DEVELOPING CRITICAL THINKING SKILLS IN UNDERGRADUATE NURSING

STUDENTS USING STRATEGIC MANAGEMENT SIMULATIONS

A DISSERTATION
IN
NURSING

Presented to the faculty of the University
of Missouri-Kansas City in partial fulfillment of the
requirements for the degree

DOCTOR OF PHILOSOPHY

By

Karen LaMartina

B.S.N., University of Kansas School of Nursing, 1987

M.S.N., University of Missouri-Kansas City, 2002

Kansas City, Missouri

2014

DEVELOPING CRITICAL THINKING SKILLS IN UNDERGRADUATE NURSING

STUDENTS USING STRATEGIC MANAGEMENT SIMULATIONS

Karen LaMartina, Candidate for the Doctor of Philosophy Degree

University of Missouri-Kansas City, 2014

ABSTRACT

A quasi-experimental design was employed to determine the effectiveness of Strategic Management Simulations (SMS) in the development of critical thinking skills (CTS) of undergraduate nursing students. Recommendations from the American Association of Colleges of Nursing (AACN) provide a prescription for the essentials in nursing education, which include as an outcome, the ability for new graduate nurses to be effective critical thinkers. Despite the efforts of nurse educators to provide effective means to teach CTS, research concludes that new graduates are often unable to make sound clinical decisions. Grounded in complexity theory, SMS provides a simulated assessment that determines cognitive ability on 25 parameters; five were selected by the developer of SMS for this study. After the simulation, participants received feedback on their results, followed by individualized training which helped increase any areas that could benefit from development. Study participants in the intervention group were tested with the SMS assessment at the beginning and at the end of the nursing program. Control group data were obtained from archival SMS scores of students who completed the SMS assessment at the end of their academic program, without receiving any of the SMS training. These data were used to describe CTS, inferential analysis included both paired sample and independent sample *T*-tests to identify any variances between the intervention

group and the control group. A post hoc power analysis determined that these data

provide an alpha of 0.05 and the ability to detect a moderate (≥ 0.6) effect size.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Nursing have examined a dissertation titled "Developing Critical Thinking Skills in Undergraduate Nursing Students using Strategic Management Simulations", presented by Karen LaMartina, candidate for the Doctor of Philosophy degree, and certify that in their opinion it worthy of acceptance.

Supervisory Committee

Peggy Ward-Smith, R.N., Ph.D., Committee Chair
School of Nursing and Health Studies

Jason Kovac, Ph.D.

Jane Peterson, R.N., Ph.D.
School of Nursing and Health Studies

Usha Satish, Ph.D.
State University of New York, Upstate
Syracuse, New York

Christine Zimmerman, R.N., Ph.D.
School of Nursing and Health Studies

CONTENTS

TABLES

ACKNOWLEDGEMENTS

so much of their time in testing labs, and in feedback and training sessions. Without their willingness to participate in this endeavor, it would never have gotten done.

To my family and friends who have supported me over these years, always inquiring with sincere interest as to the progress of my research. Thanks to my husband who so generously gave his support and always believed I would get the job done.

And finally, to Dr. David Zamierowski, who came to me a few years ago with an idea for me to work with Dr. Satish on a project that he just felt had promise for nursing education. My gratitude for his generous financial support, as well as his participation along the way, just cannot be measured. I feel unworthy to be the benefactor of such generosity, but am so very grateful.

DEDICATION

       To my husband, Sam, for sharing with me his passion for scholarly endeavors, his love of learning, and for his always believing the very best in me.

CHAPTER 1

INTRODUCTION

Background

The American Association of Colleges of Nursing (AACN) has identified and

defined what skills and attributes are essential for the newly graduated registered nurse to

deliver care in a safe and effective manner (2008). The AACN has described the

generalist nurse as being a provider of care, a manager and coordinator of care, and as a

member of the nursing profession (AACN, 2008). Being a provider, manager, and

coordinator of care requires an ability to have sound clinical reasoning and judgment

when making decisions that lead to optimum outcomes for patients. Despite the best

efforts of nurse educators in providing curricula geared toward the development of

critical thinking ability, past research indicates that the newly graduated nurse is not

always capable of sound clinical reasoning (Mann, 2012). Clinical judgment has been

described as being a tremendously complex endeavor (Tanner, 2006). Not only are

nurses expected to understand all the nuances of their patients, but they are also meant to

achieve clinical excellence in environments fraught with distractions and interruptions.

Based on a past review of research, conclusions indicate that newly graduated nurses

draw upon their own past experiences often times more than considering the objective

facts of the situation at hand. They also utilize a variety of reasoning patterns when

making decisions regarding the care of their patients (Tanner, 2006). Research has

indicated that despite the training provided in traditional nursing programs, there still

seems to be a knowledge gap amongst new graduate nurses that comes down to the fact

that they do not yet have the ability to "think like a nurse" (Tanner, 2006).

