative research) Checklist The aim of the study was clearly stated. The qualitative research method was appropriate. The research design was appropriate to address the aims of the study. The population and sample were clearly stated. The researcher explained how the participants were selected. The saturation of data was not discussed but were noted as a limitation. The researcher considered his/her relationship with the participants. A third party was used to recruit the participants and the first hour of data was not used in order to limit the Hawthorne effect. Ethical approval was obtained and clinical staff and patients were considered during the research. There was an in-depth description of the analysis process. There was a clear statement of findings and there was an in-depth discussion of the findings. **Included:** Valuable to research

				develop working structure Students used each other to navigate the clinical environment by discussing the structure of the clinical learning environment in order to understand where they fit in as nursing students. They had social interactions where they could offload their stress and seek emotional support from each other. **Negative findings:** Not reported **Limitations:** The periods of observation were limited to when students were on placement. This restricted the number of students in the specific placement areas. Ideally the observation should have been conducted between students of the same year level. Students from different year levels were used, because of the limited number of students. The 65 hours of transcription is a limited observation period for an ethnographic study.	**Level of evidence:** High

				Further research is needed to identify gender differences in PAL. **Recommendations:** Mentors and educators need to be aware of the benefits of PAL, as well as how it can contribute toward future strategies and models of learning. Other fields of nursing should be explored in order to determine similarities and the influences of PAL amongst students.	
3. Crawford, R., Jasonsmith, A., Leuchars, D., Naidu, A., Pool, L., Tosswill, L., Trezise, K. & Wordsworth, A. 2018. "Feeling part of a team" a mixed method evaluation of a dedicated education unit pilot programme. *Nurse Education Today*, 68(2018):165-171. **New Zealand**	**Aim:** To evaluate the impact of the DEU pilot on the New Zealand District Health Board's (DHB) nursing staff and nursing students from three undergraduate programmes across two education providers, Whitireia New Zealand and Massey University. **Design:** Mixed method descriptive evaluation design **Setting:** Three clinical areas of one DHB in New Zealand were included, namely a general surgical and vascular unit, a regional heart and lung unit, and a rehabilitation unit.	**Data collection:** The study had two phases. **1. Surveys** Phase one entailed an online anonymous survey to all participants. The research team developed separate surveys for staff and students. A link to the survey was emailed to the participants. The survey contained 22 questions. **2. Focus groups** Following the analysis of the survey, phase one comprised of six separate focus groups conducted with RN(s) and undergraduate nursing students. This was done in order to	**Dedicated education unit (DEU)** The DEU is based on a partnership between tertiary education institutions and clinical providers to provide clinical training for undergraduate nursing students. The model is led by academics and RN(s) working in the clinical environment. RN(s) take ownership of the clinical teaching of the students and are supported by their academic colleagues. Each unit has a CLN and each tertiary provider/programme an ALN. The CLN is	**Findings:** **1. Levels of satisfaction and relationships in the DEU** Most of the nurses and students responded that they experienced a positive relationship. **2. Similarities and differences between previous models and the DEU model** The DEU provided more student support than other models. The clinical areas could provide more students with clinical support even though there was a mix from three different programmes. There was improved	**Critical evaluation instrument used:** Mixed Methods Appraisal Tool (MMAT) There was a clear research question. The collected data addressed the research questions. A quantitative non-randomised component was included in the study. The target population was clearly described. The sample size was small and this can have an influence on transferability. The measurements were appropriate regarding the outcome and exposure. The outcome data were complete and the confounders were not accounted for

	Population: All RN(s), enrolled nurses, nurse managers, nurse educators, Clinical liaison nurses [CLN(s)], Academic liaison nurse [ALN(s)] and nursing students working in the DEU. There were 160 staff members and 26 students. **Recruitment:** All RN(s), enrolled nurses, nurse managers, nurse educators, CLN(s), ALN(s) and nursing students in the DEU were invited to participate in the study. **Sample:** During the first phase, 42 staff members (response rate of 26%) and 24 students (response rate of 92%) completed the survey. During phase two, 16 students and 17 staff participated in the focus group. **Duration:** Not reported	clarify issues and to add validity to the findings. Potential participants were informed of the opportunity to take part in a focus group discussion via email. The structured questions for the focus groups were developed by the research team based on the analysis of the survey data. The focus groups were held at a convenient place and time for participants. The sessions were 40 – 60 minutes long. Six focus groups were held. One was held with the ALN(s), two with nursing students and three with nursing staff. The focus group facilitation was undertaken by members of the research team who had no relationship with the group members. **Data analysis:** Survey data were analysed using descriptive statistical methods evaluating variances, percentages and distribution patterns. Qualitative data were thematically analysed using a general inductive approach described by Thomas (2006). The qualitative	a senior RN who is experienced in supporting clinical learning. The ALN is a RN working in an educational institution. Nursing students in each unit work alongside RN preceptors for daily support, with the CLN(s) an ALN(s) working collaboratively to facilitate clinical learning and complete the summative assessments of the students' learning.	teamwork, which assisted in the monitoring of student progress. Documentation was more manageable for the RN(s), as the CLN(s) and the ALN(s) completed the forms. **3. Supportive and flexible learning structure** Students felt that they were part of the team. Staff were approachable and supportive and provided the students with a nurturing learning environment. The students preferred to work with the same patients. Students had an allocated person who could manage issues. The CLN(s) were responsible for planning learning opportunities. The CLN(s) valued the flexibility that the unit provided to enable them to respond to students' learning needs, as well as the needs of patients and staff. **4. Learning partnership** The students enjoyed the partnership between the different members of the DEU.	in the design and analysis. The intervention was administered as intended. The qualitative approach was appropriate to answer the research question. The method was not clearly described regarding who the facilitator was, the language that was used or whether data saturation was reached. The findings were adequately derived from the data. The interpretation of results was sufficiently verified. There is consistency between data sources, collection, analysis and interpretation. There was an adequate rationale for using a mixed-methods design in order to answer the research question. The different components of the study were adequately integrated and the outputs of the integration of quantitative and qualitative components were adequately interpreted. The different components of the study adhered to the quality criteria of each method used. **Included:** Valuable to research

		data were summarised into key themes and then links between themes and research objectives were created. Nurse educators analysed nursing staff responses and nursing staff analysed nursing students' responses, in order to prevent research team members from analysing their own areas. All research members were involved in the analysis of the quantitative and qualitative data.		The relationship with the CLN(s) was important to the students. Students were given the opportunity to learn and to take responsibility for their patients. **Negative findings:** The roles of the ALN(s), CLN(s) and preceptors/RN(s) working with students need more clarity. **Limitations:** Not reported **Recommendations:** Research into DEU with students from multiple programmes	**Level of evidence:** Good
4. Croxon, L. & Maginnis, C. 2009. Evaluation of clinical teaching models for nursing practice. *Nurse Education in Practice*, (2009)9:236-243. **Australia**	**Aim:** To evaluate a practice initiative, namely trialling a group model of facilitation as compared to the current preceptor model, to facilitate students' learning in the clinical setting. **Design:** Mixed research method **Setting:** Acute care nursing in Australia. **Population:** Twenty-two second year undergraduate nursing students, enrolled in a Bachelor of Nursing course, who had completed their acute care nursing. **Recruitment:** Not reported.	**Data collection:** **1. Questionnaire** Students were invited to complete a questionnaire on completion of their acute care clinical placement. The students completed a questionnaire regarding their perceptions of the acute nursing practice placements. The questionnaire consisted of a combination of yes/no responses, Likert scale responses and open-ended short responses. The questionnaire was designed by the researchers with the objective to gain insight	The participants experienced both the cluster or group model, and the preceptor model of supervision. **Cluster or group model** Eight students were placed in one critical unit with a clinical teacher or a clinical facilitator. The clinical facilitator was a RN from the clinical setting where the student was placed. The RN was paid by the university. He/she was familiar with the staff, ward environment and policies and procedures of the	**Findings:** CLUSTER OR GROUP MODEL **1. The quantitative data** focused on: **a) Opportunity to achieve clinical objectives of the placement** Students felt that they could complete their objectives. **b) Opportunity to practice clinical skills** This model allowed the facilitators to observe the students' clinical skills and give direction as needed. **c) Degree of support from clinical facilitator/ preceptor**	**Critical evaluation instrument used:** Mixed Methods Appraisal Tool (MMAT) There was a clear research question and the collected data addressed the research question. A quantitative descriptive component was included in the study. There was a clear description of the target population. The small sample may impact on transferability. The researchers did not indicate whether the questionnaire used was pre-tested prior to the data collection. The

	Sample: Twenty-two, second year undergraduate nursing students enrolled in a Bachelor of Nursing course voluntarily chose to participate in the study. A convenience sample was done. **Duration:** The students were placed in an acute nursing practice for four weeks. The duration of the study was not reported.	into students' thoughts and experiences. **2. Interviews** Interviews were conducted based on the responses to the questionnaires, thus gathering both qualitative and quantitative data through a triangulation approach. It is not clearly stated how these interviews were conducted. **3. Survey** Students were asked to rate each model with regard to 1) its suitability in providing opportunities to achieve clinical objectives, 2) practice clinical skills, 3) the availability of the preceptor or clinical facilitator, and 4) the level of support and clinical instruction provided. They were asked to state their preference between the models and to explain their choice. **Data analysis:** Data analysis was completed through thematic coding. Major themes were identified in relation to factors that enhanced or hindered the participants' experience of the two clinical models. The coded themes were then further examined	area. The students worked under direct supervision of the RN. **Preceptor model** Students worked under the supervision of a RN who was part of the clinical staff in a nursing area. The RN was employed by the health service and supervised the students' practice and assisted students. They had a one-to-one relationship with the students while accepting a normal workload.	Students felt well supported, because they always had someone to turn to if they needed assistance. **d) Opportunity for one-to-one instruction from the clinical facilitator/ preceptor** There was a high degree of satisfaction with one-to-one instruction from the clinical facilitators/preceptors . **2. The qualitative data** revealed the following themes: **a) The role and support of the clinical facilitator/preceptor** Students felt that they had access to someone if staff could not assist them, as facilitators were immediately available and willing to teach them. **b) Clinical staff interaction and clinical staff attitudes in the clinical setting** Students reported that the willingness of clinical staff to welcome students positively influenced their learning. Time was an important	statistical analysis was not clearly stated. The qualitative approach was appropriate to answer the research question. The researchers indicated that interviews were done based on the questionnaire, but no evidence of this was included in the study. Saturation of data was not indicated. The findings were adequately derived from the data. The interpretation of results was sufficiently verified. There is consistency between data sources, collection, analysis and interpretation. The reasons for conducting a mixed-methods study were not clearly described. The different components of the study were adequately integrated and the outputs of the integration of quantitative and qualitative components were adequately interpreted. The quantitative component of the study did not adhere to the quality criteria of quantitative descriptive studies. **Included:** Valuable to research

