# INTERACTIVE PRE-SIMULATION STRATEGIES: ENGAGING STUDENTS IN EXPERIENTIAL LEARNING FROM THE START

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**ABSTRACT**

Decrease in clinical nursing facilities created a need to develop supplemental real-life patient scenarios outside of the traditional nursing units. Over the past five years, there has been a dramatic increase in the number of simulation exercises integrated into the clinical and classroom aspect of nursing education. However, many students are not engaged and are not effectively participating in the simulation. Many students state they are perplexed and do not understand the purpose and roles of simulation, and often do not take it seriously. The challenge to nurse educators is to develop realistic goals and objectives with a variety of activities that occur prior to the actual simulation experience Debriefing is one of the most important aspects of the simulation activity, but if students are not participating, then the learning is not occurring. The key with simulation is to engage students through the use of various strategies that incorporate visual, auditory, tactile, and cognitive learning prior to the simulation experience. This study investigated the use of interactive pre-simulation strategies such as concept mapping, group discussion, teaching, and body mapping prior to the simulation experience. The focus of this research was on student success and knowledge acquisition. The most important overall goal is to engage students prior to the simulation experience in a safe, nonthreatening learning environment in order to allay students' fear of failure and ultimately increase knowledge, retention, and critical thinking. Results of the study have implications on the development and integration of innovative teaching pedagogies.

**Keywords***:* pre-simulation strategies, pre-instructional activities, simulation, Interactive Pre-Simulation Strategies:

## I. INTRODUCTION

Simulation has been proven as an effective and safe methodology in academia that involves active learning. Additionally, simulation has enabled students to link theory and practice, synthesize knowledge, and gain clinical confidence (Rauen, 2004). Simulation is a proven successful learning strategy when students actively participate; therefore, the key is to determine how to gain students' enthusiasm to actively partake in the simulation experience. This research investigated the relationship between pre-simulation strategies and selected student learning outcomes (knowledge) within a medical – surgical nursing course. A quasi-experimental design was used utilizing a sample of convenience. The pre-assigned clinical groups were used as the simulation groups. Students then were randomly assigned to either the experimental or control groups for the simulation experience.

## II. LITERATURE REVIEW

A review of the literature is lacking with pre-simulation strategies or pre-instructional activities. For this research pre-simulation strategies is defined as those activities that participants perform prior to the simulation experience. One of the research articles found discussed pre-instructional strategies within a high school biology course to prepare students for the simulation experience by using either formal or informal activities [1]. This study defined the pre-instructional strategies as a formal briefing where all students were influenced by these activities [1].The idea of briefing parallels the idea of debriefing at the conclusion of the simulation experience.

Literature review is necessary to provide for an evidenced-based simulation. [2], [3], [4], [5] and assisted with the evidence to suggest symptoms and process for the simulation scenario (in this research, a Gastrointestinal [GI] scenario was utilized). It is imperative to utilize research for the scenario in order to provide an accurate and current simulation experience.

## III. RESEARCH SETTING: PROCEDURES

Once the IRB approval was obtained, the medical surgical nursing students were introduced to the consent form. The course, Medical Surgical Nursing I, is a required course for all nursing students and is offered in the second semester junior level in the nursing program every spring. The enrollment for the course varies each semester. During the spring semester of 2012, two sections of the course were offered on Thursday and one section on a Monday. The four credit course runs for 15-weeks and consists of a combined lecture and clinical component. Students learn theory and clinical skills to complement the disease process discussed. The course uses a web-enhanced learning platform where content is placed by the instructor on the *BlackBoard* course site for students to review and enhance their learning. The course site is used to provide lecture notes, class material, power point lectures, and taped lectures.

Students in the course attend a two-hour class one day a week with a 12-hour clinical component one day a week. Each class is taught by the same faculty member using the same course syllabus, text book, classroom, online quizzes, and available taped lecture. The online course site for each section is set up similarly with learning modules and videos for students to review. Prior to the Gastrointestinal (GI) module, students were provided with the consent form to sign and were reminded that they did not have to participate.

### Sample

The sample used in this research is a sample of convenience. The sample consists of approximately 74 undergraduate junior nursing students from a small, private, comprehensive Mid-Atlantic university. Data collected in the study was obtained from students enrolled in the three sections of the required second semester junior level medical surgical I nursing course. This is the second semester of the junior year and the second class that students were exposed to the simulator (*VitalSim*™) in the nursing lab. Participation in the study was completely voluntary and did not affect student grades.

