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# EDUCATION THROUGH SIMULATION

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## **Education Through Simulation**

**By: Melody Padilla-Collings**

*A thesis submitted in partial fulfillment of the requirements of the degree of Master of Science in  
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Education Through Simulation

Prospectus

University of San Francisco

N653-45 Internship: Clinical Nurse Leader

Karin Blais, RN, MSN, CNL

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**Abstract**

The purpose of this study was to determine if education through simulation was effective in an undergraduate ADN nursing program to improve nursing confidence, knowledge, skill competency, and nursing care. Two groups of second year RN students were selected in their fall semester to participate in a before and after survey to compare traditional learning (required course readings, assignments, and lectures) with the PROMPT Birthing Simulator that allows hands on, interactive learning, and feedback in preparation for the Mother-Baby clinical setting. The first PDSA cycle with Group A revealed 21% were confident in their knowledge with the traditional learning. Post simulation 47% indicated enhanced confidence and knowledge. The second PDSA cycle was performed on Group B and resulted in 36% feeling confident with traditional learning. Post simulation revealed a 72% increase in confidence and knowledge. Many students verbalized education through simulation was useful and beneficial by enhancing confidence, knowledge, and skill competency. Students report the PROMPT Birthing Simulator better prepared them for the clinical setting by solidifying proper techniques. The PROMPT Birthing Simulator proved to be an effective and useful method, as well as offered students a safe learning environment without the risk of patient harm.

*Key words: Simulation, education, training, learning methods, learning outcomes*

### **Clinical Leadership Theme**

The focus of this project is related to the American Association of Colleges of Nursing (AACN) Competencies and Curricular Expectations for the Clinical Nurse Leader (2013) with emphasis on the implementation of quality improvement and safety by executing the PROMPT Birthing Simulation. I will be taking the lead in this project with my fellow colleagues and analyzing evidenced based practice (EBP) research and other resources to quantify the impact on quality and safety through simulation to foster students' learning. The literature for this project was obtained by evidenced based change of practice at Gavilan College and as such was not formally directed by the Institutional Review Board.

### **Statement of the Problem**

Nursing is a highly respectable profession with multiple facets that requires the ability to perform various skills sets, ranging from providing comfort to a patient or making life saving decisions. One of the most significant problems with nursing students is the lack of confidence. Only 10% of hospital and health systems feel secure that new graduate nurses are prepared to safely provide effective care (Berkow, Virkstis, Stewart, & Conway, 2009). Simulation is an effective method of teaching, training, and equipping students for the nursing field, as well as proven useful for all levels of nursing.

The microsystem chosen for this project is an ADN nursing school at a local college. The most common complaint is students' feeling overwhelmed due to: a) heavy demands of homework, b) exams, c) clinical rotations, and d) lectures. This makes it difficult to participate in the skills lab. Many students have book knowledge, but lack hands on experience in a safe environment, affecting many students' ability to perform confidently, effectively, and safely. The purpose of this project is to bridge the gap between education and clinical practice through

simulation in order to improve student's confidence, increase knowledge, improve competency, and improve nursing care.

### **Project Overview**

The objectives for this project will be to increase student knowledge and confidence by 80% in the birthing process for all second year RN students by December 16, 2016. The PROMPT Birthing Simulator will navigate through the following skills: a) normal delivery, b) shoulder dystocia, c) forceps delivery, d) traction and rotational deliveries, e) ventouse (vacuum) delivery, f) breech delivery, g) placenta delivery, and h) mother on all fours' delivery (Laerdal, 2016). A survey will be given prior to the teaching and acquisition of the birthing process and again after receiving the simulation training. This will provide EBP to measure project outcomes. Another survey will be conducted upon the student's completion of labor and delivery clinical rotation mid December.

The PROMPT Birthing Simulator is a hybrid method used to imitate real life scenarios for skills practice and clinical experience training (Laerdal, 2011). Simulation consists of several components: a) manikins as patients, b) role playing, c) clinical decision making, and d) various clinical settings to improve skills competencies. Some might ask, "How is simulation beneficial?" Laerdal (2011) simulation experts describe how integrating simulation can provide rewarding benefits:

- promotes teamwork and collaboration through effective communication;
- develops delegation skills during complex patient care needs;
- provides safe practice in a protective environment;
- improves quality in microsystem;
- improves cultural awareness;
- provides enhanced learning; and

- improves patient centered care (Laerdal, 2011).

The project will be introduced to the second year RN students who represent the microsystem. The small test of change will be the implementation of the PROMPT Birthing Simulator that will provide students hands on experience of the birthing process. The PROMPT Birthing Simulator will allow students to gain knowledge of the birthing process, increase confidence in obstetrical care, provide opportunity to practice communication skills, and receive instant feedback of simulation experience. Marshall, Vanderhoeven, Eden, Segel, & Guise (2015) report that one hospital's postpartum hemorrhage response times improved after receiving education through birthing simulation. Additionally, Lucile Packard Children's Hospital (LPCH) in Palo Alto, California has implemented an in-situ simulation as part of their training among their interprofessional team. One of the areas of focus is communication among the medical team, as well as with the families. What is impressive about this interaction piece is that LPCH invite parents to participate in the development of scenarios that will be presented in the simulation training (Aebersold & Tschannen, 2013).

A further aim will be to evaluate students' competency, knowledge, educational needs, and confidence before participating in the mother/baby clinical setting. A pilot study conducted by McGregor, Paton, Thomson, Chandratilake, & Scott (2012) revealed better equipped medical students in the following areas: a) increased confidence, b) development of stress management skills, c) improved decision, and d) improved communication and reflection skills.

Last year, Gavilan faculty reported that 50% of the students failed their skills competency test. A root cause analysis was performed to determine the core of the problem (see Appendix A). After reviewing the results, it was evident a change was needed. It was decided to narrow the focus to the second RN students and implement the PROMPT Birthing Simulator to educate and train on the birthing process. A skills day was designated to set up three stations for

rotation: 1) vaginal birth, 2) postpartum assessment, and 3) hands on devices. First, a vaginal birth simulation was conducted. Various scenarios of birthing presentations were demonstrated to visualize the different maneuvers the fetus encounters during a vaginal delivery. Next, the students participated in a postpartum assessment. They learned to assess the fundus, bladder, lochia, perineum, legs, and episiotomies or incisions that were performed during delivery. Then, an assessment for postpartum hemorrhage (PPH), infection, and orthostatic hypotension were demonstrated. Last, a station was set up with instruments that may be used during labor and delivery, as well as other hands on material. Some of the resources included: a) a cervical dilation tool, b) uterine and pelvic anatomy, c) forceps, d) vacuum assisted delivery devices, e) an amnihook, and f) a maternity apron outlining a fetus in the womb. A survey was administered before and after the simulation training to evaluate the student's confidence level and knowledge achieved (see Appendix B & C).

The PROMPT Birthing Simulation will begin with the implementation of required hours in the skills lab. Additionally, simulation will be mandatory for all students when a hospital clinical day has been cancelled or when a student has an unforeseen emergency and cannot make clinical rotation. The skills lab will provide an alternative method to complete clinical hours missed. The structure of simulation will consist of the following components: a) pre-briefing; b) simulation; and c) debriefing (see Appendix D).

