Simulated Education in Nursing: An Integrative Review

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Abstract

The broad focus of this integrative review involved examining and describing student learning in relation to medium and high fidelity simulation (HFS) and exploring how SBL influenced student preparation for clinical practice. The evidence suggested that academic knowledge such as pathophysiology and pharmacology contributed to safe clinical judgment. In addition, SBL contributed to contextualized interpretation and decision-making thus improving student ability to formulate clinical judgment. A relationship between knowledge, simulated practice, and confidence existed. It is anticipated that this project will begin to build an understanding of the progression of knowledge and confidence from novice learner to senior nursing student.

Keywords: student nurse, simulation, fidelity, education, knowledge, and effective learning

Simulation Education in Nursing: An Integrative Review

Simulation learning has been a part of nursing education for 20 to 30 years (Gates, Parr, & Hughen, 2012). The Merriam-Webster dictionary defines it as an "imitative representation" and when applied to nursing it becomes a demonstration of learner knowledge when responding to human conditions (Gates et al). Fidelity in simulation learning refers to the level of technology that results in the production of realistic, life-like physiological response to medical or nursing interventions utilizing a mannequin (Baxter, Akhtar-Danesh, Valaitis, Stanyon & Sproul, 2009; Gates et al., 2012; Lapkin & Levett-Jones, 2011). Through the use of technology, mannequins have become interactive and responsive patient facsimiles providing experiences that mimic the care of real human beings (Brewer, 2011; Liaw et al., 2010). The fidelity capability of mannequins is such that high-level physiological responses to illness or medications can be elicited and students can respond to care needs in the moment (Nehring, Ellis, & Lashley, 2001). Simulation based learning (SBL) has been defined by several scholars as a "pedagogy using one or more typologies to promote, improve, or validate a participant's progression from novice to expert" (Meakim et al., 2013, p. S8). Learning experiences can be designed to provide realistic, immersive experiences that may be unavailable in clinical practice.

In an effort to address the challenges of increased clinical complexity and acuity, the shortage of clinical educators, and the decreasing availability of clinical placements relative to increasing student enrollments, nursing programs are using medium to high fidelity simulation (HFS) to augment clinical teaching and learning (Baxter et al., 2009). Several authors propose that the integration of SBL into current curricula will maximize student learning (Blum, Borglund, & Parcells, 2010; Garrett, MacPhee, & Jackson, 2011; Parker & Myrick, 2011). Simulation based learning has been gaining popularity and because it can be easily integrated

into courses and programs it has become standard practice in nursing education (Alinier, Hunt, & Gordon, 2004). Therefore, the use of consistent terminology among educators will facilitate communication related to this prevalent pedagogy. Members of the International Nursing Association for Clinical Simulation and Learning (INACSL) in the United States of America (USA) have been instrumental in developing guidelines, terminology, and competencies for SBL. Meakim et al. (2013) defined competence as "discrete and measurable knowledge, skills, and attitudes that are essential for patient safety and quality patient care" (p. S5). Knowledge has been defined as "the awareness, understanding, and expertise an individual acquires through experience or education" (Meakim et al., 2013, p. S7). These definitions are utilized frequently in the research related to SBL (Hart, Maguire, Brannan, Long, Robley, & Brooks, 2013; Ironside, Jeffries, & Martin, 2009).

Throughout the literature the term simulation is associated with technology however, it is also utilized for live-actors called standardized patients, static mannequins, and role-play (Ironside et al., 2009). The range of fidelity from low to high is described in varying ways such as: HFS or high fidelity patient simulation (HFPS), patient simulation, human patient simulation (HPS), simulation-based learning (SBL), low fidelity simulation (LFS), task trainer, or static mannequins.

Despite the increased use of SBL, evidence articulating the effectiveness of learning is lacking (Decker, Sportsman, Puetz, & Billings, 2008; Lapkin & Levett-Jones, 2011; Walton, Chute, & Ball, 2011). Research has primarily focused on student perceptions of learning, student perspectives on knowledge acquisition, transferability of learning into the clinical setting, and self-confidence (Feingold et al., 2004; Bremner, Aduddell, Bennet, & VanGeest, 2006; Walton et al., 2011).

The term *theory* is utilized to convey the vast range of knowledge associated with nursing education (Benner et al., 2010). This includes knowledge about nursing care, nursing theories, anatomy, pathophysiology, biology, chemistry, and physics (Benner et al., 2010). Benner et al. (2010) suggest that theoretical knowledge is only one aspect of nursing education and assert there is a significant difference between theoretical pedagogy and clinical practice pedagogy. Today's health care environment demands that nursing students develop the capacity to utilize knowledge in a fluid and unpredictable practice environment (Benner et al., 2010). Thus, an integrative literature review of scholarly, peer-reviewed publications that explore and discuss the effectiveness of SBL is warranted.

Objectives of the Project

There were two objectives of this project. The first objective was to examine and describe student learning in relation to medium to HFS learning through an integrative review of the research literature. The second objective was to explore how this form of experiential learning influenced student preparation for clinical practice. In relation to the second objective, Jillings (2006) stated, "nurse educators are encouraged to rise to this challenge, with the aim of not only promoting and achieving excellence in nursing education but also of improving clinical nursing practice and producing a positive impact on client care" (as cited in Young & Paterson, 2006, p. 482). This statement illuminated questions related to undergraduate nursing students' learning experiences through simulation and their ability to transfer knowledge and understanding into clinical practice. The benefits of conducting this literature review were to advance personal and professional understanding of HFS in relation to student learning. Personally, this undertaking enhanced my ability to analyze and synthesize the literature related to HFS and improved my understanding and approach to teaching and learning in general.

The Integrative Literature Review

Design

The purpose of an integrative review is to examine and summarize the literature thus providing a comprehensive look at the prevailing climate and discourse related to a topic (Cronin, Ryan, & Coughlan, 2008). It is vital to perform a comprehensive search of the literature in a transparent and structured manner prior to conducting further research (Boote & Beile, 2005). A literature review should illuminate the context of investigation related to a subject area, the current understanding and knowledge of limitations, and should justify the authors search strategy and use of chosen literature (Boote & Beile, 2005; Whittemore & Knafl, 2005). Whittemore and Knafl (2005) suggest inclusion of data from mixed methodologies contribute to a comprehensive understanding of the chosen phenomenon. The intent of utilizing Whittemore and Knafl's (2005) framework to guide this integrative review was to improve the analysis and synthesis of existing literature and to justify the contribution of each research article to the topic of SBL.