**Enrolled Nursing Students Background**

Nursing students in the first semester of their junior year take three other required nursing courses concurrently with Medical Surgical Nursing I: Research, Psychiatric Nursing, and Obstetrical nursing. Students must pass each course and maintain a 3.0 GPA in order to progress to the next level in the nursing program. Students learn about the various medical, obstetrical, and psychiatric conditions in the three clinical theory courses taken in the second semester junior year. The Research class discusses evidenced-based research that assists the students in their clinical courses.

**Selection of Content**

The content that was selected was based on utilizing a simulation that was developed with four other faculty members at a simulation seminar. Another rationale for the integration of the GI content (see brief topical outline in Appendix B) was that this is discussed in the first Medical Surgical nursing course since it is a basic concept in all nursing programs, and is necessary to learn in order to pass the nursing boards (NCLEX) which are taken at the successful completion of the nursing program. Additionally, the skills that students gain in this module carry over to the clinical setting.

**Simulation Design**

The simulation scenario was designed through a collaboration of five medical surgical educators from four different universities. The educators originally met at Johns Hopkins University M-FAST (Maryland Faculty Academy for Simulation Teaching in Nursing) program in January 2012. They reviewed the literature and developed a scenario that was appropriate for all nursing students, but focused the level of the simulation for the medical surgical I nursing student. Throughout the year the educators remained in contact via email and are encouraged to run the same simulation at all four universities. At this time two of the universities have successfully run a pilot of the simulation but did not collect data currently. The goal for all five educators is to collect and compare data in the future.

## IV. RESEARCH DESIGN

The design used in this research is a nonequivalent comparison group design. Participants were not randomly assigned to groups, but rather the groups were randomly assigned to the treatments [6]. The treatment was decided by tossing a coin to determine which treatment was assigned to each group. This research involved the use of three different Medical Surgical sections, each section had 4 clinical groups. The GI content was taught by the same instructor to all three classes, but the interventions were randomly selected the following week for each group.

The variables for this study included the aforementioned two groups (the independent variables) and student knowledge as the dependent variable (see Figure 1).

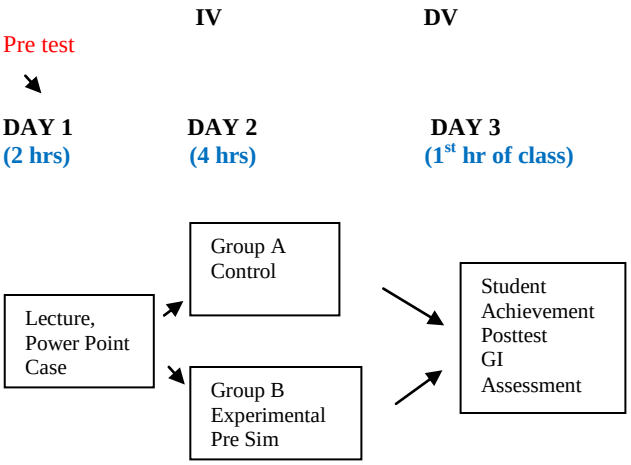


**Figure 1.** Independent (IV) and Dependent Variables (DV).

**Groups and Procedures**

All three groups were given a pretest prior to being exposed to GI content which occurred prior to day one since students prepare for class by reviewing the textbook and notes before the content is presented. Students received a power point prior to class lecture and were presented with a case study pertaining to the material. The pre- posttest was given to all students the week after the instructional treatment was administered. Students are made aware that completing the pre test post test and confidence survey have no effect on the student grade or status within the nursing program.

The learning module occurs over two class periods which are each separated by one week and consists of a power point lecture (the same given to each group). Students can download the lecture notes from the online course site at any time prior to or after class. Prior to coming to the second session, all groups were instructed to do the following: 1.) review the course textbook; and 2.) review the case study. Students were encouraged to develop questions needed to ask the case study patient in preparation for respiratory class two session. All students continued to attend their other five classes over the two weeks of the respiratory module, including clinical rotations within health care facilities, either a hospital or rehabilitation center.

Prior to the first day, students were given a pretest consisting of a twenty-five question multiple choice test. The first day was the same for all three sections of students who were instructed by the same educator. Students were provided with an outline of the power point presentation to follow during the class lecture. The class period lasts two hours. Students were assigned to groups. Each student was provided with the case study scenario and encouraged to review the scenario over the next week prior to the second class session in order to be acquainted with the information in the scenario. At the conclusion of day one, students were instructed to review the following: 1.) the lecture notes and power point; 2.) the course textbook; and 3.) the case study.