Strategic Management Simulations (SMS) is an instrument that has been utilized in a variety of fields to assess cognitive ability. Grounded in complexity theory, "SMS…allows for the measurement of different components of human functioning in response to complex task settings" (Satish et al., 2001, p. 558). The computerized simulation takes the participant through a simulated crisis scenario wherein they must make decisions based upon the resources available. Each decision takes the participant down a path of future decision opportunities. At the end of the test, the learner is provided with a mapping of their cognitive ability which is based on 25 different parameters or characteristics of human functioning while being subjected to complex tasks. What is remarkable and unique about this particular instrument is that after the initial assessment, the participant is then offered feedback on their results, and subsequent individualized training to assist them in improving any areas identified in the assessment as benefitting from development. Complexity theory focuses on not only the "what" of decision-making—the content of acquired knowledge—but also the "how" of decision-making—that process that requires critical thinking that will ultimately lead to effective problem solving (Satish, et al., 2001). SMS has been utilized with graduate medical students with some success in the development of their competence in clinical decision-making (Satish, Krummel, Foster, & Krishnamurthy, 2005). The potential for this assessment and training to be utilized with nursing students could be the final answer to the missing link of how to help students to think like nurses.

Purpose of the Study

The purpose of this research was to determine the impact of SMS on CTS of undergraduate students enrolled in a registered nursing program. This study examined

how the addition of this assessment and training impacted critical thinking ability of the new graduates as they left the academic setting and entered the workforce. While past research has examined measures of critical thinking at the beginning and end of the nursing program, this study was unique in that it had the component of post-assessment, individualized training as an important part of the methodology. My aim for this research was that the SMS assessment tool, along with the training, would reveal the possibility that newly graduated nurses leaving the academic setting could have improved decision-making ability, leading to decreased time in orientation to the workplace, and ultimately to improved patient outcomes.

Assumptions

The assumptions that were made for the purpose of this research were:

1. The current cognitive behavior and ability of the participant at the time of assessment was irrelevant to the findings. No matter where an individual is on the spectrum of cognition, they can always learn more about themselves and improve or change their cognitive behavior.

2. The participants took the assessment seriously and answered questions based on their true cognitive ability.

3. When participants are exposed to the training component of SMS and the parameters of cognition, their awareness was heightened with regard for the way they think and make decisions.

4. Participant's decision-making ability would be improved due to the heightened awareness that comes from the experience of the assessment and training.

Limitations

The limitations that were inherent in this type of research include:

1. The use of a convenience sample could make generalizability of the findings difficult (Gall, Gall, & Borg, 2007).

2. Because SMS training was brief and only held a few times during the course of the program, findings may not be a true reflection of the intervention.

Research Questions

1. Is there a change in SMS scores after feedback and training in the intervention group?

2. Is there a difference between the intervention group's and the control group's SMS scores at the end of the nursing program?

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

What if a nursing student could see a snapshot of the inner most part of their brain and see how their own grey matter works? What if after gaining that incredible awareness of one's own cognitive behavior, they discovered that with some individualized training, their areas of weakness could be improved and strengthened, leading to better decision-making ability? One of the biggest challenges in nursing education is helping students to critical think—"like a nurse". The following section will review what strategies have been implemented in nursing education to develop critical thinking skills, the outcomes of those attempts, and introduce a possible solution to this challenge.

This review of literature will provide a summary of what the nursing profession requires of new graduates with respect to clinical reasoning and decision-making skills. The construct of critical thinking will be defined, comparing and contrasting that term to clinical reasoning and clinical judgment. Discussion will follow of what has been implemented to teach students how to develop critical thinking skills, how that skill is measured, what current research has determined the true critical thinking ability is for new graduates as well as the consequences of inadequate critical thinking ability. Finally, Strategic Management Simulations (SMS) will be considered as an added component, which when layered over nursing curricula, holds the potential to enhance nursing students' acquisition of critical thinking ability, thus providing that much desired link in the gap between nursing education and practice.

Demands of the Nursing Profession for New Graduates

In 2008, the American Association of Colleges of Nursing (AACN) published a document which prescribed the essentials necessary for the newly graduated nurse. These essentials focused on a variety of desired attributes for nurses including traits such as scholarship, a working knowledge of health care policy, and professionalism. The document also includes a list of competencies, one of which is that the graduate nurse will be prepared to "use clinical/critical reasoning to address simple to complex situations" (AACN, 2008, p. 8). Ultimately, the role of the graduate nurse would include three vital abilities: 1. To provide direct care to patients; 2. To be a designer, coordinator and manager of care; and 3. To be a member of the profession. Each of these abilities require critical thinking in the current complex health care environment that is the reality today.

Critical Thinking Defined

Many definitions of critical thinking have been suggested in the literature (Facione, Facione & Sanchez, 1994; Profetto-McGrath, 2003). The term is often used interchangeably in health care with terms such as clinical reasoning and clinical judgment. One nurse researcher defines critical thinking as "an active, ongoing cognitive process of logical reasoning in which the individual methodically explores and analyzes issues, interprets complex ideas, considers all aspects of a situation and/or argument and where appropriate, follows with prudent judgment" (Profetto-McGrath, 2003, p. 570). Critical thinking skills include analysis, evaluation, inference, deductive and inductive reasoning (Stewart & Dempsey, 2005).

