

Journal of Professional Nursing

Educational strategies used in master's and doctoral nursing education: a scoping review

--Manuscript Draft--

Manuscript Number:	JPN-D-22-593R1
Article Type:	Review Article
Keywords:	Education; Nursing; Pedagogical strategies; Postgraduate students; Teaching methods; Scoping review.
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Dear Dr Morton,

We are pleased to submit a scoping review titled “Educational strategies used with postgraduate nursing students: a scoping review” for publication in the Journal of Professional Nursing (Word count: 7191; Figures: 2; Tables: 2; Additional files: 2).

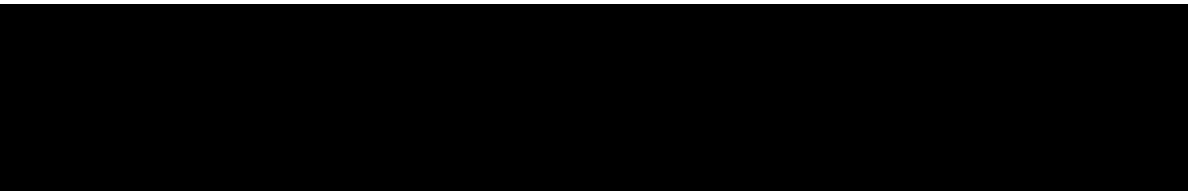
Many national and international organizations emphasize that master’s and doctoral education programs are essential to prepare and equip nurses to demonstrate leadership, participate in organizational changes, and enhance the quality of care provided in the healthcare system. In practice, educators implement various strategies in nursing programs, such as high-fidelity simulations, peer discussions, research projects, clinical vignettes, and lectures. To better understand this topic, we conducted a scoping review highlighting the educational strategies used in the education of postgraduate nursing students with the Guideline for Reporting Evidence-Based Practice Educational Interventions and Teaching (GREET) and the Saskatchewan Education Department Framework of Professional Practice. Our results show that few studies are conducted with Ph.D. students, demonstrating the need for further studies on this specific population. In addition, individual work (e.g., homework) and interactive instruction (e.g., group discussions) are the most common strategies used in the education of postgraduate nursing students. However, in terms of evaluation, the results show that most studies assessed learning outcomes related to students’ reactions only.

To our knowledge, this is the first knowledge synthesis that addresses educational strategies and their characteristics used explicitly to educate advanced practice nurses and future researchers. We strongly believe that these results would appeal to the readership of the Journal of Professional Nursing and will be of great interest to nurse educators and researchers involved in the education of graduate nurses in academic settings.

We confirm that this manuscript has not been published elsewhere and is not under consideration by another journal. All authors have approved the manuscript and agree with its submission to the Journal of Professional Nursing. The development of this manuscript has adhered to ethical standards.

We thank you for your consideration and we hope our manuscript is suitable for publication in the Journal of Professional Nursing.

Sincerely,



EDUCATIONAL STRATEGIES USED IN MASTER'S AND DOCTORAL NURSING EDUCATION: A SCOPING REVIEW

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BV & ALap (contributed equally to this paper): Conceptualization, formal analysis, investigation, writing – original draft, visualization, project administration.

ALav: Conceptualization, investigation, formal analysis, writing – review & editing.

JLL: Conceptualization, investigation, formal analysis, writing – review & editing.

MC: Conceptualization, formal analysis, writing – review & editing, supervision.

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Declarations of interest: none

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Highlights

- A variety of educational strategies are used in graduate nursing education.
- More studies are needed to evaluate educational strategies with doctoral students.
- Future studies should describe the theoretical basis of the educational strategies.
- Individual work is the most common educational strategy used.
- Most studies assessed learning outcomes related to students' reactions.

Title: EDUCATIONAL STRATEGIES USED IN MASTER'S AND DOCTORAL NURSING EDUCATION: A SCOPING REVIEW

ABSTRACT

Background: Advanced practice nurses and future nursing researchers must be adequately educated with the best available evidence. However, we know little about educational strategies and their characteristics used explicitly to educate advanced practice nurses and future researchers.

Method: A scoping review was used to map the latest educational strategies used in master's and doctoral nursing education between 2011 and 2021. Components of educational strategies were extracted based on the Guideline for Reporting Evidence-Based Practice Educational Interventions and Teaching and the Saskatchewan Education Department Framework of Professional Practice. The New World Kirkpatrick Model was used to categorize the associated learning outcomes. A narrative description approach was used to synthesize the findings.

Results: A total of 56 studies were included. Several information was missing regarding the theoretical foundations of the educational strategies. A total of 158 educational strategies were identified. Individual work (e.g., homework) was the most popular educational strategy. Most studies assessed learning outcomes related to reactions (e.g., satisfaction) or learning (e.g., knowledge).

Conclusion: More studies should be done using interactive instruction or multimodal approaches, while the authors should better describe intervention components. A systematic review of effectiveness needs to be conducted to evaluate the best educational strategies in the master's and doctoral nursing education.

Keywords: Education, Nursing, Pedagogical strategies, Graduate students, Teaching methods, Scoping review.

INTRODUCTION

The 21st century presents many challenges to healthcare systems worldwide, such as the COVID-19 pandemic or climate changes (Bose-O'Reilly et al., 2021). To address current and future health systems' challenges, advanced practice nurses and future nursing researchers must be adequately educated with the best available evidence (Han et al., 2022; Hickman et al., 2018). Many national and international organizations emphasize that master's and doctoral education programs are essential to prepare and equip nurses to demonstrate leadership, participate in organizational changes, and enhance the quality of care provided in healthcare systems (American Association of Colleges of Nursing, 2011, 2021; Canadian Association of Schools of Nursing, 2015b; Chief Nursing & Midwifery Officers Australia, 2022; International Council of Nurses, 2020; Royal College of Nursing, 2018).

In practice, educators implement various strategies in nursing programs, such as simulations, peer discussion groups, clinical vignettes, and lectures (Hardenberg et al., 2020; Hickman et al., 2018). Educational strategies refer to the approaches and methods used by educators to achieve the intended core learning objectives (Akdeniz, 2016). Since the choice of educational strategies can influence learning outcomes and consequently the quality of master's and doctoral nursing education, it is important to distinguish between them and to better understand how they are used and studied.

There is often a gap between the practice of education in universities and evidence-based knowledge (Basu, 2022). This could be explained by the fact that educators are often faced with the idea that there is no best practice in education, that there is no way to know what is the most effective, or that the latest trend must be the best way to teach (Stanovich & Stanovich, 2003). But, education should always be informed by formal scientific research (Stanovich & Stanovich, 2003). Therefore, educators need to have access to scientific research, such as knowledge synthesis.

Several knowledge syntheses highlight the educational strategies used with students completing a Bachelor of Science in Nursing (Hornthvedt et al., 2018; Leidl et al., 2020; Tyo & McCurry, 2019). However, we know little about educational strategies and their characteristics used explicitly to

educate future advanced practice nurses, educators, and researchers. To date, no knowledge synthesis has ever focused on educational strategies for nurses in master and doctoral programs. Nonetheless, one scoping review aimed to determine the theories of learning and methods used in graduate education in health sciences (McInerney & Green-Thompson, 2020). While relevant, this review included only eight studies on nursing education (15% of all studies included) from 2001 to 2016, which we believe is not representative of master's and doctoral nursing education studies. In addition, because the findings are broad and relate primarily to medicine, they do not provide specific guidance to nursing educators and researchers.

Furthermore, the scoping review of Hernon et al. (2022) examined the use of educational technologies in undergraduate and graduate nursing education. Although interesting, this knowledge synthesis does not distinguish the educational strategies used exclusively in master's and doctoral nursing education and is limited to the use of educational technologies. Because it is possible that nurse educators at the master's and doctoral levels are not systematically using educational technologies, it seems necessary to explore and document the variety of educational strategies used at these levels of nursing education.

Scoping reviews can be useful in determining the extent of knowledge about a concept or area of study and identifying research gaps (Arksey & O'Malley, 2005; Levac et al., 2010; Munn et al., 2022). In addition, they can serve as a precursor to a systematic review of effectiveness (Munn et al., 2018; Peters et al., 2020). Thus, we conducted a scoping review to map the latest educational strategies used in master's and doctoral nursing education, which could be used to plan a future systematic review of effectiveness. More precisely, two questions were formulated:

1. What educational strategies and components (e.g., learning objectives, materials, duration) are used in master's and doctoral nursing education studies?
2. What are the outcomes and tools used to evaluate the effects of these educational strategies?

METHOD

We conducted a scoping review based on the Joanna Briggs Institute (2020) method, and we followed the elements outlined in the Preferred Reporting Items for Systematic reviews and Meta-

Analyses (PRISMA) extension for Scoping Reviews Checklist (Tricco et al., 2018). This review was not registered since scoping reviews are not accepted for registration on PROSPERO.

Inclusion Criteria

The target population was nursing students in graduate studies (i.e., entry-level master's degree, master's degree, Doctor of Philosophy [Ph.D.], Doctor of Nursing Practice [DNP]) who were actively participating in an educational activity (i.e., not as observers). Although graduate education contexts differ from country to country, primarily at the doctoral level (e.g., in America the curriculum generally involves courses, which is not necessarily the case in European countries such as France), we were interested in exploring the body of literature on the subject. Studies of nurse practitioner students were excluded because they focus primarily on direct patient care, and our review sought to focus on other types of nurses, including those who pursue careers as educators, consultants, researchers, and other specialized roles. Studies involving undergraduate and graduate students were assessed but only included if it was possible to identify specific outcomes for graduate students.

The central concepts of this scoping review were the educational strategies used in master's and doctoral nursing education. As mentioned earlier, educational strategies refer to the approaches and methods used by the educators to achieve the intended learning objectives (Akdeniz, 2016). To be included, studies had to evaluate educational strategies on any learning outcome of the New World Kirkpatrick Model (Kirkpatrick & Kirkpatrick, 2016): reaction (e.g., satisfaction), learning (e.g., knowledge, skills, attitude), behaviors, and results (e.g., success rate, program completion time).

This scoping review considered studies conducted in an academic setting or a clinical setting when the education was provided as part of a master's or doctoral nursing course. Internships in clinical settings were excluded as we wanted to focus on strategies delivered in the context of graduate nursing education program.