The Control group (Group A) consisted of nursing students enrolled in the Monday section 01. These students were exposed to the simulation experience the usual way by randomly assigning roles and then orienting them to the room, followed by a period of twenty minutes to allow them time to determine what

each participant should be doing and what is the priority of the patient in the scenario. The first day was the same for sections as was previously discussed. The second day of the module consisted of beginning the class with a clarification of the case scenario. Then students were placed in their groups based on arbitrarily pre-assigned clinical groups that are randomly decided upon by the clinical coordinator. The students then prepared for their roles for the simulation experience. Students were arbitrarily assigned any one of five roles (recorder, previous shift nurse, current nurse, nursing student, and nursing instructor) by drawing a piece of paper out of a hat with their role written on it. The simulation experience lasted approximately twenty minutes. At that time, students needed to assist the patient, the *VitalSim*™ simulator with her condition. Following the simulation experience, students documented their note and were debriefed with the instructor discussing what could have been done better, how they felt, and final results of what they think was happening with the patient. Specific questions were asked of all groups.

The Experimental group (Group B) consisted of nursing students that were randomly selected to participate in this group. These students used the *VitalSim*™ simulator. The respiratory module was divided into two days. The first day was the same for both groups as was previously discussed. The second day of the module consisted of beginning the class with a clarification of the case scenario. Then students were placed in their groups and prepared for their roles for the simulation experience using the *VitalSim*™ simulator. Students were arbitrarily assigned any one of five roles (recorder, previous shift nurse, current nurse, nursing student, and nursing instructor) by drawing a piece of paper out of a hat with their role written on it. The simulation experience with the *VitalSim*™ lasted approximately twenty minutes. At that time, students needed to assist the patient, the *VitalSim*™, with her condition. Following the simulation experience, students documented and were debriefed with the instructor discussing what could have been done better, how they felt, and final results of what they think was happening with the patient. Specific debriefing questions were asked of all groups.

All groups had an opportunity at the beginning of the following class, day three, to ask questions and clarify any information. This session was followed by the posttest. The groups interacted with each other as suggested by Bandura's theory [7]. The same scenario lasting 20 minutes was given to all of groups followed with a debriefing period where students shared their experiences with each other and discussed other interventions that could have been integrated to potentially change outcomes that occurred during the simulation.

## V. THREATS TO VALIDITY

There were several threats to validity due to the inability of the researcher to assign the participants to random groups. The threats to validity include: 1.) regression; 2.) maturation; 3.) history; 4.) testing; and instrumentation [8]. More specifically, in this study, the threats to internal validity can incorporate interactions among variables such as selection, history, and testing[9]. If there was a difference between pre –test post- test scores, then the rationale could possibly be due to history versus the intervention [8]. A pretest – posttest gain could be attributed to such variables as history and testing (selection-history or selection-testing interaction) as opposed to the intervention and could pose threats to internal validity [8]. Since the nursing program is small, students may have discussed test questions outside of the classroom, even though they were instructed not to. Additionally, there was a concern that participants learn from the pre-test versus the effect of the intervention. A threat to external validity occurs when the participants are aware of being "guinea pigs" and realize that certain participants are actually part of the experiment. By being a part of the experiment, students may feel like they have to do well or possibly that they really do not care about the content or performing well. Participants might not feel like answering questions honestly or even at all since it does not reflect on their grade.

## VI. RESEARCH QUESTION

The following question was proposed:

There will be no significant difference in pre-test post-test scores of the simulation group with the pre-simulation strategies and the control group using traditional simulation preparation techniques. $p < 0.05$.

## VII. DATA COLLECION: INSTRUMENTS

Data was collected using several tools. The pretest – post test tool was used to evaluate learning gained from the simulation- case-study experience. The pre-test post-test was developed. Data was collected and analyzed using SPSS software and compared with the post test that was given immediately after the experience. The case study was developed and reviewed by expert educators for completeness. Each group of students received a copy of the case to preview prior to the simulation experience.