		to identify additional themes.		factor to determine clinical staff's willingness to assist students. **c) Opportunity to practice clinical skills** The facilitators could observe the students' clinical skills and gave direction if needed. Students felt that they could complete their clinical objectives. **d) Student confidence** Working with peers assisted in building their self-confidence. The module assisted in developing team skills. PRECEPTORSHIP MODEL **The quantitative data** focused on: **a) Opportunity to achieve clinical objectives of the placement** Students felt that they could complete their clinical objectives. **b) Opportunity to practice clinical skills** Students felt that they could practice their clinical skills, but the results were lower than for the group or CM.	**Level of evidence:** Low

				c) Degree of support from clinical facilitator/preceptor The students indicated that the degree of support was much less than with the group or CM. **d) Opportunity for one-to-one instruction from the clinical facilitator/preceptor** Students had one-to-one instruction. This was slightly less than with the group or CM. **2. The qualitative data** revealed the following themes: **a) The role and support of the clinical facilitator/preceptor** Students felt that they could complete their clinical objectives and learn independently. **b) Clinical staff interaction and clinical staff attitudes in the clinical setting** Students reported that the willingness of clinical staff to welcome students positively influenced their learning. Time was an important factor to determine clinical staff's willingness to assist students.	

				c) Opportunity to practice clinical skills Students experienced the hands-on experience as positive. **d) Student confidence** Students experienced an increase in self-confidence. **e) Opportunity for one-to-one instruction from the clinical facilitator/preceptor** Students appreciated the one-to-one instruction from their facilitators/preceptors . **Negative findings:** BOTH MODELS Students felt that clinical staff were sometimes too busy and could not discuss nursing care. Some students experienced the clinical staff as unhelpful and not willing to teach them. PRECEPTOR MODEL Students felt that preceptors lacked time to spend with them. It was sometimes hard for them to find their preceptors. In cases where the preceptors were not available,	

				the staff members were not willing to assist them. Some students struggled to practice their skills under the preceptor model. **Limitations:** The sample size was small. This could impact on the transferability of the study. It also had an impact on the validity of the findings. **Recommendations:** Universities should try to ensure enough funding for clinical facilitators. Research and feedback from the clinical staff are needed to facilitate understanding of clinical placements, to identify positive and negative aspects, and to improve the models.	
5. Henderson, A., Twentyman, M., Eaton, E., Creedy, D., Stapleton, P. & Lloyd, B. 2009. Creating supportive clinical learning environments: an intervention study. *Journal of Clinical Nursing*, 19:177-182. **Australia**	**Aim:** To assess the impact of an intervention aimed to build capacity of RN(s) to enhance the clinical learning environment of undergraduate nursing students. **Design:** Quasi-experimental design **Setting:** Two acute surgical wards in the tertiary referral hospital in South-East Queensland, Australia, specialising in	**Data collection:** **1. Questionnaire** The Clinical Learning Environment Inventory (CLEI) was adapted and used to assess the students' perception of the psycho-social aspects of the clinical learning environment. The same students were used for the control and intervention groups. Student feedback data from a control group were	**Capacity-building intervention** Students worked alongside RN(s). The students and RN(s) received assistance from supernumerary clinical facilitators. The ratio was one facilitator to eight students. The clinical facilitators, funded by the university, ensured that RN(s) and students were aware of students'	**Findings:** **1. Satisfaction** Students' satisfaction was reliant on their ability to engage in tasks and individual needs being met. During the intervention period there was a noted increase in the students' satisfaction regarding the psycho-social elements of the learning environment.	**Critical evaluation instrument used:** The Joanna Briggs Institute Checklist for Quasi-Experimental Studies (non-randomised experimental studies) The researchers noted that the participants included in the comparisons are similar. All participants received similar treatment, except for the intervention. There

	vascular, plastics and head and neck, participated in the study. **Population:** All students who did their clinical practicum before, during, and six months after the intervention. All nurses from the two acute surgical wards where the intervention was done. **Recruitment:** All students who did their clinical practicum before, during, and six months after the intervention were invited to participate in the study. The recruitment of RN(s) is not discussed. **Sample:** Sixty-two students participated in the study. All RN(s) in the two wards participated. The exact number of RN(s) is not indicated. **Duration:** Data were collected in August 2005, October 2005, November 2005 and May 2006.	compared to the intervention group. The control group's data consisted of data collected immediately prior to and six months after the intervention. The data from before the intervention and six months afterwards were grouped together into a control group. The intervention group's data consisted of data collected during the Capacity building intervention. **Data analysis:** The data analysis was done using SPPS.	scope of practice and other quality and safety considerations. The clinical facilitators directly supervised and assessed students incorporating the feedback from the RN(s). An experienced educator conducted capacity-building activities with the RN(s). The educator visited the wards every second day during the six week intervention. During visits of three to four hours, in-service training was conducted.	**2. Student involvement, innovation and personalisation** RN(s) engaged with students as individuals, encouraged their participation and recognised their unique needs. The intervention group rated the psycho-social factors of the clinical environment more favourably than the control group. **Negative findings:** Not reported **Limitations:** The study was limited by the small sample size which influenced transferability. The study was workplace specific. Turnover of nursing, educational support and patient acuity could have had an impact on the results. **Recommendations:** Strategies should be implemented to develop the training skills and abilities of RN(s). Structures and processes should be put into place so that interventions can lead to real changes in practice.	was a control group. There were multiple measurements of the outcome, both pre- and post-intervention. The outcomes of the participants in both groups were compared in the same way. The outcomes were measure in a reliable way. Appropriate statistical analysis was used. The CLEI has a low internal reliability. **Included:** Valuable to research **Level of evidence:** High
6. Jokelainen, M., Turunen, H., Tossavainen, K.,	**Aim:** To describe the mentoring of nursing students in clinical	**Data collection:** **1. Databases:**	**Mentoring** A clinical nurse supervises, teaches	**Findings:** Two themes emerged from the research:	**Critical evaluation instrument used:**

Jamookeeah, D. & Coco, K. 2011. A systematic review of mentoring nursing students in clinical placements. *Journal of Clinical Nursing*, 20:2854-2867. **United Kingdom, Australia, Scotland, Hong Kong, Finland, Ireland**	placements by reviewing prior empirical research articles published in scientific journals dealing with student mentoring, and investigate the topic from the perspectives of mentors, leaders, students and educators. **Design:** Systematic review **Setting:** United Kingdom, Australia, Scotland, Hong Kong, Finland, Ireland **Population:** Data were collected from electronic data sources published between 1986 and 2006. **Sample:** Twenty-three articles were analysed.	Seven databases were chosen, namely CINAHL, Medic, PubMed (MEDLINE), ERIC, EBSCOHost and ISI Web of Science. The Cochrane Library was also searched. **2. Inclusion criteria** 1) Literature from 1986 to 2006 2) Literature in all languages 3) Term/concepts/ keywords: 'mentoring' (mentor*) OR 'preceptoring' (precept*) OR 'supervision' (supervis*) AND 'clinical' (clinic*) AND 'practice'/'training' (pract*, train*) AND 'student' (stud*) 4) Undergraduate/pre-registration student mentoring in clinical practice or training (in placement), which is included in their professional education (bachelor level) 5) Different fields of science concerning the human content: Health sciences (Nursing Science, Medical Science, Pharmacy, Nutrition, Physical Education), Social Sciences, Pedagogy, Science of Economic and Business and Law **3. Progression of the systematic review**	and assesses student nurses in placements during their clinical practice period.	**1. Facilitating students' learning in clinical placements** Students were familiarised with the placement as a working environment. Teamwork was emphasised. Mentoring ensured the possibility for nursing students to study based on personal learning plans and to develop by evaluating learning. Mentoring focused on increasing students' responsibility to work independently and helping them to grow from observers to independent workers. Feedback was given in real-time, regularly and constructively. **2.Strengthening students' professionalism** Professional attributes and identity were developed by the mentors working with students in a professional relationship and by implementing actions that promoted growth in the nursing profession. Students appreciated being treated as nursing colleagues. Other	CASP Checklist: Systematic Review The review addressed a clearly focused question. The authors searched for a specific type of papers. No explanations were given why other fields besides Nursing were excluded despite being included in the initial search. Despite including supervision and preceptor in the search string, all articles with these synonyms were excluded later on. The review's authors ensured the quality of the included studies. The overall results of the review were discussed. The results can be applied to the local population. All the outcomes were considered. The benefits were worth the harms and costs. **Included:** Valuable to research **Level of evidence:** Good

