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Back to the Basics and Beyond: Comparing Traditional and Innovative Strategies for Teaching in Nursing Skills Laboratories

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ABSTRACT

The cornerstone of nursing practice worldwide, despite educational background, is founded on professional nursing skills. Faculty members teaching nursing skills are investigating different strategies to transition the passive knowledge from textbooks into active learning. However, the limited evidence on the topic makes their work challenging. The purpose of this study was to compare a set of traditional and innovative teaching strategies on learning advanced nursing skills in skills laboratories. In this study, nursing faculty will identify strategies to enhance teaching in laboratory settings.

In the United States and internationally, the public expects nurses to demonstrate professional competence by providing quality and safe, patient-centered care (American Association of Colleges of Nursing, 2008; Institute of Medicine, 2010; Karabacak, Serbest, Kan Öntürk, Eti Aslan, & Olgun, 2013). The cornerstone of nursing practice worldwide is founded on professional nursing skills. The learning of fundamental skills begins in schools of nursing where students are expected to gain confidence through the practice of skills, first in skills laboratories and then at clinical sites. Increasingly, skills are practiced and demonstrated in simulation laboratories (Alexander et al., 2015, Bradshaw & Hultquist, 2017; Karabacak et al., 2013; Ross, 2015). Therefore, knowledge acquired in academic settings must be transferred into clinical practice.

The names given to nursing skills laboratories vary from school to school. Laboratories are called clinical skills laboratories, centers, learning laboratories, and nursing laboratories (Bradshaw & Hultquist, 2017). Nurse educators use these laboratories to provide an environment for learning discipline-specific cognitive, affective, and psychomotor skills, clinical reasoning and decision-making, and "to provide psychomotor skill acquisition" that is specific to the student's skill level (Bradshaw & Hultquist, 2017, p. 234). The teaching strategies used in skills laboratories must aim to advance the student's level of learning (Bradshaw & Hultquist, 2017). However, the limited empirical data on best practices for advancing nursing skills in skills laboratories creates a challenge for nursing faculty (Ross, 2015; Wellard & Heggen, 2010). In Norway and Australia, for example, faculty use personal experiences and traditional practices instead of evidence-based strategies to teach nursing skills (Wellard & Heggen, 2010).

The skills that define nursing practice are at the core of the prelicensure curricula in all schools of nursing, whether they grant associate or baccalaureate degrees (Taylor, Lillis, LeMone, & Lynn, 2011). These skills range from simple to complex (Bradshaw & Hultquist, 2017), from basic hygiene care and the taking of vital signs and medication administration, to peripheral and central intravenous (IV) access tracheostomy and ostomy assessment and care, blood transfusion, and electrocardiography. Nursing skills are often taught in two levels in skills laboratories: basic and advanced. Selecting objectives and preparing lectures and interactive activities to help students transition their learning from one level to another require faculty subject matter expertise and creativity and teaching practices based on evidence.

Maginnis and Croxon (2010) and Ross (2015) found incongruence between psychomotor skills demonstrated in nursing skills laboratories and skills observed in clinical practice. Several authors have concluded that research on teaching methods of psychomotor skills is needed (Gibson & Molloy, 2012; Gonzol & Newby, 2013; Ross, 2015). Wellard and Heggen (2010) noted that faculty based their teaching practices on tradition and "personal curricula" because of limited evidence on effective teaching strategies. Faculty have investigated different strategies to help students transition the passive knowledge

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acquired from textbooks into active learning, as mastering professional cognitive and psychomotor skills required both knowledge and hands-on experience (Bradshaw & Hultquist, 2017; Shin, Sok, Hyun, & Kim, 2015; Stolic, 2014). The achievement of higher levels of learning outcomes is an essential goal for future professional practice in today's fast-paced, high-acuity health care settings.

Traditional strategies, such as assigning reading from textbooks and lecturing using Power Points (PPts), are commonly used to deliver course content (McCurry & Martins, 2010; Stolic, 2014). Prior to the emergence of digital technology, the lecture was the principal means of knowledge dissemination (Bradshaw & Hultquist, 2017). Academic nurse educators feel comfortable using traditional teaching methods, but evidence suggests that lecture-only teaching is insufficient for the acquisition of knowledge and the development of nursing skills; moreover, it leads to inattention on the part of students (Bradshaw & Hultquist, 2017; Day-Black, Merrill, Konzelman, Williams, & Hart, 2015; Zavertnik, Huff, & Munro, 2010).