### Selection of Simulator

There are several types of fidelity simulators on the market including *Meti-man,* developed by the Medical Educational Technologies, Incorporated in Florida, and Sim-Man, Sim-Baby, and *VitalSim*™ all developed by [9], [10] . This study will incorporate the integration of *VitalSim*™ for a variety of reasons, mainly its ease of use and cost. *VitalSim*™ is much more cost effective than the other two simulators with a cost of between $1900 - $2000 versus $29,000 for *SimMan* and up to $85,000 for *MetiMan* based on recent information from [9]. The *VitalSim*™ enables students to auscultate respiratory, cardiac, and bowel sounds while palpating pulses and taking vital signs. *MetiMan* and *SimMan* add another realm of realism, but are based on a more complicated programming versus the simplicity of the *VitalSim*™ computer. Overall, *VitalSim*™ is less cumbersome, less complicated, easier to use, and less costly.

## VIII. DATA COLLECTION AND ANALYSIS

Data collection for this study was conducted using a hand written pre-post test and survey collection tool. The data was entered into a statistical analysis package (SPSS) for analysis. A dependent t test was used to look at the difference between the post-test scores among the two study groups. Figure 2 shows an analysis plan for student achievement.

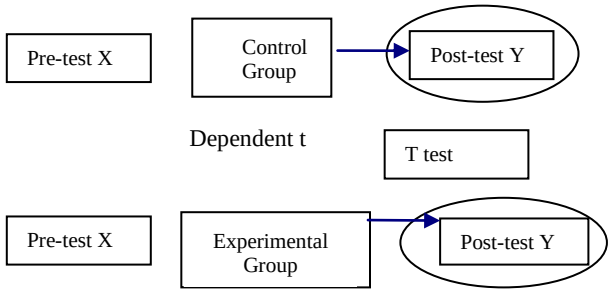


**Figure 2.** Plan for analysis of student achievement.

## IX. LIMITATOINS AND ASSUMPTIONS

The research was conducted acknowledging several limitations and assumptions. The participants were limited to 74 eligible students among three different Medical Surgical sections in the spring 2012 semester. The sample is one of convenience and introduced bias. Therefore, the results are not generalizable beyond this sample of 74 students in the three Assessment courses. It is assumed that all students will agree to participate, but they do not have to. Students were informed that whether they choose to participate or not, there grade will not be affected for the course. The module was taught by one instructor. Although the same instructor taught all three sections and did not determine which group was to receive which treatment until after the lectures were completed, the study was limited to the possible variances in the teaching style among the three classes. Researcher bias may impact the study because of pre-existing beliefs by the researcher of the effects of simulation on learning retention. This research incorporated a student self assessed confidence level report. Although it is assumed that students answered questions truthfully and honestly, the study was limited to the individual differences in student self perception. It is assumed that students honestly answered the pre and post test questions by themselves and were not informed of questions by students completing the quizzes on earlier days. All three classes completed the same pre and posttests, and for example the Monday class could have informed the Thursday class of the questions. It is assumed that students collaborated equally in the case scenarios.

## X. DATA OVERVIEW

In this study, the pre-test post-test were administered to the participants at two intervals: at the start of the teaching module and at the conclusion of the simulation. The tool was a knowledge test based on twenty multiple choice questions.

### Knowledge

The pretest – posttest tool was used to evaluate learning gained from the simulation- case-study experience. One method of measuring reliability of a tool is by using the Cronbach coefficient alpha. Using the Cronbach coefficient alpha, the internal consistency of the knowledge prequiz was 0.74. The internal consistency showed that this tool is acceptable to use for the study. According to Nunnaly [11], a Cronbach coefficient alpha of 0.7 or above indicates an acceptable reliability coefficient and shows internal consistency.

The mean pre-test scores for the groups were as follows: the Control group had a mean of 53 and the Experimental group had a mean of 53.8. The experimental group showed improvement in mean scores from the pretest to the post test, but these gains were not statistically significant. The mean gain scores was as follows: the Control group had mean gain scores of -5.6 and the Experimental group had gain score of 4.

## XI. RESULTS

This study focused on the use of different pre-simulation instructional pedagogies on knowledge.

### Research Hypothesis

This section reports results pertaining to the test of the following null hypothesis: There will be no significant difference in student knowledge based upon the instructional treatment – integration of pre-simulation strategies. Essentially the pre-test scores were similar in both groups. Post hoc comparisons for the two groups showed that there was an increase in knowledge in the Experimental group of + 4 versus the Control group showing a decrease of 5.6.Therefore the null hypothesis was rejected indicating there was a significant difference in post test scores between the Control group and Experimental group. This difference was expected since the students had complained in the past requesting more guidance prior to the simulation experience.