Pre-experimental, quasi-experimental and experimental studies (i.e., before and after studies, interrupted time-series studies, post-test-only, non-randomized controlled trials, randomized controlled trials) were considered since they are relevant for targeting outcomes that could be used in a systematic review of effectiveness. For this reason, research protocols, conference

abstracts, dissertations, theses, knowledge syntheses, qualitative studies, and opinion articles were excluded. Studies using a mixed-method design were assessed for eligibility. These studies were retained if outcomes from the quantitative method were relevant.

Identify Relevant Literature

As recommended by the Joanna Briggs Institute (2020), a three-step search strategy was conducted with the support of a health sciences librarian. First, an initial search was conducted in CINAHL and PubMed to identify keywords and Medical Subject Headings (MeSH) from articles relevant to the research topic. Second, the search strategy was developed in CINAHL (see **Supplementary Table 1**) and then adapted for the other databases. Third, a literature search was performed on September 11, 2021, in nine databases: CINAHL (EBSCOhost), MEDLINE (Ovid) EMBASE (Ovid), ERIC (ProQuest), EBM Reviews/Cochrane (Ovid), JBI EBP Database (Ovid), PsycINFO (Ovid), Web of Science (Clarivate) and Google Scholar. Studies published between 2011 and 2021 were selected to highlight the educational strategies currently being used to educate nurses at the graduate level (i.e., master's, doctorate). Studies written in French or English were selected to increase the feasibility of this knowledge synthesis. Finally, the references of the selected articles were consulted to obtain additional literature.

Study Selection

Following the database search, references were imported into Covidence (Veritas Health Innovation) to facilitate the screening of identified articles, and duplicates were removed. A random sample of 20 articles was selected and their eligibility was independently assessed by four authors (BV, ALap, ALav, JLL) to test the inclusion and exclusion criteria and standardize their understanding. A discussion meeting among all authors allowed to modify the selection criteria of the articles to increase the rate of agreement. Then, the screening of titles, abstracts, and full-text assessment was done independently in duplicate based on the inclusion criteria. Conflicts were resolved with a third reviewer (MC or MFD).

Data Extraction and Analysis

To extract data, all articles were imported in MAXQDA 2022 (VERBI GmbH). Codes in MAXQDA have been created based on an extraction form proposed by the Joanna Briggs Institute (2020) that included article characteristics (i.e., first author's name, year of publication, country of origin)

and study methods (i.e., aim, study design, population, sample size, and setting). In addition, we used the Guideline for Reporting Evidence-based practice Educational interventions and Teaching (GREET) 2016 checklist (Phillips et al., 2016) to extract the components of the interventions which includes educational strategies (e.g., theory, learning objectives, the material provided). The New World Kirkpatrick Model (Kirkpatrick & Kirkpatrick, 2016) was used to categorize the outcomes evaluating the effects of these educational strategies. This model includes four levels that refer to different outcomes resulting from education. These four levels are 1) reaction (i.e., engagement, relevance, and satisfaction); 2) learning (i.e., knowledge, skills, attitude, confidence, and commitment); 3) behaviour changes and; 4) results (i.e., organizational impact, costs or benefits to institutions). As suggested by the Joanna Briggs Institute (2020), the extraction was pilot tested by many authors (ALap, ALav, BV, and JLL) by extracting data from five studies. The authors then modified the list of codes according to the comments made. Subsequently, the data were extracted by one author and then revised by a second author (ALap-JLL or ALav-BV). Conflicts were resolved through discussion among the authors who performed the data extraction. In case of persistent disagreement, a third author was asked to resolve it. Methodological quality was not assessed, as it is not required in scoping reviews (Joanna Briggs Institute, 2020). In addition, although stakeholder/researcher consultation is often recommended to fill in missing data for scoping reviews (Arksey & O'Malley, 2005; Pollock et al., 2022), we did not consider it relevant to do so. We believe that in educational evaluative research, any intervention should be fully reported as recommended by educational interventions reporting guidelines (Phillips et al., 2016)

From the coding, educational strategies were extracted independently by BV and then reviewed by ALap. Afterwards, the strategies were analyzed using the Framework of Professional Practice (Saskatchewan Education Department, 1991). This framework divides educational strategies into five categories: direct, indirect, interactive, independent, and experiential. Direct strategies refer to highly teacher-oriented approaches such as lectures or demonstrations. In contrast, indirect strategies are more student-oriented, seeking an important level of student involvement (e.g., reflective discussion, problem-solving). Interactive strategies rely on sharing among participants. Independent strategies refer to approaches that foster the development of individual learning

initiative, self-reliance, and self-improvement. Experiential strategies emphasize the process of learning rather than the product. It is an inductive, learner-centered, and activity-oriented approach. For the other educational strategies characteristics (e.g., learning topic, the use of a theory), we grouped them iteratively by discussion between authors to reach a consensus. Because the unit of analysis was individual studies (n=56), codes and subcodes were mutually exclusive and could only be attributed once to each study. This allowed us to extract frequencies regarding the presence of each element.

Results

The initial search yielded 2823 potentially relevant citations (**Figure 1**). After removing duplicates, 2409 citations were screened, resulting in the exclusions of 2094 citations. A total of 311 full texts were assessed for eligibility. Following reference checking, two articles were added for a final sample of 56 studies.

Studies Characteristics

Table 1 presents studies characteristics (see **Supplementary Table 2** for more results). Most studies were published between 2018-2021 (41%) in North America (more specifically United States; 78%) and used a one-group pre-post-test study design (45%). Most studies were conducted with master's students (59%), followed by Doctor of Nursing Practice (23%). A few studies (11%) combined multiple populations, such as master's students with accelerated baccalaureate students (Bartlett Ellis et al., 2016), doctoral students with master's students (Pintz & Posey, 2013), and Doctor of Nursing Practice students with master's students (Gatewood, 2019; Gazarian et al., 2020; Long et al., 2021; Moore et al., 2019). The median sample size of the included studies is 28 students (interquartile range = 40).

Intervention components

The components of the educational strategies have been synthesized and are presented narratively based on the GREET checklist (Phillips et al., 2016).

Use of theories

A total of 23 of the 56 included studies (41%) mentioned the theories or models used to guide the development of the educational strategies. Some studies (n=4) combined more than one theory or model (Bruce et al., 2018; Embree & Yueh-Feng Lu, 2017; Garritano & Stec, 2019; Rutledge et

al., 2011). The theories mentioned were varied and covered different domains, including knowledge translation (n=1; i.e., Knowledge-to-Action Framework), cognitive learning theories (n=1; i.e., Paivio Dual Coding Theory), organizational approach (n=1; i.e., Results-Oriented Approach to Capacity Change), social domain (n=5; e.g., Cultural Competence and Confidence Model), nursing (n=1; i.e., Sessler Branden Advocacy Matrix), pedagogy (n=15; e.g., Adult Learning Theory), and psychology (n=5; e.g., Theory of Planned Behavior).

Learning Objectives

Most of the studies identified (n=35, 63%) had clear learning objectives. The number of learning objectives per study ranged from 1 to 6. The formulation of the learning objectives was consistent with the purpose of the studies. Given the significant variability between these elements, it was impossible to evaluate the relevance of the educational strategies to meet the learning objectives. It was also not possible to determine whether the choice of outcomes or the questionnaires and tools used were consistent with the learning objectives.

Modes of Delivery

The duration of the educational strategies ranged from 1 hour to 15 weeks. In addition, 41% of the studies (n=23) did not report information about the duration of the intervention. A total of 6 of the 56 included studies (11%) used educational strategies conducted individually. Nine studies (16%) used educational strategies taught in groups (i.e., minimum two students). The other 40 studies (71%) used a combination of individual and group educational strategies. Only one study (2%; Long et al., 2021) did not specify whether educational strategies were conducted alone or in groups.

Several studies conducted face-to-face educational strategies (n=23, 41%) or entirely online (n=19, 40%). In addition, 12 (21%) of the included studies used educational strategies within a hybrid format. The format of activities was not mentioned by the authors in only two articles (4%; Currey et al., 2015; Gazarian et al., 2020).

Educational strategies and learning topics

A total of 158 educational strategies were identified in the 56 included studies. The median number of educational strategies used per study was 3 (range 1-7). The most frequently used educational strategies were discussions (n=32, 20%), homework/assignments (n=29, 18%),

lectures (n=23, 15%), e-learning modules (n=12, 8%) and practical training (n=11, 7%). Some educational strategies have been little used in included studies (i.e., feedback, internship, roleplay, concept mapping, debate, and demonstrations).

Using the Framework of Professional Practice (Saskatchewan Education Department, 1991), educational strategies were divided into five categories: direct, indirect, interactive, independent, and experiential. The most frequently mentioned categories were 1) independent study (n=49, 31%; e.g., homework); 2) interactive instruction (n=36, 23%; e.g., discussions); 3) direct instruction (n=30, 19%; i.e., lectures); 4) experiential learning (n=28, 18%; e.g., observation) and 5) indirect instruction (n=14, 9%; e.g., case study). The studies combined educational strategies from several categories (mean 2.43; median 2). Only two studies (Northam et al., 2015; Zonsius et al., 2021) used educational strategies from all five categories.

Learning topics have been grouped into five themes 1) clinical practice; 2) research; 3) education/teaching; 4) engagement, politics, and ethics and 5) health-related knowledge. The most common themes were clinical practice (n=24, 42%; e.g., advanced trauma life support, managing clinical cases, managing complex case scenarios) and research (n=18, 32%; e.g., statistics, find and appraise systematic reviews, critical appraisal skills). **Figure 2** presents the educational strategies and learning topics identified in the studies.