Literature Search

Search methods utilized for this integrative review included electronic and manual searches. A systematic electronic search of peer-reviewed literature was conducted using the following databases; Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline, Journal Storage (JSTOR), Academic Search Complete, and Google Scholar. The following search terms were utilized: high-fidelity simulation learning (2,865), nursing simulation education (1,304), nursing simulation education and conceptual learning (172), nursing simulation education and pedagogy (281), nursing education and fidelity simulation (1,084), nursing education and high fidelity simulation learning (687), nursing education and

fidelity simulation and conceptual learning (25), nursing education and fidelity simulation and experiential learning (96), nursing education and fidelity simulation and learning (753), nursing high fidelity education and conceptual learning (30), and high fidelity simulation learning and undergraduate nursing student (161). In addition, the electronic online journal of the International Nursing Association for Clinical Simulation and Learning (INACSL) was searched utilizing the same search terms with differing results, for example; nursing simulation education and pedagogy (82), nursing education and fidelity simulation and experiential learning (0), nursing high fidelity education and conceptual learning (36), and high fidelity simulation learning and undergraduate nursing student (141).

Inclusion criteria included medium and high fidelity simulation based learning in undergraduate nursing education, peer-reviewed publications, and qualitative and quantitative research published in English from January 2001 to June 2013. Exclusion criteria initially included: standardized patients, role-playing, static mannequins, and virtual simulation such as auditory hallucinations. Auditory hallucination simulation involves simulated voices and is a solitary activity that does not require medium or high fidelity mannequins. After a careful review of the articles, further exclusion criteria were established because the identified literature was either related to students outside of nursing or involved disciplines other than nursing. These included: literature related to physician education, education of scientific disciplines, pharmacology education, and distance learning. In addition, the literature was reviewed for the term *medicine or medical* to prevent inadvertent exclusion of nursing simulations related to the care and management of medical patients. Articles associated with inter-professional simulation were excluded after noting medium to HFSL had been utilized in inter-professional education and institution-based education such as mock code blue scenarios. Studies included were specific

to undergraduate nursing students and the knowledge that solidified professional practice as they worked towards developing graduate competencies. In addition, all studies meeting the inclusion criteria, regardless of methodological quality, were utilized in an effort to examine all evidence related to this topic.

Data Evaluation and Analysis

Initially, the electronic search yielded 2, 865 articles. The search was narrowed to 96 after removal of duplicate articles and those of unrelated subject matter. A comprehensive review of the title, abstract, and conclusion narrowed the results further to 50. Out of those 50 articles, 37 were excluded because they were systematic reviews, theoretical articles, or included practical nursing students or graduate nurses resulting in 13 studies that met the inclusion criteria. Eleven research reports were primarily quantitative and two were qualitative studies. Each article has been listed in Table 1 (Appendix A) and is discussed in more detail later in this paper.

According to Whittemore and Knafl (2005), "strategies for data analysis with integrative reviews are one of the least developed aspects of the process" (p. 550). Cronin et al. (2008) propose that each article requires summarizations that highlight variation and key literature characteristics. In Table 1 (Appendix A) the literature characteristics of each article are presented. This process assisted in organizing and reducing the data, displaying and comparing research, and synthesizing and connecting patterns in the research findings (Cronin et al., 2008; Whittemore & Knafl, 2005). Examining each article for research design, purpose, data collection methods, and findings assisted with making a connection to the objectives: 1) examining and describing student learning in medium and HFS and 2) exploring how SBL prepared students for clinical practice. Repetitive reading and examination of each article led to the recognition of

common terms and concepts. Common terms were collected, counted, colour coded, and reflected upon in an effort to recognize patterns, themes, and relationships. Initially, the focus was on the relationship between knowledge acquisition and nursing skills. Continued focus on the research question and findings contributed to theming. After considerable reading, discussion, reflection and angst, two main themes were identified and will be discussed: knowledge utilization and enhancing-inhibiting confidence.

Results

Ten studies evaluated how SBL improved or had an impact on either student acquisition of knowledge, competence, critical thinking, or clinical practice skills and performance (Alinier et al., 2004; Blum et al., 2010; Elfrink et al., 2010; Gates et al., 2012; Hart et al., 2013; Hoffman et al., 2007; Ironside et al., 2009; Lewis & Ciak, 2011; Liaw et al., 2010; Radhakrishnan, Roche, & Cunningham, 2007). Many of the research questions utilized knowledge related terminology; knowledge acquisitions, subject-related knowledge, competence, knowledge attainment, learning outcomes, basic knowledge and transference of knowledge (Alinier et al., 2004; Blum et al., 2010; Elfrink et al., 2010; Feingold et al., 2004; Gates et al., 2012; Hoffman et al., 2007; & Ironside et al., 2009). Of these ten reports, none of the findings explicitly revealed a common theme. However, through the process of thematic analysis and questioning the relationship between knowledge and learning in simulation, the first theme identified was knowledge utilization.

The three remaining articles examined student experiences and perceptions of participating in medium and high fidelity simulated practice (Feingold et al., 2004; Pike and O'Donnell, 2010; Walton et al., 2011). The second theme addressed an alternating level of confidence. Four studies represented both themes (Alinier et al., 2004; Blum et al., 2010; Lewis

& Ciak, 2011; Pike & O'Donnell, 2010). Detailed characteristics of the literature sample are summarized in Appendix A - Table 1.

Knowledge Utilization. Knowledge utilization was identified from the findings reported in four articles (Elfrink et al., 2010; Gates et al., 2012; Hoffman et al., 2007; Lewis & Ciak, 2011). Elfrink et al. (2010) identified pre-simulation knowledge from textbooks and electronic reference tools, and a pre-simulation group discussion enabled students to utilize knowledge while performing in the simulation scenario. The number of students who improved their subject-related knowledge scores after participation in a HFS was statistically significant (positive mean value 0.375, p-value 0.000). Similarly, Gates et al. (2012) demonstrated improved subject-related knowledge after students participated in simulation involving a simulated-patient diagnosed with pulmonary emboli (PE) or gastrointestinal (GI) bleeding. Both groups demonstrated a greater than 8% increase in exam performance. The GI bleed intervention group's average exam score was 5.78 (SD 1.15) compared to the control group's average exam score of 4.92 (SD 1.45). Hoffman et al. (2007) also demonstrated improved basic knowledge when simulated learning was added to a nursing laboratory course. Mean basic knowledge assessment tool (BKAT) scores improved from day one of the course (52.52) to three months later (62.76). Lewis and Ciak (2011) identified significant improvement in knowledge from pretest (0.661) and posttest (0.827) in a maternity based scenario. Their findings demonstrated an increase in correct posttest responses on a pharmacological question after students manipulated the syringe during a simulated scenario compared to those students who did not (Lewis & Ciak, 2011).