		Each phase of the process was performed by two researchers. First, a literature search was conducted using relevant scientific databases. This search was based on the inclusion criteria. Second, publications were selected by title according to the review question. In the following phase, abstracts were studied for inclusion. Hard copies of research articles were examined. Articles that were not available and duplicate articles were omitted. **4. Data evaluation** The evaluation of the selected research articles was carried out using a custom designed evaluation form. This form was created and formulated on the basis of the assessment form presented by Hawker, Payne, Kerr, Hardey & Powell (2002). The evaluation form included ten specific evaluation sections. Each research article could have a maximum of 30 marks and minimum of zero marks. Research articles that accumulated 15 - 30 marks were accepted		issues included showing empathy towards the students during the clinical practice period by showing interest in, caring for and understanding students and trusting them. Students participated in different types of nursing activities, working alongside mentors. Mentors familiarised students with nursing by acting as role models, showing different aspects and functions of the work of nurses. Mentoring facilitated students' emotional development by assisting them to understand their own feelings and emotions, as well as those of the patients in their care. Mentoring assisted in training the students to improve their practical clinical nursing and communication skills. Students were advised on how to use different nursing methods in real care situations. Mentoring was also described as enabling the improvement of theoretical skills by	

		for the next phase. Two independent researchers performed the data evaluation by evaluating the quality of the selected research articles. The evaluation achieved inter-rater agreement of 84%. **5. Final data** After data evaluation, the number of research articles was 57. Only research articles in the field of nursing science were then selected. In the next phase, only articles with the term "mentoring" was used. Twenty three articles were included in the study. **Data analysis:** The data from the articles were analysed using inductive content analysis. To start, the researchers selected a unit of analysis which was a combination of words or the meaning of a sentence or phrases. Similarities and dissimilarities were sought from the data. Data with the same meaning were gathered together. After undergoing categorisation, classes with similar content were combined into subcategories. Then, subcategories with similar content were		enhancing students' understanding and knowledge of relevant care processes, linking theory into nursing practice and encouraging life-long learning. It deepened the development of critical and reflective thinking. Mentoring also involved encouraging students to consciously reflect on nursing procedures and their own learning. Mentoring further facilitated the development of problem-solving and decision-making skills by helping to clear up difficult nursing situations. **Negative findings:** Not reported **Limitations:** Not reported **Recommendations:** Not reported	

		combined into upper categories.			
7. Newton, J.M., Cross, W.M., White, K., Ockerby, C. & Billet, S. 2014. Outcomes of a clinical partnership model for undergraduate nursing students. *Contemporary Nurse*, 39(1):119-127. **Australia**	**Aim:** To investigate how the social practices of a clinical partnership model underpinned workplace learning for undergraduate students as they transitioned to become graduate nurses. **Design:** Longitudinal design using a mixed-methods approach. **Setting:** Across a healthcare organisation in a variety of clinical settings in Australia, where students are assigned a preceptor (RN) in each ward. **Population:** Bachelor of Nursing degree students in the second or third year of their degree. They must have participated in the clinical training model where they should have completed all their placements scheduled in the partner healthcare organisation. Approximately 60 places are available to second year students in the clinical partnership model per year. Students self-nominate to participate in the clinical model	**Data collection: Interviews** A series of five semi-structured audio-taped interviews were done with the participants. The first interview focused on work history, reasons for studying nursing, and the learning approaches they used at the university and on clinical placement. Subsequent interviews were based on the data analysis from the first review. The fifth interview occurred while participants were either on placement or had recently completed their graduate year. This interview was the focus of this paper. This interview included questions regarding the contributions of clinical placement experiences and the support provided by preceptors to participants' perceived work readiness. The fifth interview included a quantitative component comprised of four key questions. It measured the effectiveness of the preceptorship model, the extent to which they felt work ready at the	**Clinical partnership placement model** This model is underpinned by preceptorship. In this partnership model it is expected that the preceptor will supervise, support, role model, identify and meet individual students' learning needs. Students are expected to work the same roster as their preceptors, including weekends. Partnership is supported by the healthcare organisation and the university's nursing school through the deployment of a clinical nurse educator who facilitates the relationship between the student and the preceptor. The ratio is one (1) teacher to eight (8) students.	**Findings:** Three themes were identified in this category. **1. Organisational familiarity** The model provided students with a degree of familiarity with the organisation. This was an important feature that enabled them to be prepared for work. They had knowledge of the policies and procedures, paperwork, documentation and the ward layout. This led to a degree of confidence and created a sense of continuity. **2. Continuity** Students returned to the same healthcare facility for multiple placements. They valued the ongoing relationship they developed with their preceptors and other staff working with them in the placements. This appeared to make it easier for the students to engage in their learning. It provided a platform of familiarity with the	**Critical evaluation instrument used:** Mixed Methods Appraisal Tool (MMAT) There was a clear research question. The collected data addressed the research question. The qualitative approach was appropriate to answer the research question. Data saturation for the qualitative data was not mentioned. The findings were adequately derived from the data. The interpretation of results was sufficiently verified. There is consistency between data sources, collection, analysis and interpretation. A quantitative descriptive study was done. The sampling strategy was relevant to address the research question. The sample size was small and this can have an influence on transferability. The measurements were appropriate regarding the outcome and exposure. The risk of nonresponsive bias was not explained. The statistical analysis was appropriate to answer the question.

	and this continues through into the end of their third year of study. **Recruitment:** All students in the second and third year of their degree participating in the clinical training model were invited to participate in the research. The chief investigator introduced the project to students during key lectures and distributed expression of interest forms. **Sample:** Thirty students volunteered to participate in the project. Two students withdrew after their initial interviews. A total of 23 students remained engaged through the life of the project and each completed five interviews. **Duration:** 2006 – 2009	end of the programme, the extent to which their clinical experiences facilitated work readiness, and the effectiveness of preceptorship for work readiness. The questionnaire comprised of a five-point Likert scale ranging from "not at all" to "extremely". The researchers did not state which questionnaire they used. Clarification of the participants' responses to the key questions was then obtained through further questioning. All five interviews were conducted by the chief investigator. **Data analysis:** Analysis of interview data was supported through NVivo 8. Four central concepts were identified: 1) Curriculum, 2) Pedagogy-potentials, 3) Personal epistemologies and 4) Impact of workplace culture. These concepts were used as a platform for analysis. Quantitative data arising from the students' fifth interview were analysed using SPSS. It included simple descriptive		setting that promoted student readiness. **3. Social participation** Social participation contributed to the students' sense of belongingness. They experienced this when they were greeted by healthcare workers with whom they have worked before. **Negative feedback:** Not reported **Limitations:** Not reported **Recommendations:** A system should be put in place to recognise RN(s) who are preceptors. There are no national guidelines in Australia to prepare preceptors. Further research is needed to explore how alternative partnership models of clinical learning can prepare the students for practice and how healthcare organisations can foster a culture of learning.	There was not an adequate rationale why a mixed-methods research method was used for the research. The quantitative part of the research was not explained well. It is not clear if the different components of the study effectively answered the research question. The outputs of the integration of qualitative and quantitative components were not adequately interpreted. The research method of the quantitative component did not adhere to the quality criteria of the method. **Included:** Valuable to research **Level of evidence:** Low

		statistics of the readiness ratings.			
8. Roxburgh, M., Bradley, P. & Lauder, W. 2011. The development, implementation and evaluation of demonstration projects of new approaches to providing practice placements in the pre registration nursing programmes: Contemporising practice placements for undergraduate student nurses: Are 'hub and spoke' models the future? University of Stirling, NHS Forth Valley, NHS Highland, NHS Western Isles. Scotland: 1-110. **Scotland.**	**Aim:** To develop, implement and evaluate the impact of a hub and spoke model of clinical placement across three geographically diverse locations, with a particular focus on enhancing the first year student experience of belongingness, continuity, continuous support and contemporary and future focused practice. **Design: A** mixed-methods approach, which is consistent with longitudinal, illuminative evaluation. **Setting:** The University of Stirling over three campuses and National Health Services (NHS) acute hospital facilities with general practitioner clinics and community hospitals in community health partnerships. **Population:** Three hundred and seventy-six students registered for the first year of study in the Common Foundation programme over all three campuses. In the pre-intervention period 29 mentors, 12	**Data collection:** **1. Reflective diary:** Students were asked to complete a reflective diary twice weekly. A total of 87 diaries were completed. **2. Questionnaire:** A clinical learning environment inventory (CLEI) questionnaire was administered at the end of semesters one, two and three within two weeks after the students returned to university. A member of the research team provided the questionnaires to the students. Non-pilot students were also asked to complete the questionnaire during the same period. At the end of semester one, 29 hub and spoke and 56 traditional placement students participated. At the end of semester two, 28 hub and spoke and 61 traditional placement students participated. At the end of semester three, 12 hub and spoke and 28 traditional placement students participated. **3. Short support questionnaire:** All students who	**Hub and spoke models** A student is allocated to a mentor (hub), who allocates the student to other mentors (spoke). The spoke mentors provide feedback and assessments to the hub mentor. Three broad types of hub and spoke models were implemented, namely 1) the internal spoke model, 2) the facilitate spoke model and 3) the fixed spoke model. 1) Within the internal spoke model it was the mentor's responsibility to plan, arrange and report on student progress. The student had input into the planning and had weekly contact with the mentor. 2) In the facilitated spoke model the responsibility for planning and communication was shared between the Practice education facilitators (PEF) for the hub clinical area, the hub and spoke mentors, and the student.	**Findings:** 1. **Belongingness:** **The** majority of the students reported positive feelings of belonging by feeling part of the interdisciplinary team. Mentors were seen as an important link. **2. Continuity:** Students felt confident when returning to a ward as they experienced a clearer integration of theory and practice. **3. Continuous support:** Students were supported by clinical staff in the wards. There was no real difference between the hub and spoke placements and the traditional placement. **Negative findings:** **1. Communication:** Communication between the hub and spoke was too little and not structured. **2. Limited time:** Students felt that their placement was too short. **Limitations:** Firm conclusions are problematic because of the small sampling size, lack of statistics	**Critical evaluation instrument used:** Mixed Methods Appraisal Tool (MMAT) There was a clear research question. The collected data addressed the research questions. The qualitative approach was appropriate to answer the research question. The data collection methods were adequate to address the research question. The findings were adequately derived from the data. The interpretation of results was substantiated by the data. There was coherence between qualitative data sources, collection, analysis and interpretation. A quantitative non-randomised component was used in this study. The participants were representative of the target population. The measurements were appropriate with regards to the outcome and the intervention. Confounders were not discussed. The intervention was changed during its course, but the reasons