Studies on health-related knowledge used a greater number of educational strategies (mean 3.66) compared to clinical practice (mean 3.17), research (mean 2.78), engagement, politics and ethics (mean 2.75) and education/teaching (mean 1.43). No educational strategies related to direct instruction or indirect instruction were identified in education/teaching. The same is true for health-related knowledge and experiential learning. Several studies combined lectures with discussion to address topics related to clinical practice (Buckley & Gordon, 2011; Gatewood, 2019; Northam et al., 2015; Novotny et al., 2016; Singleton, 2017; Tiffen et al., 2011; Zonsius et al., 2021) or research (Fowler & Jones, 2015; Kulage et al., 2020; Moore et al., 2019; Newhouse et al., 2013; Stephens et al., 2021; Wells & Dellinger, 2011; Xue et al., 2021). Almost all studies using simulation (n=13, 93%), whether high-fidelity or not, addressed topics related to clinical practice. Only Foronda et al. (2014) used this educational strategy to address how master students can supervise baccalaureate students during a simulation. Debates were only used to

address themes related to engagement, politics, and ethics (DeClerk et al., 2020; George et al., 2021). Observation, internship, roleplaying, and concept mapping were used only to address topics related to clinical practice. Feedback was used only once to address a research topic (Pintz & Posey, 2013).

Outcomes and tools

Table 2 presents the outcomes assessed in the included studies based on the New World Kirkpatrick Model (Kirkpatrick & Kirkpatrick, 2016).

Level 1: Reaction

The reactions of master's and doctoral nurses' students to the educational strategies were assessed in 32 of the 56 included studies (57%). All these studies used self-reported data. Most of these studies (n=30, 94%) used researcher-generated questionnaires (e.g., Course Evaluation Form) or did not specify this item. Only two studies used a questionnaire with psychometric properties (i.e., Simulation Effectiveness Tool-Modified and Corbridge questionnaire; Roberts et al., 2021; Tiffen et al., 2011).

Level 2: Learning

Learning outcomes were reported in 41 of the 56 selected studies (73%). Engagement was assessed using self-reported data obtained with researcher-generated questionnaires in only three studies (Currey et al., 2015; Garritano & Stec, 2019; Muckler et al., 2019). Currey et al. (2015) also assessed this outcome objectively using a validated questionnaire (i.e., STROBE Observational Tool). Students' attitudes were evaluated in 11 studies. Only Zonsius et al. (2021) assessed this outcome objectively. The majority of studies used researcher-generated questionnaires except Northam et al. (2015) and Rojjanasrirat and Rice (2017). Sixteen studies assessed Self-efficacy using self-reported data. Only three studies (Chang & Levin, 2014; Roberts et al., 2021; Singleton, 2017) used validated questionnaires (e.g., Simulation Effectiveness Tool-Modified and Transcultural Self-Efficacy Tool). Master's and doctoral nurses' skills were evaluated in 19 studies. Eleven studies used self-reported data and eight studies obtained objective data. Kesten et al. (2015) and Rojjanasrirat and Rice (2017) were the only studies that used validated questionnaires (e.g., Evidence-Based Practice Questionnaire). Knowledge was assessed in 23 studies; only three studies (Swanson et al., 2012; Tiffen et al.,

2011; Zonsius et al., 2021) used objective data to measure this outcome. Rojjanasrirat and Rice (2017) was the only study that assessed this outcome with a validated questionnaire.

Level 3: Behavior

Only four of the 56 included studies (7%) evaluated a behavior. All studies used researcher generated questionnaires. The behaviors assessed were a response to a clinical emergency (Buckley & Gordon, 2011), presentation skills (Fowler & Jones, 2015), smoking cessation competency (Nogueira & Mak, 2013), and unconscious bias (Schultz & Baker, 2017). Fowler and Jones (2015) and Schultz and Baker (2017) were the only studies to obtain objective data.

Level 4: Results

Only one study (Kulage et al., 2020) assessed outcomes by obtaining objective data on the number and status of grant submissions by participants and the time to Ph.D. program completion.

Discussion

This review aimed to map the latest educational strategies used in master's and doctoral nursing education, their components as well as the outcomes and tools used to evaluate their effects.

This scoping review is the first to address this topic by focusing exclusively on graduate nursing students. Our results lead to a better understanding of the educational strategies used in the education of these students.

Unfortunately, for the description of the intervention components, much information was missing. Our results show that the use of theories was not explicitly mentioned in more than half of the studies, 37% of the studies did not indicate their learning objectives, and 41% did not specify the duration of their intervention. Yet several knowledge syntheses (Albarqouni et al., 2018; Dijkers, 2021) stress the importance of thoroughly documenting these elements to increase the rigor and transparency of studies that put educational interventions into practice. The documentation of these components is particularly essential if these interventions intend to be reproduced in nursing education programs.

For educational strategies, our results highlight that individual work is the most popular (31%), followed by interactive instruction (23%). This differs from the results of the systematic review by McInerney and Green-Thompson (2020) who found that simulations were the most frequently used educational strategies in graduate education among health sciences master's and doctoral

students (28%). Moreover, several systematic reviews and meta-analyses (Kalaian & Kasim, 2017; Zhang et al., 2021; Zhang & Cui, 2018) mention that collaborative learning would be beneficial for the education of students completing a bachelor's degree in health sciences such as nursing. Given this finding, it would be interesting to evaluate, in a systematic review, whether the use of group educational strategies could also be effective by targeting exclusively graduate nursing students.

In addition, it may be noted that most studies used more than one educational strategy to achieve their goal. In fact, multimodal approaches in undergraduate nursing education seem to be more and more popular (Duff et al., 2018; Mason et al., 2020), and help meet different learning objectives while responding to students' individual learning styles. More specifically, multimodal approaches adhere to the principles of Kolb's experiential learning theory (Kolb, 1984), which is represented by four stages: concrete experience, reflection on that experience, conceptualization (i.e., integrating), and active experimentation. This avenue in master's and doctoral education seems therefore relevant and should be studied further.

Our results suggest that only seven studies addressed themes related to education/teaching with master's and doctoral nursing students. However, as reported in a recent survey (King et al., 2020), 64% of 826 respondents think that nursing programs do not sufficiently educate graduate students in various aspects of teaching such as teaching-learning best practices or curriculum design. Undoubtedly, there is a need to implement more educational strategies to develop these skills in future nurse clinical specialists and educators (Dunbar-Jacob & Hravnak, 2021; McNelis et al., 2019). For example, the Johns Hopkins School of Nursing requires Ph.D. students to complete a teaching residency at another university and learn more about educational models and assessment methods (Han et al., 2022). Such educational strategies could be an interesting avenue for educating graduate students to perform future clinical or faculty roles such as nursing clinical specialist/educator or as teaching or supporting teaching assistants.

Only four studies (Cole & Caan, 2011; Kulage et al., 2020; Sethares & Morris, 2016; Stephens et al., 2021) were conducted with Ph.D. students. This could be explained by the smaller proportion of Ph.D. students vs. master's students. However, this small number contrasts with the need to

develop and implement educational strategies that will effectively educate students pursuing doctoral studies, as mentioned by several authors (Smaldone & Larson, 2021). Indeed, future nurse researchers must develop, during their doctoral education, many skills related to knowledge transfer, leadership, and critical thinking (American Association of Colleges of Nursing, 2022; Canadian Association of Schools of Nursing, 2015a; International Council of Nurses, 2020). To this end, Villarruel et al. (2021) suggest embracing innovation in re-envisioning doctoral education by developing and evaluating different learning outcomes to better prepare students to become competent and engaged nurse researchers.

More than half (57%) of the studies assessed an outcome related to the satisfaction of master's and doctoral nursing students. Satisfaction seems to be an important aspect related to students' perception of learning. As Baturay (2011), there appears to be a significant relationship between student satisfaction and cognitive learning. On the contrary, Ebner and Gegenfurtner (2019) meta-analysis of five studies highlights that no causal relationship seems to exist between satisfaction and acquisition of new knowledge when using webinars, online or face-to-face instruction. These results highlight the importance of further studies to clarify the relationship between these learning outcomes to select the most effective educational strategies.

Strengths and limitations

Our scoping review has several strengths. First, we used the Joanna Briggs Institute (2020) method to facilitate replicability and transparency of our approach. The documentary strategy was carried out with the support of a health sciences librarian in several databases and the grey literature. Our knowledge synthesis presents a very innovative aspect that has not been widely explored in the scientific literature, namely the education of graduate nursing students. Our team comprises several educators and university pedagogy experts, which reinforces our results' rigour.

To plan a future systematic review of effectiveness, we excluded several types of articles such as qualitative studies, theses, dissertations, opinion papers, and knowledge synthesis. To increase the feasibility of our approach, we limited ourselves to articles published in French and English since these are the languages spoken by the authors. Furthermore, the methodological quality was not assessed since the Joanna Briggs Institute (2020) points out that this is not

systematically carried out in scoping reviews. However, the absence of this assessment could influence the quality of this knowledge synthesis. Finally, some of the results obtained (e.g., classification of studies according to the Framework of Professional Practice) may be subjective. To minimize this issue, one author grouped the data, then a second author reviewed it independently, which reduces the subjectivity of the results.

Avenues for future research and recommendations for nursing educators

Our results highlight the need for further studies with Ph.D. students due to the limited number of studies targeting this population. Future studies should also use more educational strategies in a group setting rather than just individual activities (e.g., homework) and address teaching-related concepts (e.g., teaching-learning best practices). Furthermore, they should enrich the robustness of educational tools for assessing competency development in the multiple facets of the graduate nursing role. By focusing on these elements, researchers and educators could maximize the quality of education provided to master's and doctoral nursing students and increase their abilities to respond to various issues.

Given the high number of single group studies and the complexity of setting up such studies in an educational context, it would be relevant for researchers to compare different educational strategies using non-equivalent groups to compare their impacts on graduate nursing students learning.

It seems imperative to evaluate the effectiveness of educational strategies in a systematic review of effectiveness. To do so, it would be relevant to specifically target the second, third, and fourth levels of the New World Kirkpatrick Model (Kirkpatrick & Kirkpatrick, 2016) to evaluate the potential effects of these educational strategies. Such a synthesis of knowledge could help faculty members select and implement the most effective educational strategies to promote learning outcomes in graduate nursing students.

Finally, several data on the content of educational strategies were not reported in the included studies. We advise authors to specify these elements by using comprehensive checklists such as the Guideline for Reporting Evidence-based practice Educational interventions and Teaching (GREET) (Phillips et al., 2016) or the Template for Intervention Description and Replication (TIDieR) (Hoffmann et al., 2014).