The first element is pre-briefing. This provides clear communication of the key objectives and the expectations for the activity. Next, the simulation will offer a safe environment to engage in critical thinking, decision-making, therapeutic communication, and team collaboration in a variety of scenarios to learn how to provide safe and competent care. Last, the instructor will conduct a debriefing with each student individually to provide constructive feedback of the simulation experience using the Galen evaluation tool. Research has shown that debriefing is



where most learning is obtained (Smith, 2014). De Souza Teixeira, Pereira, Kusumota, Gaioso, Lima de Mello, & Campos de Carvalho (2015) report that debriefing is constructive and beneficial for the evaluation and reflection of the simulation scenarios. It provides students with an evaluation of their ability to implement the educational experience in the clinical setting (see Appendix E).

### **Rationale**

Marshall et al. (2015) estimated 14,000 deaths each year due to postpartum hemorrhage (PPH). PPH is indicated when a patient loses more than 500 mL of blood post delivery and 1000ml post cesarean. PPH is responsible for occurring in approximately 18% of births (Smith, Brennan, Talavera, Rivlin, & Ramus, 2016). However, blood loss that exceeds 1000 mL puts the patient in extreme risk of hypovolemia, hemorrhagic shock, myocardial ischemia, dilutional coagulopathy, and other complications that can lead to the mother losing her uterus, damaging organs, or death (Anderson & Etches, 2007). In most severe cases, both mother and child are in danger of losing their lives and nurses need to act quickly in a stressful environment. PPH is the most common cause of maternal mortality in the United States approximately seven to 10 women per 100,000 live births. Moreover, the World Health Organization reports that 1000 women per 100,000 births make up 25% of maternal deaths in developing countries (Smith et al., 2016).

Allen, Gurewitsch, Windle, Pierce, & Isaacs (2016) describes shoulder dystocia as another complication that can lead to a medical emergency. The dangers of shoulder dystocia can result in: a) neonatal depression, b) acidosis, c) asphyxia, d) central nervous system damage, and e) death. Additionally, the mother can suffer injuries such as: a) excessive blood loss, b) vaginal and vulvar lacerations, c) uterine atony, d) uterine rupture, and e) death of mother and baby (Allen et al., 2016).

A vaginal delivery with complications can cost the hospital up to \$70,000 per patient (AHRQ, 2014). This is a significant cost to the hospital. The Joint Commission Accreditation Healthcare Organization (JCAHO) encourages medical professionals to reenact scenarios of high-risk complications to allow critical decision-making and effective communication during a stressful medical emergency (Marshall et al., 2015). The PROMPT Birthing Simulator is necessary to facilitate students to think, communicate, and handle stress effectively and appropriately when faced with medical emergencies during delivery.

The pre-survey results, exposed a lack of confidence students were experience while providing nursing care in a hospital setting. The current education and preparation for the course of Maternal-Child Nursing is through classroom lecture and assigned readings. There is no skills preparation prior to attending clinical rotation. The implementation of the PROMPT Birthing Simulator will allow: a) students knowledge and critical thinking to be challenged, b) allow mistakes to be made in a safe environment, and c) allow students to receive guidance from a supportive staff. In a study with undergraduate nursing students, Hunter & Ravert (2010) report improved skills and critical thinking, as well as improved communication and understanding of classroom material after participating in a simulation experience. The JCAHO released the following statement, “Since the majority of perinatal death and injury cases reported root causes related to problems with organizational culture and with communication among caregivers, it is recommended that organizations: a) conduct team training in prenatal areas to teach staff to work together and communicate more effectively, and b) for high-risk events, such as shoulder dystocia, emergency cesarean delivery, maternal hemorrhage and neonatal resuscitation, to conduct clinical drills to help staff prepare for when such events actually occur, and conduct debriefings to evaluate team performance and identify areas for improvement” (Daniels, Erickson, Andreatta, Pilego, & Goffman, 2012, p. 3).

One process to improve the breakdown occurring in the Gavilan nursing program was to perform a failure modes effect and analysis (FMEA) evaluation. This systematic method is an investigative tool that analyzes vital questions like:

- What could go wrong? This identifies the failure mode;
- Why would the failure happen? This identifies the cause of failure; and
- What would be the consequences of each failure? This identifies the failure effects (IHI, 2016).

Quality improvement methods are key to ensure optimal outcomes for the simulation project.

The FMEA results indicated that students were displaying a lack of assertiveness, confidence and skill set. For many, this was due to a lack of hours with instruction in the skills lab. These actions could potentially lead to medical errors and patient harm. The majority of students voiced the PROMPT Birthing Simulator was an effective and beneficial component to their learning.

The student's confidence level before the PROMPT Birthing Simulation averaged 68% feeling somewhat or not at all confident. However after the simulation training, students confidence level increased to 89% indicating improved knowledge, with a majority stating they were engaged and interested in this type of learning method. However, in order for this project to be successful and constructive to the students, stakeholders and champions are needed to obtain the power and influence to launch the PROMPT Birthing Simulator project. Allowing the stakeholders to be a part of the process, gives a sense of ownership that will more likely influence them to buy into the idea during the beginning stages (see Appendix F).

A budget estimate was developed to evaluate the cost/savings of the simulation implementation (see Appendix G). The budget estimate can be broken down as follows: a) time cost, b) personnel costs, and c) non-personnel costs. Time costs consist of administration and management spending extra time to implement and monitor the new system. Personnel costs

include hiring more staff, trainings, and conferences. Finally, the non-personnel indicates supplies needed for operating the simulation project.

First, the time costs portion of the budget has been delayed due to administration and management issues during a program restructuring. This is an area that will need to be revisited later in the project. On the other hand, personal costs have been the bulk of the spending with hiring one extra staff to manage the new skills facility designated strictly for training and education. However, the problem lies internally with instructors not knowing how to operate the various simulators effectively. This limits the utilization of the interactive simulation devices. Currently, the main cost would be hiring a simulation specialist to facilitate training on the simulation products. This would provide maximum efficiency on set up, product operation, and how to improve students learning outcomes. Last, the nursing program has already invested in non-personnel costs by purchasing several technology manikins. Sadly, there are not being utilized. Presently, the cost may include: a) reordering consumables, b) new accessories, c) replacement parts, and/or c) receiving information technical (IT) services.

The simulation project provides many qualitative benefits: a) improved student satisfaction, b) improved student outcomes, c) improved patient safety, d) administrative and managerial peace of mind, and e) improved program reputation. A future goal for the PROMPT Birthing Simulation is to have a few instructors become certified simulation specialists. This will allow students to receive certification upon completion of the course and give RN graduates an advantage as they enter the nursing profession. Starting with a small test of change, the PROMPT Birthing Simulation, will increase confidence, critical thinking, knowledge, as well as maximize student's competencies. Moreover, it will increase information retention, job knowledge, recognition of quality productivity, and a respectable reputation among nursing colleagues.