In 1990, under the sponsorship of the American Psychological Association, a panel consisting of multiple disciplines conducted a two-year Delphi project, which yielded a conceptualization of critical thinking. This team of scholars concluded with the following definition of the "ideal critical thinker":

> The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. (Facione, Facione & Sanchez, 1994, p. 345)

Critical thinking, clinical reasoning and clinical judgment.

In an attempt to bring clarity to these different terms that are used interchangeably in nursing literature, we must understand that they really do have some, while seemingly minute, distinct differences that bear discussion. Clinical reasoning is the *application* of critical thinking to the clinical situation (Victor-Chmil, 2013), while clinical judgment is defined as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner, 2006, p. 204). Clinical reasoning is the *process* used by practitioners to apply to and guide their clinical judgments. This type of decision-making goes beyond the clinician's knowledge or domain expertise, but rather is somehow guided by their ability to process through a situation, considering the intricacies of each individual while making a sound decision in

the moment. With these definitions in mind, the development of the skill of critical thinking in undergraduate nursing students is a daunting task. Recognizing the complexity of the health care setting in which these individuals find themselves after graduation requires nurse educators to take advantage of every opportunity to develop these traits, with optimum patient outcomes as the goal.

Critical Thinking Measurement

Quantitative measures.

Critical thinking ability has been measured using a variety of methods and instruments. Researchers have used instruments such as the California Critical Thinking Skills Test (CCTST) (Stone, Davidson, Evans & Hansen, 2001) and the California Critical Thinking Disposition Inventory (CCTDI) (Profetto-McGrath, 2003), as well as the Watson-Glaser Critical Thinking Appraisal (WGCTA) (L'Eplattenier, 2001) to quantitatively determine nursing student's level of critical thinking skill. The CCTST consists of 34 multiple-choice items, which were designed to tease out those critical thinking skills identified in the aforementioned Delphi report. Scores are reported on the scales of analysis, inference and evaluation. The CCTDI consists of 75 Likert style items which are designed to identify one's disposition towards critical thinking on seven subscales including, truth-seeking, open-mindedness, analyticity, systematicity, critical-thinking confidence, inquisitiveness and maturity (Stone et al., 2001). The WGCTA uses an 80 item survey which purports to measure reasoning skills associated with critical thinking such as inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (L'Eplattenier, 2001).

Del Bueno's Performance-Based Development System (PBDS) has been used to assess critical thinking and interpersonal skills ability (2005). PBDS has been used effectively since 1985 in over 350 health care agencies in America to determine the critical thinking ability of new nurses. This system uses a series of simulated vignettes to which nurses respond with their assessment and plan of action. Based on the responses, the nurses are then deemed acceptable or unacceptable with respect to the critical thinking ability (Del Bueno, 2005).

Other researchers have used Assessment Technologies Institute's (ATI's) Critical Thinking Assessment to determine the amount of critical thinking development that occurred with nursing students (Mann, 2012). This computerized assessment has limited use in research but is often used in undergraduate nursing programs to assess critical thinking skills (Whitehead, 2006).

Qualitative measures.

Self-assessments and perceptions of critical thinking development have been done in a variety of settings to qualitatively measure the construct (Clark & Springer, 2012; Dickson & Flynn, 2012; Kajander et al., 2014; Wangensteen, Johansson & Nordstrom, 2008). Nursing students have been interviewed and surveyed while in their final semester of their educational program and throughout their first year of practice, the results of which will be discussed in another section of this review of literature. That section will also include perceptions of nurses who served as preceptors for new graduates.

Strategic Management Simulations (SMS).

SMS has been used since the 1960s as a measurement instrument to determine performance ability in complex situations (Streufert, Pogash, & Piasecki, 1988). The instrument identifies decision-making ability on 25 different parameters of cognitive behavior (see Appendix A). The basic premise of the simulated assessment is that it determines the "how vs. what" or, the process used to receive information versus the "what" of the information. Understanding that health care personnel are often challenged by situations which contain something referred to as *VUCAD,* which is an acronym for volatility, uncertainty, complexity, ambiguity, and delayed feedback, this instrument is designed to determine how the participant thinks and makes decisions in stressful or challenging situations (Satish & Streufert, 2002). The cognitive parameters seen most often in health care participants include, activity level, task orientation, initiative, information management, breadth of approach, strategy, and crisis response (Satish, Streufert & Eslinger, 2008). Participants receive a score for each parameter with follow-up feedback and training to help in improving areas that could benefit from development. This instrument has been used in industries such as corporate America, the military, and medicine, and has achieved high levels of predictive validity, reliability and applicability to real world settings (Satish, Krummel, Foster, & Krishnamurthy, 2005).