The need to engage adult students and keep them focused compels faculty to go beyond their comfort zones and implement new strategies (Day-Black et al., 2015; Karabacak et al., 2013). However, there is limited reliable and valid evidence identifying effective strategies for teaching the skills that are essential for professional nursing practice (Stolic, 2014). The purpose of this study was to compare a set of traditional and innovative teaching strategies implemented in skills laboratories for junior-level nursing students. The study addressed the following research question: What was the students' self-perception of the effects of traditional and innovative teaching strategies on learning nursing skills in skills laboratories?

Background

The study was based on adult learning theory developed by Knowles (1998) and Vella (2002), who explained the motivation people need to gain knowledge in a specific science with five principles of adult learning- self-concept, experience, and readiness, orientation, and motivation to lean. A sixth principle was later added to addressed the adult need for respect Vella (2002). Engagement and active learning are in the core of the theory. The principles, when used in instructional planning, can lead to greater knowledge acquisition. Adult learners utilize different focal points to acquire knowledge in comparison with nonadult learners. For example, adults want to learn the practical aspects of a concept when the information is associated with a meaning (Bradshaw & Hultquist, 2017). The innovative strategies identified in this study involved active learning and engagement. An assumption is that nursing students will better learn advanced nursing skills in a teaching environment, such as a skills laboratory, that motivates and engages students through active learning.

Traditional and active learning have been a subject of academic interest for years. In traditional teaching, students receive information through listening and observing while the faculty lectures in front of the classroom (Aljezawi & Albashtawy, 2015; Beery, Shell, Gillespie, & Werdman, 2013). The instructor selects and transmits the knowledge; the student is not actively engaged in the learning process but is a recipient of knowledge. With active learning, the teaching is student centered, and the education focus shifts from the instructor to the student (Bradshaw & Hultquist, 2017). This approach gives the student more ownership and control of the learning, with new information built on past knowledge and experiences (Chan, 2014; Stolic, 2014).

Although a review of the literature shows that nursing educators are exploring innovative ways to transition students successfully to clinical practice, few studies have focused on effective teaching in advanced-level nursing skills laboratories. Several authors agree that innovative teaching methods are needed to prepare graduates for professional practice (Beery et al., 2013; Gibson & Molloy, 2012; Schell, 2011; Shin et al., 2015). These authors advocate for robust evaluation of the graduates' nursing skills prior to entry into practice.

Most recently, McNett (2012) compared 13 studies published between 1998 and 2010 to evaluate alternative and traditional methods of teaching nursing skills to novice nursing students. The studies looked at methods to teach either one specific nursing skill at a basic level, such as oral medication administration or blood pressure measurement, or multiple nursing skills, such as mouth care, back care, position changes, and administration of a glycerin enema. McNett noted that all studies considered skills performance as an outcome measure and used checklists to score the students' performance.

Three of the studies reviewed by McNett (2012) concluded that a combination of a traditional lecture and skill demonstration with computer use was more effective than either method alone. In one study, there was no significant difference in student performance between the traditional methods of teaching skills versus student-centered methods (Grady, et al., 2008). However, the student-centered groups were significantly more satisfied with their learning.

Nurse educators are in position to facilitate students' learning by selecting strategies that are effective in engaging students in efforts to lead to better learning outcomes (Bradshaw & Hultquist, 2017). Gaining confidence in the skills that define nursing practice, despite level of education, is an important factor in new graduates' transition into clinical practice in environments that are often chaotic and unpredictable. This study offers an empiric investigation of the students' self-perception of the effects of traditional and innovative teaching strategies on learning advanced nursing skills in skills laboratories.

Method

In this study, the authors simultaneously asked confirmatory (quantitative) and exploratory (qualitative) questions. Numeric and narrative data were collected by using an anonymous on-line survey completed after final course grades were posted. Narrative data were used in a supportive capacity. Institutional review board approval was obtained for this study, and safeguard mechanisms to protect student confidentiality were in place. An introductory e-mail explained the risks and benefits and the voluntary nature of the study. Identifiable information was not collected, and data for statistical analysis were kept in a password-protected and encrypted computer.

Design

The study was based on an innovative integration of didactic and laboratory sessions in a two-credit, 2-hour and 50-minute course. In the first 50 to 90 minutes of the course based on the lecture objectives, the students were exposed to lecture (didactic) material, which was considered cognitive learning. The remaining time was dedicated to psychomotor learning and laboratory practice. The course objectives focused on advancing psychomotor, cognitive, and affective skills necessary for nursing practice in diverse health care settings (Jefferson College of Health Sciences, 2015).