Conclusion

This is the first knowledge synthesis to focus on educational strategies used in the education of master's and doctoral nursing students. This review identified the components of these educational strategies as well as the outcomes and tools used to evaluate their effects. Our results highlighted the importance of conducting a systematic review of effectiveness to evaluate the most effective educational strategies to educate advanced practice nurses and future nursing researchers in relation to the challenges healthcare systems will be facing in the coming years. Finally, this scoping review suggests several reflections for researchers and educators to optimize the education of advanced practice nurses and future nurse researchers.

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Acknowledgments: The authors would like to thank Assia Mourid (librarian at the Faculty of Nursing of the University of Montreal) for her help regarding the search strategy.

Figure 1. PRISMA flow chart

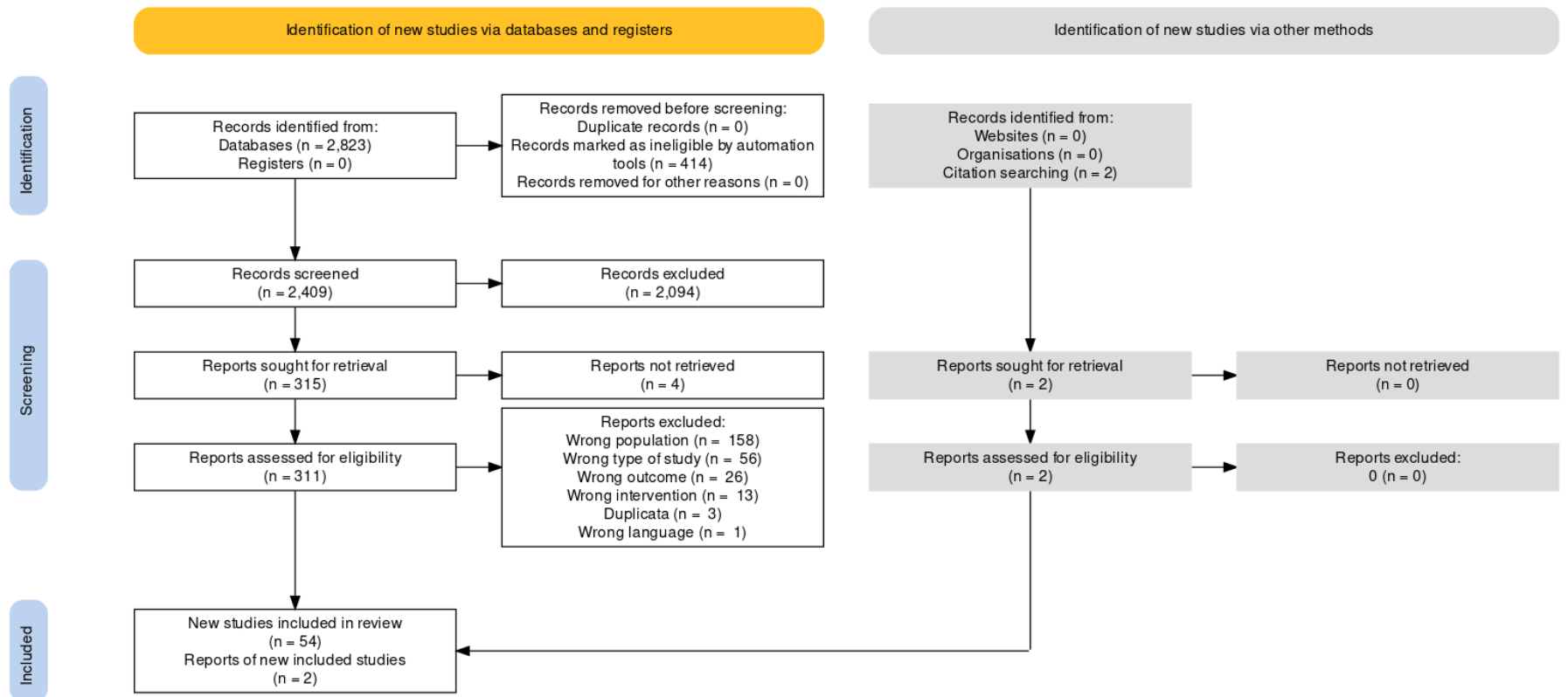


Figure 2. Educational strategies and learning topics of included studies

	Clinical practice (n=24)	Research (n=18)	Education/Teaching (n=7)	Engagement, politics and ethics (n=4)	Health-related knowledge (n=3)
Independent study (n=49)					
Homework/assignment (n=29)	10	11	2	4	2
E-learning modules (n=12)	4	3	1	2	2
Reading material (n=8)	3	3	1		1
Interactive instruction (n=37)					
Discussion (n=32)	16	11	2	1	2
Asynchronous discussion (n=3)		1	2		
Debate (n=2)				2	
Direct instruction (n=30)					
Lecture (n=23)	13	9			1
Mentoring (n=3)	1	2			
Demonstration (n=3)	2	1			
Feedback (n=1)		1			
Experiential learning (n=28)					
Simulations (n=14)	13		1		
Practical training (n=11)	2	6	1	2	
Observation (n=1)	1				
Intership (n=1)	1				
Role-playing (n=1)	1				
Indirect instruction (n=14)					
Reflection (n=7)	6				1
Case study (n=6)	2	2			2
Concept mapping (n=1)	1				

The numbers indicate the number of studies using this pedagogical strategy. **Colors: Orange**= uncommon; **Yellow**= common; **Green**= frequent

Table 1. Studies characteristics (n=56)

	n	%
Year of publication		
2018-2021	23	41
2014-2017	18	32
2010-2013	15	27
Region		
Africa	1	2
Asia	4	7
Europe	3	5
North America	43	77
Oceania	3	5
Not reported	2	4
Study design		
RCT	4	7
NRCT	4	7
1G pre-post	25	45
1G post-test	19	34
Mixed method	4	7
Postgraduate students		
Master	33	59
DNP	13	23
Ph.D.	4	7
Mixed	6	11
Sample size		
1-25	21	38
26-50	16	29
51-75	9	16
76-100	1	2
101-150	3	5
151-250	4	7
NR	2	4

Abbreviations: **1G:** One-group; **DNP:** Doctoral Nursing Practice; **NR:** Not reported; **NRCT:** Non-randomized controlled trial; **Ph.D.:** Philosophiæ doctor; **RCT:** Randomized controlled trial

Table 1. Outcomes assessed in graduate nursing education studies

Outcomes	n	%
Level 1 - Reaction	32	57
Satisfaction	32	57
Level 2 - Learning	41	73
Engagement	3	5
Attitude	11	20
Self-efficacy	16	29
Skills	19	34
Knowledge	23	41
Level 3 - Behavior	4	7
Presentation abilities	1	2
Clinical practice	3	5
Level 4 - Results	1	2
Number and status of grant submission	1	2
Time to Ph.D. program completion	1	2

Supplementary Table 1. Search strategy in CINAHL

((((Education* OR Learning OR Teaching OR Pedagogical OR Instructional) N3 (Activit* OR Method* OR Strateg* OR approach* OR Blend# OR "Problem-based learning" OR Community based learning OR Self-paced OR Group OR Mobile OR Personalized OR "Project-based" OR Experiential OR "Inquiry-based" OR Authentic OR Discovery OR "Just-in-time" OR Peer OR Culturally responsive OR Interdisciplinary OR Model# OR Associative OR Cooperative OR Team OR Situated)) OR ("PBL" OR Case method# OR Case stud# OR "JITT" OR Storytelling OR Simulation OR Microlearning OR Repetition OR Interactivity OR Gamification OR Integrated translation OR Reciprocal questioning OR Pause procedure OR Muddiest point OR Response to intervention OR Podcast OR lessons OR Scaffolding OR Direct instruction OR Prompting OR Differentiation OR Poster presentation OR Conference OR Lecture OR Visual aids OR Coaching OR Summarizing OR Paraphrasing OR Demonstration OR Role modelling OR Reflection OR Feedback OR Homework OR Brainstorming OR Jigsaw OR Read aloud OR Debating OR Lesson recording OR Reinforcement OR Metacognition OR Script Concordance test) OR (MH "Learning Methods+") OR (MH "Teaching Methods+") OR (MH "Problem-Based Learning") OR (MH "Experiential Learning") OR (MH "Self Directed Learning") OR (MH "Gamification") OR (MH "Seminars and Workshops") OR (MH "Simulations") OR (MH "Journal Clubs") OR (MH "Lecture") OR (MH "Programmed Instruction") OR (MH "Role Playing") OR (MH "Webcasts") OR (MH "Posters") OR (MH "Feedback") OR (MH "Reflection") OR (MH "Brainstorming") OR (MH "Debates

and Debating") OR (MH "Reinforcement (Psychology)+")) **AND** (((("DNP" OR Advance Practice Nurse OR Doctor of Nursing Practice OR Doctora# nurs# OR Graduate nur# OR Master nurs# OR "MSN" OR "NP" OR Nur# practitioner OR "Ph.D." OR "PhD" OR Doctorate of Nurs#) N3 (Student#)) OR Higher Education in nursing) OR (MH "Education, Nursing, Graduate+") OR (MH "Students, Nursing, Graduate"))))