Critical Thinking Development Strategies and Outcomes

A variety of methods have been employed in nursing education to facilitate the acquisition of critical thinking skills. The use of simulation with high-fidelity mannequins has shown to be an effective teaching strategy for nursing students (Ertmer et al., 2010; Guhde, 2010; Kneebone, Scott, Darzi & Horrocks, 2004; McKeon, Norris,

Cardell & Britt, 2009). Other strategies used in nursing education include problem-based learning with case studies (Brunt, 2005; Kong, Qin, Zhou, Mou, & Gao, 2014: Popil, 2011; Yuan, Williams, & Fan, 2008), discussion of critical incidences (Alphonso, 2007), in-depth clinical experience debriefing (Chan, 2013), as well as reflective writing and concept mapping (Brunt, 2005; Wahl & Thompson, 2013). For the new graduate nurse, the use of nurse residency programs (NRPs) to extend their orientation period has been used with the goal of facilitating the new nurse's acquisition of those important decision-making skills in the clinical setting (Berkow, Virkstis, Stewart, & Conway, 2009; Greene, 2010; Tanner, 2010; Thrall, 2007; Trepanier, Early, Ulrich, & Cherry, 2012).

High-fidelity patient simulation.

Simulation provides a safe, controlled environment, which allows the learner to make mistakes without actually harming a patient. The current literature contains many examples of how simulated clinical activities can assist in the development of critical thinking ability, largely due to the guided debriefing that follows the simulated scenario (Kneebone et al., 2004; McKeon et al., 2009). These debriefings are one of the barriers to this strategy, however, with the need for intensive faculty training needed for success (Rochester, et al., 2012). The exorbitant cost of equipment is also a barrier to this strategy (Quaas & Bjorklund, 2012). Simulated activities can certainly help nursing students to learn competencies in a safe environment, but it has also been noted that this should be one of several building blocks of nursing education to be layered over live clinical activities so that learning can also take place in context (Kneebone et al., 2004). One researcher found that this strategy can safely allow a student to fail and yet learn from those errors so as to apply those lessons to the live clinical setting (Guhde, 2010).

The use of role-playing in simulated activities has been shown to be somewhat effective in enhancing critical thinking ability. When students find themselves in the role of the patient or family member, they can gain important insights and perspectives. One study which had 164 nursing students engaged in simulation playing different roles (family member, patient, primary nurse or unlicensed personnel), showed that although they did have some effective reflections, the students still reported a lack of confidence in their decision-making ability, even commenting on feeling "panicked" and "not knowing what to do" in the situation (Ertmer et al., 2010).

In another study, a group of nursing students experienced a simulated clinical activity near the end of their nursing program, and then were expected to resolve a health care dilemma as a discussion group. Utilizing the critical thinking measurement instrument through Assessment Technologies Institute (ATI), these students were tested at the beginning of the program and then again at the end, after they had completed the simulated experience. The researcher found no significant differences in critical thinking ability between the pre and posttests (Mann, 2012). Students commented that although they felt the simulated activity helped them to feel more prepared for the live clinical setting, they did not feel that the experience enhanced their critical thinking ability. Mann concluded that since it is simply not plausible to teach students all the content that they might need in the health care setting, perhaps a better strategy might be to provide a guiding framework that could help them to develop their critical thinking ability. Having students work in small groups can create a synergistic environment that can lead to improved thought processes, but that type of instruction requires expensive faculty and equipment resources (2012).

Problem-based learning.

The use of problem-based learning has been used for decades in nursing education with some degree of effectiveness in teaching sound clinical reasoning (Brunt, 2005). Actual patient cases can be presented in the classroom or clinical setting and analyzed to determine the best course of action that should be taken in the care of that patient. Theoretically then, when the student is exposed to a similar situation in the future, they would be able to critically think through it and make an appropriate clinical judgment. A study that focused on the use of problem-based learning found that this strategy was an effective means of teaching students how to critically think through a patient situation, thus promoting active learning. The author was dismayed however, at the lack of use of this strategy amongst nurse educators. She suggested this lack of use could be due to the time-consuming nature of the development of sound case studies, as well as the need for faculty to be confident in their ability to guide students through the cases in order to make the learning effective (Popil, 2011).

Through systematic reviews of problem-based learning studies, it was determined that although students do sometimes report improved confidence in their decision-making ability after discussion of cases, there simply is not enough conclusive evidence that this strategy is truly effective. This was explained by suggesting that before students can truly become effective critical thinkers, they must first gain self-awareness of their own behavioral, environmental and metacognitive influences on higher order thinking skills. Consistency amongst faculty was also noted as a barrier to this teaching strategy as students were subjected to this style in some courses but not in others, which led to an inability to consistently practice this form of learning. It has also been suggested that

more randomized controlled trials are needed to determine the effectiveness of this teaching strategy (Kong et al., 2013; Yuan et al., 2008).

Critical incident discussions, reflective writing and concept mapping.