For the study, three nursing faculty members taught four sections of the course using the same lesson script for lecture and laboratory practice to decrease variations in course delivery (Song, Happ, & Sandelowski, 2010). A session included a maximum of 12 and a minimum of 6 students. The traditional and innovative didactic and laboratory activities were randomized over 15 weeks by a flipped coin approach. If heads were rolled, a traditional approach was used; if tails were rolled, an innovative approach was implemented. Six of the 15 lectures were traditional. Both traditional and innovative strategies included didactic and laboratory activities.

Sample

The sample population for this study consisted of 39 junior-level nursing students who met the inclusion criteria. To be included in the study, the students had to meet the following criteria: (a) completion of the basic nursing skills course, (b) enrollment in an advanced nursing skills course, (c) participation in the weekly activities, and (d) at least 75% of attendance. The students were exposed to traditional and innovative teaching strategies over the course of one academic semester.

Traditional Strategies

The traditional didactic instructions for this study included assigned textbook readings and focused reviews in preparation for the licensure examination, PPt lectures without a case, in-class discussions, and in-class examinations and quizzes. The students were introduced to the skills content via PPt slides that included pictures of skills and equipment. During lectures, instructors spoke while students listened. Learning was evaluated by written unit tests or quizzes. In-class tests or quizzes were considered traditional strategies for measuring students' outcomes based on the correct recall of content material in contrast to the application of reasoning skills (Gonzol & Newby, 2013; McCurry & Martins, 2010; Stolic, 2014).

In traditional nursing laboratories, the teaching strategies focused on developing fundamental skills (Maginnis & Croxon, 2010). In the laboratory sessions for this study, the instructor first demonstrated clinical skills. Then, students practiced those skills individually, using a paper checklist from the textbook. Faculty provided supervision of up to 12 students at a time and signed off on checklists at the end of the laboratory session.

Innovative Strategies

The innovative didactic instruction for the study consisted of evidence-based case scenarios and integrated equipment demonstrations, local policy and procedures, research articles about skills, and admission tickets (ATs; an evaluation strategy that integrates an evidence-based case scenario with cognitive components and clinical reasoning questions). To engage students, we used the didactic sessions' games, e-simulations (e.g., virtual e-electrocardiogram [EKG], virtual hospital), and a guest speaker. Methods of evaluation included I-clickers, knowledge checks (KCs), on-line quizzes, and proctored examinations. Group activities, such as comparing and contrasting central lines and creating a pain scale and portable chest tube, engaged the students in collaborative learning.

The innovative laboratory instructions were based on an assortment of simulation activities such as video simulations (watch and learn), evidence-based case scenario laboratory simulations, simultaneous instructor-led skills demonstrations, peer-interjected practices, and interprofessional cardiopulmonary resuscitation (CPR)-simulations with paramedic students. Low- and moderate-fidelity simulations were used with the skills practice (Grady et al., 2008). At the end of the course, skills competencies were evaluated with a final check-off tool during evidence-based case scenario simulations that integrated the three learning domains.

Admission Tickets (ATs)

The purpose of the ATs was to facilitate preclass review of the didactic component of a skill being taught and to promote critical thinking about the class topic. The students completed ATs as homework and submitted them to faculty upon entering the class; faculty reviewed the ATs during the first few minutes of the class and used them as a focal point of learning. Students were considered prepared for class upon the submission of their ATs. An example of an AT for the insertion of peripheral IV access included assessment of the patient's history to determine the best practice, size, and site for IV access; calculation of the appropriate IV flow rate; discussion about the adverse effects of IV therapy; and patient-centered cultural considerations.

Knowledge Checks (KCs)

KCs are questions that served as an evaluation of short-term learning. These assessment items were threaded throughout the PPt lecture and used to evaluate the students' understanding of the key points of the content. Students were able to review the questions before class, but correct answers were provided in class. The KCs served as summary points for content.

I-Clickers

I-clickers are an interactive, student-centered audience response technology that engages students in active learning (Porter & Tousman, 2010). The student response system was incorporated into lectures to formally evaluate students' learning, usually at the end of the lecture. In a preset time period, students answered multiple-choice or select-all-that-apply questions individually using electronic devices that interacted with PPt slides. This approach allowed for anonymous participation. A graph displayed the answer choices at the end of the time period. Students had opportunity to engage in discussion and review answers while the faculty provided rationales and feedback.