Supplementary Table 2. Characteristics of included studies

Authors (year) - Country	Design	Theme (subject)	Population (# of participants with complete data)	Theory	Modes of delivery (Duration of the intervention; Total number of hours)	Learning objectives	Educational strategy	Outcomes (objective [O] vs self-reported [SR])	Questionnaires and tools used
Bartlett Ellis et al. (2016) - USA	2G non-equivalent group	Research (Statistics)	Mixed (n=42); Master + Accelerated baccalaureate	<ul style="list-style-type: none"> Theoretical Framework of Formative Assessment (Black & William, 2009) 	Online (NR; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> Increase student familiarity with expectations by giving them early exposure to the testing environment Serve as a guide for content, allowing students to identify their learning needs 	Independent study <ul style="list-style-type: none"> Homework/assignment Reading material 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Readiness Assurance Tests Student Satisfaction
								Level 2 - Learning <ul style="list-style-type: none"> Knowledge (SR) 	Homemade <ul style="list-style-type: none"> Readiness Assurance Test
Bloomfield et al. (2013) – United Kingdom	1G posttest-only	Clinical practice (Clinical skills and knowledge, unspecified)	Master (n=55)	<ul style="list-style-type: none"> NR 	Hybrid (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Development and demonstration of proficiency in a small range of core clinical skills identified in the Nursing and Midwifery Council (2010) Essential Skills Clusters for Pre-Registration Nursing Programmes 	Independent study <ul style="list-style-type: none"> Homework/assignment Self-directed e-learning modules Interactive instruction <ul style="list-style-type: none"> Discussion Experiential learning <ul style="list-style-type: none"> Simulation (LF) 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Course Evaluation Form
Bruce et al. (2018) - Mozambique	Mixed methods ; 1G posttest-only	Clinical practice (Clinical skills and knowledge, unspecified)	Master (n=11)	<ul style="list-style-type: none"> Results-Oriented Approach to Capacity Change (Boesen & Therkildsen, 2005) Kirkpatrick's Levels of Training Evaluation (Smidt et al., 2009) 	Face to face (NR; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> Prepare nurses and midwives for the essential roles of specialist practitioner, researcher, leader and educator 	Independent study <ul style="list-style-type: none"> Homework/assignment Experiential learning <ul style="list-style-type: none"> Internship 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Course Evaluation Form
								Level 2 - Learning <ul style="list-style-type: none"> Knowledge (SR) 	Homemade <ul style="list-style-type: none"> Course Evaluation Form

Buckley and Gordon (2011) - Australia	1G posttest-only	Clinical practice (Response to clinical emergencies)	Master (n=38)	<ul style="list-style-type: none"> NR 	Face to face (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	Direct instruction <ul style="list-style-type: none"> Lecture Experiential learning <ul style="list-style-type: none"> Simulation (HF) Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
								Level 3 – Behavior <ul style="list-style-type: none"> Response to clinical emergencies (SR) 	Homemade <ul style="list-style-type: none"> NR
Chang and Levin (2014) - NR	1G pre-post test	Research (Find and appraise systematic review)	Master (n=13)	<ul style="list-style-type: none"> Social Learning Theory (Bandura, 1997) 	Face to face (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Update their knowledge and skill in conducting a search to find evidence related to the clinical practice problem 	Independent study <ul style="list-style-type: none"> Homework/assignment Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 2 - Learning <ul style="list-style-type: none"> Self-efficacy (SR) 	Validated <ul style="list-style-type: none"> Self-Efficacy in Evidence-Based Practice Tool – Finding evidence and Appraising evidence (Chang & Crowe, 2011)
Chilton et al. (2019) – USA	1G posttest-only	Research (Research process)	Master (n=22)	<ul style="list-style-type: none"> Adult Learning Model (Knowles et al., 2015) 	Online (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Increase understanding of the research process and stimulated interest in translating nursing evidence into practice 	Experiential learning <ul style="list-style-type: none"> Practical training Independent study <ul style="list-style-type: none"> Self-directed e-learning modules Homework/assignment 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
								Level 2 - Learning <ul style="list-style-type: none"> Knowledge (SR) 	Homemade <ul style="list-style-type: none"> NR
Claywell et al. (2016) - USA	1G posttest-only	Education /Teaching (Faculty presence)	Master (n=140)	<ul style="list-style-type: none"> Qualities for Effective Practices in Online Education (Palloff & Pratt, 2011) 	Online (15 weeks; Unclear) <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> NR 	Interactive instruction <ul style="list-style-type: none"> Asynchronous discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Student Satisfaction survey
								Level 2 - Learning <ul style="list-style-type: none"> Knowledge (SR) 	Homemade <ul style="list-style-type: none"> Student Satisfaction survey
Cole and Caan (2011) –	1G posttest-only	Research (Statistics)	Doctorate (n=27)	<ul style="list-style-type: none"> NR 	Face to face (3 days; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	Interactive instruction <ul style="list-style-type: none"> Discussion Experiential learning	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR

United Kingdom							<ul style="list-style-type: none"> Practical training 		
Currey et al. (2015) - Australia	1G pre-post test	Education /Teaching (Team-based learning)	Master (n=28): Graduate certificate + Diploma of Nursing Practice	<ul style="list-style-type: none"> NR 	Unclear (13 weeks; 12 hours) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	Independent study <ul style="list-style-type: none"> Homework/assignment Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Student Evaluation of Teaching and Units
								Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) 	Unclear <ul style="list-style-type: none"> Team Experience Questionnaire (Parmelee et al., 2009)
								<ul style="list-style-type: none"> Engagement (SR and O) 	Validated <ul style="list-style-type: none"> STROBE Observational tool (O'Malley et al., 2003) Homemade <ul style="list-style-type: none"> Self-report of Engagement Measure
DeClerk et al. (2020) – USA	1G pre-post test	Engagement, Politics & Ethics (DNP education and practice issues)	DNP (n=15)	<ul style="list-style-type: none"> NR 	Online (15 weeks; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	Interactive instruction <ul style="list-style-type: none"> Debate Independent study <ul style="list-style-type: none"> Homework/assignment 	Level 2 – Learning <ul style="list-style-type: none"> Skills (SR) 	Not validated <ul style="list-style-type: none"> Student self-ratings of skill acquisition (McNamara et al., 2013)
Embree and Yueh-Feng Lu	1G posttest-only	Engagement, Politics & Ethics	Master (n=11)	<ul style="list-style-type: none"> Deal Model (Ash & Clayton, 2009) 	Online (NR; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> Gain interprofessional collaborative practice leadership 	Independent study <ul style="list-style-type: none"> Self-directed e-learning modules 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR

(2017) - USA		(Civic engagement)		<ul style="list-style-type: none"> Teaching Model (Embree & Yueh-Feng Lu, 2017) Theoretical Framework for Civic Engagement (Gehrke, 2008) 	<ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Identify and research an area of public and/or health policy concern Develop a professional online network of clinical nurse specialists Identify potential mechanisms for achieving professional nursing or civic/community organizational board membership 	<ul style="list-style-type: none"> Homework/assignment <p>Experiential learning</p> <ul style="list-style-type: none"> Practical training 		
Forcina Hill et al. (2018) - USA	1G posttest-only	Education /Teaching (Education of clinical faculty)	Master (n=31)	<ul style="list-style-type: none"> Jeffries Simulation Model (Jeffries, 2005) 	<p>Face to face (NR; Unclear)</p> <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Learn the role of clinical faculty 	<p>Experiential learning</p> <ul style="list-style-type: none"> Practical training 	<p>Level 1 - Reaction</p> <ul style="list-style-type: none"> Satisfaction (SR) 	<p>Homemade</p> <ul style="list-style-type: none"> NR
								<p>Level 2 – Learning</p> <ul style="list-style-type: none"> Knowledge (SR) 	<p>Homemade</p> <ul style="list-style-type: none"> NR
Foronda et al. (2014) - USA	1G pre-post test	Education /Teaching (Education of clinical faculty)	Master (n=19)	<ul style="list-style-type: none"> NR 	<p>Online (1 day; 2 hours)</p> <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Use methods to facilitate learning of a BSN student Exhibit clinical competence as an educator with a student Demonstrate supportive interpersonal behaviors Exude a confident, positive attitude Accurately evaluate a BSN student's clinical performance 	<p>Experiential learning</p> <ul style="list-style-type: none"> Simulation (HF) 	<p>Level 2 – Learning</p> <ul style="list-style-type: none"> Self-efficacy (SR) 	<p>Not validated</p> <ul style="list-style-type: none"> Survey adapted from Nursing Clinical Teaching Effectiveness Inventory (Knox & Mogan, 1985)
Fowler and Jones (2015) - USA	1G pre-post test	Research (Presentation abilities)	Master (n=16)	<ul style="list-style-type: none"> NR 	<p>Face to face (NR; Unclear)</p> <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Provide training in the strategies, skills, and visual aids necessary to present an effective, efficient, and quality presentation to a professional audience Provide participants with opportunities to discuss common mistakes, receive feedback, and practice public speaking 	<p>Direct instruction</p> <ul style="list-style-type: none"> Lecture <p>Interactive instruction</p> <ul style="list-style-type: none"> Discussion 	<p>Level 2 – Learning</p> <ul style="list-style-type: none"> Self-efficacy (SR) 	<p>Homemade</p> <ul style="list-style-type: none"> University's Office of Cultural and Institutional Diversity questionnaire
							<p>Experiential learning</p> <ul style="list-style-type: none"> Practical training 	<p>Level 3 – Behavior</p> <ul style="list-style-type: none"> Presentation abilities (O) 	<p>Homemade</p> <ul style="list-style-type: none"> University's Office of Cultural

									and Institutional Diversity questionnaire
Garritano and Stec (2019) - USA	1G pre-post test	Engagement, Politics & Ethics (Health policy)	DNP (n=102)	<ul style="list-style-type: none"> Cultural Competence and Confidence Model (Jeffreys & Dogan, 2012) Sessler Branden Advocacy Matrix (Sessler Branden, 2012) Technological Pedagogical and Content Knowledge Model (Koehler & Mishra, 2009) 	Hybrid (3 weeks; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Improve health policy engagement 	Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Homework/assignment Self-directed e-learning modules 	Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) Engagement (SR) Knowledge (SR) 	Homemade <ul style="list-style-type: none"> NR
Gatewood (2019) - USA	1G posttest-only	Clinical practice (Uncounscious and implicit bias)	Mixed n=97; DNP (n=64) and Master (n=33)	<ul style="list-style-type: none"> NR 	Hybrid (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Summarize the effects of implicit bias on quality in healthcare Identify a resource for self-assessment of implicit bias using the Implicit Association Test Integrate knowledge of students' own implicit bias into their nursing care to improve the quality of their care 	Direct instruction <ul style="list-style-type: none"> Lecture 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Reading material 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) Self-efficacy (SR) 	Homemade <ul style="list-style-type: none"> NR
Gazarian et al. (2020) – USA	1G posttest-only	Education /Teaching (Open educational resources)	Mixed (n=21); DNP and Master	<ul style="list-style-type: none"> NR 	Unclear (15 weeks; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> NR 	Independent study <ul style="list-style-type: none"> Reading material Self-directed e-learning modules 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Not validated <ul style="list-style-type: none"> Survey adapted from Open Educational Resources Satisfaction Scale (Jaggars et al., 2018)
George et al. (2021) - USA	1G pre-post test	Engagement, Politics &	Master (n=16)	<ul style="list-style-type: none"> NR 	Online (NR; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> Assess the impact of an online debate on critical thinking and presentation skills 	Interactive instruction <ul style="list-style-type: none"> Debate 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) 	Not validated <ul style="list-style-type: none"> Adapted from Student self-