The discussion of critical incidences that occur in the live clinical setting is another strategy for teaching critical thinking. Nurse educators often use real-life situations that occurred during the clinical rotation in the acute-care setting as a means of dialogue at the end of the clinical day. Instructors often use a "post-conference" time at the end of the clinical day to reflect on such happenings. This type of reflection can be very relevant for the student who was personally involved, but could be limited in relevance for their classmates (Alphonso, 2007).

The attitudes and beliefs of the educator play an important role in these types of live debriefings. The instructor needs to understand the importance of allowing the discussion to be student-driven, letting them come to their own conclusions while being gently led by an experienced faculty member. Research has shown that if an instructor is not experienced or knowledgeable about nursing education trends and critical thinking, they will be ineffective in facilitating the acquisition of that skill (Chan, 2013). Reflective writing helps the learner to assess their practice and explore reactions while concept mapping helps the student to discuss relationships among systems and make new connections to future exposures in the health care setting (Brunt, 2005). One study demonstrated that the use of concept mapping was valuable for new nurses as part of their orientation to a critical care unit. The five key indicators reviewed were: problem recognition, clinical decision-making, prioritization, clinical implementation, and

reflection. Nurses improved in all those areas after an intensive 12-week orientation, which included the use of concept mapping (Wahl & Thompson, 2013).

In an attempt to improve patient outcomes and increase safety for patients, one researcher utilized a strategy of intensive guided debriefings at the end of the clinical day. In post conferences, student groups discussed their patient data, and considered other case studies while formulating hypotheses about their patient's problems and strengths, all in an effort to create a meaningful plan of care for the patient, which would result in the best outcome. The instructors modeled an attitude of inquiry by guiding them into the best decisions. When a student came to a poor conclusion, the instructor would use a Socratic method of questioning to assist them back to the correct path. This type of coaching, while effective, requires a great deal of experience, not only in nursing care, but also in coaching students in a way that preserves their self-esteem and confidence (Tesoro, 2012).

While on the topic of coaching, recognizing the importance of capturing a teachable moment is an important concept to grasp in nursing education. The teaching of critical thinking and sound clinical decision-making does not occur in isolation (Dowding et al., 2012). Nursing education is complex and requires many layers of strategy in order to be effective. A combination of helping students to better understand their own ways of thinking and then guide them into the correct decision-making pathways creates an environment that has the potential to be rich in learning.

Nurse residency programs (NRPs).

In response to a call for transformation in nursing education, one nurse researcher has made recommendations that suggest a paradigm shift in prelicensure nursing

education. Tanner (2010) cites several recent publications including the Institutes of

Medicine's (IOM's) *The Future of Nursing: Leading Change, Advancing Health* and the

Carnegie Foundation for the Advancement of Teaching, suggesting a change is occurring

in the workplace environments for new nurses. While many new graduate nurses begin

their careers in acute care settings, many of them migrate to non-acute care settings such

as ambulatory clinics, long-term care, schools and public health settings in a relatively

short time frame in their first year as a nurse. These community-based settings require a

highly skilled nurse, one who is capable of independent thought and sound clinical

reasoning. Because of that, nursing educators must consider curriculum redesign to

better prepare this nurse. One suggestion made by Tanner (2010) is to increase nurse

residency programs, thus keeping the new nurse with a preceptor for an extended period

of time. While this model might indeed be an excellent way for newly graduated nurses

to increase their skill levels, these programs are costly to sustain. One source cited a

figure of nearly $22,000 per nurse for a nurse residency program (Thrall, 2007). Another

source cited a cost of $150,000 to $1,000,000 is being spent in America's hospitals just to

orient new nurses utilizing the model of nurse residencies (Greene, 2010).

NRPs are multi-faceted, containing components such as direct instruction with

case studies, clinical immersion, mentoring support, and debriefing in the hospital setting.

NRPs are becoming more popular in American hospitals due to the high rate of turnover

of new graduate nurses. Some statistics have suggested a turnover rate as high as 75%

within the first 12 months of hire (Trepanier et al., 2012). This high rate of turnover

could be related to the burn out that occurs early on when new graduates feel

overwhelmed with the demands of the job. One survey of nurse executives found that only 10% of those surveyed believed new graduates are competent (Berkow et al., 2009).

The cost of this high turnover rate is astounding. Costs have been reported to be in the neighborhood of $18 million for hospitals that do not have a nurse residency program in place. With the addition of residency programs, one source reported the turnover cost has dropped to just under $3 million (Trepanier et al., 2012), while another source reported a retention rate of 95.6% in hospitals that utilized an NRP (Welding, 2011). While those statistics are notable, others have inquired as to who should be responsible to pay for this high cost of orientation. Since more and more patients receiving care in hospital settings are Medicare-aged, it has been suggested that new policies should be in place that oblige the federal government to be responsible to pay for costly nursing orientations, mandating formal internships for all new graduates (Greene, 2010). This could result in a more confident and competent nurses at the bedside, however, the cost of these extended orientations could end up further crippling an already limping economy. Overall, researchers seem to agree that more research is needed to determine the success and financial effectiveness of NRPs. Because different tools are used to evaluate effectiveness of the extended training, it is then difficult to make sound conclusions (Anderson, Hair, & Todero, 2012).