Marshall et al. (2015) revealed improved patient outcomes due to: a) nurses recognition of PPH, b) faster response times, c) enhanced effective communication, and d) improved patient safety. A cost benefit analysis was generated to shows how Gavilan College graduate RNs could potentially save the hospital significant amount of money due to receiving quality and effective education that trains future nurses warning signs and early recognition of PPH (see Appendix H). Although it is difficult to yield the potential cost savings of simulation to the Gavilan College nursing program, Maloney & Haines (2016) suggest considering the following questions: a) what results are currently being obtained by traditional learning, b) what does the program need to give up to attain better outcomes, and c) how will education through simulation compare to other alternative methods of learning? Maloney & Haines describe evaluation approaches applied to simulation to determine the viability and sustainability of education through simulation (see Appendix I). We live in a millennial era filled with technological devices and innovative gadgets. It is vital to stay current with the trends and technology for optimal healthcare education. Fletcher & Wind (2013) explain that the effectiveness of nursing education and training is more important than cost when human lives are in danger.

Research reveals tremendous strengths and opportunities to the PROMPT Birthing Simulation. However, one must also look at the weaknesses and potential threats that would discourage stakeholders to support the simulation project (see Appendix J). When analyzing the internal strengths and weaknesses, it is apparent that the strengths outweigh the weaknesses. The PROMPT Birthing Simulation is beneficial for the student, the college, the patient, the family, the hospital, and to the nursing profession. The weaknesses cannot be ignored as they represent valid concerns. However, weaknesses allow for brainstorming, creativity, and collaborative problem solving that encourage a continuum of quality improvement to student education and patient care. Nevertheless, there are external opportunities and threats along the way. The

opportunities represent growth and recognition for accomplishments achieved. The threats describe negative outcomes that need to be investigated to determine what is causing inconsistent measurements, lack of evidence or wasted resources in order to find solutions to cultivate improvement.

### **Methodology**

After analyzing the skills competency test scores, it was evident that the program needed some modification. The choice of operation will be education through simulation. The focus will be a small test of change starting with the current course material covering Maternal-Child Nursing. The theory that will guide this project will be Kotter's eight steps to change. Kotter's Eight Step Plan for Integrating Change described by Riche (n.d.) will help to communicate the urgency and need for implementing the PROMPT Birthing Simulation (See Appendix K). The first three steps of the plan will involve the stakeholders. This group will consist of the program director, the adjunct faculty members, the instructors, the staff, and the students. The goal is to improve nursing confidence in PROMPT Birthing Simulator to second year students by 80% by December 16, 2016. Steps four through six will be used to encourage, prepare, and gain the trust of the Stakeholders. The last two steps in Kotter's plan will be to evaluate and determine what improvements or changes are needed, as well as, reinforce areas that have proven successful.

My predictions for this project are optimistic. As a previous student in the program, I understand the areas of weakness and predict improved outcomes. Group A's pre-survey data revealed the following results: a) 11% very confident, b) 21% confident; c) 42% somewhat confident; d) 5% not at all confident; and e) 21% declined to comment. Post simulation, the same survey was provided with the opportunity to give feedback. The survey revealed: a) 11% very confident; b) 47% confident; c) 32 % somewhat confident; d) 5% not at all confident; and e) 5% did not respond. Overall, it was reported that 74% felt the simulation experience was productive,

beneficial, and enhanced their learning. The other 11% recorded they had no increased knowledge and the other 11% felt no change in their learning experience. There was one student who declined to comment (see Appendix L).

### **Data Source/Literature Review**

The PICO statement can be utilized to help collect data that would promote the PROMPT Birthing Simulation project. Aslam & Emmanuel (2010) along with the National Center for Biotechnology Information (NCBI) describes PICO as a group of questions one would ask when initiating research to see if the focus is relevant, researchable, and carries a specific subject matter. The PICO search statement for my project can be described as follows: a) the P represents the second year nursing students, b) the I signifies simulation in education as the treatment of interest, c) the C stands for the alternative or standard treatment; referring to traditional education verses simulation education, and d) the O represents the outcome or evidence that the research is trying to measure (Harris, Roussel, & Thomas, 2014).

Simulation offers students the benefit of repetitive practice as they recognize their mistakes and use their critical judgment to prepare for the clinical setting. Educators have the ability to correct misunderstandings, as well as the advantage to empower students through modern day technology (Parker & Myrick, 2010). Another research by Mc Namara's (2015) showed how undergraduate nursing students, who faced various challenges due to a lack of available hospital sites, used simulation to provide alternative training to prepare them for the clinical setting. Those who participated stated the simulation was vital to their learning and hoped this method of education would continue.

Simulation offers real life scenarios in a variety of clinical settings that facilitate students learning, such as: a) manikins; b) standardized patients; c) role playing; d) computerized clinical decision scenarios; and e) skills competency. Curl, Smith, Chisholm, McGee, & Das (2016)

performed a quasi-experimental study with undergraduate nursing programs. The research focused on comparing two groups. The first group would incorporate simulation as part of their clinical practice, while the second group would remain with the traditional clinical experience. It was revealed that combining simulation with the conventional experiences resulted in those students scoring higher on their end of program exam. Overall, students found that integrating the pre-lab activities, the self-paced simulation stations, and the individualized debriefing sessions were essential to learning.

Alexander, Durham, Hooper, Jeffries, Goldman, Kardong-Edgren, Kesten, Spector, Tagliareni, Radtke, & Tillman (2015) discussed a study done by the John Hopkins School of Nursing, along with the National Council of State Boards of Nursing, who conducted one of the largest and comprehensive studies nationwide involving 666 undergraduate students. The objective was to evaluate the use of simulation as a substitute for the traditional clinical experience. There were three phases to the study: a) a national survey of simulation used in associate degree nursing programs, b) a randomized control study comparing the influence of simulation with the traditional clinical instruction, and c) a longitudinal study that tracked the new graduates in a registered nurse (RN) clinical setting. Research revealed that simulation can be an effective tool to enhance the clinical nursing environment with the proper facilitation.

The AHRQ (2016) encourages education through simulation, as it creates an environment for healthcare clinicians to review or learn new skills in a setting that does not put the patient at risk. A simulation-based program is encouraged as a training guide with TeamSTEPPS (AHRQ, 2016). This tool is implemented to facilitate healthcare professionals to master training scenarios, activity measures, and debriefs of performance in the simulation process necessary to effectively train healthcare teams and students.



Last, is an article addressing cost benefit and cost effectiveness for simulation. Maloney & Haines (2016) discuss the importance of providing the benefits and consequences associated with simulation education. Common types of breakdown are demonstrated to determine the potential outcomes by utilizing a benefits/effects analysis. A description of measurement of the benefits and effects, along with a hypothetical reaction is given to show relationship between each analysis performed. Additionally, Maloney & Haines exhibit a flowchart used as a framework to narrow the Stakeholders focus and support the project (See Appendix M).

### **Timeline**

The objective is to capture specific, measurable, attainable, realistic, and timely goals, also known as SMART (Penner, 2013). A timeline is meant to communicate clear, actions that need to occur before the implementation of the PROMPT Birthing Simulation project.

The PROMPT Birthing Simulation project was presented on September 1, 2016 to the Gavilan College director, as well as a few adjunct faculties. An overview of the PROMPT Birthing Simulation including the aim, cost, and potential benefits were discussed briefly and well received. September 9, 2016 some revisions were made by the simulation team to narrow the research to a more specific test of change.