		Ethics (Ethical health care issue)			<ul style="list-style-type: none"> In group 		Independent study <ul style="list-style-type: none"> Homework/assignment 	<ul style="list-style-type: none"> Skills (SR) 	ratings of skill acquisition (McNamara et al., 2013)
Gordillo Martin et al. (2017) - Spain	1G pre-post test	Clinical practice (Advanced trauma life support)	Master (n=32)	<ul style="list-style-type: none"> NR 	Face to face (4 weeks; 72 hours) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	Experiential learning <ul style="list-style-type: none"> Simulation (HF) Direct instruction <ul style="list-style-type: none"> Lecture 	Level 2 – Learning <ul style="list-style-type: none"> Skills (O) 	Not validated <ul style="list-style-type: none"> Kinematic analysis with Vicon 3D motion capture system
Ignacio (2012) – Singapore	RCT	Clinical practice (Managing clinical cases)	Master (n=10)	<ul style="list-style-type: none"> NR 	Face to face (15 weeks; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Help the students integrate theory and practice by managing clinical cases 	Experiential learning <ul style="list-style-type: none"> Simulation (HF) 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Reading material Direct instruction <ul style="list-style-type: none"> Lecture 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) Self-efficacy (SR) Skills (O) 	Homemade <ul style="list-style-type: none"> Written examination
Jones et al. (2011) - China	1G pre-post test	Research (Critical appraisal skills)	Master (n=37)	<ul style="list-style-type: none"> NR 	Hybrid (5 days; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Undertake and provide a critical amount of a literature search, applying techniques across a range of sources Debate and critically appraise research studies (including understanding hierarchies of evidence) Critically appraise qualitative and quantitative research styles Conduct a systematic review of published literature 	Direct instruction <ul style="list-style-type: none"> Lecture 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Homework/assignment 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) Skills (SR) 	Homemade <ul style="list-style-type: none"> NR
Kesten et al. (2015) – USA	1G pre-post test	Clinical practice (Managing complex)	Master (n=NR)	<ul style="list-style-type: none"> NR 	Face to face (24 weeks; Unclear) <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Improve leadership skills, prioritization, communication, collaboration, and professionalism 	Experiential learning <ul style="list-style-type: none"> Simulation (HF) Interactive instruction	Level 2 – Learning <ul style="list-style-type: none"> Skills (O) 	Validated <ul style="list-style-type: none"> APRN Competency Evaluation Tool

		case scenario)					<ul style="list-style-type: none"> Discussion 		
Kulage et al. (2020) – USA	1G posttest-only	Research (Grant writing)	Doctorate (n=26)	<ul style="list-style-type: none"> NR 	Face to face (1.5 days; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Encourage to write and submit grand applications to support their dissertation research 	Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Direct instruction <ul style="list-style-type: none"> Lecture Mentoring 	Level 2 – Learning <ul style="list-style-type: none"> Self-efficacy (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Reading material 	Level 4 – Results <ul style="list-style-type: none"> Number and status of grant submissions by participants (O) Time to PhD program completion (O) 	Homemade <ul style="list-style-type: none"> NR
Long et al. (2021) – USA	1G pre-post test	Clinical practice (Perinatal depression)	Mixed (n=59); DNP and Master	<ul style="list-style-type: none"> Theory of Planned Behavior (Ajzen, 1985) 	Online (1 day; 1 hour) <ul style="list-style-type: none"> Unclear 	<ul style="list-style-type: none"> Improve perinatal depression knowledge and attitudes 	Independent study <ul style="list-style-type: none"> Self-directed e-learning modules 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) Attitude (SR) Self-efficacy (SR) 	Not validated <ul style="list-style-type: none"> Theory of Planned Behavior Scale
Martin (2012) - USA	Mixed methods ; 1G posttest-only	Research (Writing evidence-based nursing)	Master (n=7)	<ul style="list-style-type: none"> NR 	Hybrid (13 weeks; 26 hours) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Develop writing skills and content expertise in a clinical area selected for the practicum course 	Experiential learning <ul style="list-style-type: none"> Practical training 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
							Independent study <ul style="list-style-type: none"> Homework/assignment 		
							Interactive instruction <ul style="list-style-type: none"> Discussion 		

Mayne and Wu (2011) - USA	2G non-equivalent group	Education /teaching (Social presence)	Master (n=26)	<ul style="list-style-type: none"> Model of Community Inquiry (Garrison et al., 1999) 	Online (NR; Unclear) <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Implement strategies to increase social presence in online courses 	Interactive instruction <ul style="list-style-type: none"> Asynchronous discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Social presence questionnaire <p>Not validated</p> <ul style="list-style-type: none"> Adapted from Richarson and Swan (2003) Adapted from Self-report classroom community scale (Rovai et al., 2004)
								Level 2 – Learning <ul style="list-style-type: none"> Skills (SR) 	Homemade <ul style="list-style-type: none"> Social presence questionnaire
McClure et al. (2020) - USA	1G posttest-only	Clinical practice (Child abuse)	Master (n=53)	<ul style="list-style-type: none"> NR 	Face to face (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Obtain a history and establish a timeline of events that begins at the time of injury or the time the parent being interviewed last saw child at baseline Recognize and respond therapeutically to the parent's emotions Verbalize concern for abuse Communicate to the parent the plan for medical management and referrals to social work and child protective services or appropriate agency 	<p>Experiential learning</p> <ul style="list-style-type: none"> Simulation (HF) <p>Direct instruction</p> <ul style="list-style-type: none"> Lecture <p>Indirect instruction</p> <ul style="list-style-type: none"> Reflection 	Level 2 – Learning <ul style="list-style-type: none"> Skills (O) 	Homemade <ul style="list-style-type: none"> Assessment tool of communication skills
McLain et al. (2012) - USA	RCT	Clinical practice	Master (n=24)	<ul style="list-style-type: none"> Dual Coding Theory (Paivio, 1990) 	Face to face (NR; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> NR 	Direct instruction <ul style="list-style-type: none"> Lecture Demonstration 	Level 2 – Learning <ul style="list-style-type: none"> Knowledge (SR) 	Homemade <ul style="list-style-type: none"> Anesthesia machine

		(Anesthesia)			<ul style="list-style-type: none"> In group 		<ul style="list-style-type: none"> Indirect instruction <ul style="list-style-type: none"> Case study 	<ul style="list-style-type: none"> Skills (O) 	preoperative checkout process
Moore et al. (2019) - USA	1G pre-post test	Research (Evidence-based practice)	Mixed; DNP (n=24) and Master (n=102)	<ul style="list-style-type: none"> NR 	Face to face (15 weeks; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Improve knowledge, skills, and ability to evaluate and translate evidence into clinical practice 	<ul style="list-style-type: none"> Direct instruction <ul style="list-style-type: none"> Lecture Independent study <ul style="list-style-type: none"> Self-directed e-learning modules Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) Knowledge (SR) Self-efficacy (SR) Skills (SR) 	Homemade <ul style="list-style-type: none"> NR
Muckler et al. (2019) - USA	1G pre-post test	Clinical practice (Trans health)	DNP (n=28)	<ul style="list-style-type: none"> NR 	Face to face (Once; Unclear) <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Increase awareness of trans health issues Provide an opportunity to practice therapeutic communication Address psychosocial risk factors with patients who identify themselves as trans 	<ul style="list-style-type: none"> Experiential learning <ul style="list-style-type: none"> Simulation (HF) Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) Engagement (SR) Knowledge (SR) Self-efficacy (SR) 	Not validated <ul style="list-style-type: none"> LGBT Health Issues Questionnaire (Mitchell et al., 2016)
Newhouse et al. (2013) - USA	1G pre-post test	Research (Evidence-based practice)	DNP (n=41)	<ul style="list-style-type: none"> NR 	Hybrid (15 weeks; Unclear) <ul style="list-style-type: none"> In group 	<ul style="list-style-type: none"> Teach the students how to identify best practices 	<ul style="list-style-type: none"> Independent study <ul style="list-style-type: none"> Homework/assignment Self-directed e-learning modules 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> End-of-semester course evaluation questionnaire
							<ul style="list-style-type: none"> Direct instruction <ul style="list-style-type: none"> Lecture Interactive instruction <ul style="list-style-type: none"> Discussion Experiential learning <ul style="list-style-type: none"> Practical training 	Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) 	Homemade <ul style="list-style-type: none"> End-of-semester course evaluation questionnaire

Nogueira and Mak (2013) - China	1G pre-post test	Clinical practice (Smoking cessation)	DNP (n=18)	<ul style="list-style-type: none"> NR 	Face to face (2 days; Unclear) <ul style="list-style-type: none"> Individually 	<ul style="list-style-type: none"> Improve the nurses' competencies, knowledge, and skills in smoking cessation 	Direct instruction <ul style="list-style-type: none"> Lecture 	Level 1 – Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> NR
								Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) Knowledge (SR) Self-efficacy (SR) 	Homemade <ul style="list-style-type: none"> NR
								Level 3 - Behavior <ul style="list-style-type: none"> Smoking cessation competency (SR) 	Homemade <ul style="list-style-type: none"> NR
Northam et al. (2015) - Australia	Mixed methods ; 1G pre-post test	Clinical practice (Cultural competence)	Master (n=9)	<ul style="list-style-type: none"> NR 	Face to face (14 weeks; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Develop competency in providing culturally sensitive end of life care in critical care environment 	Interactive instruction <ul style="list-style-type: none"> Discussion Indirect instruction <ul style="list-style-type: none"> Reflection Direct instruction <ul style="list-style-type: none"> Lecture Independent study <ul style="list-style-type: none"> Homework/assignment Experiential learning <ul style="list-style-type: none"> Simulation (HF) 	Level 2 – Learning <ul style="list-style-type: none"> Attitude (SR) Knowledge (SR) 	Not validated <ul style="list-style-type: none"> Measure of students' cultural learning (Mak & Kennedy, 2012) Validated <ul style="list-style-type: none"> Measure of cultural intelligence development (MacNab & Worthley, 2012)
Novotny et al. (2016) - USA	Mixed methods ; 1G pre-post test	Clinical practice (Critical thinking)	Master (n=21)	<ul style="list-style-type: none"> NR 	Online (NR; Unclear) <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Improve critical thinking 	Direct instruction <ul style="list-style-type: none"> Lecture Indirect instruction <ul style="list-style-type: none"> Reflection Interactive instruction <ul style="list-style-type: none"> Discussion 	Level 1 - Reaction <ul style="list-style-type: none"> Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> Unclear
								Level 2 – Learning <ul style="list-style-type: none"> Skills (O) 	Not validated <ul style="list-style-type: none"> Unclear (Ralston & Bays, 2013)