The Reality of Critical Thinking Ability in New Graduate Nurses

Despite the best efforts of nurse educators to provide active learning environments with the goal of facilitating the acquisition of critical thinking skills, the research is highly suggestive in reporting that these new graduates are still not capable of sound clinical judgments. Through questionnaires, surveys and interviews, both

quantitative and qualitative research has revealed a pervasive gap in the ability to effectively teach critical thinking skills. One nurse researcher developed a system which assessed the performance of new nurses in the clinical setting. This Performance-Based Development System (PBDS) has been used in more than 350 health care agencies in 46 states to assess nurse's critical thinking ability (Del Bueno, 2005). What Del Bueno's data reflects is that only 35% of new nurses meet the entry level expectations for clinical judgment.

A longitudinal study with nursing students regarding their thoughts on their acquisition of clinical reasoning skills utilized interviews, reflective journals, case studies and critical incident analyses. This study population was followed for four years, encompassing their first positions as licensed nurses. As nurses, they consistently commented that the prospect of having to "think on their feet" as a new graduate was stressful for them without the "security blanket" of an instructor present (Standing, 2007). The conclusion from the study was that in order to facilitate entry into the workplace, there needs to be more collaboration between education and health service partners to integrate critical thinking skills throughout the curriculum (Standing, 2007).

Another study investigated the critical thinking ability as well as the critical thinking disposition of undergraduate nursing students (Profetto-McGrath, 2003). The study aimed to determine if critical thinking skills increased throughout the nursing program. Students took the California Critical Thinking Skills Test (CCTST) as well as the California Critical Thinking Disposition Inventory (CCTDI). Results of these tests indicate that approximately 38% of students had adequate levels of critical thinking skills and 85.5% had adequate levels of critical thinking disposition. These results indicated a

18

need to find ways to develop critical thinking skill and that disposition is crucial to critical thinking (Profetto-McGrath, 2003).

A study that examined the validity of using tests of critical thinking and critical thinking disposition with nursing students revealed some interesting findings. Nurse educators who taught content related to critical thinking were asked in a survey format to indicate the degree to which they believed that a list of skills and dispositions were essential to nursing practice. The educators were also asked to identify the five most important skills for nurses. Each of the skills identified related to problem solving and the ability to assess a situation or condition. The participants also indicated that all the traits seen in the CCTDI were essential to nursing practice and the development of critical thinking skills. As a measurement instrument, the educators indicated that although the CCTST includes skills that are important for nurses, those skills seemed only moderately reflective of the critical thinking skills required of nurses. The final point of this study suggested that nurse educators need to reexamine how critical thinking should be evaluated (Stone, Davidson, Evans, & Hansen, 2001).

In addition to the high cost of orientation previously described, another issue to consider is the threat to patient safety when new nurses are ill equipped to handle situations requiring critical thinking. As little as two to three years and as many as 10 years has been suggested as the requirement for a nurse to reach competency post-graduation from traditional nursing programs (Sportsman, Poster, Curl, Waller, & Hooper, 2012). One qualitative study asked experienced nurses who often act as preceptors for new graduates, to give their perspective on what sort of acute episodes challenge new graduate's competence (Hartigan, Murphy, Flynn & Walshe, 2010). The

respondents identified 41 challenging acute nursing episodes which encompassed four themes or aspects of competence. Those themes were patient assessment, interactions and communications, technical/clinical skills, and clinical decision making. Findings of this study will inform nursing education in an effort to create instruction that is congruent with the reality of the workplace environment (Hartigan et al., 2010). New graduate nurses have commented that they need to feel supported and unintimidated by more experienced co-workers. When identifying the correct interventions for a deteriorating patient, it was noted that new nurses felt more confident when they knew their preceptor would be supportive of their decisions. It was determined that when nurses admitted to feeling fearful of other staff nurses, their actions were limited and even delayed, leading to poor outcomes for their patients (Purling & King, 2012).

Providing the education required to graduate a competent and confident nurse is challenging for nurse educators. Many strategies have been employed to attempt to create a new graduate who possesses the ability to make sound clinical decisions, which require critical thinking skills. Each of these strategies have had some success, but all of them seem to fall short of effectively preparing the new graduate for the daunting task at hand when they begin their first job. This leads then to the strategy of costly NRPs and extended orientations. While these efforts have decreased some of the cost of turnover, the expense is nonetheless noteworthy. As mentioned before, no learning is done in isolation. Nursing education is complex and requires multiple layers of strategies to be successful. The next section will look to Strategic Management Simulations as a possible solution or layer over a successful curriculum to attempt to help students to gain

awareness of their cognitive behavior and improve in areas that could benefit from development.