## XII. SUMMARY

Descriptive statistics were calculated which revealed that the Experimental group showed an improvement between the pre and post knowledge test. There was a statistical significant difference found between the Control and Experimental groups after the post knowledge test favoring the Experimental group. It appears that the integration of pre-simulation strategies assists students with learning content and additionally students appeared more comfortable during the simulation experience.

## XIII. DISCOVERIES and Limitations

The integration of simulation as a teaching and learning pedagogy has been shown to be effective in teaching all levels of nurses from students to novice nurse to experienced nurses [10], [12]. The use of high fidelity simulation enhanced clinical competence such that students were able to learn proper techniques in a safe and nonthreatening realistic environment that aligns with the hospital setting [13]. One of the more recent types of simulation strategy is the incorporation of standardized patients, which is similar to an actor. Standardized patients are trained to perform in a certain way for specific training purposes [14] [15]. Simulation using standardized patients assist nursing students to learn new skills and perfect previously learned clinical skills in a safe environment. This study examined pre-simulation strategies (use of activities prior to simulation in order to engage students in the simulation experience) and traditional simulation preparation pedagogy as instructional techniques.

This study supports the relevance of technology integration, namely simulation, within a baccalaureate nursing course. There was a statistical difference in knowledge between the Control and Experimental group demonstrating that there is a need for pre-simulation activities to prepare students better in an engaging manner for the simulation experience. A variety of instructional pedagogies can be utilized, thus challenging educators to select the appropriate teaching method for each specific class.

The improvement of post test scores shows that the Experimental group's instructional treatments assisted students in learning content. Similar studies did not find statistically significant differences in knowledge scores comparing high fidelity simulation and traditional learning groups with medical students [16].

There are several limitations that affect the generalizability of this study. The study cannot be generalizable to all nursing student groups since this study used a small sample size of 74 second semester junior nursing students; however, the results can be generalizable to small size groups at similar nursing schools for first semester medical surgical nursing students. Only one simulator was used in this research that possibly could limit the use of the study results to schools integrating this specific simulator. The focus of this study relied on students being truthful with relation to maintaining test integrity by not sharing the questions with the other sections.

**Instrumentation**

The instrumentation might have affected the results of the study. Scherer, Bruce, and Runkawatt [16] suggested that instruments such as the knowledge test might have produced different results. It is possible that the knowledge test could be improved with additional items that measured lower level content knowledge to make it easier for the students at the junior level.

Additionally every section had a student evaluator and the instructor as an evaluator. For each group, an observer tool was completed. During the debriefing phase, the students would discuss what they had observed during the simulation. Additionally pre-selected questions for debriefing were utilized so that consistency was maintained between sections.

**Simulation and Use of Actors**

In the 1980's, nurse educators incorporated the use of early simulation by using actors to play patients in simulated case scenarios [17]. However, one study was located using standardized patients, or actors that demonstrated positive outcomes with teaching undergraduate nursing students skills [15]. Bosek, Li, and Hicks [15] found that the use of standardized patients may be a promising adjunct to the clinical setting for skill attainment, but more research needs to be done with the use of standardized patients.

Radhakrshnan, Roche, and Cunningham [17] found that the use of simulation assists with the ability of nursing students assessing patients. According to the literature reviewed, simulation demonstrates the ability of students learning in a self-paced risk-free realistic environment with immediate feedback and remediation available at any time [10], [12], [19], [20]. Simulation provides the opportunity to improve and /or learn skills within a safe environment, which is an important educational endeavor. The results of this study suggests that simulation is an important tool for nurse educators in order to provide active learning for their students based on Bandura's theory. Additionally, the type of simulator utilized is important for nurse educators to be able to operate. If the simulator is difficult to utilize, then nurse educators will not integrate the technology. The more sophisticated the simulator, the less apt the educator will utilize the technology [17]. *MetiMan* is one example of a high fidelity simulator that is complicated and contains complex medical simulation programs. The programs may be too complex for nursing students to use. For example, nurse educators find the *MetiMan* extremely difficult to work, even just to turn the simulator on and off. It takes several days of training to be able to learn how to turn the simulator (*MetiMan*) on and off, much less program it with appropriate scenarios for nursing students. This study found that an important component to the successful integration of simulation was to align the student's level in the program with the simulation. Educators must remember to assure that the scenario is not too complicated for the student.