The first round of the PDSA cycle began on September 14, 2016 with Group A (see Appendix N). Afterwards a meeting was held with the project team to review the survey results. It was evident that some revisions were needed to obtain better outcomes. Based on Group A's feedback from the survey, the following modifications were implemented: a) shorter presentations at each station, b) students interaction with various scenarios, and c) constructive feedback for each group.

The next PDSA cycle was performed with Group B on October 21, 2016. These students had better interactive participation than Group A. The pre-simulation survey determined the

following outcomes: a) 19% very confident, b) 36% confident, c) 44% somewhat confident, and d) 1% not at all confident. The same survey was given post simulation. The results were as follows: a) 23% very confident, b) 72% confident, and c) 5% somewhat confident. This was encouraging as the changes produced better outcomes in Group B.

Due to some recent changes in the Gavilan Nursing Department, the meeting scheduled for November 28, 2016 has been postponed. Penner (2013) suggests being mindful when planning a timeline and allow for unexpected events (see Appendix O). In the meantime, a meeting with the Gilroy Fire Department was scheduled to inquire what type of training is used for the emergency medical responders (EMR), emergency medical technicians (EMT), and the paramedic programs. On November 7, 2016, a meeting with the Chief of the Gilroy Fire Department (GFD) was conducted to distinguish a way to partner with their training program. In conversation, it was discovered that the GFD had approached the Allied Health Department at Gavilan College regarding implementing an EMR, EMT, and paramedic program; however they were denied. Since then, GFD have partnered with a couple of other local colleges. The Chief of GFD explained how they are finishing up a brand new million-dollar facility in Sunnyvale, California with a state of the art simulation lab. A discussion began on how the allied health program can partner with GFD to provide improved education and training that would benefit both departments. The Chief shared another contact person who is the Director of the EMS, EMR, and EMT Programs at Foothill College in San Jose, California. He runs the Biological & Health Sciences Division. He has facilitated and developed partnerships with two other local colleges.

Another idea that came about was to partner with the performing arts program to see if they would like to provide actors for live simulation. This would be beneficial in helping students to communicate effectively in stressful situations using therapeutic communication. In

addition, the media department would be a good resource for videography during the debriefing evaluations. The material could be used to review areas of strengths and weaknesses.

Incorporating both departments at Gavilan College would be a valuable experience for all who participate.

A new meeting has been rescheduled for December 9, 2016 to provide an update on the project.. After the first of the year, a conference will be requested with the director, faculties, and instructors to discuss purchases, grants, conferences, trainings, and various partnerships to support the expansion of the project. The goal is to have a functional simulation lab by fall 2017.

### **Expected Results**

Implementing these changes will bring excitement and enthusiasm in the nursing department and among the student population. An increase in confidence, knowledge, skill competency, critical thinking, decision-making, and student satisfaction is expected with the time and dedication to the simulation process. Additionally, partnering with the GFD and the Gavilan College departments to enhance the learning experience for all students involved will bring strength to the program and a valuable reputation. There will be anticipated barriers and adjustments in order to have continuous quality improvement. Some future expectations for the nursing department are: a) increase in the NCLEX pass rates, b) improved reputation, c) new partnerships, d) increased enrollment, e) better quality nurses, and g) increased hire rates for RN graduates. A future expectation is to improve patient outcomes by a decrease in adverse events due to well-equipped, confident nurses. This will save hospitals a vast amount of money and promote cost effective care. Last, the nursing department anticipates the expansion of the skills lab by occupying the child development building, which is currently closed, and transform it into a state of the art simulation facility,

### **Nursing Relevance**

Doyle & Leighton (2010) express their belief, “The true value of simulation lies in the ability to offer experiences throughout the educational process that provide students with opportunities for repetition, pattern recognition, and faster decision making” (Rispel, 2015). Implementing a simulation program would benefit the student’s skill set and offer the delivery of exceptional healthcare that will provide increased confidence, enhanced learning, improved critical decision making, increased knowledge and understanding, along with higher pass rates on the National Council of State Boards of Nursing Licensure Examination (NCLEX). Moreover, the value of simulation at the macro-system level will provide patient safety, optimal outcomes, cost effective care, improved program reputation, and positive employment opportunities for new RN graduates.

### **Summary Report**

The objective of this project is to evaluate the effectiveness of the PROMPT Birthing Simulation education compared to the traditional training given to second year RN students by December 16, 2016. The purpose of this process is to improve the level of confidence, knowledge, competency, and nursing care. Prior to the implementation of simulation, the preparation for the Maternal Mother and Baby clinical setting was through course required readings, assignments, and lectures. The PROMPT Birthing Simulation served as an opportunity to bridge the gap between education and clinical practice by providing a simulation learning experience in a safe environment without putting the patient at risk for harm.

The study design involved two groups of RN students along with a simulation team. The initial research revealed that a narrower focus was needed. After Group A’s run through of the PDSA cycle; it was evident from the feedback that the scope of the project needed restructuring. Implementing the changes to the simulation activity with more student interaction and debriefing

proved successful with increased student satisfaction, improved confidence, and increased knowledge.

Education through simulation has proven to be an effective method of training. Many studies have demonstrated that simulation education and training can enhance and refine students learning. Several studies have indicated improved nursing assertiveness, improved response times, and improved participation in emergency situations. Maloney & Haines (2016) proclaim that with proper training and education, instructors are better equipped with the knowledge needed to implement real life scenarios to better prepare students for the clinical setting, as well as the future workforce in the medical health profession.

Because the PROMPT Birthing Simulation was proven successful, this provides the opportunity to pursue further simulation training using customized wireless technology with manikins. The key will be to continue to keep stakeholders informed and recruiting new champions for the continuation of a multifaceted simulation program.

A quantitative method was used involving second year RN students at the Gavilan College nursing program during the 2016 fall semester. The demographics of the study consisted of 39% Caucasian, 44% Hispanic, and 17% listing ethnicity as other. The age population was gathered with the following results: a) 19-25 years, 13%; b) 26-30 years, 31%; c) 31-35 years, 18%; d) 36-40 years, 18%; e) 41-45 years, 9%; f) 46-50 years, 9%; and 51-55 years, 2%. The gender demographics recorded at 100% females (see Appendix P).

Several methods were used to evaluate the progress of the project to determine what changes were needed. Lazzara, Benishek, Dietz, Salas, & Adriansen, (2014) discussed the Joint Commission's eight factors that encourage the creation and implementation of a successful simulation program: a) science, b) staff, c) supplies, d) space, e) support, f) systems, g) success, and h) sustainability. Some of these factors were measured using various metrics to benchmark

data collected. A pre and post survey was administered to quantify the knowledge and confidence gained after receiving education and training with the PROMPT Birthing Simulator. Next, the project team evaluated the first run of the PDSA cycle to determine areas of weakness and made appropriate changes. What we learned was students felt a need to focus more on return demonstration and debriefing. On the second PDSA cycle, there was increased confidence, increased knowledge, and increase in student satisfaction. Another method utilized was a stakeholder analysis to help manage the different individuals and groups and their impact on the project. A fishbone cause/effect diagram was an additional process used to help identify the root cause of the problem. It was determined that there was a lack time to participate in the skills lab. A new skills lab instructor has been hired to help provide more guidance and training. Also, a SWOT analysis was performed and revealed that the strengths and opportunities far out weigh the weaknesses and threats. Last, a cost/ratio analysis was illustrated to show the long-term benefits of simulation, in addition to the many monetary rewards. More important still is the safety and well being of the patients.