	senior charge nurses and 12 personal tutors were involved. During the post-intervention period 38 mentors, 18 senior charge nurses and 10 personal tutors were involved. **Recruitment:** Not reported **Sample:** Thirty-two students participated in the pilot study. The rest of the students (n=330) were non-pilot participants and were a convenience sample. In the pre-intervention period 16 mentors, three senior charge sisters and seven personal tutors participated in the research. In the post-intervention period 16 mentors, one senior charge sister and five personal tutors participated in the research. **Duration:** 18 months	participated in the study, as well as non-pilot students, completed a short questionnaire on support at the end of the third semester. Twenty-two hub and spoke and 63 traditional students completed the questionnaire. The four-item scale questionnaire was developed by Lauder *et al.* (2008). **4. Open-ended survey tool:** An open-ended survey tool was developed, piloted and refined by the researchers. This was given to the mentors, the senior charge sister and personal tutors in the pre- and post-intervention periods. **5. Focus groups:** Focus groups with students, mentors, personal tutors and the senior charge sister were conducted three months into the placement of the students. The focus groups were homogenous and conducted at the placement areas. **Data analysis:** **1. Reflective diary:** The diaries were analysed using content (qualitative) and frequency analysis	3) In the fixed spoke model the University campus placement coordinator (UCPC) was responsible for planning and reporting student progress. The student had no input in planning. Hub mentor contact was arranged on an informal basis. The spoke mentor communicated mainly by means of written communication in the spoke booklets. In all models the spoke mentors communicated with the hub mentors through meetings, telephone conversations and written documentation.	and the nature of the pilot study. The diversity in social and geographical attributes could have impacted on the participants. The team tried to limit the effect by concentrating on first year students who had not yet been exposed to other allocation systems. This could not be extended to the mentors as they had prior experience of the traditional allocation system. There was a lack of mentor involvement from one geographic area of the institution. **Recommendations:** **1. Local:** 1) Additional mentor preparation to support the model should be provided. 2) Spoke placements should be a minimum of four weeks. **2. National:** 1) Realistic timescales for implementation must be followed. 2) Placement areas should not be labeled, as the focus should be on the learning opportunities	were adequately described. Different methods of data collection were used in order to triangulate and confirm findings. The different components of the study integrated to answer the research question. The outputs of the integration of qualitative and quantitative methods were adequately interpreted. The researchers adhered to the quality criteria of the traditions of each of the methods involved. **Included:** Valuable to research **Level of evidence:** Good

		(quantitative). The data collected from the diaries were used for the development of the future focus group schedules. **2. Questionnaire:** The differences between hub and spoke and the comparison group were determined using T-tests. **3. Short support questionnaire:** Support was analysed as four variables (range 0-9) to reflect the source of support. It was also analysed as an 'all source support' variable (range 0-36), which was developed by combining raw scores form all four individual sources of support. **4. Open-ended survey tool:** Frequency and content analysis were conducted. This enabled the comparison between issues of concern identified before introducing the hub and spoke model and experiences after its implementation. **5. Focus groups:** All interviews were recorded and transcribed. Coding categories were continuously revised. Patterning in the data		available in clinical areas. 3) It should be explored whether all RN(s) should be mentors. 4) The feasibilities of PEF's supporting the model should be examined, due to the time involved and the national descriptors of the role. 5) Further study on the hub and spoke model should be conducted to understand its impact on student learning. A study to explore whether increased university input has a substantial effect on the new model is suggested, as well as a study to explore whether all RN(s) should act as mentors.	

		was systematically identified and cross-examined using the constant comparative method.			
9. Williamson, G.R., Callaghan, L., Whittlesea, E., Mutton, L. & Heath, V. 2011. Longitudinal evaluation of the impact of placement development teams on student support in clinical practice. *The Open Nursing Journal*, 2011(5):14-23. **United Kingdom**	**Aim:** To compare and contrast data from before Placement development teams' [PDT(s]) implementation with that gathered after their first year of operation in a longitudinal qualitative evaluation. **Design:** Longitudinal qualitative evaluation **Setting:** Sixteen National health services (NHS) Trusts in the south west peninsula of England were included in the study. The specific placement areas were not indicated. **Population:** Third year physiotherapy students, adult nursing students, podiatry students, occupational therapy students, midwifery and dietetics and first year paramedics working on 16 National Health Services (NHS) Trusts in the south west peninsula of England were included in the study. The size of the population was not mentioned.	**Data collection:** Telephonic interviews and focus groups were used to explore student support from the clinical staff and multi-professional student perspective. Thirty physiotherapy students, adult nursing students, podiatry students and occupational therapy students were part of focus groups. There was a focus group for physiotherapy students, a focus group for adult nursing students and another focus group for the podiatry and occupational therapy students. Eleven (11) students participated in telephonic interviews. The interviews included midwifery, dietetics and paramedic students who were off-site at the time that focus groups were held. Telephonic interviews were conducted with the PDT staff after signed consent was obtained. Interviews and focus groups were digitally	**Placement Development Team [PDT(s)]:** PDTs include academic and clinical staff working together in all placement areas. They aim to deliver supportive activities to students and mentors in clinical practice. These activities include mentor preparation, visits to placement areas in order to support mentors and students, performing quality assurance audits, designing action plans with placement areas and providing profession-specific advice in the multidisciplinary settings. PDT(s) involve interdisciplinary teams who support all students in practice. They provide interpersonal and structural support. Mentors act as teachers and supervisors who support, assess and monitor performance.	**Findings:** STUDENT FEEDBACK **1. Communication:** Students generally viewed communication as efficient and positive. They valued the provision of timely information and having a contact person in the clinical learning environment who welcomed them. Good communication between the higher education institute (HEI) and the clinical learning environment was important to the students. Students felt that mentors were well prepared through university and PDT courses. There was good quality, timely and open communication between all parties. Staff supporting the students increased their confidence. **2. Supportive behaviour of staff** Students believed that they were well supported by all staff. They valued being able to direct their	**Critical evaluation instrument used:** CASP (Qualitative research) Checklist There was a clear statement of the aims of the research. There was no justification for choosing the design. Researchers did not indicate if the sample was representative. There is no indication of the population size. There is no mention of data saturation during the interviews. The questions in the pre- and post-PDT(s) were different, while the same questions should have been asked. Too many questions were used for the focus group interviews. There is not a good comparison of data. This study was not longitudinal as indicated, but the umbrella research might have been. It is not clear if the relationship between participants and the researcher was considered. The data analysis was not sufficiently rigorous. There is no in-depth

	Recruitment: Students were recruited personally during lectures or via email using the HEI(s) programme manager distribution list. PDT staff, who participated in the implementation, were recruited via email. **Sample:** Forty-one students participated in the research. Thirteen staff members across six Acute Trust PDT(s) participated in the research. They included six academic leads, three practice leads, three directors of nursing and one strategic health authority (SHA) manager. **Duration:** Not reported	recorded and transcribed verbatim. **Data analysis:** Data were analysed using "Thematic Content Analysis". The qualitative approach to interpretation was required to address the aim. Quantification was not done. Codes in transcripts were identified in order to discover key themes. Two researchers coded the data and compared it.		own learning, while still having access to support as they needed it. Autonomy in learning and assessment was very important to the paramedic students. Students appreciated the opportunity to work on a supernumerary basis. **3. The effect of peers on the placement experience** Students verbalised that they received emotional support from their peers by discussing their experiences. Support from peers from other professions consolidated learning. FEEDBACK FROM PDT STAFF **1. Central point of contact** The PDT staff's physical presence was key to the communication between mentors, students, the Trust and HIE. The PDT(s)' roles and responsibilities were communicated clearly so that individuals knew where to go for support. Mentors	description of the analysis process. The pre-PDT(s) were only mentioned and not described in detail. The post-PDT(s) were described well. There is no indication that the researchers critically examined their own role, potential bias and influence during the analysis and selection of data for presentation. **Included:** Valuable to research **Level of evidence**: Low

				reached out to the PDTs for support. **2. Direct provision of support** Mentors and staff were prepared through updates and sessions. **Negative findings:** STUDENT FEEDBACK **1. Communication** Some students did not receive placement information timeously. Students verbalised that all staff who had contact with students during placement should receive the same training as the mentors. Students sometimes felt that the HIE did not communicate the student outcomes to the clinical placement areas. There was a lack of communication between the HEI and the mentors. **2. Unsupportive behaviour of staff** Some students found that clinical staff did not apply the supernumerary principle when workloads were high. **3. The effect of peers on the**	

				placement experience Not all students experienced peer support as positive. They felt that too many students in placement is problematic as there are not enough patients for the number of students. It was difficult to reach outcomes in midwifery. **4. Knowledge and implementation of the work PDT(s)** Some students were unsure about who they should contact for support. They wanted information to be delivered more personally and not via email or other web-based methods. FEEDBACK FROM PDT STAFF **1. Direct provision of support** Challenges that needed to be addressed were staff release, clarity regarding the purpose of placement learning, and preparing staff. **Limitations:** The research was done in one English region. The pre-PDT(s) were done with students in adult	

				nursing and the post-PDT(s) were done with students in adult nursing and other non-medical healthcare professions students. The PDT(s) were implemented as a multi-professional initiative impacting on interprofessional education. **Recommendations:** PDT clinical staff and academic leads should emphasise that there is a shared responsibility between the HEI and the placement providers. Communication channels should be more open. An on-line placement database should be developed. Further research is needed on the views of mentors, the effectiveness of preparation and support and challenges faced by mentors.	
10. Zentz, S.E., Kurtz, C.P. & Alverson, E.M. 2014. Undergraduate peer-assisted learning in the clinical setting. *Journal of Nursing Education*, 53(3):S4-S10. **Unites States**	**Aim:** To evaluate the effectiveness of Peer-assisted learning in the clinical setting and to ascertain students' perceptions of fulfilling the role of professional nurse.	**Data collection:** **1. Capstone Log:** Students were instructed to reflect on their Peer-assisted learning experience in the Capstone Log. **2. Survey:**	**Peer-assisted learning** Senior students assisted for one session in the simulation laboratory and another session in the clinical setting. In the simulation	**Findings:** OPEN-ENDED RESPONSES **1. Second year students:** Four major themes emerged during the analysis of the responses:	**Critical evaluation instrument used:** Mixed methods appraisal tool (MMAT) A clear research question was set. The collected data addressed the research question.