The Addition of Strategic Management Simulations in Nursing Curriculum

Strategic Management Simulations (SMS) has been used extensively to test and train higher cognitive functions in persons who occupy professional and leadership positions (Satish & Streufert, 2002). Grounded in complexity theory, SMS places the participant in a simulated situation that is challenging and potentially stressful. Complexity theory considers the interaction between a stressful environment and the competency of the responses performed by the participant. It considers the "how" of thinking rather than only focusing on the "what" or specific knowledge at hand. This simulation is not industry-specific, but rather is generic in its approach, allowing for a thorough mapping of the participant's behavior in an out-of-context simulation. The learner is provided the opportunity to make decisions about the simulated events that are occurring, each decision creating a new series of events and decision-making possibilities. At the end of the assessment, a mapping of the participant's cognitive ability is provided. This assessment can then be followed with feedback and training which has been shown in some fields to improve ability by as much as 76% with extensive training (Satish & Streufert, 2002). It has been used in many different populations and fields, including the U. S. military, corporate America, and medicine, to predict competency in decision-making. SMS assesses decision-making ability based on 25 different characteristics of cognitive thinking. In one study, SMS scores were correlated to faculty ratings of medical residents. Results indicated that SMS does allow for assessment of decision-making abilities in residents. Several of the SMS parameters

correlated significantly with faculty ratings, identifying areas of strength and weakness. The study concluded with the recommendation that the simulation could be followed by focused training to further develop any areas of weakness (Satish et al., 2001).

Anecdotal data from those who have worked extensively with SMS, reveal it is technologically useful in the assessment of competence measurement, and even more and uniquely effective for assessment and training when professional task requirements are complex (Satish et al., 2005). SMS has yet to be used specifically with a cohort of undergraduate nursing students. As this review of literature has suggested, nurses are a group which require the ability to have sound decision-making and critical thinking skills. It is also evident that despite nurse educator's attempts at teaching these vital skills, new graduates are ill-prepared to handle the complexity of the environments in which they find themselves upon entering the workforce.

Today's nurse is required to possess skills and attributes necessary for complex decision-making. Many different teaching strategies have been employed to facilitate undergraduate nursing students in their acquisition of critical thinking skills which aid in making clinical decisions. Many of these techniques have been effective and yet, the research is conclusive that many new nurses are not capable of making sound clinical decisions for their patients. Extended orientations and nurse residencies offer some solutions yet are costly to maintain. With the ultimate goal of patient safety and optimal outcomes, nursing education must be redesigned to accommodate the ever-changing complex settings in which nurses find themselves. Former attempts at teaching critical thinking have only had minor successes. The addition of SMS along with feedback and

training could offer the missing link to the question of how to get students to think like

nurses.

CHAPTER 3

METHODOLOGY

Participant Characteristics

Sixty-four associate degree registered nursing students from a Midwestern

community college were asked to participate in the Strategic Management Simulation

(SMS) assessment in the fall of 2012 as part of their regular nursing curriculum. These

students were in the first semester of a four semester program. This sample, which will

now be referred to as group A, received the intervention. Study inclusion criteria was

simply being admitted and enrolled in the first course of the registered nursing program.

Students in this cohort ranged in age from 20 years to 61 years with an average age of 34.

The population was 86% female to 14% male. According to a survey conducted by the

Department of Health and Human Services and the Health Resources and Services

Administration (2010), these demographics mirror those of other Associate Degree

programs. According to that survey conducted in 2008, associate degree nursing students

average 32 years of age at the beginning of the program (US Department of Health and

Human Services, 2010). Archived data from a previous cohort of students who took the

SMS assessment in the spring of 2012, yet received none of the intervention, were used

as control group data. This group, referred to as group B, consisted of a group of 37

students who volunteered to take the assessment at the end of their "business as usual"

nursing program. They did receive feedback on their results but did not receive any

subsequent training regarding their areas of strengths and weaknesses. The demographics

of group B mirror that of group A in terms of gender and age.

Sampling Procedures and Size

This was a convenience sample as the researcher works as the director for the nursing program at the same college. The assessments were conducted in a computer lab on the college campus proctored by a team of researchers from State University of New York Upstate. Although the intervention was embedded into their regular curriculum, students were told they could refuse to participate without any repercussions related to their standing in the program or their grade for the current course in which they were enrolled. The assessment was part of the curriculum, and no identifying information will ever be tied to the data for publication. Due to the sole intent of the research being for the improvement of nursing education, an IRB exemption was requested. Sample size was dictated by the number of students in the class, or in the case of the control group, by the number of volunteers, however, in order to achieve a power of 0.60, using an alpha of 0.05, it was determined that 48 students would be necessary to perform meaningful statistical conclusions. Before data collection began for group A, there was a 6% attrition rate with a loss of four students from the program in the first few weeks. Two students were absent on the day of the assessment, one of which eventually withdrew from the nursing program, leaving the total number of assessments which formed the data set at 58. Since the fall of 2012, the class has decreased by another four students for a total attrition of 14% for this cohort. Perhaps significant to note, this attrition rate is highly unusual for this program. Average attrition rates in years prior and after this cohort are rarely above 5%. The number of assessments that will be done as a retest will, therefore, be 54. The sample size of the control group was 37.

