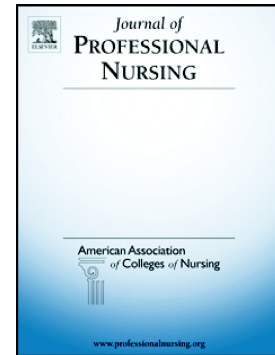


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Collaborative Learning in Higher Nursing Education: A Systematic Review

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## Title page

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**Background**

Collaborative learning has been used in nursing education for more than two decades. However, little is known about its relationship to quality of nursing education, its implementation process as well as what factors likely influence the effectiveness of the teaching approach.

**Methods**

Previous relevant literature had been searched and located from three electronic databases including CINAHL, PubMed, and Google Scholar.

**Results**

Collaborative learning had been employed in classroom teaching, clinical education and online course teaching. The strategy of instruction was found useful for improving nursing knowledge and skill performance, improving student clinical competency, as well as promote student group skills and learning behavior (e.g., Class engagement, motivation for learning, self-confidence).

**Conclusions**

It was recommended to integrate collaborative learning into nursing education due to positive influences on student learning.

**Key Words:** *Collaborative learning; Nursing education; systematic review*

## Introduction

Collaborative learning is defined as a set of instructional methods in which students are required or encouraged to work together to achieve a common learning goal (Slavin, 1987). Collaborative learning has been effective and widely adopted throughout different disciplines, school settings, or age groups. The collaborative learning covers both cognitive benefits (e.g. enhanced learning performance, motivation to learn) and improved social skills needed for future professional work (Scager, Boonstra, Peeters, Vulperhorst, & Wiegant, 2016). According to a recent meta analysis, small-group learning approaches including collaborative learning has an average effect size of 0.59 in standard deviation units. Collaborative learning appears to be more effective for students in the senior and junior levels than in freshman and sophomore levels (Kalaian & Kasim, 2017).

Currently the clinical environment is becoming increasingly complex; hence it is urgent that nursing education respond promptly by reforming current course curriculum as well as seeking innovative teaching strategies to better prepare nursing graduates to meet enlarged demands. Collaborative learning approach has been substantially used in nursing education for several decades, however, the related performance and process has rarely been evaluated systematically in relation to the improvement of quality of nursing education.

## Background

### Collaborative Learning

Collaborative learning in college classes has its roots in the theories of social

interdependence, cognitive development and behavioral learning (Andrew, 1994). Collaborative learning is an adult-centered learning process where students themselves are responsible for group governance and education output (Bruffee, 1984). Collaborative learning has been used interchangeably with cooperative learning, although sometimes they are defined differently (Kirschner, 2001). Cooperative learning is considered a more structured form of collaborative learning.

Slavin (1995) proposed a model explaining the mechanism underlying why collaborative learning might affect the learning results. The model demonstrated the relationship of group learning goals, motivation, and enhanced learning. Group learning goals motivated the team members to learn as well as help each other. Each group member achieved deep learning through peer tutoring, practice, assessment and correction. Group learning goals linked group members together throughout a continuous and managed learning process.

A collaborative learning involves five essential components including (a) positive interdependence: a cooperative group shares a common goal and completes learning tasks together; (b) individual accountability: each member holds accountability for the success of each other; (c) promotive interaction: strategies are used to facilitate teamwork, create trust and enhance communication; (d) social skills training; and, (e) group processing: learners need to reflect upon group experiences and learn from each other (Johnson & Johnson, 1989). When implemented appropriately, each of these components helps ensure that collaborative learning groups function properly and helps all students achieve the preset learning goals (Johnson, Johnson, & Holubec,

1998).

Forming learning group is the essential step in the implementation of a collaborative learning process. In the collaborative learning, students participate in small-group activities in which they share their knowledge and expertise. The teacher usually acts as a facilitator in the learning process (Kirschner, 2001). The success of the learning depends on the quality of student interaction within the group, which needs to be built in a way that can be counted to promote active participation from each member and facilitate shared learning opportunities (Scager, et al., 2016). There are three types of collaborative learning groups including formal collaborative learning groups, informal collaborative learning groups and collaborative base groups (Goodfellow, 1995). Students in formal collaborative learning groups work together in groups of three to five until they have completed the learning task. The learning group usually lasts from one class period to several weeks. Informal collaborative learning groups are lasting a few minutes to one class period, which is used to redirect student attention to the learning material, ensure they process the information taught, as well as provide closure to a class period. Cooperative base groups are often used in graduate programs and usually last for a year or longer. These groups consist of students that have a stable membership (Goodfellow, 1995).

Formal learning groups usually contain fixed learning steps such as Student Teams-Achievement Division (STAD), whose four learning steps are (a) whole-class presentation: teachers present learning material to the entire class; (b) group discussion: form different learning teams of four based upon students' learning ability,

sex and social economic status. Students work within the team to make sure all members have achieved the group learning goals; (c) test: after the group discussion, all students take individual tests and can't help each other and the test results are also rated individually. The test is generally in the forms of multiple-choice questions; (d) group recognition: each member's test results sum up to form group learning outcomes. The group with the highest test score are rewarded (Slavin, 1995).