Games

Evidence supports the use of serious games based on educational goals to supplement academic and clinical learning (Bradshaw & Hultquist, 2017; Day-Black et al., 2015; Nicholson, 2011). Games such as rag or riches, flash cards, Jeopardy, and puzzles (e-puzzle and paper puzzle) were incorporated into practice sections during lectures to provide an interactive way to review key concepts necessary for developing cognitive skills. For example, puzzles were created to review and learn complex terminology for IV fluids, pacemakers, and chest tubes. The answers to the puzzles were provided after class.

Role-Modeling

Role-modeling is an instrumental technique in developing specific competencies (Bradshaw & Hultquist, 2017). The role-modeling used for the laboratory session involved instructor-led and peer practice as interactive learning. The instructor demonstrated a specific skill with the student, using a low- or moderate-fidelity manikin. While performing the skill, the instructor provided the rationale for each step and answered questions and offered feedback. Next, students performed the skill in groups of two, with each student providing feedback to the other. This approach promoted active learning as peers taught and reviewed skills simultaneously in a nonthreatening environment.

Simulation

Simulation creates realism and allows students to practice skills in a safe environment (Bradshaw & Hultquist, 2017; Day-Black et al., 2015; Ross, 2015). Several simulation strategies were used for this study. For example, an e-simulation exercise was used before class during the EKG, automated external defibrillation, and CPR content unit. For this study, students completed an on-line simulation of EKG tracings, an interactive review of the cardiac system, and a basic review of CPR skills followed by a quiz. These learning activities prepared the students for the laboratory, where they practiced skills in an interprofessional simulation with peers from the paramedic program. The nursing students and paramedic students rotated in small groups to perform CPR and automated external defibrillation

skills. The paramedic students started first as their first-year curriculum included CPR training. A peer and instructor observed each student for proper sequence and technique and provided comments. Learning in small groups promoted interprofessional interaction and respect, while providing constructive peer feedback (Bradshaw & Hultquist, 2017).

Another simulation in this study was a virtual hospital assignment. This activity utilized a case-based scenario with a hospitalized patient (avatar) receiving a blood transfusion. The student had to use cognitive, psychomotor, and critical thinking skills related to safety and patient-centered care to complete the assignment.

Research has validated the benefits of simulation with regard to student learning. Several authors noted that simulation is an effective teaching strategy when it followed a didactic class (Alexander et al., 2015, Bradshaw & Hultquist, 2017; Hutchinson et al., 2011). Low- and moderate-fidelity manikins were used to create a more realistic environment (Grady et al., 2008). Equipment shown during the lecture included IV pumps, simulated blood products, Huber needles, peripheral and central line kits, trachesotomy kits with inner cannulas, bag-valve mask devices, and a central venous pressure manometer and tubing set.

Data Collection

For this study, the investigators created an original instrument that included three parts: demographics, quantitative, and qualitative questions. The demographic section collected data on gender, educational background, and age. The quantitative questions were divided into four sections: (a) traditional didactic strategies, six-question items, (b) traditional laboratory strategies, three-question items, (c) innovative didactic strategies, 16-question items, and (d) innovative laboratory instructions, seven-question items. A 5-point Likert scale measured the effectiveness of the teaching strategies for student learning; scores were as follows: 1 (*not effective*), 2 (*somewhat effective*), 3 (*effective*), 4 (*very effective*), and 5 (*extremely effective*). Data were analyzed using descriptive and inferential statistics.

Responses to three open-ended questions provided narrative data as such as list which activities you have enjoyed the most and explain why these activities were effective or not for your learning. Content analysis was used to analyze the narrative data by breaking down narrative content and putting it back together based on themes (Polit & Beck, 2014). Using categorical differentiation, grammatical units such as words or phrases were clustered in frequency and direction. Frequency was defined as a counting activity where each word or identified theme was counted against the text, and direction represented the positive or negative attitude toward a theme (Neuman, 2003).