Contrary to other findings, two studies reported improvement in student performance in both the control and intervention groups (Blum et al., 2010; Liaw et al., 2010). Liaw et al.,

(2010) compared student performance in two different scenarios related to respiratory and chest pain subject matter. While the intervention groups demonstrated significantly lower scores than the control group in a respiratory distress scenario, the intervention group had significantly higher scores in the chest pain scenario. In the chest pain scenario, student performance scores related to 'assessment' in the problem-based discussion (PBD) group (6.93) were significantly lower than the simulation with problem-based discussion (SPBD) group (8.44). In addition, the 'immediate action' score was lower in the PBD group (14.60) while the SPBD group (17.44) was significantly higher (Liaw et al., 2010). Findings from Blum et al. (2010) also demonstrated improved clinical competence scores in both the control and intervention groups. The change in clinical competence scores from midterm to final testing was not significantly different in the control group 1.61 (11.88 – 14.13) or the intervention group 1.18 (11.51 – 13.86).

Performance indicators in patient deterioration scenarios were more favorable in a study by Hart et al. (2013). Student awareness and response improved in three key areas: time to begin chest compressions, time to ventilate a patient with a bag-valve mask, and time to intervene with electricity (Hart et al., 2013). These findings demonstrated improved emergency response times (6:54 minutes to 1:17 minutes) and emergency response performance (ERP) scores (51.0 to 95.10) from the beginning to the end of a course when simulated training was implemented (Hart et al., 2013).

Three studies contributed to knowledge utilization by examining clinical competency in simulation (Alinier et al., 2004; Radhakrishnan et al., 2007; Ironside et al., 2009). In a quasi-experimental inquiry by Alinier et al. (2004), participants in the experimental group completed two forty-minute medium-fidelity simulation sessions. Baseline objective structured clinical examination (OSCE) scores were utilized to evaluate any changes in competency between the

control and experimental groups. The OSCE method utilized fifteen clinical performance stations to measure students' clinical competency. The average pre-intervention OSCE score in the control group was 49.59 and the intervention group was 50.19. The average post-intervention OSCE score in the control group was 56.35 and the intervention group was 63.62. The intervention group score rose by almost 7% in key areas (Alinier et al., 2004). These included recognition of incorrect ECG electrode positioning, identification of a dysrhythmia, recognition and response to the patient monitor and syringe driver alarm, as well as recognition of impending cardiac arrest (Alinier et al., 2004).

Safety competencies significantly improved after experiencing multiple-patient scenarios over a course of ten weeks in a study by Ironside et al. (2009). These findings implied that SBL prepared students for responding appropriately in varying contexts of nursing practice. However, variability in the findings suggested additional influences such as previous learner experiences, level of maturity, and how physically interacting with knowledge in simulated practice can influence the complexity of SBL. Similarly, Ironside et al. (2009) reported significant improvement in students' implementation of patient safety competencies after participating in two 4-patient simulation experiences. The mean score attributed to patient safety competencies was 11.48 after the first simulation experience and 13.88 after the second. The differences in implementation of patient safety competencies from week three to week ten ($t = -4.00$, degrees of freedom = 66, and $P < 0.0002$) was statistically significant (Ironside et al., 2009).

Radhakrishnan et al. (2007) also demonstrated improved competency in two categories when traditional courses were enhanced with medium and HFS. Improvement in 'basic assessment' category was identified by a score of 33 in the control group and 43 in the intervention group. Similarly, improvement in the 'safety' category was demonstrated by a score

of 34 in the control group and 45 in the intervention group. In all other categories, that is, focused assessment, interventions, delegation, and communication, the difference between the two group scores was not statistically significant (Radhakrishnan et al., 2007).

Enhancing-Inhibiting Confidence. Research by Alinier et al. (2004), Blum et al. (2010), and Lewis and Ciak, (2011) reported variable findings related to student confidence. Alinier et al. (2004) asked students in their experimental and control groups to complete a Confidence Questionnaire. The results of the questionnaire demonstrated that the utilization of SBL did not improve self-confidence between the two groups of student learners (Alinier et al., 2004). The mean confidence score in the control group was 3.50 compared to 3.48 in the experimental group. Blum et al. (2010) conducted a study utilizing a Lasater Clinical Judgment Rubric (LCJR), which demonstrated enhanced confidence in both the control and intervention groups. The change in students' mean self-confidence scores in the control group (11.42 to 13.03) was slightly higher than the intervention group (11.30 to 12.48), however the change was not statistically significant. Conversely, research by Lewis and Ciak (2011) demonstrated statistically significant findings of improved self-confidence from pretest to posttest. The overall mean score was 4.35 on a five point Likert scale and was similar to the mean satisfaction score (4.33). Lewis and Ciak (2011) proposed that the student interactions with their physical learning environment contributed to improved self-confidence and satisfaction scores.

Learner self-efficacy in relation to communication skills and authenticity within medium and high fidelity simulation were two main findings that emerged in the study by Pike and O'Donnell (2010). Students reported feeling anxious and lacking confidence in their general communication and when communicating in situations of bereavement (Pike & O'Donnell, 2010). It was unclear whether student anxiety inhibited student confidence. These students

reported the same fear when practicing in the clinical environment. It was also determined that scenarios needed to be more realistic and less skills-based in order to enhance learner confidence (Pike & O'Donnell, 2010). Findings related to student confidence were inconsistent in the study by Feingold et al. (2004). Despite 84.6% students reporting SBL was realistic (mean value, 2.83), there was a lower level of agreement (50.8%) related to the view that skills learned in medium and HFS practice would transfer (mean 2.52) into the clinical arena. Regardless, 54.7% maintained that simulated clinical experiences prepared them to function in a real or non-simulated environment (Feingold et al., 2004). Based on these results, it appears that components of SBL, such as realism and practicing skills in simulated contexts, both enhanced and inhibited student confidence.

In a study by Walton et al. (2011), students reported feeling anxious and uncomfortable with spontaneity in the beginning phases of SBL. Phase one and two were, *feeling like an imposter* and *trial and error* (Walton et al., 2011). As they practiced and progressed they reached phase three, *taking the role seriously,* which involved feeling more confident. Improved confidence resulted from the development of a routine and feeling comfortable in the role of a nurse. Confidence decreased again in phase four, *transference of skills and knowledge,* due to failure with a skill or making an error. If multiple errors were made this resulted in significant fear and subsequent failure. With support and practice, students' confidence was rebuilt and they began assimilating into the role of a professional (Walton et al., 2011). These findings have implications for SBL and the role it plays in enhancing confidence as students' prepare for clinical practice, especially at the beginning of their education when they may be unfamiliar with the clinical environment.