### **Collaborative Learning in Higher Nursing Education**

Higher nursing education refers to nursing education specifically offered in university settings, with an aim to prepare nursing graduates with complex knowledge and skills. The curriculum and instruction are central to nursing education; and they need to be constantly changed to meet the increasing demand of health care delivery and the diversified needs of the society. Currently, the practice environment of professional nurses is becoming more diverse and global in nature. The older adults are the fastest-growing segment of the population which demands significant and growing professional care (AACN, 2008). Due to the prevalence of multidisciplinary working environment, developing interprofessional team-work ability among nursing students has become a primary focus of current nursing education (AACN, 2008).

Traditional teaching approach (e.g., lecture) is considered passive learning approach where students have little opportunities to work together and take little responsibility for their own learning outcomes. In collaborative learning, students actively engage in the learning process through interaction and collaboration with

each other. Compared to traditional teaching, the students in collaborative learning have acquired better educational benefits such as critical thinking and group skills that are urgently needed by today's society (Scheckel, 2017). Collaborative learning is a pedagogical approach that is congruent with current curriculum reform occurring in nursing education (Breen, 2015).

### **Aim of the Study**

The purpose of the systematic review was to investigate the current state of science related to collaborative learning in higher nursing education. Three research questions were addressed including 1. How was collaborative learning implemented in nursing education? 2. What was the impact of collaborative learning on nursing educational results? and 3. What factors likely influenced the effectiveness of collaborative learning?

### **Methods**

The process for literature search, literature selection and retrieval was depicted in Figure 1. Figure 1 Literature search and retrieval process.pdf . Three electronic databases used for the above process included Cumulative Index to Nursing and Allied Health Literature (CINAHL®), PubMed and Google™ Scholar. An ancestry search of the article reference lists was also performed to obtain those articles missing from electronic archives. Keywords and Boolean combinations for the search included *nursing, nursing education, collaborative learning* and *cooperative learning*. The publishing time for the literature was set between the year of 1985-current, and all were published in English.

The literature search returned 1,817 initial records. Two investigators independently evaluated and selected the records following a two-step procedure. Firstly the relevancy of the literature was checked through the title / abstract and those relevant ones were kept in the data set. Their full-texts were retrieved from online archives of the university library or picked manually from the journals. Secondly, the content of the full-texts were read through to further determine the relevancy of the literature.

The inclusion criteria of literature included 1. Focusing on collaborative learning / cooperative learning in university nursing education; 2. The type of the article could be either research report or learning practice report. Other types of literature such as personal opinion, editorial report were excluded. As a result, a total of 29 articles were included in final data analysis (see Table 1).

## **Findings**

### **The Quality Assessment of Previous Collaborative Learning Studies**

The evidence level for most studies (n=23/29) were either level 3 or level 5, with only one as level 1 (OHSU Clinical Inquiry Council, 2018). Most of them were descriptive research (e.g. learning practice report, qualitative studies). There was only 1 randomized controlled trial (No: 6) and 5 quasi-experimental studies (No: 1, 11, 25, 26, 28) with or without a comparison group. The studies had employed either a quantitative or qualitative research design; most interventional studies came out within the past decade (2010-current). Regarding the quality level, only 5 of the studies were A; and most were B.

Most studies were conducted in the USA (19/29), others were from Iran, Canada, United Kingdom, Finland, Sweden, and Taiwan. The utilization of collaborative learning in nursing education had been on the rise since this century. Research evidence supporting the positive impact of collaborative learning among nursing students had been growing. Despite shared theoretical understanding about collaborative learning, the actual implementation process had varied considerably across different studies. The variation had something to do with the course content, faculty teaching style, student preference, educational setting and countries of origin.

### **Modes of Collaboration in Higher Nursing Education**

Almost all the studies had involved different degrees of collaboration among nursing students, with or without the formation of small collaborative learning groups. The learning mostly occurred through collaborations within students in the nursing discipline. Other modes of collaborative learning was increasingly seen in the literature, such as interdisciplinary collaboration (Kaplan, Shaw-battista & Stotland, 2015; Young, Machado, & Clark, 2015; Wright, 2003), collaboration between two or more settings (Souers, Kauffman, McManus, Parker, 2007; O'Neal, McClellan, & Jarosinski, 2016), or international collaboration (Wihlborg, & Friberg, 2016). Certain collaborative learning strategies such as Jigsaw (a technique where each student becomes a topic “expert”, and shares his / her knowledge in traditional collaborative learning group as well as expert groups. The Jigsaw is a modified collaborative learning approach where each student become an “expert” in a topic) had only been used sparingly in nursing (Leyva-Moral & Camps, 2016).

### **Collaborative Learning in the Classroom Setting**

According to previous literature, the USA was the first country that initiated the study about collaborative learning in higher nursing education around the end of 1990s. The researchers established a two-semester seminar to assist doctoral students with their dissertation work focusing on nursing administration. The collaborative learning strategies included forming an effective learning group, inviting faculty as an equal learning partner. Results found that collaborative learning had demonstrated benefits for both students and faculty, in terms of productivity and quality of dissertation work for students; as well as using time more productively and efficiently for the faculty (Rea, Anderson, & Scalzi, 1988).