	Design: Descriptive multi-method **Setting:** The strategy was implemented at a nursing college within a private university in the Midwestern United States. The specific clinical area where students were placed, were not indicated. **Population:** Second year and senior students involved in the peer-assisted strategy were asked to participate in the study. The original number of students approached is not indicated. **Recruitment:** The classroom instructor for the senior level course introduced the purpose of the programme, the logistics of scheduling and the students' general responsibilities. **Sample:** The survey was completed by 342 Bachelor of Nursing students who participated in the teaching strategy. This included 206 second year and 136 senior students. There was a response rate of 86.9% second year students and 81.9% senior students.	Students completed a survey that included items rated using a 5-point Likert-type scale and items requiring an open-ended response. The researchers developed the survey. **Data analysis:** Quantitative data were analysed using SPSS. Qualitative data were reviewed by experts in the field of nursing education. Common themes emerged.	laboratory, two senior students were assigned to assist a group of 25 second year students. In the clinical setting, one to two peer teachers were assigned to eight to 10 second year students. Clinical instructors provided senior students with direction regarding how they could assist the second years. Senior students also attended pre- and post-conferences.	**a) Sharing knowledge and skills:** Second year students appreciated the opportunity to ask senior students about patient care. **b) Sharing personal experiences:** Senior students shared their personal experiences about the nursing course and how to be successful. **c) Accessibility:** Students could ask senior students for assistance when mentors and clinical teachers were not available. **d) Decreased anxiety and increased confidence:** Second year students felt more comfortable and less intimidated by the senior students. The interaction with senior students built their confidence. They experienced an increase in learning. **2. Senior students:** Three major themes emerged: **a) Self-reflection:** They had an increased awareness of their own personal and professional development.	The quantitative sampling strategy was relevant in addressing the research question. The sample was representative of the target population. The measurements were appropriate. The statistical analysis was appropriate to answer the research question. The qualitative approach was appropriate to answer the research question. The data collection methods were adequate to address the research question. The findings were adequately derived from the data and were interpreted in such a way that it could be substantiated by the data. There is coherence between qualitative data sources, collection, analysis and interpretation. There was a rationale for the use of mixed methods, which increased the rigour of the study. The quantitative data supported the qualitative data that was collected. The qualitative and quantitative data were adequately and thoroughly explained.

	Duration: Data were collected during a 2-year period.			**b) Teaching:** It increased their teaching abilities and created an interest in nursing education. **c) Helping others:** They could motivate and inspire other students that increased their confidence in the clinical learning environment. QUESTIONNAIRE: **1. Second year students:** They agreed that working with senior students decreased their anxiety, and increased their confidence and learning. **2. Senior students:** They could effectively demonstrate the professional nursing role of teacher, lifelong learner, caregiver, manager and research consumer. **Negative findings:** **1. Second year students:** Some second year students indicated that peer support was not helpful when senior students lacked initiative or had a poor attitude. They also indicated that a lack of time and contact with senior	**Included:** Valuable to research **Level of evidence**: High

				students can be problematic. **2. Senior students:** Students said that they felt insecure regarding the teaching role and their knowledge base. Some students responded that it felt as if the second year students did not need them. **Limitations:** Not reported **Recommendations:** **1. Second year students:** Senior students could be assisted in their role by empowering them. **2. Senior students:** Students indicated that they needed more preparation for peer support. **3. Other:** Written hand-outs to the orientation to the PAL program should be formulated. A discussion with senior students about how to implement the role of teacher will improve preparing for the experience. Developing evaluation skills of students could be explored.	

ADDENDUM C

MMAT version 2018

MIXED METHODS APPRAISAL TOOL (MMAT) VERSION 2018

User guide

Prepared by
Quan Nha HONG[a], Pierre PLUYE[a,*], Sergi FÀBREGUES[b], Gillian BARTLETT[a], Felicity BOARDMAN[c], Margaret CARGO[d], Pierre DAGENAIS[e], Marie-Pierre GAGNON[f], Frances GRIFFITHS[c], Belinda NICOLAU[a], Alicia O'CATHAIN[g], Marie-Claude ROUSSEAU[h], & Isabelle VEDEL[a]

[a]McGill University, Montréal, Canada; [b]Universitat Oberta de Catalunya, Barcelona, Spain; [c]University of Warwick, Coventry, England; [d]University of Canberra, Canberra, Australia; [e]Université de Sherbrooke, Sherbrooke, Canada; [f]Université Laval, Québec, Canada; [g]University of Sheffield, Sheffield, England; [h]Institut Armand-Frappier Research Centre, Laval, Canada

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What is the MMAT?
The MMAT is a critical appraisal tool that is designed for the appraisal stage of systematic mixed studies reviews, i.e., reviews that include qualitative, quantitative and mixed methods studies. It permits to appraise the methodological quality of five categories to studies: qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies.

How was the MMAT developed?
The MMAT was developed in 2006 (Pluye et al., 2009a) and was revised in 2011 (Pace et al., 2012). The present version 2018 was developed on the basis of findings from a literature review of critical appraisal tools, interviews with MMAT users, and an e-Delphi study with international experts (Hong, 2018). The MMAT developers are continuously seeking for improvement and testing of this tool. Users' feedback is always appreciated.

What the MMAT can be used for?
The MMAT can be used to appraise the quality of empirical studies, i.e., primary research based on experiment, observation or simulation (Abbott, 1998; Porta et al., 2014). It cannot be used for non-empirical papers such as review and theoretical papers. Also, the MMAT allows the appraisal of most common types of study methodologies and designs. However, some specific designs such as economic and diagnostic accuracy studies cannot be assessed with the MMAT. Other critical appraisal tools might be relevant for these designs.

What are the requirements?
Because critical appraisal is about judgment making, it is advised to have at least two reviewers independently involved in the appraisal process. Also, using the MMAT requires experience or training in these domains. For instance, MMAT users may be helped by a colleague with specific expertise when needed.

How to use the MMAT?
This document comprises two parts: checklist (Part I) and explanation of the criteria (Part II).

1. Respond to the two screening questions. Responding 'No' or 'Can't tell' to one or both questions might indicate that the paper is not an empirical study, and thus cannot be appraised using the MMAT. MMAT users might decide not to use these questions, especially if the selection criteria of their review are limited to empirical studies.
2. For each included study, choose the appropriate category of studies to appraise. Look at the description of the methods used in the included studies. If needed, use the algorithm at the end of this document.
3. Rate the criteria of the chosen category. For example, if the paper is a qualitative study, only rate the five criteria in the qualitative category. The 'Can't tell' response category means that the paper do not report appropriate information to answer 'Yes' or 'No', or that report unclear information related to the criterion. Rating 'Can't tell' could lead to look for companion papers, or contact authors to ask more information or clarification when needed. In Part II of this document, indicators are added for some criteria. The list is not exhaustive and not all indicators are necessary. You should agree among your team which ones are important to consider for your field and apply them uniformly across all included studies from the same category.

How to score?
It is discouraged to calculate an overall score from the ratings of each criterion. Instead, it is advised to provide a more detailed presentation of the ratings of each criterion to better inform the quality of the included studies. This may lead to perform a sensitivity analysis (i.e., to consider the quality of studies by contrasting their results). Excluding studies with low methodological quality is usually discouraged.

How to cite this document?
Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, Dagenais P, Gagnon M-P, Griffiths F, Nicolau B, O'Cathain A, Rousseau M-C, Vedel I. Mixed Methods Appraisal Tool (MMAT), version 2018. Registration of Copyright (#1148552), Canadian Intellectual Property Office, Industry Canada.

Part I: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening 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 non-randomized	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?				

Part II: Explanations

1. Qualitative studies	Methodological quality criteria
"Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem" (Creswell, 2013b, p. 3). Common qualitative research approaches include (this list if not exhaustive): **Ethnography** The aim of the study is to describe and interpret the shared cultural behaviour of a group of individuals. **Phenomenology** The study focuses on the subjective experiences and interpretations of a phenomenon encountered by individuals. **Narrative research** The study analyzes life experiences of an individual or a group. **Grounded theory** Generation of theory from data in the process of conducting research (data collection occurs first). **Case study** In-depth exploration and/or explanation of issues intrinsic to a particular case. A case can be anything from a decision-making process, to a person, an organization, or a country. **Qualitative description** There is no specific methodology, but a qualitative data collection and analysis, e.g., in-depth interviews or focus groups, and hybrid thematic analysis (inductive and deductive). Key references: Creswell (2013a); Sandelowski (2010); Schwandt (2015)	1.1. Is the qualitative approach appropriate to answer the research question? Explanations The qualitative approach used in a study (see non-exhaustive list on the left side of this table) should be appropriate for the research question and problem. For example, the use of a grounded theory approach should address the development of a theory and ethnography should study human cultures and societies. This criterion was considered important to add in the MMAT since there is only one category of criteria for qualitative studies (compared to three for quantitative studies). 1.2. Are the qualitative data collection methods adequate to address the research question? Explanations This criterion is related to data collection method, including data sources (e.g., archives, documents), used to address the research question. To judge this criterion, consider whether the method of data collection (e.g., in depth interviews and/or group interviews, and/or observations) and the form of the data (e.g., tape recording, video material, diary, photo, and/or field notes) are adequate. Also, clear justifications are needed when data collection methods are modified during the study. 1.3. Are the findings adequately derived from the data? Explanations This criterion is related to the data analysis used. Several data analysis methods have been developed and their use depends on the research question and qualitative approach. For example, open, axial and selective coding is often associated with grounded theory, and within- and cross-case analysis is often seen in case study. 1.4. Is the interpretation of results sufficiently substantiated by data? Explanations The interpretation of results should be supported by the data collected. For example, the quotes provided to justify the themes should be adequate. 1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation? Explanations There should be clear links between data sources, collection, analysis and interpretation.