Authenticity in SBL enabled students to gain confidence in varying contexts of nursing practice (Pike & O'Donnell, 2010; Feingold et al., 2004). Two articles reported that realistic scenarios imitating acute patient deterioration supported student capacity to view a simulation as realistic thus contributing to their confidence in dealing with similar situations in clinical practice (Hart et al., 2013; & Pike & O'Donnell, 2010). Hart et al. (2013) proposed HFS contributed to students' ability to rapidly respond to patient deterioration. Although one student reported feeling confident in cardiac arrest management after participating in a simulation scenario, she felt unable to perform when faced with the situation in practice (Pike & O'Donnell, 2010). Interestingly, Pike and O'Donnell (2010) stated, "perhaps clinical simulation increases learner self-efficacy in performing skills in a simulated setting, but not in applying them to the clinical setting, thereby producing a potentially false sense of self-efficacy" (p. 408).

Discussion and Implications of Findings

Today's health care environment demands that undergraduate nursing students develop and utilize knowledge, skills, and attitudes that prepare them to practice in a fluid and unpredictable practice environment (Benner et al., 2010). Simulation is currently being promoted as an education strategy that supports an opportunity to meet this demand (Gates et al., 2012; Hart et al., 2013; Hoffman et al., 2007; Liaw et al., 2010). Dall'Alba (2007) challenged traditional nursing education by proposing that knowledge should not be objectified or gathered but rather "understood as created, embodied and enacted" (p. 683). The ability to prepare for clinical practice by utilizing knowledge and improve performance when immersed in a simulation scenario is one of the desired outcomes of SBL.

Knowledge Utilization. The findings by Elfrink et al. (2010), Gates et al. (2012), Hoffman et al. (2007), and Lewis and Ciak (2011) demonstrated that organized, realistic patient care scenarios engaged students in a manner that improved their subject-specific knowledge. Student use of knowledge derived from case specific information, textbooks, electronic reference tools, and a pre-simulation discussion followed by simulated practice improved their post-test scores (Elfrink et al., 2010). Similarly, post simulation examination scores pertaining to knowledge of disease process and nursing knowledge improved following simulated practice (Gates et al., 2012). Lewis and Ciak (2011) also identified a connection between students' prior knowledge of pharmacology and their post-test knowledge scores. The increase in correct posttest responses by the participants who manipulated the syringe of simulated medication implied that while prior knowledge is necessary, the process of physically interacting with knowledge in practice was necessary to improve understanding. Hoffman et al. (2007) also demonstrated that the combination of academic knowledge, clinical practice, and subject-specific simulation increased students' mean basic knowledge scores. While the improvement in basic knowledge could not be attributed solely to simulated learning, students' ability to practice clinical reasoning and formulate clinical judgment in simulated scenarios was deemed to be a contributing factor.

A nursing student is required to practice and "develop an attuned, response-based practice and capacity to quickly recognize the nature of whole situations" (Benner et al., 2010, p. 43). Several studies captured contextualized interpretation and decision-making in context, or making clinical judgments, in simulated practice (Blum et al., 2010; Hart et al., 2013; Liaw et al., 2010; Radhakrishnan et al., 2007). In one study, student awareness and response to the deteriorating patient improved in key areas of emergency response, which has direct implications

for clinical practice (Hart et al., 2013). Similar findings by Radhakrishnan et al. (2007) suggest that simulated scenarios with purposeful, directed learning enhanced students' ability to recognize and prioritize tasks when managing complex patients. These findings also demonstrated the development of patterned reasoning. This is a complex process of utilizing logic to make sense of a situation (Tanner, 2006) and needs to be nurtured in undergraduate nursing students. SBL is an effective approach with which to do so.

Some findings suggest simulation-enhanced courses did not surpass traditional methods of improving student performance and clinical competence (Blum et al., 2010; Liaw et al., 2010). For example, Blum et al. (2010) suggested that the lack of difference between the control and intervention groups was related to student inexperience utilizing knowledge in context. Similarly, improved outcomes may be attributed to the problem-based approach utilized in both the control and intervention groups in the study by Liaw et al. (2010). Regardless, this integrative review illuminated students' abilities to utilize knowledge to improve their skills, contextualize interpretations, and formulate clinical judgments in a risk free environment, which have direct implications for teaching and learning in undergraduate nursing students.

Enhancing-Inhibiting Confidence. Results were not overwhelmingly supportive of SBL as an approach that enhanced student confidence. However, discussion and inquiry related to effective learning in medium and HFS were apparent in the literature review. Confidence related to performance in a specific simulated context, such as emergency response, prepared students to rapidly respond to patient deterioration (Hart et al., 2013). Liaw et al. (2011) maintained that confidence is closely correlated with performance in a crisis. There was a concern that a student may experience a false sense of confidence in simulated emergency response and may be negatively influenced when they are unable to perform to the same standard in clinical practice

(Pike & O'Donnell, 2010). While it has been demonstrated that student confidence is impacted by SBL, SBL can be seen to both enhance or inhibit confidence in various circumstances.

Skill development in SBL, such as communication or psychomotor skills, was reported as a valuable method for teaching and contributed to students' ability to transfer skills into clinical practice (Pike & O'Donnell, 2010). Students immersed in SBL experienced a range of feelings that have a bearing on their confidence (Pike & O'Donnell, 2010; Walton et al., 2011). As such, it was emphasized that learning is more effective and transfers into the clinical environment more easily when the scenarios are realistic (Elfrink et al., 2010; Feingold et al., 2004; Ironside et al., 2009). Jeffries (2005) advised that utilizing scenarios that are realistic and mirror the clinical environment assisted students to learn patterns in practice and encouraged confidence. In addition, it is necessary to ensure that the simulated experiences are equal to the students' level of nursing knowledge and experience. The evidence suggested there was a progression of learning and confidence from novice learner to senior nursing student (Feingold et al., 2004; Walton et al., 2011). Feingold et al. (2004) reported, "that younger students believed the 'pace and flow' of the simulation were more realistic than older students did" (p. 161). According to Walton et al. (2011) engaging in SBL involved a process filled with discomfort, fear, and uncomfortable learning opportunities therefore, confidence may be inhibited by a simulated experience. This evidence has direct implications for teaching and learning strategies and requires further research to examine how progression of learning and realism in SBL contributes to learner confidence and prepares students for clinical practice.