Collaborative learning had been used to teach a number of nursing theoretical courses, such as nursing research (O'Neal, McClellan, & Jarosinski, 2016), community health (Yang, Woomer, & Matthews, 2012), and pathophysiology (Elberson, Vance, Stephenson, & Corbett, 2001). In the pilot collaborative learning project of Yang et al. (2015), a group of nursing students (N=83) worked in teams to explore epidemiology data, synthesize the literature, and develop an evidence-based plan for nursing intervention and evaluation pertaining to a public health issue. It was concluded that having students work in teams might be a viable strategy for preparing the next generation of nurses for inter- and intraprofessional collaboration, as well as an effective way to expose students to constructive approaches to teamwork and prepare them for evidence-based nursing practice in the future (Yang et al., 2015). In the classroom teaching, collaborative learning was

mostly led by the faculty, only a few used student peer leaders (White, Rowland, & Pesis-Katz, 2012).

### **Collaborative Learning Conducted in Clinical Settings**

In the study of Suikkala et al. (2016), elderly patients were involved as age-experts in genuine gerontological clinical settings to facilitate student understanding of the aging process. According to the content analysis of student interview with the elderly and their own learning experiences, it was showed that the collaborative learning experience was mostly positive, interaction and collaborative learning activities in genuine gerontological clinical settings contributed to the students' understanding of the multiple age-related and disease-specific challenges as well as the issues of functional decline that aged patients face (Suikkala, Kivelä, & Käyhkö, 2016).

Researcher found that peer collaborative learning was suitable for clinical nursing education, given that it was a useful strategy for improving the quality and efficiency of clinical instruction (Owens, Sharkey, Smithson, Hewis, Emmens, & Ford, et al., 2015; Trueman, Osuji, & El-Hussein, 2014; Austria, Baraki, & Doig, 2013). In Trueman et al. (2014)'s study, baccalaureate nursing students worked in dyads in medical-surgical settings to develop their clinical practice. A modified phenomenological approach was used to understand student learning experience. Based on students' reflective journals, course evaluation data and semi-structured exit interview, four themes were revealed including work engagement, relational practice, autonomy, and empowerment. According to the qualitative study results about peer

learning, both students and patients reported positive outcomes including reduced student anxiety, increased confidence and task efficiency (Austria et al., 2013). Students described the process of collaborative learning as information sharing, cross-checking while making clinical decisions, and group processing when assessing the outcomes of nursing interventions (Austria et al., 2013).

Two practice education models existed in Canadian nursing context, including collaborative learning units (CLU) and preceptorship. In the CLU model, students worked with multiple team members, negotiated an assignment based on their learning needs, asked for feedback from each nurse with whom they worked, and sought guidance from the nurse with knowledge appropriate to their question. In the preceptorship model, students worked with one nurse and relied on that nurse for feedback, guidance, and modeling of professional practice. The CLU data revealed the themes of working with many and making practice their own. Both models offered different yet complementary paths for learning and enhanced professional development and practice (Callaghan et al., 2009).

### **Online Collaboration**

Online collaborative learning is a recent development in nursing education; however, the effect needs to be further tested. According to Breen's qualitative analysis of online collaborative discourse, the type of collaboration developed with the learning process and covered three phases including idea generating, idea organizing and intellectual convergence (Breen, 2015).

Wihlborg & Friberg (2016) had proposed a framework for a virtual nursing

faculty and student learning collaboration involving two universities from two different countries. The pedagogical framework was found compatible with Bologna Process' constructive alignment (A pedagogy philosophy that places the learner as the center of the teaching and learning process. Collaborative learning has been integrated into traditional classroom and lectures becomes less dominant), deep learning, and a student focus. The online collaboration through international exchange had broadened the learning opportunities for all students in understanding global health issues and health care practice (Wihlborg & Friberg, 2016). Online collaborative learning could be facilitated by using a social network, such as wiki and blogging (Garrity, Jones, VanderZwan, de la Rocha, & Epstein, 2014).

The three online-teaching strategies were found useful for effective collaboration: computer supported collaborative learning, case-based facilitated discussion, and cognitive flexibility hypermedia. These strategies promoted the student to develop the ability to examine, assess, and synthesize multiple perspectives to resolve ill structured problems (i.e., Problems for which there is no clear-cut solution) (Posey & Pintz, 2006).

### **Collaborative Testing**

Collaborative testing is a collaborative learning strategy used to foster knowledge development, critical thinking in decision-making, and group processing skills (Sandahl, 2009). Collaborative testing is a unique form of collaborative learning and a constructivist learning activity. It is an active implementation of peer-mediated learning where individual knowledge is enhanced through problem solving or defense

of an individual position with collaborative method (Duane & Satre, 2014). In the quasi-experimental study of Sandahl (2010), student learning as measured by unit examination scores was greater for students taking tests collaboratively compared to individually. Student perceptions were overwhelmingly positive, with students reporting increased learning as results of the collaborative testing experiences. A student reported more positive interactions and collaboration with their peers (Sandahl, 2010). Previous study found that collaborative testing affected both test performance and retention of course content among nursing students (Rivaz, Momennasab, & Shokrollahi, 2015).

### **The Educational Benefits of Collaborative Learning on Nursing Students**

Most previous studies have supported a positive effect of collaborative learning among nursing students.