Due to 50% of students failing their skills competency last year, it was necessary to assess the current methods and see where the program was failing. Using this data as the baseline, a survey was conducted that revealed the students felt there was insufficient time to participate in the skills lab. This prompted the first area of change. The director hired a new instructor to strictly to provide increased lab hours to students. Next, the PROMPT Birthing Simulator was implemented. A new survey was conducted before and after the teaching of the birthing process as a way to measure the effectiveness of the simulation. It was concluded by both Group A and B that the PROMPT Birthing Simulation was beneficial in improving confidence, knowledge, skills competency and improved nursing care. Students' felt protected knowing they could make mistakes in a safe environment with no risk to patients.

The AHRQ (2013) published five key principles of TeamSTEPPS that was useful to validate EBP to ensure optimal outcomes in the framework and competencies of the PROMPT Birthing Simulator training. These five principles included: a) team structure, b) communication, c) leadership, d) situation monitoring, and e) mutual support. The main teaching aid for this project was the PROMPT Birthing Simulator manufactured by Laerdal. This hybrid healthcare simulation enabled instructors to effectively navigate through the following skills: a) normal delivery; b) shoulder dystocia; c) forceps delivery; d) traction and rotational deliveries; e) ventouse (vacuum) delivery; f) breech delivery; g) placenta delivery; and h) mother on all fours' delivery (Laerdal, 2016). Students were able to visualize birthing maneuvers and use hands on demonstration to manipulate the proper force during a delivery. A future goal is to partner with the performing arts to recruit patient actors to emulate real life scenarios so students can practice therapeutic communication. Collaboration with the film department would enable the scenarios to be filmed and reviewed for debriefing and instruction.

In evaluation of this project, it has been demonstrated that the PROMPT Birthing Simulator proved effective and useful. Students concur this type of learning increased their confidence and helped prepare them for the clinical setting by solidifying proper techniques, as compared to the traditional required lectures, readings, and assignments. It is concluded that education with the PROMPT Birthing Simulator provided evidence demonstrating the positive outcomes with the second year RN students. The various surveys revealed that this procedural method of hands on, interactive, and communicative feedback improved the overall learning experience. Overall, students report satisfaction with the education through simulation project.

As the project continues to move forward, sustainability standards will be necessary. Capella (2016) discusses five factors of influencing sustainability: a) modification of the program, b) having a champion, c) fit with the organization's mission/procedures, d) perceived

benefits of the staff/clients, and e) support from stakeholders. In reviewing these factors, more champions and stakeholders are needed to strengthen the vision of this project. Keeping them informed and involved will give them a sense of ownership. Also, incorporating new partnerships will bridge the gap between possibilities and realities. The continuous modifications of the PDSA model are another influencing factor toward continued growth. Last, Gavilan College's Mission Statement states, "In an environment that cultivates creativity, stimulates curiosity, and emphasizes student learning, Gavilan College services its community by providing high quality educational and support services that prepare students for transfer, technical and public service careers, lifelong learning and participation in a diverse global society," (Kinsella, 2012, Sec. 2, p.5). Education through simulation fits within the organizations mission for learning. This can be achieved by using effective communication to advocate for the needs of the students and encourage simulation technology that will promote educational excellence.



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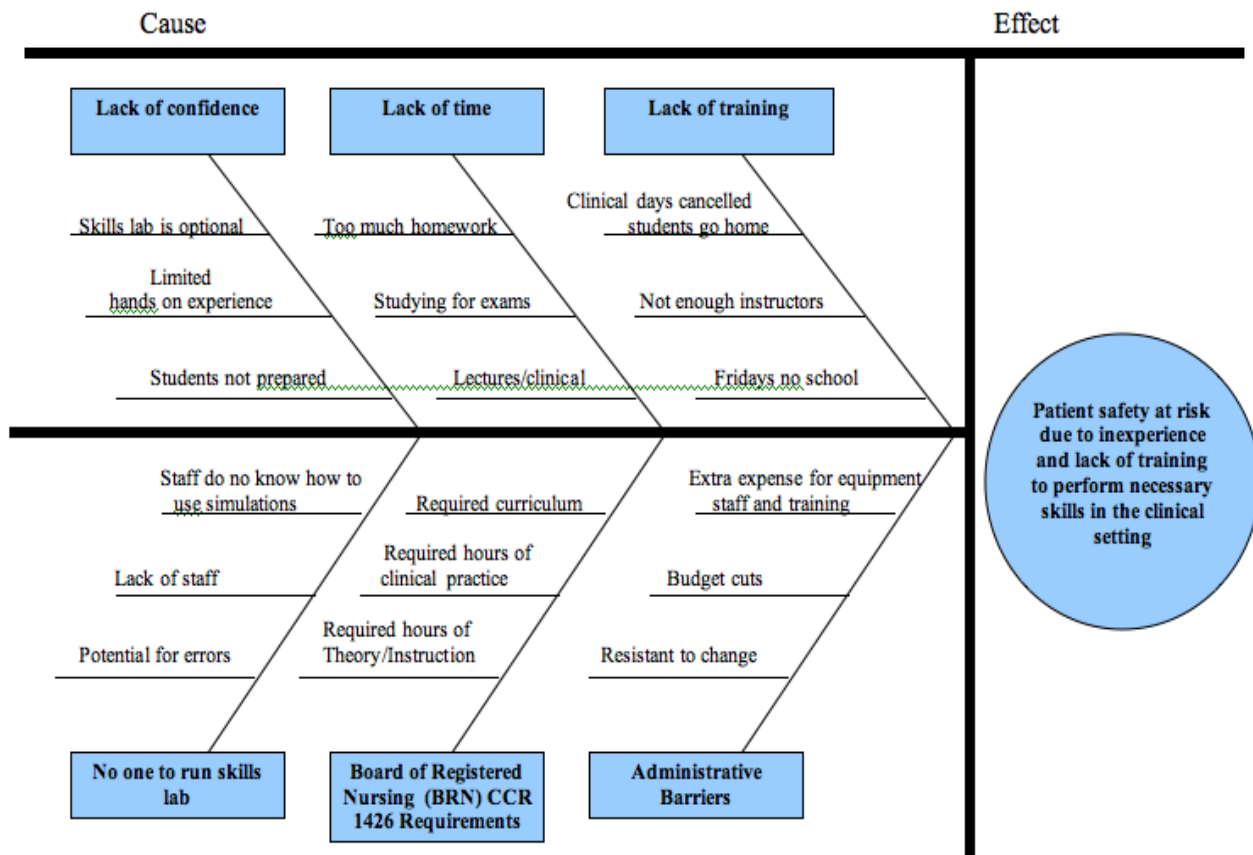
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Appendix A

Fishbone Diagram



*Appendix B***Maternal Mother/Baby Simulation Fall 2016  
Pre-Simulation Experience Survey**

1. How confident are you with the birthing process
  - Very confident
  - Confident
  - Somewhat confident
  - Not at all confident
  