Pagano et al. (2020) - USA	1G pre-post test	Clinical practice (End of life care)	Master (n=26)	<ul style="list-style-type: none"> • Experiential Learning Theory (Kolb, 1984) 	Face to face (1 day; 6 hours) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • NR 	<p>Interactive instruction</p> <ul style="list-style-type: none"> • Discussion <p>Independent study</p> <ul style="list-style-type: none"> • Reflection • Homework/assignment <p>Experiential learning</p> <ul style="list-style-type: none"> • Role play 	Level 2 – Learning <ul style="list-style-type: none"> • Attitude (SR) • Self-efficacy (SR) 	Homemade <ul style="list-style-type: none"> • Reflection
Pintz and Posey (2013) - USA	1G pre-post test	Research (Challenges in graduate students)	Mixed (n=77); Doctorate and Master	<ul style="list-style-type: none"> • Attention, demonstrate Relevance, build Confidence and ensure Satisfaction Model (Keller, 2004) 	Hybrid (15 weeks; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • Provide students with a refresher and to promote their success in graduate coursework 	<p>Direct instruction</p> <ul style="list-style-type: none"> • Demonstration • Lecture • Feedback <p>Experiential learning</p> <ul style="list-style-type: none"> • Practical training 	Level 1 - Reaction <ul style="list-style-type: none"> • Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> • User satisfaction survey
Roberts et al. (2021) - USA	1G pre-post test	Clinical practice (Heart failure exacerbation)	Master (n=38)	<ul style="list-style-type: none"> • NR 	Face to face (NR; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • NR 	<p>Interactive instruction</p> <ul style="list-style-type: none"> • Discussion <p>Experiential learning</p> <ul style="list-style-type: none"> • Simulation (HF) 	Level 1 - Reaction <ul style="list-style-type: none"> • Satisfaction (SR) 	Validated <ul style="list-style-type: none"> • Simulation Effectiveness Tool-Modified (Leighton et al., 2015)
							<p>Independent study</p> <ul style="list-style-type: none"> • Homework/assignment 	Level 2 – Learning <ul style="list-style-type: none"> • Self-efficacy (SR) 	Validated <ul style="list-style-type: none"> • Simulation Effectiveness Tool-Modified (Leighton et al., 2015)
Rohan and Fullerton (2019) - USA	1G pre-post test	Research (Writing)	DNP (n=18)	<ul style="list-style-type: none"> • NR 	Face to face (NR; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • Promote writing as an essential component of scholarship • Provide opportunities for students to develop a self-awareness of writing confidence and writing challenges • Improve writing competence 	<p>Independent study</p> <ul style="list-style-type: none"> • Homework/assignment <p>Direct instruction</p> <ul style="list-style-type: none"> • Mentoring 	Level 2 – Learning <ul style="list-style-type: none"> • Self-efficacy (SR) • Skills (SR) 	Homemade <ul style="list-style-type: none"> • NR

Rojanasri et al. (2017) - USA	1G pre-post test	Research (Evidence-based practice)	Master (n=63)	<ul style="list-style-type: none"> NR 	<p>Online (15 weeks; Unclear)</p> <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	<p>Interactive instruction</p> <ul style="list-style-type: none"> Asynchronous discussion <p>Indirect instruction</p> <ul style="list-style-type: none"> Case study <p>Independent study</p> <ul style="list-style-type: none"> Homework/assignment 	<p>Level 2 – Learning</p> <ul style="list-style-type: none"> Attitude (SR) Knowledge (SR) Skills (SR) 	<p>Validated</p> <ul style="list-style-type: none"> Evidence-Based Practice Questionnaire (Upton & Upton, 2006)
Rutledge et al. (2011) - USA	1G posttest-only	Clinical practice (Social media)	DNP (n=NR)	<ul style="list-style-type: none"> Social Media Model (Rutledge et al., 2011) Social Learning Theory (Bandura, 1997) 	<p>Face to face (1 day; Unclear)</p> <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Develop an understanding of the role of technology in healthcare, in particular rural healthcare Examine and explore innovative processes to utilize social media for patient and caregiver support Identify online resources that will assist providers in a rural setting 	<p>Experiential learning</p> <ul style="list-style-type: none"> Simulation (HF) <p>Independent study</p> <ul style="list-style-type: none"> Homework/assignment <p>Interactive instruction</p> <ul style="list-style-type: none"> Discussion 	<p>Level 1 - Reaction</p> <ul style="list-style-type: none"> Satisfaction (SR) 	<p>Homemade</p> <ul style="list-style-type: none"> NR
Rutledge et al. (2014) - USA	1G posttest-only	Clinical practice (Telehealth)	DNP (n=60)	<ul style="list-style-type: none"> Social Learning Theory (Bandura, 1997) 	<p>Face to face (2 days; Unclear)</p> <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> Provide an understanding of the role of technology in healthcare, in particular rural healthcare Examine and explore the numerous ways telehealth can be utilized for patient and caregiver care, education, and support 	<p>Experiential learning</p> <ul style="list-style-type: none"> Observation Practical training Simulation (HF) <p>Interactive instruction</p> <ul style="list-style-type: none"> Discussion <p>Independent study</p> <ul style="list-style-type: none"> Homework/assignment 	<p>Level 1 - Reaction</p> <ul style="list-style-type: none"> Satisfaction (SR) 	<p>Homemade</p> <ul style="list-style-type: none"> NR
Schultz and Baker (2017) - USA	1G posttest-only	Clinical practice (Unconscious bias)	Master (n=75)	<ul style="list-style-type: none"> Intercultural Competency Model (Teal et al., 2012) 	<p>Online (NR; Unclear)</p> <ul style="list-style-type: none"> Individually In group 	<ul style="list-style-type: none"> NR 	<p>Independent study</p> <ul style="list-style-type: none"> Homework/assignment <p>Interactive instruction</p> <ul style="list-style-type: none"> Discussion 	<p>Level 3 – Behavior</p> <ul style="list-style-type: none"> Unconscious bias (O) 	<p>Not validated</p> <ul style="list-style-type: none"> Implicit Association Tests

							Experiential learning • Practical training		
Seckman and Van de Castle (2021) - USA	1G posttest-only	Clinical practice (Telehealth)	DNP (n=163)	• NR	Hybrid (15 weeks; Unclear) • In group	• NR	Indirect instruction • Concept mapping • Reflection Interactive instruction • Discussion	Level 1 - Reaction • Satisfaction (SR)	Homemade • Course Evaluation Form
Sethares and Morris (2016) - USA	1G posttest-only	Research (Peer review)	Doctorate (n=22)	• Analysis, Design, Development, Implementation and Evaluation Model (ADDIE)	Hybrid (2 weeks; Unclear) • Individually	• NR	Independent study • Homework/assignment	Level 1 - Reaction • Satisfaction (SR)	Homemade • NR
Singleton (2017) - USA	1G pre-post test	Clinical practice (Cultural competence)	DNP (n=54)	• Cultural Competence and Confidence Model (Jeffreys & Dogan, 2012)	Hybrid (15 weeks; Unclear) • Individually • In group	• NR	Direct instruction • Lecture Independent study • Self-directed e-learning modules Interactive instruction • Discussion	Level 2 – Learning • Self-efficacy (SR)	Validated • Transcultural Self-Efficacy Tool (Jeffreys, 2006)
Slota et al. (2018) - USA	1G pre-post test	Research (Visual intelligence education)	DNP (n=9)	• Experiential Learning Theory (Kolb, 1984)	Face to face (1 day; 4 hours) • In group	• Enhance visual literacy, communication and empathy	Interactive instruction • Discussion Independent study • Homework/assignment	Level 2 – Learning • Knowledge (SR) • Skills (SR)	Homemade • Visual Intelligence Assessment Tool
Stephens et al. (2021) - USA	1G posttest-only	Research (Theory development and testing)	Doctorate (n=4)	• Experiential Learning Theory (Kolb, 1984)	Online (15 weeks; Unclear) • Individually • In group	• Provide a hands-on experience in theory development and testing • Introduce the Framework Method as a form of data analysis • Test the applicability of a conceptual model	Direct instruction • Lecture Independent study • Reading material Interactive instruction	Level 1 - Reaction • Satisfaction (SR)	Homemade • NR