#### **Enhancing nursing theoretical knowledge and skill performance.**

Collaborative learning has been used in both graduate and undergraduate nursing courses. Previous literature has shown that collaborative learning is helpful for improving student understanding the theoretical contents covered in such courses as nursing research (Goodfellow, 1995), pathophysiology (Elberson, Vance, Stephenson, Corbett, 2001), leadership and management (Copp, 2002), as well as useful for nursing skills teaching such as fundamental nursing skills ( Lin, 2013), health assessment (Grant, Kelley, Northington, & Barlow, 2002; Gaffney, 2000).

Cason et al. (2015) described a novel method of teaching psychomotor skills to associate degree and baccalaureate nursing students, which was Cooperative Learning

Simulation Skills Training (CLSST) in the context of nasogastric tube insertion. Student dyads served as operator and student learner. Student pairs alternated roles until they achieved mastery, after which they were assessed individually. Both students and faculty provided positive feedback regarding this educational innovation (Cason, Gilbert, Schmoll, Dolinar, Anderson, & Nickles, et al., 2015). Collaborative learning was able to increase confidence levels about the taught skills among nursing students enrolled in different nursing programs (Tucker, Wakefield, Boggis, Lawson, Roberts, & Gooch, 2003).

**Increase positive learning experience or promote learning behavior.**

Ruth-Sahd (2011) had explored students' experience about collaborative learning in the clinical setting and identified the underlying theory explaining the positive learning process. The theory included a reciprocal relationship among five categories relevant to a community of learning: supportive clinical experience; improved transition into practice; enhanced socialization into the profession; increased accountability and responsibility; and the emergence of self-confidence as a beginning student nurse. The use of student dyads had created a supportive learning environment while students were able to meet the clinical learning objectives. Collaborative learning approach also eased the transition from the classroom to the clinical learning environment and enhanced patient outcomes (Ruth-Sahd, 2011).

Noohi et al. (2013) found a significant association between active collaborative learning and university engagement level (Noohi, Abaszadeh, & Maddah, 2013).

Collaborative learning was more useful in increased respect, self-awareness,

self-evaluation, communication skills and responsibility as well as increased motivation and learning score in comparison to traditional method (Hasanpour-Dehkordi & Solati, 2016).

**Improving professional competency.** According to the study of Baumberger-Henry (2005), cooperative learning techniques combined with case-study had effect on students' perception about skills of problem-solving and clinical decision-making (Baumberger-Henry, 2005). The study was completed through a quasi-experimental design, with the experimental group taught through cooperative learning and case study. The three comparison groups were taught by either a) lecture and large group case study; or b) lecture only, or c) lecture and occasional use of non-cooperative learning groups (Baumberger-Henry, 2005).

**Improving interpersonal skills.** Nursing students tended to believe the collaborative learning strategy had helped them to develop team work as well as work independently (Leyva-Moral & Riu Camps, 2016). According to the report of Baghcheghi et al. (2011), communication skills with patients were significantly higher for students in the cooperative learning group than the traditional learning group especially in interactive skills (36.27 vs. 24.18,  $p=.01$ ) and follow-up the problems subscales (23.85 vs. 16.65,  $p=.02$ ) (Baghcheghi, Koohestani, & Rezaei, 2011).

### **Discussions and Conclusions**

Collaborative learning has come into use in nursing education for more than three decades. Compared with individualistic learning or lecture-based learning, collaborative learning has shown some benefits in enhancing learning experiences and

group skills among college nursing and graduate nursing students. Collaborative learning fits well with current nursing education reform to promote intraprofessional and interprofessional teamwork. However, well-designed studies with large sample size are needed to strengthen the above comments. According to our review, most studies employed descriptive design instead of experiments. Among the few experimental studies, most did not use a comparison group and provide any evidence about an adequate sample size. Lack of strong research rigor was an issue, due to the fact that most studies had a quality level of B.

Although collaborative learning was implemented differently across different settings, the key components of learner interaction and collaboration was present. In previous studies, collaborative learning was either a primary teaching approach or a supplementary component of a lecture. It was used to promote student learning, together with other instructional strategies such as case-study (Baumberger-Henry, 2005), simulation (Schoening, Selde, Goodman, Tow, Selig, & Wichman, et al., 2015), technology-based learning (Lin, 2013).

Previous studies have mostly focused on students as the consumer of collaborative learning, with little attention paid to nursing faculty. It needs to be aware that the role of faculty is not diminished; however, it shifted from lecturing to collaboration and facilitation. Their responsibilities have now changed to assigning learning groups, monitoring and organizing the learning progress, as well as making evaluations of student productivity (Johnson, Johnson, & Holubec, 1998).

At present, interprofessional educational efforts have been initiated for students

to understand about teamwork in health care and develop the ability to be effective team players. This demands collaborative learning across disciplinary and professional boundaries, which is more challenge than conducting collaborative learning within the same discipline. Interprofessional collaboration is often perplexed with distrust, confrontation, disrespect and hierarchical structure (Aase, Hansen & Aase, 2014). Hence it is essential that faculty from different professional fields work together to promote student acceptance and satisfaction with the learning.