Project Strengths and Limitations

The inclusion of 13 articles specific to the effectiveness of SBL may be viewed as strength due to the rigorous process utilized to contribute to the specificity and relevancy of the

subject matter. Limitations of the articles reviewed included smaller sample sizes, reduced number of similarities in simulation design, and variation in education level of participants. These limitations resulted in an inability to generalize the results or apply them directly to nursing pedagogy. Adding to the limitations of this integrative review was the absence of articles focusing on undergraduate nursing in recent years. Nonetheless, research focusing on effectiveness of SBL is rapidly increasing (Walton et al., 2011) and new findings continue to be published. The thirteen articles that met the inclusion criteria of this integrative review provided insight into the effectiveness of SBL and highlighted the need for further inquiry.

Conclusion

This integrative review investigated the literature for evidence of SBL as an effective teaching and learning strategy that adequately prepared students for clinical practice. Learning arising from SBL was complex and discrete, making it challenging to demonstrate. The evidence suggested that academic knowledge such as that associated with pathophysiology and pharmacology was utilized in scenarios and contributed to safe clinical judgment. Simulation learning was a teaching and learning strategy that contributed to contextualized interpretations and decision-making in context. Realistic scenarios enabled students to practice and develop patterned reasoning, which both enhanced and inhibited student confidence. This project furthered understanding of simulation-based education for undergraduate nursing education and contributed to SBL discourse. I look forward to future research exploring effective learning in medium and HFS practice.

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Appendix A

Table 1 Literature Characteristics

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
Alinier, Hunt, & Gordon (2004)	Multi-phase, Quasi-experimental To determine the effect of realistic scenario-based simulation on nursing students' competence and confidence.	67 participants in the second year of a diploma program Control group (C) = 38 Experimental group (E) = 29 The study was composed of several phases through which consecutive cohorts were involved.	<u>Phase 1</u> = All students completed the first Objective Structured Clinical Examination (OSCE) to determine their level of competency with clinical and communication skills. Students separated into control & experimental group Experimental Group completed two 40-minute intermediate fidelity simulation sessions in the observer role or qualified nurse role. Scenario content not identified in the article. Control group followed	Control and experimental group had similar OSCE scores at baseline. OSCE 1 Scores C = 49.59 E = 50.19 OSCE 2 Scores C = 56.35 E = 63.62 Experimental group improved their score by 6.67% over the control group. Practical & Theoretical OSCE results were not individually reported. Confidence questionnaire	The use of SBL did not increase student's self-confidence over their traditional nursing course.	Participation in 2 simulation scenarios improved students' ability to utilize their knowledge to recognize alarms and modify them appropriately, apply ECG electrodes correctly, manage an airway, and recognize signs of cardiac arrest. Course work previous to simulation & this research was not identified.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
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			traditional course work, which was not identified in the article. Confidence Questionnaire completed by the control & experimental group just prior to phase 2. <u>Phase 2</u> = Control & Experimental groups completed the second OSCE . Students were observed by an examiner for 11 OSCE practical stations while the 4 theoretical OSCE stations were marked after the OSCE session.	C = Confidence = 3.50 Stressfulness = 2.92 E = Confidence = 3.48 Stressfulness = 2.79 Improved student confidences in relation to simulation results were inconclusive.		
Blum, Borglund, & Parcells (2010)	Quasi-experimental Quantitative Study	53 junior Bachelor of Science in Nursing	Clinical competence was measured utilizing the Lasater Clinical Judgment Rubric	**According to student and faculty Lasater Ratings**; Clinical competence	Student self-confidence improved in both the	Students utilized their knowledge from an introductory

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	Research Questions: 1) How do student ratings of self-confidence and faculty ratings of student competence correlate between midterm and final assessment? 2) How does enrollment in a traditional or simulation-enhanced laboratory course impact student-self-confidence and clinical competence?	students 16 = Control group (C) 37 = Intervention group (I)	(LCJR). Both students and faculty completed the LCJR independently. The rubric measured four subscales: noticing, interpreting, reflecting, & responding. Faculty ratings of students clinical competence consisted of 4 distinct items: recognizing deviations, information seeking, prioritizing data, and clear communication. Student responses measuring self-confidence consisted of four distinct items: calm/confident manner, well-planned interventions/flexibility, evaluation/self-analysis, and commitment to	score from midterm to final: C = 11.88 to 14.13 I = 11.51 to13.86 Mean change in student competency evaluation in C group = 1.61 while the I group = 1.18. **According to student and faculty Lasater Ratings**: 1) 26 rated student self-confidence at the "accomplished" level at final assessment compared to 34 at midterm. 2) 27 rated student self-confidence at the "exemplary" level at final assessment compared to 16 at midterm. 3) 14 rated student clinical competence at the "accomplished"	simulation-enhanced and traditional laboratory courses. Student & faculty ratings of student self-confidence according to the LCJR increased between MT & Final at the "exemplary" level and decreased at the "accomplished" level. No significant difference in self-confidence between the control and intervention group	assessment and skills course in both simulation enhanced & traditional course to demonstrate their ability to address the following categories: Recognizing deviations, information seeking, prioritizing data, and clear communication Enrollment in a simulation-enhanced course did not surpass traditional methods of improving clinical competence in these specified areas. Both groups demonstrated a positive change in

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			improvement. Students were enrolled in a lab section that met weekly for 7 hours of instruction with traditional laboratory education (C) or simulation-enhanced laboratory (I). LCJR was completed at the midterm & final week of a 13-week didactic & skills course.	level compared to 32 at midterm. 4) 38 rated student clinical competence at the "exemplary" level compared to 16 at midterm. **Change in mean score on student self-confidence between traditional and simulation groups at midterm (MT) & Final Assessment**: I=Simulation group means score MT = 11.30 & Final = 12.48 C=Traditional group mean score MT = 11.42 & Final = 13.03.		the competence score.
Elfrink, Kirkpatrick, Nininger, & Schubert	Exploratory Study using pretest/posttest **Research**	84 pre-licensure nursing students	All students completed a 2-question pre-simulation assessment of knowledge related to	Pre to post simulation subject-related knowledge scores improved. The		Students use of knowledge from case-specific information,