2. Name the three variations of a breech presentation
  - a)
  - b)
  - c)
  
3. Name the fetal presentations and positions
  - a)
  - b)
  - c)
  - d)
  - e)
  - f)
  - g)
  - h)
  - i)
  - j)
  - k)
  
4. Name the stations in relation to the fetal presentation of the ischial spines
  - a)
  - b)
  - c)
  - d)
  - e)
  - f)
  - g)
  - h)
  
5. Name the four stages of labor
  - a)
  - b)
  - c)
  - d)

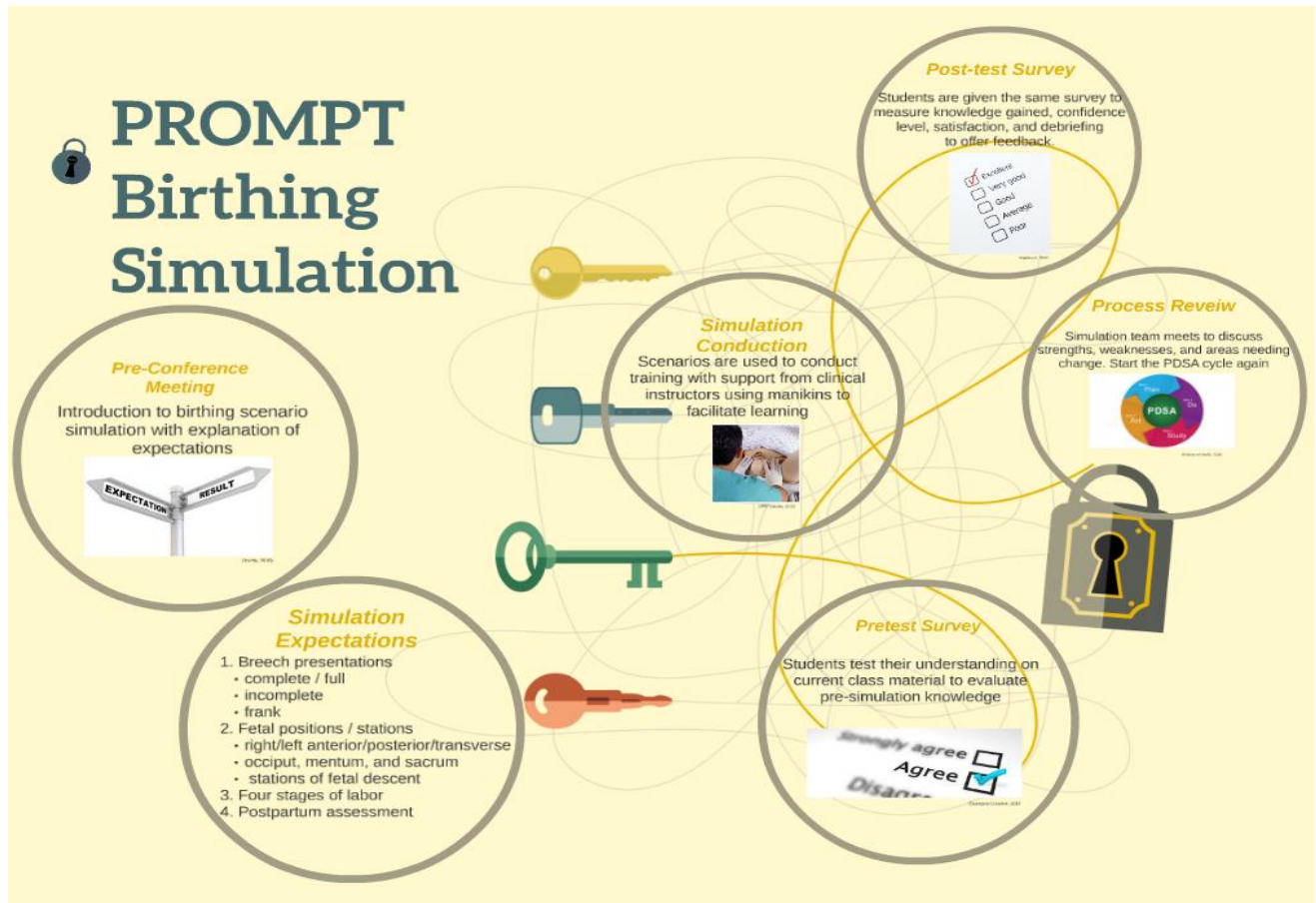
*Appendix C***Maternal Mother/Baby Simulation Fall 2016  
Post-Simulation Experience Survey**

6. How confident are you with the birthing process
  - Very confident
  - Confident
  - Somewhat confident
  - Not at all confident
  
2. Name the three variations of a breech presentation
  - a)
  - b)
  - c)
  
3. Name the fetal presentations and positions
  - a)
  - b)
  - c)
  - d)
  - e)
  - f)
  - g)
  - h)
  - i)
  - j)
  - k)
  
4. Name the stations in relation to the fetal presentation of the Ischial spines
  - a)
  - b)
  - c)
  - d)
  - e)
  - f)
  - g)
  - h)
  
5. Name the four stages of labor
  - a)
  - b)
  - c)
  - d)
  
6. What effect, if any, did the simulation experience have on your self confidence in caring for a labor patient?
  
7. What did you like most/least about the simulation? How could it be improved?



Appendix D

Flow Diagram



Appendix E



Student Simulation Evaluation Tool

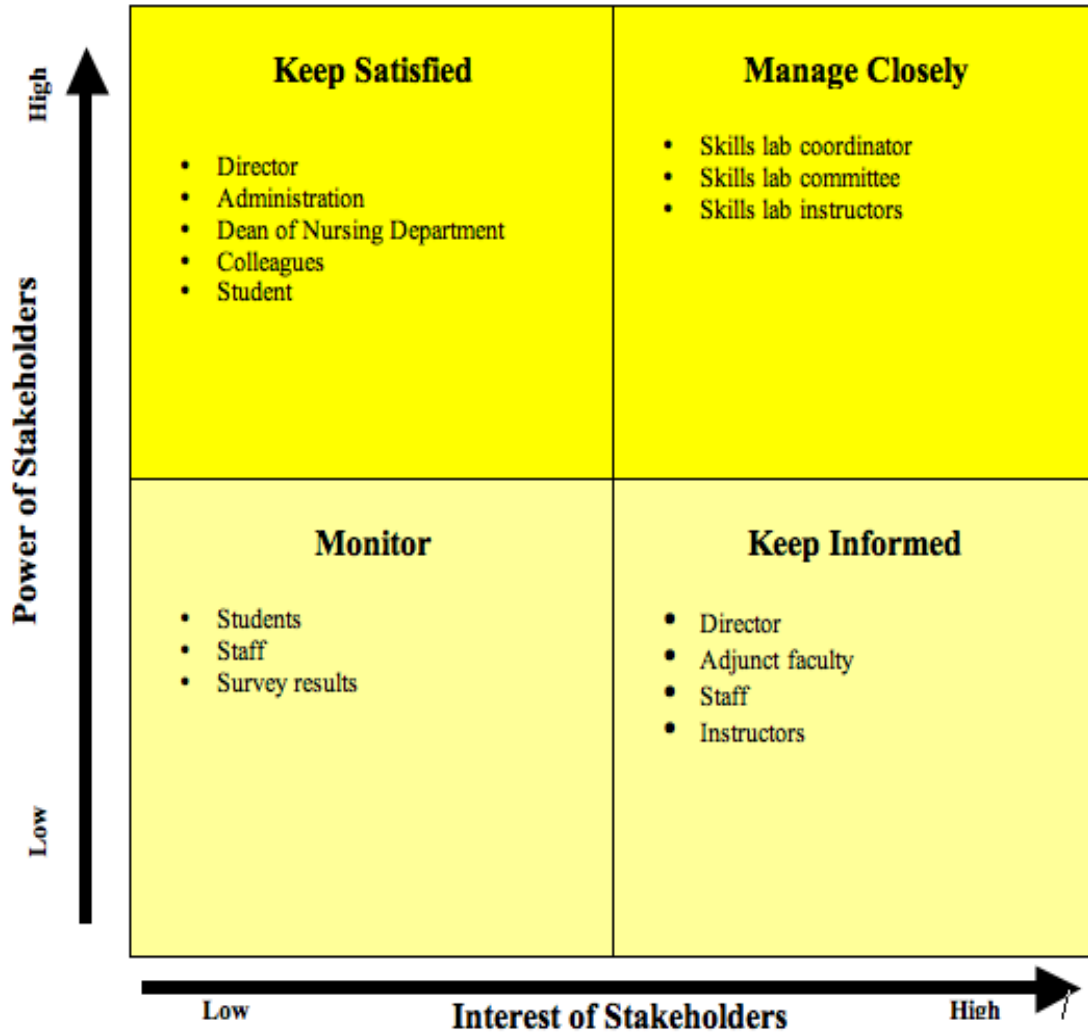
Program Student Learning Outcomes (PSLO):

- 1. Safe, Patient-Centered Care
- 2. Caring Behaviors
- 3. Communication/Information Technology Use
- 4. Critical Thinking/Clinical Judgment
- 5. Teamwork/Collaboration
- 6. Leadership/Professionalism

Evaluation Criteria		Strongly Agree 4	Agree 3	Disagree 2	Strongly Disagree 1
Objectives/Information	I clearly understood the purpose and objectives of the simulation. (PSLO 3)				
Support/Cues	My need for help was recognized. (PSLO 1)				
	I was supported in the learning process. (PSLO 5)				
Problem Solving/Complexity	I was encouraged to explore all possibilities during the simulation. (PSLO 4)				
	The simulation provided me with opportunity to set goals for the patient. (PSLO1,4)				
Guided Reflection/Debriefing	Feedback provided was constructive and centered around patient safety and care. (PSLO 1,4)				
Fidelity	The scenario resembled a real-life situation. (PSLO 2,3,4)				
Active Learning	I actively participated in the debriefing session after the simulation. (PSLO 3,4,5,6)				
	I received cues during the simulation in a timely manner. (PSLO 1)				
Diverse Ways of Learning	The simulation offered a variety of ways in which to learn the material. (PSLO 3)				
High Expectations	I was challenged in my thinking and decision-making skills. (PSLO 1-6)				
Teamwork/Collaboration	I collaborated effectively with my peers during the simulation. (PSLO 3,5)				
Satisfaction with Current Learning	The teaching methods used in this simulation encouraged critical thinking. (PSLO 3,4)				
	My instructor incorporated information technology into the simulation. (PSLO 3)				
Self-Confidence in Learning	I am confident that the simulation has assisted in improving my ability to provide safe and competent care. (PSLO 1,2,4,6)				

Appendix F

Stakeholder Analysis



*Appendix G***Budget Estimate**

<b>Expense Type</b>	<b>Hours</b>	<b>First 1 year</b>	<b>Year 2</b>
Part Time Employee @ \$55/hr.	800-1200	\$52,800	\$79,200
Instruction by Simulation Expert	8	\$2,232.50	\$1000
Simulation Conference (2 staff)	24	\$500 x 2 = \$1,000	\$525 x 4 = \$2,100
Student Training Hours (educating, researching)	80	\$7,000	\$10,000
New Equipment		\$10,000	\$20,000
Maintenance/upkeep		\$6,500	\$8,500
<b>Total</b>	<b>912 - 1312</b>	<b>\$80,532.50</b>	<b>\$120,800.00</b>

*Appendix H***Cost Benefit Analysis**

<b>Estimated Annual Savings</b>	<b>Year 1</b>	<b>Year 2</b>
Starting Budget	\$140,000.00	\$200,000.00
Net Cost	\$80,532.50	\$120,800.00
Annual Benefit (adverted PPH)	\$3.5 million	\$4.9 million
Net Benefits (hospital savings)	\$3.4 million	\$4.8 million
B/C Ratio	\$22.65	\$24.87

*Appendix I***Types of Analysis for Simulation**

<b>Analysis</b>	<b>Description of measurement of benefits/effects</b>	<b>Hypothetical example applied to simulation</b>
Cost minimization analysis (CMA)	A comparison of costs when the effects are considered equal in all respects	Measurement of the simulation education method versus an alternative education method produced equivalent learning outcomes within a meaningful threshold; however, the simulation method is less costly.
Cost effectiveness analysis (CEA)	Benefits/effects are measured in natural units (e.g. students educated)	Measurement of the simulation education method resulted in less clinical errors by the learner than the alternative education method.
Cost utility analysis (CUA)	Benefits/effects measured in 'utility' units (e.g. a measure of satisfaction derived from consumption or attainment of benefit)	Measurement of the simulation education method resulted in higher levels of patient satisfaction with their care compared to the alternative education method.
Cost benefit analysis (CBA)	Benefit monetized	The simulation education method was measured to be of higher value (willingness to pay) by the learners when compared to the alternative education method.

(Maloney &amp; Haines, 2016)

*Appendix J*

**SWOT Analysis**

<b>Internal</b>		<b>External</b>	
<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Improved confidence</li> <li>• Improved skills competency</li> <li>• Increased knowledge</li> <li>• Improved NCLEX pass rates</li> <li>• Increased enrollment</li> <li>• Improved patient care and safety</li> <li>• Improved critical thinking</li> <li>• Improved decision making</li> <li>• Decrease in LOS</li> <li>• Decrease in adverse events</li> <li>• Hospital savings</li> <li>• Improved reputation</li> <li>• Instant feedback</li> <li>• Culture of safety</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive</li> <li>• Budget cuts</li> <li>• Maintenance costs</li> <li>• More research needed</li> <li>• Lack of longitudinal care</li> <li>• Lack of patient response</li> <li>• Staffing</li> </ul>	<ul style="list-style-type: none"> <li>• College nursing program recognition</li> <li>• Hospitals seeking out RN graduates</li> <li>• Simulation certification</li> <li>• Expansion of simulation program</li> <li>• Increased enrollment</li> <li>• Partnership with GFD</li> <li>• Partner with other departments in the college</li> </ul>	<ul style="list-style-type: none"> <li>• Inconsistent outcome measurements</li> <li>• Little evidence</li> <li>• Wasted resources</li> <li>• Unpredictable responses</li> <li>• Lack of preparedness to human responses</li> </ul>