### **Implications**

**Educational implications.** Collaborative learning was a type of teaching strategies beneficial for nursing students, particularly in promoting student interaction and social skills. However it needs to be carefully designed if used as a main teaching approach. Faculty need to face a few new challenges, such as getting to know students better, re-organizing the course content as well as monitoring student learning more closely.

**Research implications.** Collaborative learning has been an effective instructional approach to help train new nursing graduates to meet increased and complex demand from clinical environment. It is necessary to understand the mechanism underlying the development of collaboration in the learning process, as well as seek strategies to promote collaboration between nursing students.

One area of future studies needs to focus on establishing measurement tools to standardize, analyze and evaluate the collaborative learning process and learning outcomes. Another research area is to further test the effect of online collaborative

learning.

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**Figure 1. Literature search and retrieval process**

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**Table 1***Literature relevant to collaborative learning in higher nursing education (N=29)*

No	Author and date	Research design & research purpose	Country of origin	Sample & setting	Sample size (N)	Findings including outcome assessments	Level of evidence	Quality of evidence
<b>Collaborative learning in the classroom</b>								
1	Baumberger-Henry, 2005	A quasi-experimental pre-test–post-test static group comparison design was used to determine the influence of teaching methodologies on student nurses' self perceptions of problem-solving and decision making skills.	USA	A convenience sample of students enrolled in community college two year nursing programs, located in Southern New Jersey.	123	The results, however, showed that the experimental group obtained scores indicating somewhat better self-perception of both problem-solving and decision making skills.	II	A
2	Copp, 2002	Learning practice report; The author describes cooperative learning and its use in a leadership/management course to teach students about the	USA	Students enrolled in leadership and management course	17	Overall, student comments about the group activity were positive. Most students indicated that they felt most engaged during the large group	V	B

		provisions of the state's Nurse Practice Act.				discussion.		
3	Elberson, et al., 2001	Learning practice; This project was undertaken to obtain qualitative and quantitative data on the effectiveness of using cooperative learning strategies in a pathophysiology course traditionally taught in lecture format.	USA	In the East Carolina University School of Nursing, the students participating in the projects over three consecutive semesters.	324	The cooperative learning strategy is effective in teaching pathophysiology. It may also result in increased knowledge and an environment for enhanced interaction among students and faculty.	V	B
4	Gaffney, 2000	Learning practice project; The author describes the experience of establishing a teaching and learning environment to foster the concept of collaborative learning.	USA	The setting was a health assessment course with students from 13 countries of origin.	22	Overall, the students gave the course high ratings and said they appreciated the approach used for working toward culturally competent health assessments. All students, both U.S. and foreign born, highly praised the coordinated	V	B

						audiovisual approach to lecture presentation with the accompanying note-taking handouts.		
5	Goodfellow, 1995	Learning practice report The author describes how informal and formal collaborative learning groups was used to facilitate nursing research course learning in undergraduate nursing students	USA	A group of nursing students enrolled in a nursing research course.	Not mentioned.	Findings: Collaborative learning strategies are effective in teaching nursing research to undergraduate nursing students  Outcome assessments: The learning outcomes were assessed through mid-term and final examination grades, as well as feedback from students.	V	B
6	Hasanpour-Dehkordi & Solati, 2016	Randomized controlled trial with pretest and	Iran	The participants were senior nursing students.	$N_1=N_2=24$	Both Context-Based Learning and	II	B

		<p>post-test of control group;</p> <p>To investigate the efficacy of three learning approaches, collaborative, context-based learning (CBL), and traditional, on learning, attitude, and behavior of undergraduate nursing students.</p>		<p>The samples were randomly assigned to three groups; CBL, collaborative, and traditional.</p>		<p>collaborative approaches were useful in terms of increased respect, self-awareness, self-evaluation, communication skills and responsibility as well as increased motivation and learning score in comparison to traditional methods.</p>		
7	Leyva-Moral, et al., 2016	<p>Cross-sectional study;</p> <p>The aim of this study was to evaluate nursing student satisfaction with the Jigsaw Technique used in the context of a compulsory course in research methods for nursing.</p>	Spain	<p>The study population was composed of all the students who completed the course on research methods during the academic years 2012–13 and 2013–14.</p>	157	<p>Findings:</p> <p>The method was not highly valued by students, mainly by those older than 22 years, who concluded that they did not learn more with it than with other traditional techniques.</p>	III	B

						Outcome assessment: Results of Jigsaw learning were assessed by self-developed questionnaire regarding attitude, knowledge and skills.		
8	Rea, et al., 1988	Learning practice report; It describes a collaborative teaching and learning method that substantially reduced the inherent isolation experienced by many nursing admiration doctoral students. It also discusses the experience of students and faculty using the method at	USA	Doctoral students and faculty the School of Nursing, University of Texas at Austin.	Not mentioned	Findings: ● This collaborative learning method had a number of advantages for both doctoral students and faculty. Some key advantages for the faculty were that it provided a forum to identify dissertation topics and to address ongoing theoretical and methodological issues. The group format and group rules ensured the efficient use of time	V	B