## XIV. RECOMENDATIONS

The results of the study demonstrate that pre-simulation strategies can enhance the learning experience for the students during simulation by integrating a variety of participative instructional pedagogies. Simulation itself incorporates both Bandura and adult learning theories which provides an interactive learning environment. By providing activities prior to the simulation, students are even more engaged. The study needs to be replicated with a larger sample size using detailed nursing skills and behavior checklist that could be incorporated within the clinical setting. The addition of the clinical instructor perception of critical thinking would add another dimension to the evaluation of simulation. In order to assess if simulation assists students to integrate theory into practice, clinical instructors could assess students in the clinical setting to determine if they are able to function effectively in the practice setting.

An important consideration is the ease of use of the simulator since it could be easier to demonstrate to new and graduate faculty. In this study, the researcher demonstrated to the students and current new faculty how to use the *VitalSim*$^{TM}$ in less than twenty minutes while other simulators, such as the *MetiMan*, may require multiple training sessions to learn the series of steps necessary to make the simulator operational. Students were able to continue using the simulator once the research data was collected in order to maintain their clinical assessment skills. Most nursing schools have "Open Skills Lab" where students can practice skills at their own pace which is a perfect opportunity for students to gain and improve basic ausculatory skills such as lung, heart, and bowel sounds. It is recommended that the integration of the *VitalSim*$^{TM}$ continues to be utilized within the nursing curriculum, and that more graduate nurse educator programs train future nurse educators both the benefit and ease of simulation within the classroom setting.

Kardong-Edgren, Lungstrom, and Bendel [20] recently conducted a study integrating two different simulators (*VitalSim*$^{TM}$ *and SimMan* $^{TM}$) and found no differences with learning acquisition and satisfaction among baccalaureate nursing students. A suggestion would be to repeat the current study in terms of analyzing confidence levels and knowledge acquisition integrating a post 2 quiz at 1 month and possibly following up with NCLEX pass rates. Currently the author is attempting to collect information regarding NCLEX results that will be available during the summer and fall 2013 since the participants graduated in spring 2013.

Replication of this study utilizing the simulation continuously throughout the same semester could be conducted to determine the effectiveness of simulation. Future research could analyze larger groups with multiple simulation scenarios throughout a variety of nursing courses encompassing several levels of undergraduate nursing students, since the results of this study are only generalizable to this sample and course. It is the goal of the five scenario developers (including the author) to collect and compare data from her own university and then compile the data to ascertain commonalities and themes.

Future studies incorporating different instructional approaches such as a variation of the case study and utilizing standardized patients would be an asset to nursing students. A possible strategy for future research is the integration of instructional pedagogy that would combine both simulation strategies and comparing both simulations with traditional learning strategies. Another question to ask is in what setting does each instructional treatment work best – online or face-to-face in the classroom? Additionally, more research should be conducted with the integration of simulation as an activity completed by one student via videotaping without an instructor present and the effects on student learning and confidence levels. There is still much more work that needs to be conducted in the area of simulation and simulation evaluation, including transference to the clinical setting.

Another possibility for future research is to compare other schools to see if there are any other factors involved in the improvement of learning. There are so many strategies and instructional pedagogies that could be utilized for preparing

students for simulation. The incorporation of virtual online simulation preparation and interactivity via clickers on cell phones would be interesting to investigate since the group of students that nurse educators are teaching are technology savvy and learn better with the integration of technology.

The future possibilities of simulation integration are endless. The value of simulation versus the clinical setting needs to be explored. Will students possibly gain more from the clinical setting if every student first completes several case study simulations prior to practicing on the clinical unit with real patients under the guidance and supervision of the nursing instructor? The impetus for this is based on the fact that various hospitals have recently purchased simulators for training purposes of hospital personnel. Nurse educators and leaders have adapted new training strategies for new graduates and experienced nurses integrating simulation to demonstrate and test new skills and techniques with the nursing staff [13].

## XV. CONCLUSION

This study along with other research demonstrates that simulation does assist students with increasing their knowledge, no manner the profession. The premise behind the simulation scenario was based on several meetings of a group of five nurse educators the met during the fall and January of an academic year and continued to contact each other via email.

Simulation is currently utilized in a variety of settings, including education, business, aviation, and healthcare. Instructional technology teachers need to be reminded of the benefits of benefits from simulation in education from preschool through doctoral education and beyond. There are many challenges that educators face when integrating simulation technology in the classroom. Simulation needs to be appropriately introduced to both faculty and students alike [21]. It is important to integrate simulation wisely such that it is realistic and aligns with the curriculum at the appropriate level for the student.