*Appendix K*

*Change Theory*

# Kotter's 8 step change model

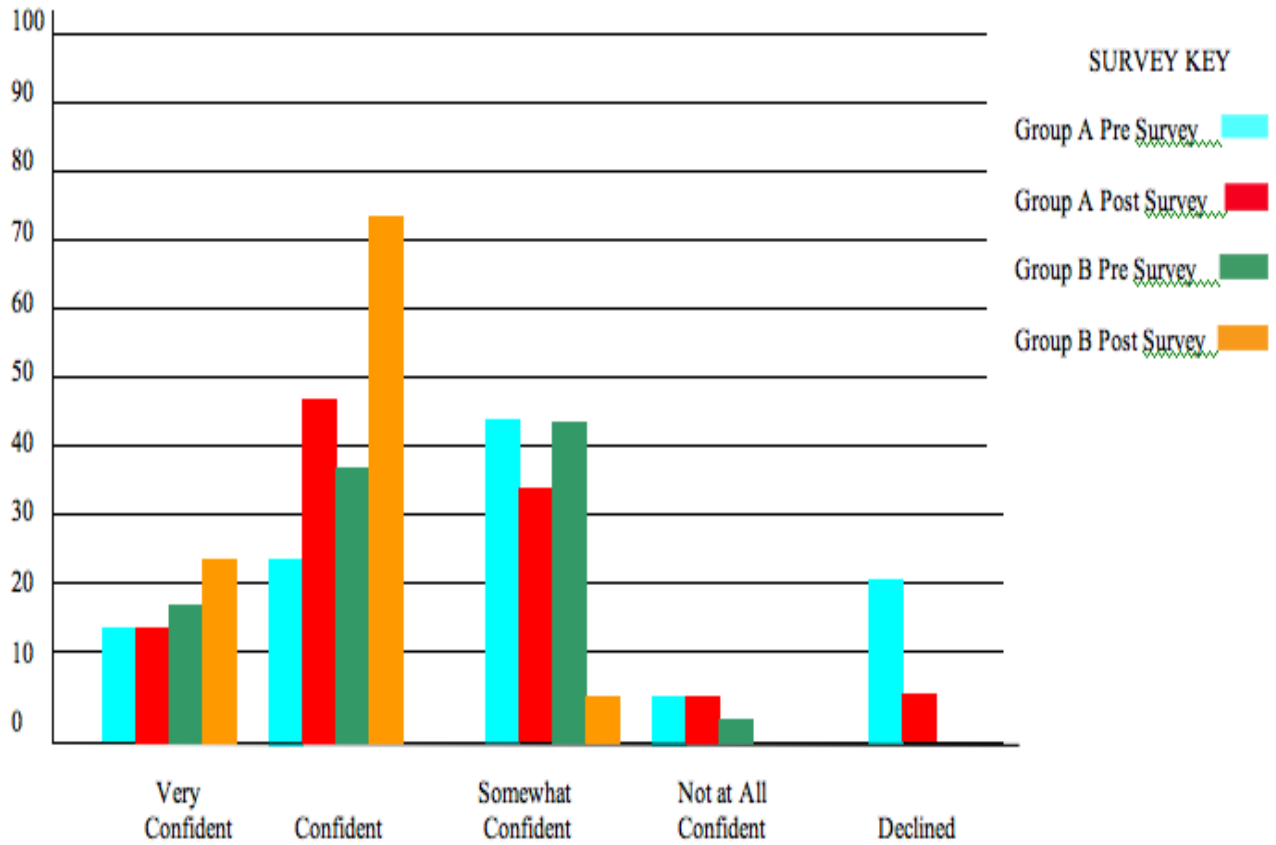


(Riche, n.d.)



*Appendix L*

**Pre/Post Survey Results**



*Appendix M*

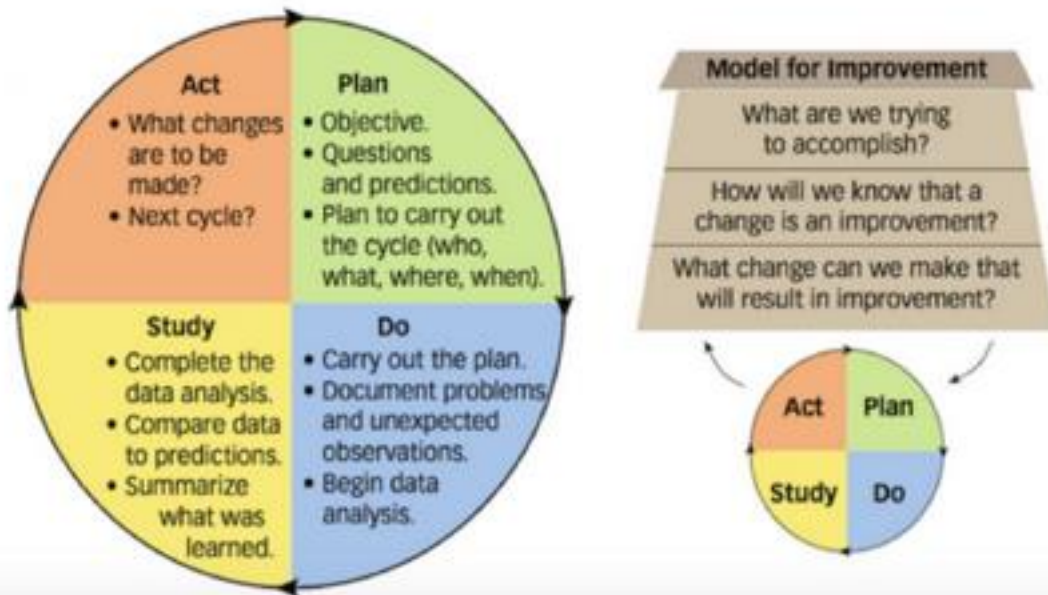
**Flowchart Between Benefit/Effects**

QuickTime™ and a  
decompressor  
are needed to see this picture.

(Maloney & Haines, 2016)

*Appendix N*

**PDSA cycle and Model for Improvement—1991, 1994** / FIGURE 8



(Deming, 2015)

*Appendix O***Timeline**

<b>Date</b>	<b>Activity</b>	<b>Authority/Responsibility</b>
August 29, 2016 Phase 1	Present Simulation Project to the Director and faculty members of the department	Simulation Project Team
September 9, 2016 Phase 2	Revisions per suggestions from September meeting	Director, Staff, and the Simulation Project Team
September 14, 2016 Phase 3	First cycle of PSDA implemented and survey results reviewed	Simulation Project Team
October 21, 2016 Phase 4	Second cycle of PSDA	Simulation Project Team
November 30, 2017 Phase 5	Meet with Director of Foothills College to discuss a potential partnership program	Simulation Project Leader
December 9, 2017 Phase 6	Proposal submitted for approval to Director, adjunct faculty, and instructors	Simulation Project Team
January 10, 2017 Phase 7	Discussion of purchases, grants, maintenance of current resources, and upcoming conferences	Director, Staff, and the Simulation Project Team
March 10, 2017 Phase 7	Planning, interviewing, hiring, staffing, conference, and training by simulation expert	Simulation Project Team, IT, and Human Resources
August 17, 2017 Phase 8	Simulation up and running. Start third PSDA cycle	Simulation Project Team

*Appendix P*

**Age Demographics**