						<ul style="list-style-type: none"> • Provide experience and mentoring in collaborative scholarship for budding nurse scientists 	<ul style="list-style-type: none"> • Discussion 		
Swanson et al. (2012) - USA	1G pre-post test	Health knowledge (Complementary and alternative medical therapies)	Master (n=248)	<ul style="list-style-type: none"> • NR 	Online (NR; Unclear) <ul style="list-style-type: none"> • Individually 	<ul style="list-style-type: none"> • NR 	Indirect instruction <ul style="list-style-type: none"> • Case study • Reflection Independent study <ul style="list-style-type: none"> • Self-directed e-learning modules 	Level 2 – Learning <ul style="list-style-type: none"> • Knowledge (O) 	Homemade <ul style="list-style-type: none"> • NR
Tiffen et al. (2011) - USA	RCT	Clinical practice (Physical assessment)	Master (n=28)	<ul style="list-style-type: none"> • Nursing Education Simulation Framework (Jeffries, 2007) 	Face to face (NR; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • NR 	Experiential learning <ul style="list-style-type: none"> • Simulation (LF) 	Level 1 - Reaction <ul style="list-style-type: none"> • Satisfaction (SR) 	Validated <ul style="list-style-type: none"> • Questionnaire (Corbridge et al., 2010)
							Direct instruction <ul style="list-style-type: none"> • Lecture • Mentoring Interactive instruction <ul style="list-style-type: none"> • Discussion 	Level 2 – Learning <ul style="list-style-type: none"> • Knowledge (O) • Self-efficacy (SR) 	Homemade <ul style="list-style-type: none"> • NR
Tornwall et al. (2021) - USA	2G non-equivalent group	Education /Teaching (Peer feedback)	Master (n=155)	<ul style="list-style-type: none"> • NR 	Online (NR; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • NR 	Independent study <ul style="list-style-type: none"> • Homework/assignment Interactive instruction <ul style="list-style-type: none"> • Discussion 	Level 2 – Learning <ul style="list-style-type: none"> • Knowledge (SR) • Skills (O) 	Homemade <ul style="list-style-type: none"> • NR
Vogt and Schaffner (2016) - USA	RCT	Health knowledge (Pharmacology)	Master (n=46)	<ul style="list-style-type: none"> • Constructivism (Bristol & Zerwekh, 2011) 	Online (3 weeks; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • NR 	Independent study <ul style="list-style-type: none"> • Homework/assignment Interactive instruction <ul style="list-style-type: none"> • Discussion Indirect instruction	Level 1 - Reaction <ul style="list-style-type: none"> • Satisfaction (SR) 	Homemade <ul style="list-style-type: none"> • NR

							• Case study		
Webber-Ritchey et al. (2020) - USA	1G posttest-only	Clinical practice (Physical assessment)	Master (n=9)	• NR	Online (10 weeks; Unclear) • Individually • In group	• Provide students the ability to demonstrate practice of weekly physical assessment skills with low-fidelity simulation in peer review feedback, providing and receiving feedback on their performance • Enable faculty evaluation of students' physical assessment skills	Experiential learning • Simulation (LF) Independent study • Homework/assignment	Level 1 - Reaction • Satisfaction (SR)	Homemade • NR
								Level 2 – Learning • Skills (SR)	Homemade • NR
Wells and Dellinger (2011) - USA	1G posttest-only	Research (Research and statistics)	Master (n=49)	• NR	Hybrid (NR; Unclear) • Individually • In group	• NR	Direct instruction • Lecture Interactive instruction • Discussion	Level 2 – Learning • Knowledge (SR) • Skills (SR)	Not validated • Adapted from Learner-Interaction Tool (Sherry et al., 1998)
Williams and Dale (2016) - USA	1G pre-post test	Health knowledge (Genetic and genomic)	DNP (n=7)	• NR	Online (15 weeks; Unclear) • Individually • In group	• NR	Independent study • Self-directed e-learning modules • Homework/assignment • Reading material Interactive instruction • Discussion Direct instruction • Lecture	Level 2 – Learning • Self-efficacy (SR)	Homemade • NR
Xue et al. (2021) - China	2G non-equivalent group	Research (Writing evidence-based nursing)	Master (n=75)	• NR	Hybrid (NR; Unclear) • Individually • In group	• Articulate an answerable clinical question • Systematically search for scientific evidence related to the clinical question • Appraise the evidence critically • Select the best available evidence to recommend for	Direct instruction • Lecture Indirect instruction • Case study	Level 1 – Reaction • Satisfaction (SR)	Homemade • Student Evaluation of Teaching and Units (Currey et al., 2015)
							Independent study • Homework/assignment	Level 2 – Learning • Skills (SR)	Homemade

						practice using the tools learned in class	Interactive instruction <ul style="list-style-type: none"> • Discussion 		<ul style="list-style-type: none"> • Student Evaluation of Teaching and Units (Currey et al., 2015)
Zonsius et al. (2021) – USA	1G posttest-only	Clinical practice (Quality and safety care for older adults)	DNP (n=183)	<ul style="list-style-type: none"> • Knowledge-to-Action Framework (Graham et al., 2006) 	Online (15 weeks; Unclear) <ul style="list-style-type: none"> • Individually • In group 	<ul style="list-style-type: none"> • Evaluate national trends and factors influencing the quality and safety mandates for aging adults • Analyze the impact of physical, psychological, and social aging processes on quality and safety issues • Examine the quality and patient safety priorities specific to the aging adult • Examine how models of interprofessional collaboration are used to create cultures of patient safety and quality • Analyze current models, processes, and tools of quality improvement and patient safety • Apply methodological approaches to address a quality improvement and/or patient safety issue for the aging adult 	Independent study <ul style="list-style-type: none"> • Reading material Interactive instruction <ul style="list-style-type: none"> • Discussion Indirect instruction <ul style="list-style-type: none"> • Case study • Reflection Independent study <ul style="list-style-type: none"> • Homework/assignment • Self-directed e-learning modules Direct instruction <ul style="list-style-type: none"> • Lecture 	Level 2 – Learning <ul style="list-style-type: none"> • Attitude (O) • Knowledge (O) • Skills (O) 	Homemade <ul style="list-style-type: none"> • Quality and Safety Survey

Abbreviations: **1G:** One group; **2G:** 2 groups; **APRN:** Advanced practice registered nurse; **BSN:** Bachelor of Science in Nursing; **DNP:** Doctoral Nursing Practice; **HF:** High fidelity; **LF:** Low fidelity; **LGBT:** Lesbian, gay, bisexual and transgender; **NR:** Not reported; **O:** Objective; **SR:** Self-reported; **RCT:** Randomized controlled trial; **USA:** United States of America

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Authors' Response to Reviewers' Comments

Journal: Journal of Professional Nursing

Title of Paper: EDUCATIONAL STRATEGIES USED IN MASTER'S AND DOCTORAL NURSING EDUCATION: A SCOPING REVIEW

Thank you for your insightful comments. We have addressed each reviewer's comments as outlined in the following table. We hope this version will be satisfactory.

Reviewers' comments	Response from the authors
<p>1. In the United States, the term "postgraduate" means after one has completed graduate education. Throughout the manuscript and in the title, please use either the term "graduate education" or "masters and doctoral nursing education."</p>	<p>The term "postgraduate" has been replaced with "master's and doctoral nursing education". We have also chosen to use the term "graduate education" to minimize redundancy throughout the text.</p>
<p>2. Please provide more complete sentences with punctuation for the highlights. For example, in the second highlight tell the reader more studies about what? In the third highlight do you mean that theoretical foundations should be better described in research reports?</p>	<p>Highlights have been modified according to your comment.</p>
<p>3. Throughout the manuscript, please replace the word "trained" with the word "educated." Also please replace the word "training" with the word "educating."</p>	<p>The words "trained" and "training" have been replaced with "educated" and "educating" throughout the text.</p>
<p>4. In your work, are you including entry-level master's programs that lead to licensure or are you referring to master's programs entered after completing a baccalaureate degree in nursing?</p>	<p>Yes, we have included all types of master's degrees (except nurse practitioner) in this review. This information has been added and can be found on page 4.</p>
<p>5. In the first line on page 3, you added the group "educators" whereas in prior pages you only talked about advanced practice nurses and researchers. Please be clear. What groups are included?</p>	<p>We understand that this sentence may have caused confusion. However, we intended to convey our interest in gaining further insight into the educational strategies used to prepare nursing students to become advanced practice nurses, educators, and researchers. To clarify this point, we added the word "future" to emphasize our focus on future careers, on the first line of page 3.</p>
<p>6. At the top of page 4, you use the term "specialized graduate diploma." Readers</p>	<p>The term "specialized graduate diploma" have been removed to to better reflect the</p>

<p>in the United States will not understand this term. Are you referring to a certificate program that is completed after a master's degree?</p>	<p>content for a US readership.</p>
<p>7. On page 4, you state "Studies targeting nurse practitioner students were excluded as they focus mostly on clinical practice." Do you mean then that your inclusion criteria were focused only on didactic education? I do not understand why you would exclude clinical education. Please be clearer in explaining this information to readers.</p>	<p>Our point is that nurse practitioner education emphasizes a comprehensive understanding of underlying physiological processes and equips practitioners with the skills to provide evidence-based nursing interventions in a variety of clinical settings. As a result, nurse practitioners are primarily educated to provide direct patient care. However, our review sought to shift the focus to other types of nurses, including those who pursue careers as educators, consultants, researchers, and in other specialized roles.</p> <p>The sentence on page 4 was changed to read, "Studies of nurse practitioner students were excluded because they focus primarily on direct patient care, and our review sought to focus on other types of nurses, including those who pursue careers as educators, consultants, researchers, and other specialized roles.</p>
<p>8. I do not understand why qualitative studies were excluded. Please provide readers with more rationale for your decision.</p>	<p>Our aim was to outline the most recent educational strategies used in master's and doctoral nursing education, with the intention of conducting a systematic review in the future to assess their effectiveness. Therefore, we made a deliberate choice to focus exclusively on quantitative studies for this purpose.</p>
<p>9. At the top of page 5, you inform readers that you used a three-step search strategy. Explain to readers what the three steps were. Would it be better to use each of the steps as a heading in the manuscript?</p>	<p>We added first, second, and third to orient the reader to the three steps. Since these steps are quite simple, we do not believe they need different headings.</p>
<p>10. In the section titled "studies selection" you state "A discussion meeting between all authors... The correct word is "among" rather than "between."</p>	<p>The word "between" has been changed to "among".</p>

<p>11. In the limitations section of the manuscript, I think you need to restate that methodological quality was not assessed for the selected studies.</p>	<p>This limitation was presented in the limitation section as "Furthermore, the methodological quality was not assessed since the Joanna Briggs Institute (2020) points out that this is not systematically carried out in scoping reviews. However, the absence of this assessment could influence the quality of this knowledge synthesis." We changed the words "risk of bias" for methodological quality to ensure comprehensiveness.</p>
<p>12. At the top of page 11, it would be better to use the term "researcher generated" rather than the term "homemade."</p>	<p>We have changed the word "homemade" to "researcher-generated".</p>
<p>13. Aim to decrease the use of the word "indeed" to start sentences.</p>	<p>Most of the "indeed" has been removed from the text.</p>