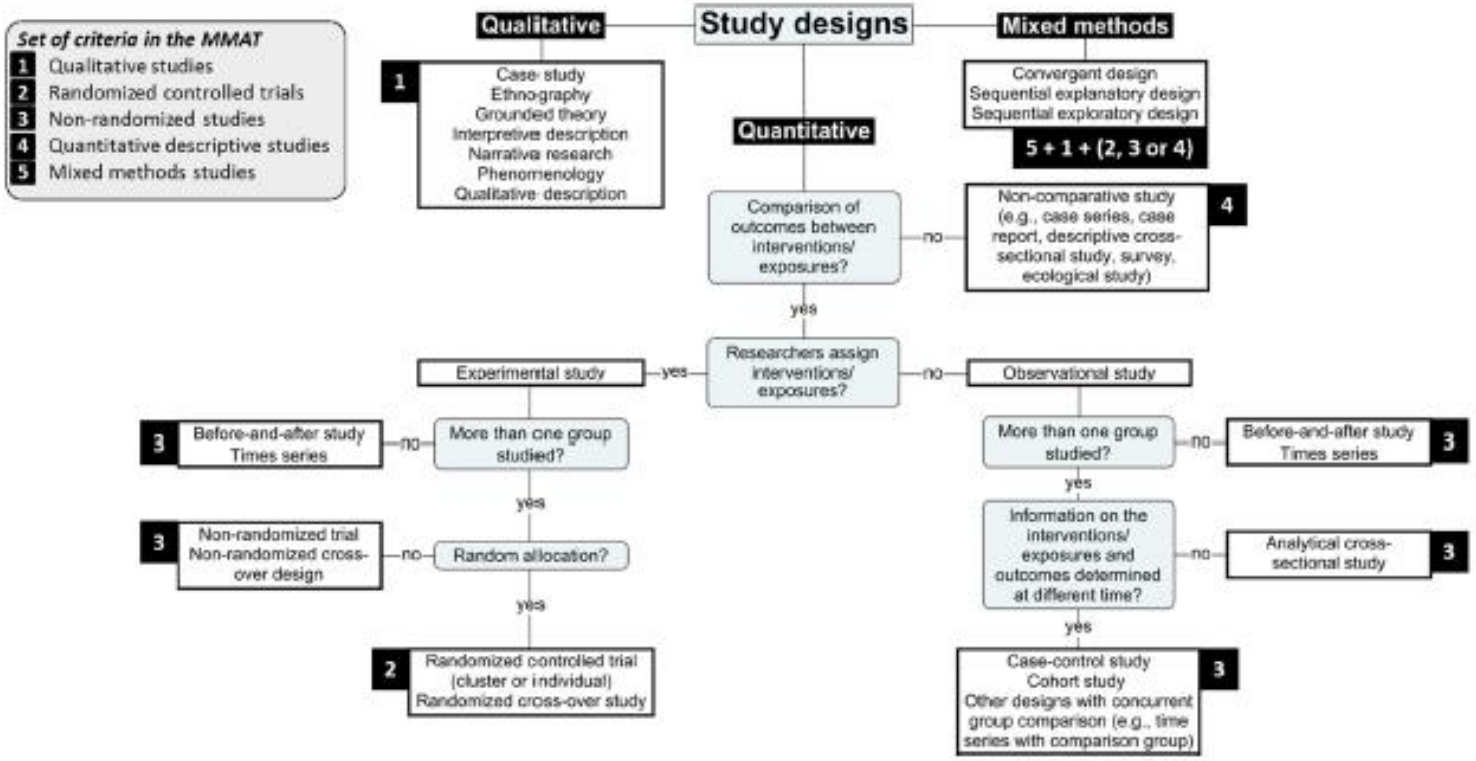
2. Quantitative randomized controlled trials	Methodological quality criteria
Randomized controlled clinical trial: A clinical study in which individual participants are allocated to intervention or control groups by randomization (intervention assigned by researchers). Key references: Higgins and Green (2008); Higgins et al. (2016); Oxford Centre for Evidence-based Medicine (2016); Porta et al. (2014)	2.1. Is randomization appropriately performed? Explanations In a randomized controlled trial, the allocation of a participant (or a data collection unit, e.g., a school) into the intervention or control group is based solely on chance. Researchers should describe how the randomization schedule was generated. A simple statement such as 'we randomly allocated' or 'using a randomized design' is insufficient to judge if randomization was appropriately performed. Also, assignment that is predictable such as using odd and even record numbers or dates is not appropriate. At minimum, a simple allocation (or unrestricted allocation) should be performed by following a predetermined plan/sequence. It is usually achieved by referring to a published list of random numbers, or to a list of random assignments generated by a computer. Also, restricted allocation can be performed such as blocked randomization (to ensure particular allocation ratios to the intervention groups), stratified randomization (randomization performed separately within strata), or minimization (to make small groups closely similar with respect to several characteristics). Another important characteristic to judge if randomization was appropriately performed is allocation concealment that protects assignment sequence until allocation. Researchers and participants should be unaware of the assignment sequence up to the point of allocation. Several strategies can be used to ensure allocation concealment such relying on a central randomization by a third party, or the use of sequentially numbered, opaque, sealed envelopes (Higgins et al., 2016).
	2.2. Are the groups comparable at baseline? Explanations Baseline imbalance between groups suggests that there are problems with the randomization. Indicators from baseline imbalance include: "(1) unusually large differences between intervention group sizes; (2) a substantial excess in statistically significant differences in baseline characteristics than would be expected by chance alone; (3) imbalance in key prognostic factors (or baseline measures of outcome variables) that are unlikely to be due to chance; (4) excessive similarity in baseline characteristics that is not compatible with chance; (5) surprising absence of one or more key characteristics that would be expected to be reported" (Higgins et al., 2016, p. 10).
	2.3. Are there complete outcome data? Explanations Almost all the participants contributed to almost all measures. There is no absolute and standard cut-off value for acceptable complete outcome data. Agree among your team what is considered complete outcome data in your field and apply this uniformly across all the included studies. For instance, in the literature, acceptable complete data value ranged from 80% (Thomas et al., 2004; Zaza et al., 2000) to 95% (Higgins et al., 2016). Similarly, different acceptable withdrawal/dropouts rates have been suggested: 5% (de Vet et al., 1997; MacLehose et al., 2000), 20% (Sindhu et al., 1997; Van Tulder et al., 2003) and 30% for a follow-up of more than one year (Viswanathan and Berkman, 2012).
	2.4. Are outcome assessors blinded to the intervention provided? Explanations Outcome assessors should be unaware of who is receiving which interventions. The assessors can be the participants if using participant reported outcome (e.g., pain), the intervention provider (e.g., clinical exam), or other persons not involved in the intervention (Higgins et al., 2016).
	2.5 Did the participants adhere to the assigned intervention? Explanations To judge this criterion, consider the proportion of participants who continued with their assigned intervention throughout follow-up. "Lack of adherence includes imperfect compliance, cessation of intervention, crossovers to the comparator intervention and switches to another active intervention." (Higgins et al., 2016, p. 25).

3. Quantitative non-randomized studies	Methodological quality criteria
Non-randomized studies are defined as any quantitative studies estimating the effectiveness of an intervention or studying other exposures that do not use randomization to allocate units to comparison groups (Higgins and Green, 2008). Common designs include (this list if not exhaustive): **Non-randomized controlled trial:** The intervention is assigned by researchers, but there is no randomization, e.g., a pseudo-randomization. A non-random method of allocation is not reliable in producing alone similar groups. **Cohort study** Subsets of a defined population are assessed as exposed, not exposed, or exposed at different degrees to factors of interest. Participants are followed over time to determine if an outcome occurs (prospective longitudinal). **Case-control study** Cases, e.g., patients, associated with a certain outcome are selected, alongside a corresponding group of controls. Data is collected on whether cases and controls were exposed to the factor under study (retrospective). **Cross-sectional analytic study** At one particular time, the relationship between health-related characteristics (outcome) and other factors (intervention/exposure) is examined. E.g., the frequency of outcomes is compared in different population subgroups according to the presence/absence (or level) of the intervention/exposure. Key references for non-randomized studies: Higgins and Green (2008); Porta et al. (2014); Sterne et al. (2016); Wells et al. (2000)	3.1. Are the participants representative of the target population? Explanations Indicators of representativeness include: clear description of the target population and of the sample (inclusion and exclusion criteria), reasons why certain eligible individuals chose not to participate, and any attempts to achieve a sample of participants that represents the target population.
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)? Explanations Indicators of appropriate measurements include: the variables are clearly defined and accurately measured; the measurements are justified and appropriate for answering the research question; the measurements reflect what they are supposed to measure; validated and reliability tested measures of the intervention/exposure and outcome of interest are used, or variables are measured using 'gold standard'.
	3.3. Are there complete outcome data? Explanations Almost all the participants contributed to almost all measures. There is no absolute and standard cut-off value for acceptable complete outcome data. Agree among your team what is considered complete outcome data in your field (and based on the targeted journal) and apply this uniformly across all the included studies. For example, in the literature, acceptable complete data value ranged from 80% (Thomas et al., 2004; Zaza et al., 2000) to 95% (Higgins et al., 2016). Similarly, different acceptable withdrawal/dropouts rates have been suggested: 5% (de Vet et al., 1997; MacLehose et al., 2000), 20% (Sindhu et al., 1997; Van Tulder et al., 2003) and 30% for follow-up of more than one year (Viswanathan and Berkman, 2012).
	3.4. Are the confounders accounted for in the design and analysis? Explanations Confounders are factors that predict both the outcome of interest and the intervention received/exposure at baseline. They can distort the interpretation of findings and need to be considered in the design and analysis of a non-randomized study. Confounding bias is low if there is no confounding expected, or appropriate methods to control for confounders are used (such as stratification, regression, matching, standardization, and inverse probability weighting).
	3.5 During the study period, is the intervention administered (or exposure occurred) as intended? Explanations For intervention studies, consider whether the participants were treated in a way that is consistent with the planned intervention. Since the intervention is assigned by researchers, consider whether there was a presence of contamination (e.g., the control group may be indirectly exposed to the intervention) or whether unplanned co-interventions were present in one group (Sterne et al., 2016). For observational studies, consider whether changes occurred in the exposure status among the participants. If yes, check if these changes are likely to influence the outcome of interest, were adjusted for, or whether unplanned co-exposures were present in one group (Morgan et al., 2017).