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(2010)	**Questions**: 1) Is there a difference in the in the subject-related knowledge of students from pre- to post simulation? 2) Is there retention of subject-related knowledge? 3) How can the findings from the pre/post-measurement and retention of learning outcomes inform teaching practices for HPS?	41 = second year (advanced medical-surgical course) 43 = third year (high acuity course)	caring for a mastectomy patient & an Acute Respiratory Distress Syndrome (ARDS) patient. Following the simulation students completed the same 2-question assessment. In addition, one or two questions similar to the pre and post simulation questions were included on the students' final examinations to identify retention of knowledge.	positive mean value (0.375) indicated that on average student scores improved between the pretest and posttest and was statistically significant. (Individual or group pretest/posttest scores not provided). Among students who answered incorrectly pre simulation, 17 answered correctly post simulation. The mean score is reported to be lower than the score expected by random guessing (1.75), and this difference was significant with a p-value of 0.001. Based on the students		textbooks, electronic reference tools, and a pre-simulation group discussion in a simulated setting where they were required to assess and prioritize their actions improved their post-simulation subject related knowledge. Participation in simulation scenarios were demonstrated to have improved utilization of knowledge for a post-Mastectomy simulation and an ARDS simulation.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
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				who had the knowledge at the time of the posttest, 93% retained the information. 21 students answered correctly on both the posttest and the final exam. 21 students answered correctly on the posttest and answered incorrectly on the final exam.		
Feingold, Calaluce, & Kallen (2004)	Evaluation Research The intent of this evaluation was to elucidate undergraduate nursing students' and faculty members' perceptions	Baccalaureate nursing students enrolled in Advanced Acute Care Course. Fall semester = 50 students. Spring semester = 47	Student surveys were completed at the end of each group's semester after having participated in 2 standard simulated clinical assessment scenarios. A typical scenario involved a patient admitted with exacerbation of chronic obstructive pulmonary disease (COPD) &	Students identified SBL was valuable (69.3%) and realistic (86%). 50% felt skills experienced in simulation would transfer to clinical practice. Realism Subscale mean score = 2.83	Increased confidence in less than 50% of students despite student report that simulation scenarios were valuable & realistic. Confidence related results	

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	about the experience of using the computerized patient model, SimMan, for teaching and assessment during simulation clinical scenarios. Key questions included students' & faculty members' perceptions of patient & scenario realism, students' ability to transfer knowledge from the simulated clinical scenarios to real clinical	students. Total of 95 enrolled. 65 students (67%) in total completed a satisfaction survey.	pneumonia. Fall 2001, Group 1 (28 students) & Spring 2002, Group 2 (37 students) completed the satisfaction survey that utilized 3 subscales (realism, transferability, & value of SBL) & 7 individual items. Students responded to a 20-item, 4-point Likert scale related to the value of the experience, the ability to transfer skills learned in simulation to the real clinical world, the realism of the simulation, and the overall value of the learning experience. Faculty surveys included 3 full time faculty who taught in the Advanced Acute	with 84.6% student agreement. Transferability Subscale mean score = 2.52 with 50.8% student agreement. Value Subscale mean score = 3.04 with 92.3% student agreement. Individual Items: Decision making taught is valuable (mean 3.46 & 100% student agreement) & Skills taught in course are valuable (3.53 & 100% student agreement) 54.7% of students believed simulated clinical prepared them to function in a real clinical environment.	were extracted from the subscale items under transferability. Despite more than 80% of students agreeing that simulation was an adequate test of clinical skills only 69.3% believed the scenarios were valuable.	

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	experiences, and the value of the learning experience.		Care of the Adult course and 1 faculty member from the Intermediate Acute Care of the Adult course.	46.9% felt simulated clinical improved their confidence and competence. Faculty members believed the simulation adequately tested clinical & decision making skills and reinforced clinical objectives.		
Gates, Parr, & Hughen (2012)	Experimental design To examine the effects of high-fidelity simulation on nursing students'' knowledge acquisition of medical-surgical nursing as	104 1st year Undergraduate nursing students participating in their second semester of a medical-surgical course. 15 hours of high fidelity simulated	In the previous semester students had been exposed to the disease processes and nursing knowledge related to PE & GI Bleed in the form of course lectures, readings, case studies and clinical experience. Also prior to participation in the study, students had already completed 2	The PE simulation (intervention group) had an average exam score of 6.89 (SD = 1.40). This score was statistically different than the mean PE exam score from the GI Bleed simulation group (control group), which was 6.08 (SD = 1.41).		Students' ability to utilize their knowledge of disease process and nursing knowledge related to PE and GI Bleed improved after they participated in a simulation scenario related to specific content. Students were able to utilize

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
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	evidenced by their performance on content-specific examinations. Hypothesis: Students participating in a simulation experience will receive higher scores on all examination of course content covered in the simulation than students who did not participate in the simulation.	learning was a requirement of students course. **PE Simulation Scenario** Intervention group = 53 students. Control group = 51 students from the GI bleed group. **GI Bleed Simulation Scenario** Intervention group = 51 students. Control Group = 53 students from the PE group. Control group became the	course exams covering the theoretical nursing knowledge necessary to care for patients experiencing a PE or GI Bleed. Students were randomly assigned based on clinical group to participate in one of the scenarios for their simulation experience. After participating in their simulation scenario all students wrote a content-specific 10-item NCLEX style exam on both subjects (PE & GI Bleed) the next class after completing the simulated scenario. 2 distinct dummy variables, one representing GI bleed simulation participation	Students participating in the GI Bleed simulation (intervention group) had an average exam score of 5.78 (SD = 1.15) versus the PE simulation group (control group), which were 4.92 (SD = 1.45). The results from both the PE and GI bleed scenarios indicated there is more than an 8% increase in exam performance for students who participate in high-fidelity simulation compared with those who do not.		their knowledge in the content specific scenario to recognize changes in the patients status & the occurrence of complications necessitating calling the physician and transferring the patient to the Intensive Care Unit.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
		students from the opposite content-specific group.	and one representing GI bleed simulation participation, were utilized to easily identify the control and experimental groups on the exam. Each exam was worth 10 marks.			
Hart, Maguire, Brannan, Long, Robley, & Brooks (2013)	Quasi-experimental, One-group repeated measure Design. To evaluate the effectiveness of a structured education curriculum with simulation training in improving undergraduate students' performance in recognizing and	48 Bachelor of Science in Nursing students enrolled in a 45-hour Acute Patient Deterioration (APD) elective course occurring at the end of their junior year. This course consisted of didactic	Data collection occurred at the beginning, middle, and end of the course utilizing 2 instruments. 1. An Emergency Response, Performance Tool (ERPT) was adapted for use to reflect only Basic Life Support (BLS) standards in which medical-surgical nurse would perform. 2. A Patient Outcome Tool was developed for	Emergency response performance (ERP) mean scores improved. Baseline = 51.0 Mid course = 89.3 End course = 95.10 Length of time to implement each individual intervention (1. chest compressions, 2. ventilation with bag-valve mask, & 3. electrical intervention) decreased		Student utilized their knowledge from didactic lecture, skills lab, and high-fidelity simulation related to acute patient deterioration to recognize signs of cardiac arrest, implement a focused cardiac/respiratory assessment, verbalize the need for assistance, implement appropriate

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	responding to acute patient deterioration.	lectures, skills labs utilizing medium fidelity simulators, & 3 high-fidelity simulations at the beginning, middle, and end of the course.	each scenario based on the time frame it took the team to begin cardiopulmonary resuscitation and perform defibrillation and patient survival.	significantly from pre-intervention to post-intervention by > 50%. 1. Time to chest compression Baseline = 6:54 min Mid course = 1:37 min End course = 1:17 min 2. Ventilation with bag-valve mask Baseline = 6:29 min Mid course = 3:06 min End course = 2:11 min 3. Electrical intervention Baseline = 8:10 min Mid course = 4:11 min End course = 2:20 min		interventions, evaluate patient's condition by assessment finding and vital signs, and demonstrate effective teamwork. Student's time to intervention with 3 specific actions significantly improved.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
Hoffman, O'Donnell & Kim (2007)	Pre- and Post-test Repeated Measure Design To investigate whether participation in instruction with human patient simulators, in conjunction with a traditional clinical experience, improves professional competence in senior-level nursing students related to basic knowledge of critical care nursing.	29 Senior Baccalaureate nursing students enrolled in a 15-week Advanced Medical-surgical course .	Data was collected utilizing a Basic Knowledge Assessment Tool 6 The BKAT-6 items measured content related to critical care nursing practice in the subscales: cardiovascular, monitoring lines, pulmonary, neurology, endocrine, renal, gastrointestinal/parenteral, and other content. The total number of questions pertaining to each subscale were as follows: 31 cardiovascular, 11 monitoring lines, 10 pulmonary, 11 neurology, 9 endocrine,	BKAT-6 results demonstrated significant improvement in knowledge post simulation in the following areas: cardiac, pulmonary, monitoring lines, neurology, renal, and other content. Total mean scores on BKAT-6 pretest =52.52 & posttest = 62.76 BKAT-6 results did not demonstrate significant findings in knowledge improvement related to endocrine & gastrointestinal		Scenario subject matter involved acute myocardial infarction progressing to ventricular tachycardia, pulmonary edema from heart failure, drug overdose, and decreased level of consciousness and increased intracranial pressure from a motor vehicle collision. Students utilized their knowledge from their 45 hour classroom lecture & clinical experience to demonstrate improved

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					Enhancing-Inhibiting Confidence	Knowledge Utilization
			8 renal, 8 gastrointestinal/parenteral, & 12 other. Baseline BKAT-6 was administered on the first day of class. Over the period of 7 weeks, students attended 45 hours of classroom lecture combined with 45 hours of clinical experience on a general medical surgical or step-down unit involving one day per week (6.5 hour day). The second half of the semester students spent 7 weeks (one day per weeks/6.5 hour day) in the simulation lab. Post test BKAT-6 was repeated at 3 months	knowledge. Endocrine pretest=5.93 & posttest = 6.31 Gastrointestinal pretest =4.72 posttest = 5.28 Endocrine and gastrointestinal content were not included in the simulation scenarios.		competency in caring for and managing patients specific to cardiac, pulmonary, neurological, & renal system in addition to pulmonary monitoring lines.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
			after baseline, which was after SL was completed.			
Ironside, Jeffries, & Martin (2009)	Multi-site study Research Design not identified The purpose was to investigate: 1) The extent to which student experiences with multiple-patient simulation improved students' patient safety competencies & 2) The student factors (age, GPA, & tolerance for ambiguity) that were related to improved safety competencies.	Baccalaureate and Associate Degree nursing students from 8 University Schools of Nursing	Fall 2007 semester. 413 students completed a 22-item pre-simulation Multiple Stimulus Types Ambiguity Tolerance Scale-1 (MSTAT-1) Week 3/4 first four-patient simulation occurred. Second four-patient simulation occurred at week 9/10 MSTAT-1 completed again. During each simulation 1 faculty member utilized a 16 criteria Knowledge, Skills, & Attitude (KSA) instrument to evaluate a	There were significant differences in patient safety competencies from week 3 to week 10 ($t=-4.00$, degrees of freedom = 66, & $P< .0002$). Mean score on patient safety competencies was 11.48 after the 1st simulation experience & 13.88 after the second simulation experience. Utilizing Pearson R, no significant correlations found between students age, GPA, tolerance for ambiguity and safety competency after either simulation		Significant improvement in students' implementation of patient safety competencies occurred after participation in two 4-patient simulation experiences. Students utilized their knowledge and general understanding of patient safety. Simulation enhanced their practice of applying their knowledge and improved demonstration of their safety competence.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
	Specific patient safety competencies were not reported.		total of 67 students Each scenario closely mimicked the volume and complexity of patients typically assigned to a new nurse in an acute care setting. Education pertaining to knowledge, skills, & attitude related to patient safety prior to student participation was not reported.	experience.		Safety competency measures were not specifically reported.
Lewis & Ciak (2011)	Quasi-experimental Design To investigate the impact simulation lab experiences have on critical thinking, student satisfaction, self-confidence, & cognitive	63 students participating over 4 semesters (Sept. 2006 - Dec. 2007) in a Nursing Diploma program.	20-question multiple-choice test administered pre-simulation to assess baseline cognitive knowledge. Students participated in an 8-scenario simulation day. Identical multiple-choice post-test completed.	Results demonstrated each semester's cognitive knowledge mean scores improved from pre-test to post-test. Fall = 0.661 to 0.833 Winter = 3.51 to 3.96 Summer=4.71 to 4.59 Fall = 4.53 to 4.48 All were statistically significant.	Students' self-confidence and satisfaction was rated high following simulation. Researchers proposed it was the student's ability to interact with the physical learning	Students utilized their knowledge of medications in a maternal-child simulation. Active manipulation of the medication in the scenario is proposed to have improved students post-test score compared to the

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	learning.		1-2 weeks after the simulation scenarios, students completed a 13-item student satisfaction and self-confidence learning tool. All students enrolled in the course completed the maternal-newborn and nursing care test. Scores from the study participants were compared to the control group (summer semester)	Overall mean for satisfaction with the learning experience was 4.33 on a 5-point Likert scale. Overall mean for self-confidence in learning was 4.35. Only the winter group rated their self-confidence higher than their satisfaction.	environment that prompted improved self-confidence & satisfaction scores.	post-test score when the medication was not present in the scenario.
Liaw, Chen, Klainin, Brammer, O'Brien, & Samarasekera (2010)	Quasi-experimental Design To evaluate the integration of a SBL activity on nursing students' clinical crisis	30 first-year Bachelor of Science in Nursing students. 1st Experimental Cohort = 13 assigned to	Clinical performances were measured using two sets of checklists developed for the scenarios. The checklist subcategories were assessment and immediate actions that a Year 1 nursing student might reasonably be	Mean performance scores for students managing crisis events were higher in the SPBD group than those in PBD group. Respiratory SPBD had higher average scores than PBL		There were no significant differences between SPBD & PBD group in relation to *physical assessment* and marginally significant differences to *immediate actions*

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	management performance in a problem-based curriculum.	Simulation with Problem-based discussion (SPBD) group & 17 assigned to Problem-based discussion (PBD) group. 2nd Experimental Cohort = 18 SPBD & 15 PBD	expected to perform. The intervention phases of the study consisted of core topics of instruction implemented within a module. All students received 2 teaching methods 5 weeks apart (Simulation & PBL). Both groups worked on the case scenario for an hour identifying clinical problems and developing hypotheses and learning issues one week prior to the simulation. Data collection took place during the simulation scenarios. Students crossed over in the intervention phases thus producing 2	group. Scenario 1 (Respiratory Distress) Assessment mean score after SPBD = 8.83 compared to 8.19 in the PBD group. Immediate action mean score after SPBD = 11.25 compared to 18.19 in PBD group. Scenario 2 (Chest Pain) Assessment mean score after SPBD = 8.44 compared to 6.93 in PBD group. Immediate action mean score after SPBD = 17.44 compared to 14.60 in PBD group. SPBD had		scores for Scenario 1 (Respiratory Distress). Students receiving simulation with problem-based discussion (SPBD) demonstrated an improved ability to utilize their subject specific knowledge to *assess and take immediate action* to manage a cardiac crisis in Scenario 2 (chest pain simulation).

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
			experimental cohorts. 1st Group = Respiratory SPBD followed by cardiac PBD. 2nd Group = Cardiac SPBD followed by respiratory PBD	significantly higher scores than PBL group.		
Pike & O'Donnell (2010)	Qualitative Focus Group Method To explore the impact of clinical simulation on self-efficacy beliefs among pre-registration nurses.	Recruited from a larger convenience sample of 22 involved in a preliminary study (Pike, 2008). From this sample 9 –pre-registration nurses participated in the focus group.	A 48-minute focus group was recorded and transcribed. Preliminary themes utilized included: the importance of enactive mastery for self-efficacy beliefs; the value of vicarious experiences; the influence of educator/mentor, and; teaching and learning methods within clinical simulation.	Two main themes emerged after independent analysis and critical reflection by both researchers: 1) Learner self-efficacy in relation to communication skills, 2) Need for authenticity within clinical simulation. Students report simulation scenarios need to be more realistic and less skills-based. It was proposed that improved learner self-	Students reported feeling anxious & lacking confidence specifically related to communication in specific situations such as bereavement and general situations such as telephone inquiries. Students felt their simulated practice as well as their clinical	Student reported simulation scenarios with a realistic clinical context assisted their ability to utilize knowledge to prioritize skills and manage complex patient care such as cardiac arrest.

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					Enhancing-Inhibiting Confidence	Knowledge Utilization
				efficacy through SBL may provide an unrealistic sense of competency.	practice focused too much on psychomotor skills. Students reported feeling confident in cardiac arrest management after the simulation however when it occurred in the clinical setting the student less confident.	
Radhakrish-nan, Roche, & Cunningham (2007)	Quasi-experimental Pilot Study This pilot study attempted to identify the nursing clinical practice parameters influenced by	12 Senior Baccalaureate nursing students	Evaluation involved the use of a Clinical Simulation Evaluation Tool (CSET). This tool listed expected behaviors to indicate performance with a numeric scale. Subcategories of the CSET: Safety & Communication,	Students in the intervention group scored higher in 2 areas (safety and basic assessment) compared to the control group. <u>Safety category</u> I = 45 & C= 34 *Safety Subcategories*		Students utilized their knowledge from their course focusing on caring & managing a group of complex patients in simulation to demonstrate improvement in safety (correctly

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
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	HPS by evaluating the clinical performance of 12 senior second degree BSN students in five categories; safety, assessment, prioritization, problem-focused assessment, interventions, delegation & communication.		Assessment & Critical Thinking, Diagnosis & Critical Thinking, Interventions & Critical Thinking, & Reflection & Critical Thinking. Control group (6) = completed clinical requirements with no simulation practice. Intervention group (6) = completed clinical requirements and usual teaching/learning methods in addition to participating in 2 one hour complex 2-patient assignment simulation spaced throughout the semester. Post-test intervention, both groups participated in a mandatory 2-patient simulation exercise &	= Hand Hygiene & Detecting Medical Error both I & C = 7 Patient ID - I=20 & C=9 <u>Basic assessment Category</u> I = 43 & C = 33 *Subcategory* = Initial Assessment I=26 & C=25 Assess Vital Signs I=17 & C=8 In all other categories the clinical parameters were not statistically significant (focused assessment, interventions, delegation, & communication).		identifying their patient) and basic assessment (performing an assessment & vital signs) in response to patient presentation.

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
			were evaluated based on the CSET. The semester objective for all students was identified as: caring for and managing a group of complex patients to demonstrate appropriate assessment, planning, implementation of interventions, and patient evaluation. Weekly journals to augment clinical practice was expected along with web-based discussions related to course objectives.			
Walton, Chute, & Ball (2011)	Grounded Theory Qualitative Methodology To explore how students learn using	26 Senior Baccalaureate nursing students	In their program these students participated in 2 semesters of high fidelity simulation scenarios with newborn, pediatrics, obstetrics, and adult health prior to participating in this	Developed a mid-range theory. Core category was: *Negotiating the Role of the Professional Nurse*. 5 phases reported: 1) Feeling like an	Students reported transitioning through overlapping phases of emotions when exposed to SL.	

Author(s)	Design & Purpose	Sample	Data Collection Method	Findings	Themes	
					Enhancing-Inhibiting Confidence	Knowledge Utilization
	simulation, the process of learning within simulations from the students perspective, to see what faculty teaching styles promote learning and how faculty support students during simulation.		study. 15 – 60 minute audiotaped interviews conducted along with theoretical memos, field notes and focus group interviews. Data saturation reached after the 12th interview. 4 more interviews completed after saturation reached.	Imposter 2) Trial and Error 3) Taking the Role Seriously 4) Transference of Skills & Knowledge 5) Professionalization Each of the 5 phases included subcategories and faculty strategies.	Students progressed from feeling disorganized, uncomfortable and anxious to periods of feeling like a failure with new learning. Next they began to analyze their progress through reflection and began feeling confident. Socializing into the role of a professional nurse occurred. Increased practice in simulation improved one students self-confidence	