						<p>and improved the productivity and quality of the dissertation work.</p> <ul style="list-style-type: none"> <li>• The primary benefits of the students were that it enabled them to acquire in-depth understanding of a variety of theoretical frameworks and stimulated new thinking in relation to research in nursing administration.</li> </ul>		
9	Yang, et al., 2012	<p>Learning practice report;</p> <p>The purpose of this paper is to describe the collaborative learning experience that we implemented in our community health nursing course to address Essential VI.</p>	USA	<p>The piloted a collaborative learning project with undergraduate community health nursing students that entailed working in teams to explore</p>	83	<p>Findings:</p> <p>Our experience suggests that instituting a collaborative learning experience as part of an undergraduate course in community health nursing can be an</p>	V	B

		Specifically, we describe how the faculty structured the experience and how students and faculty responded to our approach.		epidemiologic data, synthesize the literature, and develop an evidence-based plan for nursing intervention and evaluation pertaining to a public health issue.		effective way to expose students to constructive approaches to teamwork and prepare them for evidence-based nursing practice in the future.  Outcome assessments: Pre- and post-project survey, peer evaluation, and formative and summative evaluation by faculty		
<b>Collaborative learning in nursing clinical settings</b>								
10	Austria, et al., 2013	Qualitative research; The aim of this qualitative study was to explore the student nurse and patient experiences of collaborative learning	USA	Interviews were conducted with 11 students and 9 patients. This study was conducted on a 25 beds inpatient		When peers are engaged in collaborative learning in the clinical setting, students report positive learning	III	A

		when peer dyads are used in clinical nursing education.		surgical oncology unit.		experiences and patients generally report satisfaction with nursing care.		
11	Baghcheghi, et al., 2011	Experimental study. To compare the effect of traditional learning and cooperative learning methods on nursing students' communication skill with patients,	Iran	The sample population for this study consisted of nursing students in semester 2 of their first year of training. All nursing students in their 2nd semester of program, studying in Arak University of Medical Sciences in Iran were selected	34	Findings: A significant difference was found between the two groups in the interaction skills and problem follow up sub-scales scores after the teaching intervention.  Outcome assessment: Communication skills of students assessed using the nursing students' communication with patients scale	I	A
12	Callaghan et al., 2009	Qualitative study; Twenty-two Bachelor of Science in Nursing	Canada	This study shares the perceptions of twenty-two	22	The participants suggest that both models offer	III	B

		(BSN) graduates shared their perceptions one year after graduation on two practice education models they experienced during years three and four of their nursing education.		graduates from four Bachelor of Science in Nursing (BSN) programs, one year after graduation, regarding their student experiences in CLUs and preceptorship.		different yet complementary paths for learning and enhanced professional development and practice. There is also confirmation that both are relevant and perhaps necessary.		
13	Grant, et al., 2002	Learning project To help students understand the benefits of independence and collaborative learning and to allow faculty to use their time more efficiently and effectively.	USA	A school of nursing located in the southeastern in the United States.	not mentioned.	Most senior students realized the benefit of a skills review and learned about evaluation, collaboration, and mentorship. Most junior students were proud of their accomplishments and seemed to have more productive clinical experiences. In addition, students	V	B

						worked both collaboratively and autonomously, and developed beginning problem-solving skills, and faculty learned to relinquish some control over student learning.		
14	Noohi et al. 2013	<p>Descriptive correlational study;</p> <p>The purpose of this study was to determine university engagement and collaborative learning in nursing students of Kerman University of Medical Sciences.</p>	Iran	Participants were senior students of nursing in a medical university in Iran who were attending neurology apprenticeship in an interior neurology ward	384	<p>There was a significant positive correlation in components including active and collaborative learning (ACL) level, students' level of academic challenge (LAC) as well as student faculty interaction (SFI), supportive campuses environment and enriching educational experiences (EEE)</p>	III	B

						with total score of university engagement ( $P < 0.05$ ).  Outcome assessment: National survey of student engagement (NSSE)		
15	Ruth-Sahd, 2011	Ground theory; Understand the collaborative learning process in clinical setting	USA	Using a grounded theory methodology a sample of 64 participants (32 student nurse dyads, eight clinical groups, in two different acute care institutions) were observed on their first day in the clinical setting while working as cooperative partners.	64	A holistic clinical education theory for student nurses was identified from the data. This theory includes a reciprocal relationship among five categories relevant to a community of learning	III	A

16	Trueman et al., 2014	Phenomenological approach; This article describes a unique learning project designed to address the praxis gap between baccalaureate nursing students' clinical learning and theoretic principles of collaborative practice on an acute medical-surgical unit in Canada.	Canada	The active engagement model was used with eight baccalaureate nursing students to inform a program of clinical teaching and learning in the bachelor of nursing program at Mount Royal University in Calgary, Alberta, Canada.	8	Four themes were revealed based on students' reflection of their experience: work engagement, relational practice, autonomy, and empowerment.	III	A
<b>Collaborative learning occurred between different disciplines or different setting</b>								
17	O'Neal et al., 2016	A quality improvement study; The purpose of this Collaborative Approach and Learning Cooperatives (CALC) Model is to foster working relations between faculty and	USA	A quality improvement study using the CALC Model was implemented in an undergraduate nursing research course at a southern	75	The student teams developed posters, which were evaluated by hospital administrators. The administrators selected several posters to display on hospital units for	V	B

		hospital administrators, maximize small group learning of undergraduate nursing students, and promote on site knowledge of evidence -based care for unit nurses.		university.		continuing education opportunity.  Outcome assessment: The students were required to complete posters related to evidence-based care issue, and were graded by peer review, nursing school faculty and hospital administrator.		
18	Souers, et al., 2007	Learning practice report; This paper describes a collaborative project that joins academic perspectives and clinical practice perspectives in a focused clinical experience.	USA	It involves 3rd quarter associate degree nursing students in a medical-surgical course aiming to prepare students for intravenous injection skills.	4	Results indicate a very positive learning experience for the students, as well as a collaborative and contributing effort by the students or the staff.  Outcome assessment: Student ratings about	V	B

						learning experience using a likert scale, with clinical learning ranked the highest.		
19	Suikkala et al., 2016	Qualitative content analysis; The aim of this study is to describe the participating student nurses' experiences of collaborative learning in gerontological clinical settings where older people are involved as age-experts participating in the students' learning processes.	Finland	Data was collected in 2012 using students' reflective writing assignments and own assessment of learning experiences  This study was conducted in one of the 23 polytechnics in Finland.	Not mentioned	<ul style="list-style-type: none"> <li>• Contributed to the students' understanding of the multiple age-related and disease-specific challenges as well as the issues of functional decline that aged patients face.</li> <li>• The results emphasized the importance of the authentic clinical learning environment and the genuine partnerships among student nurses, elderly people, staff nurses and nurse educators for the highlighting of the</li> </ul>	III	B

						positive aspects of elder care.		
20	Tucker, et al., 2003	Learning practice report; To evaluate the feasibility and effectiveness of shared learning of clinical skills for medical and nursing students at the University of Manchester.	UK	Year 3 students registered on the Medical (n = 41), Bachelor of Nursing (Honours) (n = 43) or the Diploma for Professional Studies in Nursing (n = 29) courses participated in the project which was set in the clinical skills unit of a teaching hospital.	113	<ul style="list-style-type: none"> <li>• Pre- and post self-evaluation of confidence levels for the taught skills revealed a statistically significant increase for all skills.</li> <li>• The primary reason students gave for participation in the project was to learn or consolidate skills. An additional inducement for participation was the opportunity to share knowledge and observations between professional groups.</li> <li>• Tutors also evaluated the experience favourably,</li> </ul>	III	B

						<p>particularly with regard to small group discussion.</p> <ul style="list-style-type: none"> <li>• The program provided an opportunity to standardize clinical skills teaching.</li> </ul>		
21	Wihlborg & Friberg, 2016	Theoretical paper; To explore a sound pedagogical framework to implement opportunities for collaborative learning through international exchange	Sweden & USA	Nursing students and faculty involved in collaborative learning between two universities in Sweden and USA.	N/A	Supports the development of cultural awareness and understanding of global health care practices and the nursing profession on mutual topics of concern.	V	B
22	Wright, 2003	Learning practice report; This article describes learning experiences about local environmental health issues, several of which were designed to initiate and foster	USA	The community health nursing students and the public health graduate students at Loma Linda University (LLU)	43	The nursing students gained experience working in a collaborative team of health professionals and recognized that an interdisciplinary team is necessary to address	III	B

		collaboration between baccalaureate nursing students and graduate students in public health.				environmental health issues. This met the goal of the original faculty partnership. The learning strategies implemented to meet the partnership goal were successful, and the community health nursing faculty gained some perspective in using those teaching strategies.		
<b>On-line collaborative learning or technology-based collaborative learning</b>								
23	Breen, 2015	Qualitative approach; This qualitative study using transcript analysis was undertaken to clarify the value of Harasim's Online collaborative Learning Theory as a way to assess the	USA	The setting for the study was a fully online RN to BSN program offered through the School of Nursing and Adult Education Program in a small northwest liberal	19	This study supports the use of Online Collaborative Learning Theory as a framework for assessing online collaborative discourse. Individual or group outcomes	III	B

		collaborative process within nursing education.		arts college in the United States. Participants for the study were the RNs enrolled in their final nursing course during the summer of 2012		were required for the students to move through all three phases of the theory.		
24	Cason et al., 2015	Learning practice report; This article describes a novel method of teaching psycho motor skills to associate degree and baccalaureate nursing students, Cooperative Learning Simulation Skills Training (CLSST), in the context of nasogastric tube insertion using a deliberate practice-to-mastery learning model.	USA	All of the students enrolled in the course participated as part of their normal scheduled laboratory time at the point in the program where the skill was introduced. Students in the ADN curriculum included second-year nursing students ( $n = 134$ ), with data collected in September and	186	Students and faculty provided positive feedback regarding this educational innovation.	V	B

				October 2011. Students in the BSN curriculum included first-year nursing students ( $n = 52$ ), with data collected in the spring of 2013.				
25	Lin, 2013	Pretest–posttest experimental design; The purpose of this study was to compare the effect of technology-based cooperative learning with technology-based individual learning in nursing students' critical thinking in catheterization knowledge gaining, error discovering, skill acquisitions, and overall scores	Taiwan	The participants for this study comprised the nursing students who were in the second year of a five-year junior college program, and were taking fundamental nursing skill course.	98	Cooperative learning with technology integration supports positive improvement in the participants' critical thinking and knowledge enhancement.	II	B
26	Owen & Ward-Smith, 2014	Research design: educational	USA	A total of 152 first-semester	170	<ul style="list-style-type: none"> <li>• Near-peer teaching and learning, coupled</li> </ul>	II	B

		<p>intervention</p> <p>The focus of this article is to describe the development and implementation of a unique simulation experience.</p>		<p>students and 18 upper-level students participated in the simulation over two semesters.</p>		<p>with SPs in a first semester simulation, met the learning outcomes for all students involved.</p> <ul style="list-style-type: none"> <li>• Students demonstrated cognitive and skills development, which exemplifies SCT. This collaborative learning experience was successfully accomplished and continues to improve with student feedback and faculty oversight.</li> </ul>		
27	Posey & Pintz, 2006	<p>Theoretical paper;</p> <p>Compares the design characteristics and educational benefits of three online-teaching strategies that nurse educators can use to build the critical</p>	USA	N/A	N/A	<p>Students need to develop the ability to examine, assess and synthesize multiple perspectives to resolve ill-structured problems.</p>	V	B

		thinking and social skills needed for effective collaboration.						
<b>Collaborative testing</b>								
28	Rivaz, et al. 2015	Quasi-experimental study; This study aimed to determine the effect of collaborative testing on test performance and retention of course content in nursing students of Shiraz University of Medical Sciences, Shiraz, Iran.	Iran	This quasi-experimental study was carried out on the students enrolled in the course of Medical-Surgical 2 in Spring 2013 and Fall 2013 semesters.	84	The results indicated an increase in test performance and a long-term learning enhancement in collaborative testing compared with the traditional method	II	B
29	Sandahl, 2010	Review; To Review the theoretical basis for collaborative learning and research on collaborative testing in nursing education.	USA	N/A	N/A	Research on collaborative testing as a collaborative learning strategy in nursing education is meager, increased exam scores are shown consistently; however, findings on long-term retention, as measured by final	V	B

						cumulative examinations, inconsistent.	are		
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### Highlights

- Collaborative learning had been employed in classroom teaching, clinical education and online course teaching.
- The collaborative learning was useful for improving student cognitive performance, promoting social interactional skills, as well as increase positive learning behavior of students.
- It is necessary to integrate collaboration learning into nursing education due to a number of learning benefits.

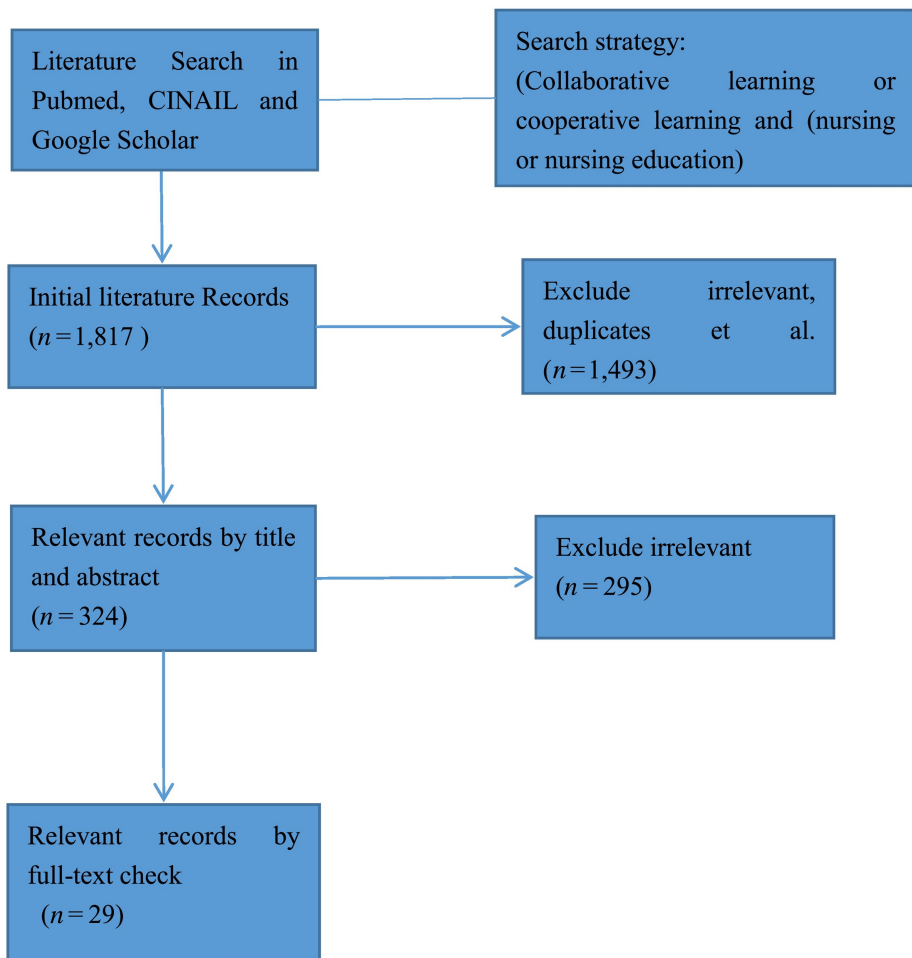


Figure 1