4. Quantitative descriptive studies	Methodological quality criteria
Quantitative descriptive studies are "concerned with and designed only to describe the existing distribution of variables without much regard to causal relationships or other hypotheses" (Porta et al., 2014, p. 72). They are used to monitoring the population, planning, and generating hypothesis (Grimes and Schulz, 2002). Common designs include the following single-group studies (this list if not exhaustive): **Incidence or prevalence study without comparison group** In a defined population at one particular time, what is happening in a population, e.g., frequencies of factors (importance of problems), is described (portrayed). **Survey** "Research method by which information is gathered by asking people questions on a specific topic and the data collection procedure is standardized and well defined." (Bennett et al., 2011, p. 3). **Case series** A collection of individuals with similar characteristics are used to describe an outcome. **Case report** An individual or a group with a unique/unusual outcome is described in detail. Key references: Critical Appraisal Skills Programme (2017); Dranguls et al. (2008)	4.1. Is the sampling strategy relevant to address the research question? Explanations Sampling strategy refers to the way the sample was selected. There are two main categories of sampling strategies: probability sampling (involve random selection) and non-probability sampling. Depending on the research question, probability sampling might be preferable. Non-probability sampling does not provide equal chance of being selected. To judge this criterion, consider whether the source of sample is relevant to the target population; a clear justification of the sample frame used is provided; or the sampling procedure is adequate. 4.2. Is the sample representative of the target population? Explanations There should be a match between respondents and the target population. Indicators of representativeness include: clear description of the target population and of the sample (such as respective sizes and inclusion and exclusion criteria), reasons why certain eligible individuals chose not to participate, and any attempts to achieve a sample of participants that represents the target population. 4.3. Are the measurements appropriate? Explanations Indicators of appropriate measurements include: the variables are clearly defined and accurately measured, the measurements are justified and appropriate for answering the research question; the measurements reflect what they are supposed to measure; validated and reliability tested measures of the outcome of interest are used, variables are measured using "gold standard", or questionnaires are pre-tested prior to data collection. 4.4. Is the risk of nonresponse bias low? Explanations Nonresponse bias consists of "an error of nonobservation reflecting an unsuccessful attempt to obtain the desired information from an eligible unit." (Federal Committee on Statistical Methodology, 2001, p. 6). To judge this criterion, consider whether the respondents and non-respondents are different on the variable of interest. This information might not always be reported in a paper. Some indicators of low nonresponse bias can be considered such as a low nonresponse rate, reasons for nonresponse (e.g., noncontacts vs. refusals), and statistical compensation for nonresponse (e.g., imputation). The nonresponse bias is might not be pertinent for case series and case report. This criterion could be adapted. For instance, complete data on the cases might be important to consider in these designs. 4.5. Is the statistical analysis appropriate to answer the research question? Explanations The statistical analyses used should be clearly stated and justified in order to judge if they are appropriate for the design and research question, and if any problems with data analysis limited the interpretation of the results.

5. Mixed methods studies	Methodological quality criteria
Mixed methods (MM) research involves combining qualitative (QUAL) and quantitative (QUAN) methods. In this tool, to be considered MM, studies have to meet the following criteria (Creswell and Plano Clark, 2017): (a) at least one QUAL method and one QUAN method are combined; (b) each method is used rigorously in accordance to the generally accepted criteria in the area (or tradition) of research invoked; and (c) the combination of the methods is carried out at the minimum through a MM design (defined *a priori*, or emerging) and the integration of the QUAL and QUAN phases, results, and data. Common designs include (this list if not exhaustive): **Convergent design** The QUAL and QUAN components are usually (but not necessarily) concomitant. The purpose is to examine the same phenomenon by interpreting QUAL and QUAN results (bringing data analysis together at the interpretation stage), or by integrating QUAL and QUAN datasets (e.g., data on same cases), or by transforming data (e.g., quantization of qualitative data). **Sequential explanatory design** Results of the phase 1 - QUAN component inform the phase 2 - QUAL component. The purpose is to explain QUAN results using QUAL findings. E.g., the QUAN results guide the selection of QUAL data sources and data collection, and the QUAL findings contribute to the interpretation of QUAN results. **Sequential exploratory design** Results of the phase 1 - QUAL component inform the phase 2 - QUAN component. The purpose is to explore, develop and test an instrument (or taxonomy), or a conceptual framework (or theoretical model). E.g., the QUAL findings inform the QUAN data collection, and the QUAN results allow a statistical generalization of the QUAL findings. Key references: Creswell et al. (2011); Creswell and Plano Clark, (2017); O'Cathain (2010)	5.1. Is there an adequate rationale for using a mixed methods design to address the research question? Explanations The reasons for conducting a mixed methods study should be clearly explained. Several reasons can be invoked such as to enhance or build upon qualitative findings with quantitative results and vice versa; to provide a comprehensive and complete understanding of a phenomenon or to develop and test instruments (Bryman, 2006). 5.2. Are the different components of the study effectively integrated to answer the research question? Explanations Integration is a core component of mixed methods research and is defined as the "explicit interrelating of the quantitative and qualitative component in a mixed methods study" (Plano Clark and Ivankova, 2015, p. 40). Look for information on how qualitative and quantitative phases, results, and data were integrated (Pluye et al., 2018). For instance, how data gathered by both research methods was brought together to form a complete picture (e.g., joint displays) and when integration occurred (e.g., during the data collection-analysis or/and during the interpretation of qualitative and quantitative results). 5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted? Explanations This criterion is related to meta-inference, which is defined as the overall interpretations derived from integrating qualitative and quantitative findings (Teddlie and Tashakkori, 2009). Meta-inference occurs during the interpretation of the findings from the integration of the qualitative and quantitative components, and shows the added value of conducting a mixed methods study rather than having two separate studies. 5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed? Explanations When integrating the findings from the qualitative and quantitative components, divergences and inconsistencies (also called conflicts, contradictions, discordances, discrepancies, and dissonances) can be found. It is not sufficient to only report the divergences; they need to be explained. Different strategies to address the divergences have been suggested such as reconciliation, initiation, bracketing and exclusion (Pluye et al., 2009b). Rate this criterion 'Yes' if there is no divergence. 5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved? Explanations The quality of the qualitative and quantitative components should be individually appraised to ensure that no important threats to trustworthiness are present. To appraise 5.5, use criteria for the qualitative component (1.1 to 1.5), and the appropriate criteria for the quantitative component (2.1 to 2.5, or 3.1 to 3.5, or 4.1 to 4.5). The quality of both components should be high for the mixed methods study to be considered of good quality. The premise is that the overall quality of a mixed methods study cannot exceed the quality of its weakest component. For example, if the quantitative component is rated high quality and the qualitative component is rated low quality, the overall rating for this criterion will be of low quality.

Algorithm for selecting the study categories to rate in the MMAT*



*Adapted from National Institute for Health Care Excellence. (2012). *Methods for the development of nice public health guidance*. London: National Institute for Health and Care Excellence; and Scottish Intercollegiate Guidelines Network. (2017). *Algorithm for classifying study design for questions of effectiveness*. Retrieved December 1, 2017, from http://www.sign.ac.uk/assets/study_design.pdf. 8

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ADDENDUM D

Checklist for quasi-experimental studies (non-randomised experimental studies)

THE JOANNA BRIGGS INSTITUTE

The Joanna Briggs Institute

Introduction

The Joanna Briggs Institute (JBI) is an international, membership based research and development organization within the Faculty of Health Sciences at the University of Adelaide. The Institute specializes in promoting and supporting evidence-based healthcare by providing access to resources for professionals in nursing, midwifery, medicine, and allied health. With over 80 collaborating centres and entities, servicing over 90 countries, the Institute is a recognized global leader in evidence-based healthcare.

JBI Systematic Reviews

The core of evidence synthesis is the systematic review of literature of a particular intervention, condition or issue. The systematic review is essentially an analysis of the available literature (that is, evidence) and a judgment of the effectiveness or otherwise of a practice, involving a series of complex steps. The JBI takes a particular view on what counts as evidence and the methods utilized to synthesize those different types of evidence. In line with this broader view of evidence, the Institute has developed theories, methodologies and rigorous processes for the critical appraisal and synthesis of these diverse forms of evidence in order to aid in clinical decision-making in health care. There now exists JBI guidance for conducting reviews of effectiveness research, qualitative research, prevalence/incidence, etiology/risk, economic evaluations, text/opinion, diagnostic test accuracy, mixed-methods, umbrella reviews and scoping reviews. Further information regarding JBI systematic reviews can be found in the JBI Reviewer's Manual on our website.

JBI Critical Appraisal Tools

All systematic reviews incorporate a process of critique or appraisal of the research evidence. The purpose of this appraisal is to assess the methodological quality of a study and to determine the extent to which a study has addressed the possibility of bias in its design, conduct and analysis. All papers selected for inclusion in the systematic review (that is – those that meet the inclusion criteria described in the protocol) need to be subjected to rigorous appraisal by two critical appraisers. The results of this appraisal can then be used to inform synthesis and interpretation of the results of the study. JBI Critical appraisal tools have been developed by the JBI and collaborators and approved by the JBI Scientific Committee following extensive peer review. Although designed for use in systematic reviews, JBI critical appraisal tools can also be used when creating Critically Appraised Topics (CAT), in journal clubs and as an educational tool.

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JBI Critical Appraisal Checklist for Quasi-Experimental Studies (non-randomized experimental studies)

Reviewer_____Date_____

Author _____Year_____Record Number_____

		Yes	No	Unclear	Not applicable
1.	Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	☐	☐	☐	☐
2.	Were the participants included in any comparisons similar?	☐	☐	☐	☐
3.	Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	☐	☐	☐	☐
4.	Was there a control group?	☐	☐	☐	☐
5.	Were there multiple measurements of the outcome both pre and post the intervention/exposure?	☐	☐	☐	☐
6.	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	☐	☐	☐	☐
7.	Were the outcomes of participants included in any comparisons measured in the same way?	☐	☐	☐	☐
8.	Were outcomes measured in a reliable way?	☐	☐	☐	☐
9.	Was appropriate statistical analysis used?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reason for exclusion)

_____

_____

_____

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Explanation for the critical appraisal tool for Quasi-Experimental Studies (experimental studies without random allocation)

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Critical Appraisal Tool for Quasi-Experimental Studies (experimental studies without random allocation)

Answers: Yes, No, Unclear or Not Applicable

1. **Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?**

Ambiguity with regards to the temporal relationship of variables constitutes a threat to the internal validity of a study exploring causal relationships. The 'cause' (the independent variable, that is, the treatment or intervention of interest) should occur in time before the explored 'effect' (the dependent variable, which is the effect or outcome of interest). Check if it is clear which variable is manipulated as a potential cause. Check if it is clear which variable is measured as the effect of the potential cause. Is it clear that the 'cause' was manipulated before the occurrence of the 'effect'?

2. Were the participants included in any comparisons similar?

The differences between participants included in compared groups constitute a threat to the internal validity of a study exploring causal relationships. If there are differences between participants included in compared groups there is a risk of selection bias. If there are differences between participants included in the compared groups maybe the 'effect' cannot be attributed to the potential 'cause', as maybe it is plausible that the 'effect' may be explained by the differences between participants, that is, by selection bias. Check the characteristics reported for participants. Are the participants from the compared groups similar with regards to the characteristics that may explain the effect even in the absence of the 'cause', for example, age, severity of the disease, stage of the disease, co-existing conditions and so on? *[NOTE: In one single group pre-test/post-test studies where the patients are the same (the same one group) in any pre-post comparisons, the answer to this question should be 'yes.']*

3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?