Results

Twenty-one of the 39 eligible students completed the survey in full; the overall response rate was 53.80%. One questionnaire was partially completed, and one student entered invalid numbers (e.g., 6 on a 1 to 5 scale); these two surveys were excluded from the analysis. Most participants were women (83%). Age distribution was as follows: 17 to 21, 38%; 22 to 29, 38%; 30 to 39 years old, 9.5%; 40 to 49, 9.5%; 50 or older, 4.7%. Most of the students (47.6%) had some college credits, and 23.8% held a baccalaureate degree; only few students had an associate degree, a high school diploma, or a master's degree as their final degree and indicated it under "other."

Research Question

Quantitative Analysis

The items in the original instrument were tested for internal consistency. Cronbach's alpha, $\alpha = 0.968$, was established for the standardized items (see Table 1). Cronbach's alpha (α) is a reliability index that was commonly used to evaluate composite scales and tests with a range from 0.00 to +1.00. The closer to +1.00 a value is, the more precise the scale (Polit & Beck, 2014).

Participants selected 19 of the 32-question items from the traditional and innovative sections as extremely or very effective: 4 of 9 traditional strategies (44%) and 15 of 23 innovative strategies (65%). From the traditional didactic teaching, the item "in-class discussions" received the highest rating in general and was considered as the most effective ($M = 4.3$, $SD = 0.9$) teaching strategy in this study. From the traditional laboratory teaching, "the instructor demonstration of skills" was rated as extremely effective ($M = 4.3$, $SD = 0.8$). Other strategies that ranked as very effective were "power point lecture without a case" ($M = 3.9$, $SD = 0.9$) and "self-implemented checklist" ($M = 3.7$, $SD = 1.3$). However, these two items ranked lower in comparison to reciprocal innovative strategies (see Table 2).

Comparing the innovative didactic teaching, the "power point presentation with an evidence-based case scenario" was rated extremely effective ($M = 4.1$, $SD = 1$). That item was rated higher than the traditional "Power Point lecture without a case" ($M = 3.9$, $SD = 0.9$), which was considered very effective.

The items related to "knowledge checks" ($M = 4.1$, $SD = 1$) and "equipment and skill integration in lecture" ($M = 4.1$, $SD = 1.2$) were also rated as extremely effective. Other items rated as very effective were related to the "virtual hospital" ($M = 3.9$, $SD = 1.2$), on-line quiz ($M = 3.7$, $SD = 1$), proctored examinations ($M = 3.6$, SD 1.3), "games" ($M = 3.6$, SD 1.4), "e-EKG simulation" ($M = 3.6$, $SD = 1.1$), "group activity" ($M = 3.6$, $SD = 1.4$), and use of audience response system or i-clicker ($M = 3.6$, $SD = 1.4$). Two items rated

Table 1
Original instrument reliability and summary item statistics

Reliability statistics							
Cronbach's alpha			Cronbach's alpha based on standardized items				*N* of items
.967			.968				32
Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum/Minimum	Variance	*N* of items
Item means	3.492	2.600	4.200	1.600	1.615	.176	32
Item variances	1.496	.686	2.457	1.771	3.583	.211	32

N = number.

Table 2
Quantitative question items with highest means

Instructions: During the semester, you were exposed to a variety of teaching strategies.			
Please enter a number that best reflects perceived effect of each strategy on your learning. 1 – Not effective 2 – Somewhat effective 3 – Effective 4 – Very effective 5 – Extremely effective NA			
Traditional didactic teaching question		μ	*SD*
Q4	In-class discussion	4.3	0.9
Q3	Power Point presentation without a case	3.9	0.9
Traditional laboratory questions			
Q8	Instructor demonstration of skills	4.3	0.8
Q9	Self-implemented checklist	3.7	1.3
Innovative didactic teaching questions			
Q1	PPt with case-based learning	4.1	1
Q2	KCs	4.1	1
Q9	Equipment and skill integration in lecture	4.1	1.1
Q11	I-clicker	3.9	1.2
Q13	On-line quiz	3.7	1
Q14	Proctored examinations	3.6	1.3
Q10	Games	3.6	1.4
Q6	EKG e-simulation	3.6	1.1
Q15	Group activities	3.6	1.4
Innovative teaching strategies – laboratory			
Q21	Low and moderate fidelity laboratory simulation, e.g., IV arm, Port-A-Cath assess model, subcutaneous emphysema simulation	4.1	1.1
Q19	Simultaneous instructor-led skill demonstration	4.0	1.2
Q23	Case-based final checkoffs	3.9	1.2
Q22	Weekly case-based laboratory simulations	3.6	1.2
Q20	Peer-interjected skill practice	3.6	1.3
Q18	Video simulation "watch and learn"	3.5	1.1

Q = question, μ = mean, *SD* = standard deviation.

very effective from the innovative laboratory strategies were item 21, which addressed the low- and moderate-fidelity laboratory simulation, ($M = 4.1, SD = 1.1$) and item 19, "instructor-led-simultaneous skill checklist demonstration" ($M = 4.0, SD = 1.1$); that item scored lower than the reciprocal item in the traditional strategies. Other items rated very effective were item 23, case-based final check offs ($M = 3.9, SD = 1.2$) and item 22, weekly case-based laboratory simulations ($M = 3.6, SD = 1$; see Table 2).

Qualitative Content Analysis

Participants entered narrative responses for the three open-ended questions. A student commented: "I enjoyed the teacher's approach to spending most of the class time on skills activities and case skills activities rather than reading me a Power Point. I liked the fact she placed emphasis on the analytical activities/skills rather than the traditional power point lecture." Another student wrote: "I loved the versatility of teaching methods in my skills class." A student concluded: "These activities were effective because they made the material I didn't know more evident than anything else."

Assigned numerical values to words and themes in the content analysis helped in arriving to the conclusions that the students enjoyed the hands-on practice time, instructor demonstrations, and the impact learning skills had on their learning and confidence. The participants emphasized the need for modern equipment in the skills laboratories (see Table 3 for details). These conclusions were congruent with most of the items in the quantitative analysis.

Table 3
Qualitative items: content analysis

Qualitative item: Enjoyable activities	Frequency	Direction
Hands on/practicing skills	8	(+)
Demonstration (demo)/teaching	6	(+)
PPt Lecture/Textbook/Notes	7	(−)
Enjoyed/Liked	6	(+)
CPR activity	4	(+)
Games/Video/Virtual/e-ECG	4	(+)
CPR activity	2	(+)
ATs	2	(+)
Qualitative item: Effect on learning		
Learn/Study/Know/Understand/Retain/Repeat Confidence	14	(+)
Practice skills/Perform/Hands On/Experience	12	(+)
Effective/Applied/Helpful/Emphasize/Ensure preparation/Stuck in/"to get" it	8	(+)
Additional comments		
Equipment/Skill laboratory/Training/Modern	7	(−)
Like/Enjoy/Fun	4	(+)
Testing/Quiz	4	(−)

Discussion

The results in the study indicated that six innovative strategies in comparison to two traditional strategies achieved a level of significance, $p < .05$ using a chi-test analysis. Effective teaching strategies that were also statistically significant were related to simulation (EKG, low and moderate fidelity), equipment integration in lecture, simultaneous instructor-led skills demonstration, and evidence-based case scenario weekly simulations. Lecture with an evidence-based case scenario and KCs were rated higher than lecture without a case. However, overall statistical significance between the effects of traditional versus innovative strategies was not noted ($p = .3$).

The findings of this study are congruent with the literature. McNett (2012) and Gibson and Molloy (2012) concluded that active learning is achieved via the combination of traditional and innovative approaches that facilitate learning. The participants in this study rated in-class discussions the highest of the traditional strategies. This question was statistically significant ($p < .013$) and suggested that the students' learning of advanced nursing skills in skills laboratories was significantly affected by in-class discussions.

Major limitations of this study were the small sample size with a mostly young adult female population in a single suburban setting. The population and the location of the college could be a threat to the external validity because of the local phenomenon. However, the study results can be generalized to other colleges with mostly female nursing student populations or similar suburban settings. Another limitation was the insufficient evidence from the literature to provide information on best teaching practices for advanced nursing skills classes; research on the effects of traditional and innovative teaching strategies on learning advanced skills in nursing laboratories with larger samples may broaden knowledge in this area. Nevertheless, this study contributes to the nursing science by evaluating a tool for reliability and by providing evidence related to students' perceptions of the effects of traditional and innovative teaching strategies on learning nursing skills in skills laboratories.

Conclusions

The findings of this study support the use of both traditional and innovative strategies to facilitate active learning in nursing skills laboratories. Knowles (1998) and Vella (2002) state that adult learners

prefer education that engages them in active learning. Providing a variety of teaching methods enhanced the students' learning experiences. Teaching strategies must challenge students to solve problems, prioritize patient care, and think critically. The strategies discussed in this study can be implemented by nurse educators who use didactic and laboratory strategies to teach nursing skills across the United States and internationally.

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