Further research needs to be conducted in order to ascertain best practices with simulation technology, especially with pre-simulation strategies. There is limited empirical evidence to support the effect that simulation has on clinical practice [13] Studies have shown that students value the simulation experience within the safe, interactive learning environment, but there is no robust conclusive quantitative evidence indicating the transfer of knowledge and skills into the clinical practice [13]. Simulation is seen as a potential learning pedagogy to promote safe practice in an ever increasing litigious healthcare environment. According to the National League for Nursing [22], the challenge for nurse educators is to create learning environments that promote clinical competency, "critical thinking, self-reflection, and prepare nurse graduates for practice in a complex, dynamic healthcare environment" (p. 1-2).

Simulation can provide an opportunity for students to gain exposure to increased learning with the integration of debriefing, immediate feedback, and guided reflection. Additionally, these opportunities have enabled students to demonstrate the link between theory and practice, synthesize knowledge and gain clinical confidence [23]. To be effective, simulation should be aligned with goals, skills and knowledge acquisition, competency testing, critical thinking, and best practices while integrating a variety of realistic case scenarios.

Another aspect of learning in the clinical setting is the post conference. Debriefing is an important strategy that is used within simulation learning and is compared to post conference learning [24]. Both the post conference and the simulation debriefing are facilitated by nursing faculty. This study used pre-selected questions for the debriefing in order to maintain consistency across all sections. Lassater [24] stated that students learn by sharing observations during and after the simulation experience. Even the students that are present within the lab can learn by observing others and during debriefing experience whether they are directly participating in the experience and discussion since this is facilitated by the nursing faculty and can be compared to their own simulation experience [25]. Likewise pre-simulation strategies could be compared to the pre-conference where students are prepared for the clinical day.

The current research certainly has proved the value of not only incorporating simulation for the benefit of increasing confidence, but there are also additional benefits that have not been totally explored at this time with relation to the clinical setting. Simulation is now currently being integrated within hospital settings to train nurses and medical residents to learn new skills, techniques, and strategies as new medical equipment is purchased for the hospital setting [25]. Simulation provides a kinesthetic (hands-on) learning strategy within a safe environment. There is a need to push for more simulation studies for cost-saving and life-saving reasons. The most expensive simulators might not be necessary in order to effectively train all personnel. Some lower cost simulators, such as the *VitalSim*$^{TM}$ could be purchased as additional simulators so that the medical facility has several simulators, not just one expensive simulator. This would provide learning opportunities for more hospital personnel. The more training, the more lives that could be saved in the long run, especially since simulation has already proven to be an effective learning strategy for skill acquisition, and in this research demonstrated an increase in confidence levels so that nurses will ultimately be able to rely on themselves to make life or death decisions within the clinical setting.

Simulation has proven to be an effective learning strategy for baccalaureate nursing students, not only for skill acquisition, but for increasing confidence levels. Future research will be needed to connect the increase confidence levels with improvement in critical thinking which enables nurses to think quicker in the clinical setting, promoting more effective and efficient life or death decision making. This research proved an important aspect of that decision making algorithm, in addition to demonstrating that simulation would assist students with clinical acquisition. Students will still acquire knowledge, skills, confidence, and critical thinking without always being at the clinical site with the integration of simulation. Additionally, learning time on the clinical site might even prove to be more effective with the use of simulation learning.

The challenge facing all educators, not just nursing educators, today is to implement teaching strategies that promote clinical and theoretical competency while at the same time assisting students in developing critical-thinking skills within a safe environment. There is the potential for simulation to assist with the clinical void in nursing education. With the increasing demand for more clinical sites, simulation may serve as a potential placement for clinical experiences, especially since it can provide consistent learning across all groups by exposing students to the same disease conditions [12], [13] [21], [23]. . The challenge for the educator is to develop realistic case-based scenarios, standardized simulation forms, and reliable testing checklists while making the simulation experience available to students [26]. Utilizing standardized patients from another department such as Theatre within an academic setting could prove to benefit both nursing and theatre students. This definitely

has potential within the collegiate setting. It is up to the educator to facilitate the integration of the simulation experience whether it be utilizing a simulator or the human touch via standardized patients. Educators need to remember that prebriefing is just as important as debriefing.

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