In order to attribute the 'effect' to the 'cause' (the exposure or intervention of interest), assuming that there is no selection bias, there should be no other difference between the groups in terms of treatments or care received, other than the manipulated 'cause' (the intervention of

interest). If there are other exposures or treatments occurring in the same time with the 'cause', other than the intervention of interest, then potentially the 'effect' cannot be attributed to the intervention of interest, as it is plausible that the 'effect' may be explained by other exposures or treatments, other than the intervention of interest, occurring in the same time with the intervention of interest. Check the reported exposures or interventions received by the compared groups. Are there other exposures or treatments occurring in the same time with the intervention of interest? Is it plausible that the 'effect' may be explained by other exposures or treatments occurring in the same time with the intervention of interest?

4. Was there a control group?

Control groups offer the conditions to explore what would have happened with groups exposed to other different treatments, other than to the potential 'cause' (the intervention of interest). The comparison of the treated group (the group exposed to the examined 'cause', that is, the group receiving the intervention of interest) with such other groups strengthens the examination of the causal plausibility. The validity of causal inferences is strengthened in studies with at least one independent control group compared to studies without an independent control group. Check if there are independent, separate groups, used as control groups in the study. *[Note: The control group should be an independent, separate control group, not the pre-test group in a single group pre-test post-test design.]*

5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?

In order to show that there is a change in the outcome (the 'effect') as a result of the intervention/treatment (the 'cause') it is necessary to compare the results of measurement before and after the intervention/treatment. If there is no measurement before the treatment and only measurement after the treatment is available it is not known if there is a change after the treatment compared to before the treatment. If multiple measurements are collected before the intervention/treatment is implemented then it is possible to explore the plausibility of alternative explanations other than the proposed 'cause' (the intervention of interest) for the observed 'effect', such as the naturally occurring changes in the absence of the 'cause', and changes of high (or low) scores towards less extreme values even in the absence of the 'cause' (sometimes called regression to the mean). If multiple measurements are collected after the intervention/treatment is implemented it is possible to explore the changes of the 'effect' in time in each group and to compare these changes across the groups. Check if measurements were collected before the intervention of interest was implemented. Were there multiple pre-test measurements? Check if measurements were collected after the intervention of interest was implemented. Were there multiple post-test measurements?

6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

If there are differences with regards to the loss to follow up between the compared groups these differences represent a threat to the internal validity of a study exploring causal effects as these differences may provide a plausible alternative explanation for the observed 'effect' even in the absence of the 'cause' (the treatment or exposure of interest). Check if there were differences with regards to the loss to follow up between the compared groups. If follow up was incomplete (that is, there is incomplete information on all participants), examine the reported details about the strategies used in order to address incomplete follow up, such as descriptions of loss to follow up (absolute numbers; proportions; reasons for loss to follow up; patterns of loss to follow up) and impact analyses (the analyses of the impact of loss to follow up on results). Was there a description of the incomplete follow up (number of participants and the specific reasons for loss to follow up)? If there are differences between groups with regards to the loss to follow up, was there an analysis of patterns of loss to follow up? If there are differences between the groups with regards to the loss to follow up, was there an analysis of the impact of the loss to follow up on the results?

7. Were the outcomes of participants included in any comparisons measured in the same way?

If the outcome (the 'effect') is not measured in the same way in the compared groups there is a threat to the internal validity of a study exploring a causal relationship as the differences in outcome measurements may be confused with an effect of the treatment or intervention of interest (the 'cause'). Check if the outcomes were measured in the same way. Same instrument or scale used? Same measurement timing? Same measurement procedures and instructions?

8. Were outcomes measured in a reliable way?

Unreliability of outcome measurements is one threat that weakens the validity of inferences about the statistical relationship between the 'cause' and the 'effect' estimated in a study exploring causal effects. Unreliability of outcome measurements is one of different plausible explanations for errors of statistical inference with regards to the existence and the magnitude of the effect determined by the treatment ('cause'). Check the details about the reliability of measurement such as the number of raters, training of raters, the intra-rater reliability, and the inter-raters reliability within the study (not to external sources). This question is about the reliability of the measurement performed in the study, it is not about the validity of the measurement instruments/scales used in the study. *[Note: Two other important threats that weaken the validity of inferences about the statistical relationship between the 'cause' and the 'effect' are low statistical power and the violation of the assumptions of statistical tests. These other threats are not explored within Question 8, these are explored within Question 9.]*

9. Was appropriate statistical analysis used?

Inappropriate statistical analysis may cause errors of statistical inference with regards to the existence and the magnitude of the effect determined by the treatment ('cause'). Low statistical power and the violation of the assumptions of statistical tests are two important threats that weakens the validity of inferences about the statistical relationship between the 'cause' and the 'effect'. Check the following aspects: if the assumptions of statistical tests were respected; if appropriate statistical power analysis was performed; if appropriate effect sizes were used; if appropriate statistical procedures or methods were used given the number and type of dependent and independent variables, the number of study groups, the nature of the relationship between the groups (independent or dependent groups), and the objectives of statistical analysis (association between variables; prediction; survival analysis etc.).

ADDENDUM E

CASP checklist for qualitative research

CASP
Critical Appraisal Skills Programme

www.casp-uk.net
info@casp-uk.net
Summertown Pavilion, Middle Way Oxford OX2 7LG

CASP Checklist: 10 questions to help you make sense of a **Qualitative** research

How to use this appraisal tool: Three broad issues need to be considered when appraising a qualitative study:

- Are the results of the study valid? (Section A)
- What are the results? (Section B)
- Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions. There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

About: These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA 'Users' guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist, a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.: *Critical Appraisal Skills Programme (2018). CASP (insert name of checklist i.e. Qualitative) Checklist. [online] Available at: URL. Accessed: Date Accessed.*

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Paper for appraisal and reference: .....

Section A: Are the results valid?

1. Was there a clear statement of the aims of the research?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- what was the goal of the research
- why it was thought important
- its relevance

Comments:

2. Is a qualitative methodology appropriate?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the right methodology for addressing the research goal

Comments:

Is it worth continuing?

3. Was the research design appropriate to address the aims of the research?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- if the researcher has justified the research design (e.g. have they discussed how they decided which method to use)

Comments:

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4. Was the recruitment strategy appropriate to the aims of the research?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
- If there are any discussions around recruitment (e.g. why some people chose not to take part)

Comments:

5. Was the data collected in a way that addressed the research issue?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If the setting for the data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews are conducted, or did they use a topic guide)
- If methods were modified during the study. If so, has the researcher explained how and why
- If the form of data is clear (e.g. tape recordings, video material, notes etc.)
- If the researcher has discussed saturation of data

Comments:

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6. Has the relationship between researcher and participants been adequately considered?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If the researcher critically examined their own role, potential bias and influence during (a) formulation of the research questions (b) data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

Comments:

Section B: What are the results?

7. Have ethical issues been taken into consideration?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

Comments:

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8. Was the data analysis sufficiently rigorous?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- If there is an in-depth description of the analysis process
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings
- To what extent contradictory data are taken into account
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

Comments:

9. Is there a clear statement of findings?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider whether
- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researcher's arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

Comments:

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Section C: Will the results help locally?

10. How valuable is the research?	HINT: Consider • If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g. do they consider the findings in relation to current practice or policy, or relevant research-based literature • If they identify new areas where research is necessary • If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

Comments:

ADDENDUM F

CASP checklist for systematic review

CASP
Critical Appraisal Skills Programme

www.casp-uk.net
info@casp-uk.net
Summertown Pavilion, Middle Way Oxford OX2 7LG

CASP Checklist: 10 questions to help you make sense of a **Systematic Review**

How to use this appraisal tool: Three broad issues need to be considered when appraising a systematic review study:

- Are the results of the study valid? (Section A)
- What are the results? (Section B)
- Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions. There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

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For each new checklist, a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.: *Critical Appraisal Skills Programme (2018). CASP (insert name of checklist i.e. Systematic Review) Checklist. [online] Available at: URL. Accessed: Date Accessed.*

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Paper for appraisal and reference:.....

Section A: Are the results of the review valid?

1. Did the review address a clearly focused question?

Yes	
Can't Tell	
No	

HINT: An issue can be 'focused' in terms of
- the population studied
- the intervention given
- the outcome considered

Comments:

2. Did the authors look for the right type of papers?

Yes	
Can't Tell	
No	

HINT: 'The best sort of studies' would
- address the review's question
- have an appropriate study design (usually RCTs for papers evaluating interventions)

Comments:

Is it worth continuing?

3. Do you think all the important, relevant studies were included?

Yes	
Can't Tell	
No	

HINT: Look for
- which bibliographic databases were used
- follow up from reference lists
- personal contact with experts
- unpublished as well as published studies
- non-English language studies

Comments:

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4. Did the review's authors do enough to assess quality of the included studies?

Yes ☐
Can't Tell ☐
No ☐

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies' results ("All that glisters is not gold" Merchant of Venice – Act II Scene 7)

Comments:

5. If the results of the review have been combined, was it reasonable to do so?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider whether
- results were similar from study to study
- results of all the included studies are clearly displayed
- results of different studies are similar
- reasons for any variations in results are discussed

Comments:

Section B: What are the results?

6. What are the overall results of the review?

HINT: Consider
- If you are clear about the review's 'bottom line' results
- what these are (numerically if appropriate)
- how were the results expressed (NNT, odds ratio etc.)

Comments:

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7. How precise are the results?

HINT: Look at the confidence intervals, if given

Comments:

Section C: Will the results help locally?

8. Can the results be applied to the local population?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider whether
- the patients covered by the review could be sufficiently different to your population to cause concern
- your local setting is likely to differ much from that of the review

Comments:

9. Were all important outcomes considered?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider whether
- there is other information you would like to have seen

Comments:

10. Are the benefits worth the harms and costs?

Yes ☐
Can't Tell ☐
No ☐

HINT: Consider
- even if this is not addressed by the review, what do you think?

Comments: