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Graduating Nurses in the Time of COVID-19

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Abstract

Nursing has been a leader in online education for more than two decades. Nursing students have taken advantage of the flexible scheduling and variety of online nursing programs to pursue their education due to distance, family, or work demands; however, since the outbreak of COVID-19, nursing schools in the United States have adapted by implementing an online alternative to assess students' clinical skills required to graduate. Nursing faculty have been forced into this new learning culture, navigating the online landscape, learning new technologies and teaching methods, and adapting to clinical social distance education. Nursing is a performance-based profession in which the clinical learning environment plays an important role in developing skills and professional abilities. The purpose of this evidence-based teaching project is to, based on National League for Nursing (NLN), not only contribute to improvement but ensure educational quality for undergraduate nursing students by examining how online simulation compared to clinical experience with an actual patient, affects nurses' clinical competence. Therefore, after reviewing 14 peer-reviewed articles, evidence shows benefits for undergraduate nursing students to retain better clinical competence when virtual simulation and clinical sites are combined; however, further research is recommended. Articles were selected as the evidence base for this project, following specific inclusion criteria. Inclusion criteria for evidence were articles within six years, including undergraduate nurse students with online clinical education; the exclusion criteria were studies including graduate nurse students and articles older than six years. Based on the project's outcome, it is suggested that a nurse residency should follow online simulations to complete clinical hours.

Keywords

COVID-19, Pandemic, Online Undergraduate Nursing Program, Online Simulation, Clinical Experience, Nurse Students' Competence, Nurse Student, Nurse Residency

1. Background and Significance

Due to the global COVID-19 pandemic, nursing program faculty and students were driven from the face-to-face teaching model to virtual education. State boards of nursing, higher education accrediting, school administrators, and faculty began working together to identify issues and create solutions to create significant opportunities for innovative learning nationwide. The COVID-19 pandemic has impacted every aspect of evaluating competency in the next generation in the nursing profession [1]. Reference [2] has called on training programs to allow flexibility for graduating students who may have been removed from clinical rotation because of safety concerns; however, the need to balance educational goals with ethical concerns raised by this pandemic affects nursing education broadly [3].

The president of the California Association of Colleges of Nursing and California Organization of Associate Degree Nursing wrote to Governor Gavin Newsom requesting relief from a state requirement that nursing students complete 75% of their clinical hours in a direct patient care setting to 50% [4]. The California Community College added that it was necessary to waive these requirements to meet the ongoing needs of California's health care system. Nursing is a performance-based profession. Clinical learning environments play an important role in developing skills and professional abilities. Studies have shown that learning in clinical practice allows students to learn from peers, professionals, and patients, creating knowledge through transforming experience (Experimental Learning Theory) [5]. Clinical environments empower nursing students by improving professional skills and socialization in a complex and diverse learning environment [6]. During the COVID-19 outbreak, the Spain government proposed the deployment of senior nursing students to work as assistants; however, due to the demand, they became full team members for patient care. By missing the transitional period of students to professional nurses, students became the hospital educator's responsibility to provide high-risk setting skills [7].

Due to the uncertainty of the COVID-19 pandemic and the reduction of clinical placement, the number of clinical hours in the Fundamental of Nursing class at the practicum site has been reduced to 10.5 hours, creating a need to decrease content overload to foster deeper learning and attain outcomes [8]. The Community College had to re-organize its mission/strategic plan by refining and eliminating assignments to ensure students could manage with limited physical resources. Lectures and labs were being held online via Zoom, complemented by an online program called the Point (a division of Wolters Kluwer Health) that the state had provided to all community colleges. This program offers journals, professional development services, clinical software applications, and extensive point-of-care databases [9].

In addition, the Point provides online simulation (vSim), designed to simulate real nursing scenarios allowing students to interact with virtual patients in a safe, realistic online environment. Reference [2] states that vSim for nursing is "de-

signed to simulate real nursing scenarios and to develop clinical decision-making skills, competence, and confidence". In addition, the College of Nursing at my practicum site uses the New York Simulation Center for the Health Sciences (NYSIM) via Zoom to evaluate students' clinical competence. However, the Fundamental of Nursing highlights the significance of the essential needs of humans but also assists future nurses in building up the ability in fundamental skills to provide extensive nursing care. Social distancing is causing a challenge in ensuring that the COVID-19 nurses' generation will develop the competencies required to function effectively in healthcare settings. In addition, nursing students are facing challenges that are not related to nursing. Some community college nursing students are financially challenged since they have jobs on and off campus, which support their education and provide technology access. Technology might be helping the new norm, but some community college students cannot afford to access it. This Community College provides an academic environment that strengthens students' commitment to their education, and the Nursing Program is prepared to restructure its curriculum, as needed, to ensure educational quality to its undergraduate nursing program.

1.1. Setting

The college of nursing utilized in this project is a two-year public institution that works under state budget cuts and has shifted courses from on-ground to online via Zoom to accommodate "the new normal" during the pandemic. The college currently has 15,400 students who are enrolled, and the student to faculty ratio is 21:1. This community college employs 415 full-time faculty members, 243 full-time higher education officers (HEOs), and 47 full-time college laboratory technicians (CLTs); this community college is one of the most diverse colleges in the nation. The students come from 123 countries and speak 79 languages. The program's average NCLEX pass rate is 91.8% [8]. The rapidity with which the students in this college are responding and how the faculty assists them during the pandemic exceeds anything they have ever experienced.

1.2. PSCOT Question

In online undergraduate nursing programs (P), how does online simulation (S) compared to clinical experience with actual patients (C) affect a nurse's clinical competence (O)?

1.3. Search Protocol

The following databases were searched: ScienceDirect, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Eric, Cochrane, Academic Search Premier, Directory of Open Access Journals, Supplemental Index, Health and Medicine, PubMed, and MEDLINE. The databases were combined for the search, and the search strategy used the following keywords and following results: *undergraduate nursing online education* (821 results), *online simulation in under-*

graduate nursing school (59 results), *online simulation with vSim* (2 results), *outcome for power-point used for online undergraduate nurse educator* (29 results), *importance for clinical environment for undergraduate nurse program* (13 results), *undergraduate nursing clinical hours during COVID*-19 (3), *pandemic results in undergraduate nursing school* (6), *pandemic results in undergraduate nursing education* (2), *impact on undergraduate nurse student's clinical competence during COVID*-19 (1), and *nursing residency* (17).

The search yielded a total of 1339 articles. After review, 14 articles from Health and Medicine, ScienceDirect, Supplemental Index, Directory of Open Access Journals, Academic Search Premier, MEDLINE, CINAHL, and PubMed were selected as the evidence base for this project. The inclusion criteria for evidence were articles within six years, including undergraduate nurse students. The exclusion criteria were studies including graduate nurse students and articles older than six years. In addition, the search was limited to studies that had a published date, were full text, written in English, and were peer-reviewed. These criteria helped ensure that the strength and quality of sources remained high (see **Appendix A**).

2. Systematic Review

The appraisal was conducted following the JHEBP tool for evaluating and appraising evidence (see **Appendix B**). Synthesis of the literature resulted in many similarities; the studies included in the literature review consist of one randomized control trial (level I), which concluded that the use of vSIM might be an effective supplementary teaching strategy to improve student's knowledge of the fundamentals of nursing [10], five randomized control trials (level II), which concluded that web-based education was equivalent to the education provided face-to-face (e.g., traditional education), [11]. Evidence demonstrated that introducing clinical virtual simulation in nursing education could improve knowledge retention and clinical reasoning [12] [13] [14] [15]. In addition, there were four systematic reviews (level III). Reference [5] concluded that learning in a clinical site provided students the opportunity to learn from peers, professionals, and patients, creating knowledge through the transformation of experience. In contrast, reference [16] concluded that online simulation was beneficial for pharmacology education to undergraduate students, with traditional lectures being the least effective. However, reference [5] referred to therapeutic and psychomotor skills, which individuals learn from books and refine by socializing with others, such as cultural sensitivity and cross-cultural communication; reference [16] referred to clinical reasoning, which is learned from books alone.

Nursing residency program may contribute to new graduate nurses' integration into high-acuity settings and improve patient's quality of care by linking therapeutic skills, psychomotor skills, clinical competency (reasoning), confidence, job retention, and job satisfaction. Reference [17] conducted a systematic review study where an electronic search was conducted between 1980 and 2013

using databases that included Medline, PubMed, Cochrane, EPOC, Cumulative Index to Nursing, CINAHL, and PsychInfo. In addition, all 13 journal articles used in their study were peer-reviewed, published in English, and studied the impact of residency programs on new graduate nurses' clinical decision-making and leadership skills. The study was based on the residency program content where teaching and learning strategies were used. The study concluded the effectiveness of residency programs in promoting new graduate nurses' knowledge and competency beyond those developed in nursing school.

In addition, reference [18] conducted peer-reviewed research and systematic reviews for five years found on Medline, Nursing and Allied Health, and CINHAL that addressed the impact of one-year nurse residency programs on nurse retention or nurse satisfaction. The JHEBP appraisal tools were used to extract and appraise evidence. The study concluded that the nurse residency program was more effective than traditional hospital orientations for new nurse hires, and nurse retention and satisfaction were related to an increase in confidence and management of workload by the end of the nursing residency program.

In addition, two quasi-experimental studies (level II) concluded that simulation increases clinical learning competencies, but one of the studies added the need to combine simulation with traditional education for increased learning outcomes. One quasi-experimental study (level III) concluded that online teaching improved students' knowledge but does not increase students' interest in the subject [19]. Lastly, one experimental study (level I) concluded that when it comes to the fundamentals of nursing, the combination of traditional and online classes effectively improved clinical skills [20]. The average time of the studies was approximately one year.

The studies were conducted in multiple countries and included undergraduate nursing program content from various cultures. This supports the generalization of the findings and use of these methods when teaching at the Schools of Nursing. Of the 12 articles for the literature search, case studies, qualitative interviews, and quantitative surveys were used. Synthesis of the literature resulted in many similarities. The research results indicated that face-to-face classes, online classes, and virtual simulation combined within a nurse residency provided a platform for undergraduate nursing students to understand topics or complete assignments on course content. This finding not only helps learners make connections among readings, online discussions, and written assignments, but increase confidence and management of workload by the end of the nursing residence program.

Informatics has provided nurse instructors with additional resources by clarifying concepts or helping learners think more deeply about a particular issue; it also provides distance education. Studies reviewed that the use of simulation as an intervention helped undergraduate nursing students in skill performance when caring for patients whose clinical condition was deteriorating; it provided confidence and competency to students. However, the common limitation on the studies was that they did not evaluate the use of clinical site learning with

virtual simulation combined, neither followed by a nurse residency to compare with the use of clinical site learning or virtual simulation alone.

Quality improvement training can also facilitate student learning. Studies have demonstrated that active learning strategies combining traditional learning with virtual simulation can best be delivered to improve skills, critical thinking, and learning outcomes [21] [22]. Clinical training for undergraduate students is important to ensure that they have the skills needed to improve the quality of patient care and enhance their motivation to do so. Clinical sites allow undergraduate students to self-reflect, assess needs and gaps, and consider improving for a better patient outcome [19]. In addition, clinical sites permit faculty to evaluate students' knowledge and competency.

3. Results and Discussion

The purpose of this project was to answer the question: in online undergraduate nursing programs (P), how does online simulation (S) compared to clinical experience with actual patients (C) affect a nurse's clinical competence (O)? The search results indicated that virtual simulation provided a platform for undergraduate nursing students to understand topics or complete assignments on course content [5] [12] [13] [16]. However, based on the evidence, learning in a clinical site can allow students to learn from peers, professionals, and patients, creating knowledge through experience transformation [20]. Since nursing is a performance-based profession, a clinical learning environment not only improves but also ensures educational quality for nursing students. Clinical learning environment, when combined with virtual simulation, helps undergraduate students in skills performance for patient care, improving knowledge, competency, and confidence [10] [22] [23]. In addition, the college of nursing at the practicum site uses the New York Simulation Center for the Health Sciences, by NYSIM via Zoom to evaluate students' clinical competence.

Clinical training for undergraduate students is important to ensure they have the skills needed to improve the quality of patient care and evaluate students' clinical competence. To evaluate students' competence, the practicum site is being assisted, via Zoom, by NYSIM, a simulation center used by NYU Grossman School of Medicine for clinical teaching. However, simulation is used in medical school to teach new procedures, validate competencies, and transition medical students into residency programs [20]. The nursing profession does not require a standardized nurse residency program before becoming licensed and registered as an RN; nursing students' practical training is included in the undergraduate program curriculum.

It is premature to assume that nursing students will develop the competencies required to function effectively in healthcare settings. However, reference [2] concluded that nursing students retained clinical competence better when face-to-face and online experiences were combined. According to reference [19], NLN (2020), "Nursing is a practice discipline, so actual contact with patients is an essential

component of pre-licensure nursing education" (p. 185). With the need to include virtual simulation in undergraduate nursing programs to replace clinical sites due to COVID-19, the evidence is promising in virtual simulation to provide confidence and competency to students in recognizing deteriorating patients [5].

Nevertheless, the evidence is not conclusive to support that nursing students' clinical competence to provide safe and effective patient care is being developed with the use of virtual simulation alone. Evidence shows benefits for an undergraduate nursing student to retain better clinical competence when virtual simulation and clinical site are combined [20] [24]. Considering these promising results, further study in this area should include clinical site learning with virtual simulation combined to compare with the use of clinical site learning or virtual simulation alone, followed by a nurse residency program to explore the use of this intervention for undergraduate nursing students.

4. Implications

4.1. Practice

COVID-19 has created a shortage of clinical training sites for undergraduate nursing students. Online simulations simulate real nursing scenarios and develop clinical decision-making skills, competence, and confidence in nursing students [5]. However, learning in a clinical site is imperative for undergraduate nursing students to retain clinical competence by learning from peers, professionals, and patients [18] [20]. Establishing a nurse residency program before student nurses become licensed would be a foundation for new graduates' transition and retention of knowledge and competence to accommodate the new COVID era. A coalition between healthcare institutions and academic nurse leaders to standardize and validate nurse residency programs would support nursing students' clinical competence that is affected by using virtual simulation alone during the undergraduate program [17] [25]. Nurse residency programs could help nursing students during COVID-19 by helping them develop skills such as organizing, prioritizing workflow, and communicating with other healthcare team members.

4.2. Nursing Education

During COVID-19, curriculum change is a requirement and not a choice; nurse educators must be aware of the factors influencing the nursing school. Healthcare reforms affect everyone, and they will continue to challenge nurse educators to develop relevant curricula to prepare and equip practitioners for their new roles and responsibilities [26]. By contributing to changing curricular frame conditions, where online simulation would be followed by a nurse residency to complete clinical hours in a direct patient care setting, nursing educators would respond to the changes in teaching and accommodating the new access routes to knowledge and competence [17].

4.3. Research

Evidence has shown that numerous kinds of literature have reviewed the benefit, attributes, and outcomes of virtual simulation and nursing residency programs; however, much remains to be understood about the work readiness of new graduate nurses for the COVID-19 era. Researchers have not examined the combined relationship between virtual simulation, face-to-face teaching, and nursing residency program. Further studies can assist the development of nurse residency programs to improve undergraduate nurses' clinical competency with potential benefits for healthcare organizations. To sustain the development of high-quality healthcare providers for the pandemic, it is important to study the transitions of new graduate nurses into professional roles to identify competency gaps and improve preparation programs.

5. Implementation Plan

5.1. Project Goal

This evidence-based practice project proposed changing the curricular frame condition, where a nurse residency would follow online simulation to complete clinical hours during COVID-19. As the Collebe of Nursing redesigns the teaching strategy, change in the curricular frame condition is essential for new graduate nurses to integrate into high-acuity settings and improve patient's quality of care by linking therapeutic skills, psychomotor skills, clinical competency (reasoning), confidence, job retention, and job satisfaction [17] [26]; clinical learning environment, when combined with virtual simulation, help undergraduate students in skills performance for patient care, providing knowledge, competency, and confidence [10] [18] [22].

Goal 1—Upon completing the service, the audience will be able to identify at least two benefits to the nurse students when online simulation and clinical sites are combined before entering the profession.

Goal 2—Upon completion of the in-service, the audience will be able to verbalize the benefits to the clinical site.

5.2. Change Theory

The change theory guiding the teaching project is Lippitt's theory of change. Lippitt's theory of change, an expanded extension of Lewin's three-step change theory, focuses on the role and responsibility of the change agent in creating a safe, empowering, and positive environment for improved patient care [5]. The stages of Lippitt's theory have a relationship with nurses by accurately describing the nursing process for problem-solving (assessment, planning, implementation, and evaluation), which nursing can be used in any practice setting [27]. Lippitt's theory has seven steps, and compared to the nursing process, include:

- **Assessment:** (1) diagnose the problem; (2) assess the motivation and capacity for change; (3) assess the resources and motivation of the change agent, which includes their commitment to change, power, and stamina.

- **Planning:** (4) choose progressive change objects, including developing plans of action and strategies; (5) the role of the change agent should be selected and clearly understood by all parties so that expectations are clear.
- **Implementation:** (6) maintain the change, including communication, feedback, and group coordination, which are essential for this step.
- **Evaluation:** (7) gradually terminate the helping relationship with the gradual withdrawal of the change agent [28].

By emphasizing those affected by the change, Lippitt's theory creates a more empowering environment during learning by leading nurse educators to emphasize on those affected by the change. Nurse educators create a democratic environment by building partnerships with the staff that includes two-way communication, problem-solving strategies, and establishing mechanisms for feedback while building trust and teamwork [29].

5.3. Application of Theory to the Implementation and Evaluation Plan

When applying theory to the implementation and evaluation plan, specific steps were used (see **Appendix D**).

Steps 1 - 3

In assessing the necessity for this project, Lippitt's first three phases were utilized, diagnosing the problem, assessing the motivation and capacity for change, and assessing change agents' motivations by identifying the need for a method to determine the nurse program leadership and students' abilities. Studies have shown that active learning strategies combining traditional learning with virtual simulation can best be delivered to improve skills, critical thinking, and learning outcomes [22] [27].

However, since nursing program faculty and students were driven from the face-to-face model of teaching into virtual education, every aspect of how to evaluate competency in the next generation in the nursing profession has been impacted since the reduction of clinical placement and number of clinical hours became the new norm in nursing education [20]. During a committee meeting to evaluate the need to restructure their curriculum, the idea of adding a nurse residency program, followed by the online simulation to complete clinical hours during COVID-19, was brought up by the Dean, and the need for further understanding of the subject was noticed. The project's primary objective is to increase the Nursing Department and nurse students' understanding of the benefits of the nurse residency program following online simulation to complete clinical hours during COVID-19. The capacity to make the change involved me being hired to assist with the project. The person responsible for the interest in adding a nurse residency program to complete the clinical hours during COVID-19 was the Dean, making her the change agent. The committee, faculty, and students understood the motivation behind the change and agreed.

Steps 4 - 5

During the planning phase, a training program was developed. An online

learning strategy via Zoom was created, where nursing faculty, Dean, nursing students, committee, and administrators examined teaching strategies that benefit student engagement and successfully transition from student nurse to professional registered nurse [1]. The role of the change agent (e.g., Dean) in this project would be the project leader, to work with the other stakeholders (e.g., committee, faculty, administrators, nurse students) in developing relevant changes aimed at preparing and equipping undergraduate nurses for their new roles and responsibilities by adding clinical site hours during the pandemic. The stakeholders will identify their interest, role, and responsibility in the project, and agree that once they accept clinical hours and sites, the change agent will present it to the committee for approval (see **Appendix C**). Interprofessional collaborations have been identified as a positive way to reach education, service, and scholarship outcomes [30]; interprofessional collaborations outweigh the challenges. The assumption was that if the participants scored a four or higher on the questionnaire using a 5-point Likert Scale, where four is "Agree", and five is "I Strongly Agree", the expected outcome was within target. This impetus for this project focuses on increasing the nursing department's understanding of the nurse residency program so that clinical hours can be added during COVID-19.

Step 6

To maintain the change, constant communication between the committee, the change agent, the students, and the faculty will be required to ensure adequate resources and constructive feedback for areas of strength and areas requiring improvement.

Step 7

As the nursing school has redesigned the teaching strategy by completing required clinical hours at the clinical site followed by online simulation during COVID-19, the change agent can gradually withdraw from the role, reinforcing the changes with new rules and policies approved by the committee (see **Appendix C**).

6. Inhibitors and Facilitators to Project Success

The element that potentially inhibits the implementation of this project is Senate Bill S6768 [31]. Since New York Governor Andrew Cuomo signed into law a requirement that nurses earn a BSN within ten years of an initial license, not only New York hospitals have lost interest in hiring associate degree nurses, but also the associate degree in nursing (ADN) programs at the clinical site are facing difficulty to find a clinical site for their students. Besides, the College of Nursing utilized in this project is a two-year public institution that works under state budget cuts, and faculty are not provided with extra compensation for developing a strategic improvement plan.

Facilitators to the project's success are that the in-service participants expressed enhanced knowledge and confidence during the in-service; besides, appreciation for the in-service is an attestation of the program's value. Also, having

nursing students in the hospital during the pandemic will bring additional skilled nurses into the workforce to assist with the efforts and enhance the COVID-19 response.

6.1. Evaluation Method

For the nursing school assessment, a survey will be used to evaluate if the in-service has successfully prepared the attendees and if the educational objectives have measurable outcomes. A survey is the right choice when you need to evaluate the audience's awareness and feelings about the subject. Besides, a survey can help determine whether your audience remembers seeing or hearing anything about your communications and the specific content your audience remembers to distinguish your efforts from the information they may have gleaned from another source [32]. Objectives will be measured by a post-in-service survey, where 100% of the attendees will score four or higher on the questionnaire using a 5-point Likert Scale where four is "Agree", and five is "Strongly Agree". Nursing educators aim to transmit nursing knowledge by assisting nursing students acquire the necessary skills and attitudes associated with nursing practice. Evaluation of teaching strategies helps gauge the effectiveness of educators' instructional strategies. It identifies components necessary for educators to improve their teaching and assist nursing students in acquiring the beliefs, skills, and knowledge needed in nursing practice [33].

6.2. Project Timeline

While conducting the project, the three steps of the Evidence Based Practice process were utilized: practice question, evidence, and translation (see **Appendix D**: JHEBP PET Management Tool).

6.3. Teaching Plan

An online learning strategy via Zoom was created, where nursing faculty, the Dean, nursing students, the committee, and administrators examined teaching strategies that benefited student engagement and successfully transitioned from student nurse to professional registered nurse (see **Appendix E**). The online in-service included a PowerPoint presentation, a debriefing session, and a post-in-service survey (see **Appendix G**). Online classes will provide a platform for faculty to present information addressing topics or answering questions on course content and can help learners make connections among readings, online discussion, and written assignments; the instructor promotes connections by clarifying concepts or helping learners think more deeply about a particular issue and providing distance education a deeper cognitive exercise [34]. In addition, engaged learners are more apt to remember more from the lesson since they have been actively participating in their education and transferring newly acquired skills to different situations. Interactive learning can also make learning more interesting and fun, so students will have more intention to learn new things. Students learn

better from each other than from the teacher [35]. Encouraging cooperative learning among peers through projects or assignments creates a more relaxed classroom environment allowing the teacher to act as a facilitator instead of a lecturer [36] (see **Appendixes E-G**).

7. Conclusion

Regarding patient outcomes, the nursing profession has seen an increase in incorporating evidence-based practice (EBP). However, the ability of nurses to better serve the public is still being held by outdated policies. The nursing profession has evolved quicker than the public policies that affect it. As nurses play a crucial role in health care delivery, they must embrace new and innovative techniques to provide the best possible treatment to their patients. Based on the project's outcome and the assistance of Bloom's Taxonomy, a change in the curricular frame condition, where a nurse residency would follow online simulation to complete clinical hours during COVID-19, is suggested. Nursing institutions must carefully consider which evidence-based teaching strategies, evaluation methods, and practices are best to include in their curriculum for nursing students to exit school and enter the nursing world with the proper education, preparation, skills, and confidence. There are various methods to teach nursing students. However, institutions must consider and figure out the overall demographic of the student nurse body and cater to their learning needs and required environment to achieve the utmost success. As an institution employs the appropriate strategy for its program/curriculum, it is vital always to re-evaluate those methods and ask the nursing students for constructive feedback to improve the program.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix A: Strength and Quality of Sources

#	1st Author	Year	Level of research (or non-research) evidence	Sample Composition & Size	Results/ Recommendations	Limitations	Rating Strength/ Quality
1	Gu	2017	Randomized controlled Trial	27 undergraduates (13 experimental and 14 control group). The experimental group received 10 virtual cases in addition to the regular course procedure. The control group received standard course procedures only.	The experimental group had higher knowledge scores than the control group. vSim for nursing students' fundamentals is effective, improving students' knowledge when combined with the traditional lecture. Tool—Knowledge test and skill performances were compared.	Small sample size vSim is developing in English only.	I/A
2	Durmaz	2019	Randomized controlled Trial	305 nursing students: *155 experimental group—received web-based preoperative and postoperative patient care education. *150 control group—received traditional education. From February to May 2017.	The experimental group showed a higher knowledge score. Web-based education is a useful tool to educate nurse students in preoperative and postoperative patient care. Preoperative and Postoperative Care Knowledge Test, Preoperative and Postoperative Care Skill Control List, Clinical Decision Making in Nursing Scale, and Nursing Student Clinical Performance Evaluation Scale.	Both groups were in the same environment, creating a possibility of interaction. Also, the control group was able to ask more questions in real-time. questions in real-time.	II/B
3	Gill	2019	Systematic Review	20 peer-reviewed articles	Online simulation is beneficial for pharmacology education to undergraduate students. Tradition lectures were the least affected for the students. Evaluated Knowledge.	Only one group of students received the pretest to establish group equivalence.	III/A
4	Goldsworthy	2019	Quasi-experimental study	59 undergraduate nursing students in their third year were randomly assigned to a control or treatment group (24 treatment group - 39 comparison group). From age 26 - 25 years Treatment received 2, 8 hrs each virtual simulation intervention on unstable patient.	Clinical self-efficacy was seen only in the treatment group after the intervention. The simulation does provide confidence and competency to students in responding and recognizing deteriorating patients. Evaluated knowledge. Clinical self-efficacy tool	Small sample size and a single site.	II/C
5	Ramsay	2020	Quasi-experimental	First-year undergraduate nursing students in Austria. 410 students enrolled in an online EBP research class and participated in post-class survey.	Online teaching does not create a positive attitude about nursing students' research but benefits their knowledge outcome. Evaluate behave.	Online teaching does not create a positive attitude about nursing students' research but benefits their knowledge outcome. Evaluate behave.	III/C
6	Stoffels	2019	Systematic review	From 9360 abstracts, 17 articles were included. 5 articles focus on learning in practice, and the others focus on social, unplanned, or active learning.	Learning in clinical practice allows students to learn from peers, professionals, and patients, creating knowledge through the transformation of experience (Experimental Learning Theory). Evaluated knowledge and competence.	The literature search only covered undergraduate nursing education, lacking understanding of other health professionals.	III/B

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Continued

7	Terry	2018	Quasi-experimental studies	102 first-year nursing students (89 female/13 male) enrolled in a medication course—from age 18 to 44 years, for 26 weeks. The 102 students were divided into 3 groups: #1 learned online, #2 learned on campus, in traditional face-to-face, and #3 trained online and on campus.	Nursing students retained clinical competence better when face-to-face and online combined. Evaluated knowledge and competency. Tool—Post test.	Age groups were in unequal intervals, and only 14% were in the older age category limiting the study on the possibility of age influence on retention competency and time to complete the tasks.	II/B
8	Sheikha-houmasoudi	2017	Experimental Study	2 post-experimental group (Fundamental of nursing students in Iran) from 2/14 - 2/15.	The experimental group's midterm and final scores were higher than the control group, suggesting that the combination of traditional and online classes effectively improves clinical skills. Evaluated knowledge.	The use of tradition and e-learn combined steady of e-learning alone to evaluate the effectiveness of e-learning alone.	I/A
9	Padilha	2018	Randomized controlled trial	42 Portuguese undergraduate nursing students, divided into 2 groups, received the same objectives and timing. The experimental group received a case-based learning approach with a clinical virtual simulator. The Control group received a laboratory class 45 min and a simulation created by the teacher.	Evaluated knowledge. The experimental group students showed better outcomes in knowledge retention and learning satisfaction than the students in the control group. Tool—1 pre-test and 2 post-testes.	Was a single context, with second-year nursing students, and on a single subject (respiratory process).	II/B
10	Berg	2020	Randomized controlled trial	First-year medical and Nursing students.	Evaluated knowledge. Individual self-practicing the ABCDE approach (Airways, Breathing, Circulation, Disability, Exposure) in virtual reality (VR) is non-inferior to individual self-practicing with traditional practice (TP). Tool—Practice test on a simulator manikin.	Lack of blinding, the study tested only one type of VR application and a short follow-up time (30 days).	II/B
11	Jaberi	2019	Randomized controlled trial	87 third-year undergraduate nursing students are divided into 2 groups: virtual simulation education and classroom education. They were evaluated into three phases, Pre-test knowledge, training session, and post-test/recall test OSCE evaluation.	Evaluate knowledge on physical examination of the abdomen. The nursing students' abdominal physical examination skills improved regardless of whether they belonged to the virtual simulation group or the classroom education group.	Small sample size Single center.	II/B
12	Turrise	2020	Randomized Controlled Trial	27 nursing students enrolled in a Pathophysiology-Pharmacology online class and were divided into 2 groups. The control group received written case studies, and the experimental group received digital clinical experience.	The experimental group made more significant improvements in knowledge after the intervention. Both groups tested with the same pre-test and 2 post-tests. Clinical virtual simulation in nursing education has the potential to improve knowledge retention and clinical reasoning. Tool—Pre-test and post-test were used to compare critical thinking, confidence, and satisfaction.	Single center. Only evaluated one subject (Respiratory process).	II/A

Continued

13	AL-Dossary	2014	Systematic Review	13 peer-review studies on residency program/clinical/ leadership over 33 years.	Nursing residency programs may contribute to new graduate nurses integrating into high-acuity settings and improving patients' quality of care by promoting skills, clinical competency, confidence, retention, and satisfaction.	Variation and limited research findings.	III-A
14	Eckerson	2018	Systematic Review	12 peer-review studies on new nursing graduate/nurse retention rates/nurse satisfaction/preceptor-based with nurse residency program participation/one-year nursing residency program/ from 2012-2017.	The nursing residency program increases the satisfaction and retention of new nurse graduates over a one-year period, reinforcing that nursing residency is more effective in promoting skills and clinical competency than traditional hospital orientation.	A risk for selection bias was identified as a limiting factor in two studies. The study only newly hired BSN graduates.	III-A

Appendix B: Synthesis of Findings

EBP Question: In online undergraduate Nursing Programs (P), how does online simulation (S) compared to clinical experience with actual patient (C) affect a nurse's clinical competence (O)?

Category (Level Type)	Total Number of Sources/ Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
Level I • Experimental study • Randomized controlled trial (RCT) • Systematic review of RCTs with or without meta-analysis • Explanatory mixed method design that includes only a Level I quaNtitative study	2	A	- The use of vSim for fundamental nursing students is an effective tool to use with regular course procedures to improve student's knowledge (Gu 2017). - - Fundamental nursing students that received e-learning combined with traditional lectures scored high on the exams (Sheikkahoumasoudi 2017).
Level II • Quasi-experimental studies • Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis • Explanatory mixed method design that includes only a Level II quaNtitative study	6	A/B/C	- There was no significant difference between student's knowledge levels, clinical performance, or clinical decision-making scores between Web-based and tradition base education for students learning preoperative and postoperative patient care (Durmaz 2019). - Nursing students retained clinical competence better when face-to-face and online combined (Terry 2018). - Simulation provided confidence and competency to students in recognizing deteriorating patients (Goldsworthy 2019). - Review that the introduction of clinical virtual simulation in nursing education has the potential to improve knowledge retention and clinical reasoning (Padilha 2018). - Virtual simulation for the ABCDE approach shows non-inferior outcome compared to TP (Berg 2020). - Clinical virtual simulation in nursing education has the potential to improve knowledge retention and clinical reasoning (Turrise 2020).

Continued

Level III ▪ Nonexperimental study ▪ A systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta-analysis ▪ Qualitative study or meta-synthesis ▪ Exploratory, convergent, or multiphasic mixed-methods studies ▪ Explanatory mixed method design that includes only a level III QuaNtitative study	6	A/B/C	- Online simulations are beneficial for pharmacology education for undergraduate students, while traditional lectures were the least effective (Gill 2019). - Online teaching improves student's knowledge but does not increase student's interest in the subject (Ramsay 2020). - Learning in a clinical site provides the students an opportunity to learn from peers, professionals, and patients, creating knowledge through the transformation of experience (Stoffels 2019). - Study demonstrates that the virtual simulation method is an effective tool for learning to perform the physical examination of the abdomen as compared to the purely lecture-based educational method (Jaberi 2020). - Nursing residency program may contribute to new graduate nurses integrating into high-acuity settings and improve patient's quality of care by promoting skills, clinical competency, confidence, retention, and satisfaction (Al-Dossary 2014). - Nursing residency program increase satisfaction and retention of new nurse graduates over a one-year period, reinforcing that nursing residency is more effective in promoting skills and clinical competency than traditional hospital orientation (Eckerson 2018).

Appendix C: JHEBP Stakeholder Analysis Tool

1. Identify the key stakeholders.

▪ **Manager or direct supervisor**	❑ Organizational leaders
❑ Finance department	▪ **Interdisciplinary colleagues (e.g., physicians, nutritionists, respiratory therapists, or OT/PT)**
❑ Vendors	
❑ Patients and/or families; patient and family advisory committee	❑ Administrators
❑ Professional organizations	❑ Other units or departments
▪ **Committees**	▪ **Others: Dean, Nurse student**

2. Stakeholder roles and responsibilities. (The stakeholder roles—which include Responsibility, Consult, Approval, and Inform and their corresponding responsibilities, described here—guide completion of the table.)

Responsibility • Completes identified tasks • Recommending authority	Consult • Provides input (e.g., subject matter experts) • No decision-making authority Approval
Approval • Signs off on recommendations • May veto	Inform • Notified of progress and changes • No input on decisions

Project tasks	Stakeholder name Stakeholder role	Stakeholder name Stakeholder role	Stakeholder name Stakeholder role
Make decisions about the project	Faculty Inform	Nurse Student Consult	Dean Responsibility
Organize meetings to follow up on the project	Dean Approval	Faculty Responsibility	Faculty Consult

Continued

Maintain communication with the Dean	Faculty	Faculty	Faculty
	Inform	Consult	Responsibility
Development of the new clinical hours and clinical sites to maintain clinical competence	Dean	Faculty	Faculty
	Approval	Responsibility	Inform
Approval of the hours and clinical sites.	Dean	Committee	Faculty
	Approval	Approval	Consult

Appendix D: PET Management Guide

Initial EBP Question: In online undergraduate Nursing Programs (P), how does online simulation (S) compared to clinical experience with actual patients (C) affect a nurse's clinical competence (O)?

EBP Team Leader(s): Andrea Barbosa

EBP Team Members: clinical hours workgroup

Activities	Start Date	Days Required	End Date	Person Assigned	Milestone	Comment/ Resources Required
PRACTICE QUESTION:						
Step 1: Recruit interprofessional team	8/21	10	9/31	Dean/Self	Form an interprofessional team	Faculty, dean, and student nurse meetings
Step 2: Define the problem	8/31	7	9/7	Nurse Students/ Self/faculty/dean	Determine the problem	Cooperative learning among peers so gaps between practices can be identified
Step 3: Develop and refine the EBP question	9/7	7	10/14	Nurse Students/ Self/faculty/dean	Identify background question	Faculty, dean, and student nurse meetings
Step 4: Identify stakeholders	10/5	1	10/6	Dean/self	Identify staff and students that show interest and/or concern about the topic.	Faculty, dean, and student nurse meetings
Step 5: Determine responsibility for project leadership	10/12	1	10/12	Dean/Self	Assess knowledge on the subject; assess the motivation and capacity for change	Dean and self-meeting to evaluate organization structure and strategies for change
Step 6: Schedule team meetings	10/26	3	10/29	Faculty/Dean	Organize calendar for the project	Reserve room; ensure team member availability and complete presentation
EVIDENCE:						
Step 7: Conduct internal and external search for evidence	9/11	14	9/25	Self	Determine the evidence to search	School protocol, current curriculum, and school financial data
Step 8: Appraise the level and quality of each piece of evidence	9/15	20	10/5	Self	Research Review	Appraisal tool A
Step 9: Summarize the individual evidence	9/22	7	9/29	Self	Sums the evidence documents that answer the PSCO question	Appraisal tool B

Continued

Step 10: Synthesize the overall strength and quality of evidence	9/29	7	10/6	Self	Determine the overall quality for each level of evidence	Appraisal tool B
Step 11: Develop recommendations for change based on evidence synthesis: ▪▪ Strong, compelling evidence, consistent results ▪▪ Good evidence, consistent results ▪▪ Good evidence, conflicting results ▪▪ Insufficient or absent evidence	10/3	10	10/13	Self	Consider possible ways to convert evidence into practice	Verify evidence results that support school needs

<p align="center">TRANSLATION:</p>

Step 12: Determine fit, feasibility, and appropriateness of recommendation(s) for translation path	11/3	4	11/7	Self	Evaluate stakeholders understanding and expectations.	Round table discussion
Step 13: Create an action plan	11/9	10	11/19	Self	Evaluate resources, choose progressive objectives, request feedback, and consider each member's responsibility.	Action planning tool
Step 14: Secure support and resources to implement action plan	11/16	7	11/23	Self/faculty/dean/ administrators committee.	Obtain support from organization leaders.	Meeting administration, Dean, committee, and faculty
Step 15: Implement action plan	11/23	1	11/24	Faculty/student nurse/committee/ administrators/ dean	Evaluate stakeholders' knowledge of the practice change and their availability during the implementation.	Round table discussion
Step 16: Evaluate outcomes	11/23	1	11/24	Self/faculty/ student nurse/ dean/committee	Post-inservice survey	Evaluate stakeholder's understanding of the subjects by reviewing the survey
Step 17: Report outcomes to stakeholders	11/27	1	11/28	dean	Review survey with stakeholders	Authorization from the Dean for a new meeting with the staff.
Step 18: Identify next steps	11/27	1	11/28	Committee/ dean/faculty	New meeting	Evaluate stakeholder's motivation to continue the new plan.
Step 19: Disseminate findings	12/4	2	12/6		Evaluate school support	Follow-up meetings.

Appendix E: Lesson Plan

Intended Audience: Nursing faculty, Dean, nursing students, committee, and administrators.

Length of Time for Lesson: 105 minutes

Brief Description of Lesson: On an online learning strategy via Zoom, the audience will examine teaching strategies that benefit student engagement and successfully transition from student nurse to professional registered nurse.

Pre-reading or activities prior to attending the lesson: Read the three articles provided.

Objective	Content	Learning Activity (Method)	Allotted Time	Resources	Evaluation
Upon completion of the inservice, the audience will be able to: 1) identify at least two benefits to the nurse students when online simulation and clinical site are combined prior to entering the profession. 2) verbalize the benefits to the clinical site.	In a 60-minute inservice, the following topics will be examined: Nurses entering the profession need to attain competencies to deliver safe, quality care. Clinical learning environments play an important role in developing skills and professional abilities. Online simulation can provide clinical decision-making skills, competence, and confidence. Nursing students retained clinical competency better when online simulation and clinical sites were combined.	Powerpoint presentation Round table discussion Post-inservice survey	30 minutes 60 minutes 15 minutes	Eckerson, C. M. (2018). The impact of nurse residency programs in the United States on improving retention and satisfaction of new nurse hires An evidence-based literature review. Nurse Education Today, 71, 84-90. https://doi-org.sacredheart.idm.oclc.org/10.1016/j.nedt.2018.09.003 Stoffels, M., Peerdeman, S. M., Daelmans, H. E. M., Ket, J. C. F., & Kusurkar, R. A. (2019). How do undergraduate nursing students learn in the hospital setting? A scoping review of conceptualizations, operationalizations, and learning activities. BMJ Open, 9(12), 1. https://bmjopen.bmj.com/content/bmjopen/9/12/e029397.full.pdf Goldsworthy, S., Patterson, J. D., Dobbs, M., Afzal, A., & Deboer, S. (2019). How Does Simulation Impact Building Competency and Confidence in Recognition and Response to the Adult and Pediatric Deteriorating Patient Among Undergraduate Nursing Students? Clinical Simulation in Nursing, 28, 25-32. https://doi-org.sacredheart.idm.oclc.org/10.1016/j.ecns.2018.12.001	Both objectives will be measured by a post-in-service survey, where 100% of the attendees will score 4 or higher on the questionnaire using a 5-point Likert Scale, where 4 is "Agree," and 5 is "Strongly Agree," confirming that clinical learning environment, when combined with virtual simulation enhance clinical competency.

Appendix F: Post-Inservice Survey

Based on the in-service you just completed, please indicate to what degree you agree with each statement, been 0 strongly disagree and 5 strongly agree

1) Based on the in-service, do you agree that online simulation followed by a nurse residency will benefit nursing student by:	Strongly Disagree			Strongly Agree		
	0	1	2	3	4	5
a) Enhancing understanding of EBP through direct application in the care environment.						
b) Improving knowledge of policies, procedures, and resources.						
c) Fostering professional growth and personal satisfaction through individual development plans.						
d) Strengthen self-confidence and competence in the ability to provide leadership at the point of care.						
e) Promoting the development of professional relationships across the interdisciplinary team.						
f) Supporting the transition from the role of student nurse to professional registered nurse.						
2) Based on the service, do you agree that a clinical site is necessary to evaluate clinical competency?						
3) Based on the service, do you agree that the nurse residency program helps nursing students transition into clinical practice?						

Appendix G: Open PDF

https://myqrcode.com/qr/d5554140