Measures

The first SMS assessment was administered to the students during the first semester of the nursing program in October, 2012. Students were informed in advance that the assessment would take approximately two hours to complete. They were told that in the following semester, the research team would return and provide them with 1:1 feedback regarding the results of the assessment, as well as group and individualized training. They were also informed that they would be asked to retake the assessment at the end of their nursing program in the spring of 2014 in order to determine if there had been a change in critical thinking or decision-making ability. The terms, *critical thinking* and *decision-making ability* are used interchangeably. SMS defines these constructs as "cognitive processes that focus on (1) the application of learned factual knowledge, (2) thoughts that lead to effective problem solving, and (3) integrative and creative processes" (Satish et al., 2001, p. 557).

SMS Reliability and Validity

SMS has demonstrated high levels of predictive validity, reliability, and applicability to real world settings across multiple professions and disciplines. Data collected in various countries have demonstrated that the SMS simulation consistently predicts decision-making success across professional specialties, cultures and continents. Overall validity coefficients exceed $r = 0.6$ and reliability values range from $r = 0.7$ to 0.94. Test-retest reliabilities reach levels as high as $r = 0.84$ (Satish, et al., 2005; Satish et al., 2008). The simulation takes the participant through a series of events that are occurring in a fictitious city. Resources are provided and the simulation offers the participant many decision-making opportunities utilizing the resources at hand. Each

decision takes the student down a different path of future events and decisions. The simulation provides an assessment of one's cognitive ability on 25 different parameters such as, response speed, initiative, planning, and breadth of approach. Following the simulation, the computer calculates performance measures based on actions taken throughout the simulation. The measures load reliably on 12 orthogonal factors (Satish et al., 2001). The assessment's predictive nature has also shown reliability in accurately predicting leadership indicators such as "job level at age", "income at age", "number of persons supervised", and "number of job promotions during the last 10 years", thus having the ability to distinguish between successful and less successful persons (Satish, et al., 2001).

Research Design

This study was a quasi-experimental test-retest design with the intervention of feedback and training prior to retesting. The dependent variable being studied is critical thinking skills while the independent variable is the feedback and training provided by SMS. Students were simultaneously enrolled in the registered nursing program, wherein they received instruction didactically and clinically along with simulated clinical activities. Components of critical thinking and decision-making ability were threaded throughout the nursing curriculum. Due to the predictive nature of SMS, this research sought to determine if student's critical thinking ability was improved as a result of the training associated with SMS as evidenced by their retest scores on SMS. Archived data from a control group who did not receive training was compared to the intervention group's results on SMS scores derived at the end of the nursing program.

Intervention

Approximately six months following their initial SMS assessment, students received a 1:1 feedback session with a trained member of the SMS team. Team members were either psychiatrists or doctorally-trained psychologists in the field of clinical psychology. The results of the assessment were reviewed with each student, explaining the meaning of the scores. These results were provided with a written form of the feedback as well, which indicates areas of strength and areas that could be developed with training. This feedback was followed by training that the individual was encouraged to follow to increase their ability to think critically and make sound decisions. Initially, in the feedback session, the students were provided with some brief tips that the participant could begin employing to improve their critical thinking ability. After this initial feedback and training session, students were provided with an email and phone contact information for any follow-up questions or concerns that might arise.

A year after their initial feedback and training, each student, now in his/her fourth semester of the nursing program underwent further training just prior to being reassessed. This "booster" training is meant to reacquaint the participants with the basic constructs of the instrument just prior to retesting. After the reassessment was completed, the participants were provided with feedback on the results.

Data Analysis

The analysis of these data examined the proposed benefit of Strategic Management Simulations (SMS) on the development of critical thinking skills (CTS) in nursing students. The hypothesis analyzed determined if the feedback and training aspects of SMS increases CTS.

Preliminary analyses of the data was run to test for assumptions of normality, linearity, homogeneity of variance and multicollinearity. Analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 22. The design of the study is quasi-experimental, descriptive, and quantitative. It involved two cohorts of students referred to as group A (intervention group) and group B (control group). First, means and standard deviations were run on the assessment data of group B, and the pretest and posttest data of group A. An a priori and post hoc power analysis was conducted to determine effect size. With an alpha of 0.05 and a desired power of ≥ 0.6, it was determined that the sample size was adequate for a medium effect.

Inferential statistical analysis included both paired sample and independent sample t-tests. Means of the SMS scores were analyzed from both groups of students and compared. Group A student's posttest scores on SMS were compared to group B's end-of-program assessment scores (independent samples t-test). Means from group A's scores on pretest and posttest were also compared to see the benefit of the training on CTS (paired sample t-test). A Levene's test was conducted to ensure homogeneity of variances.

Ethical considerations.

Participants were assured that all data collected throughout this study was kept securely stored with all identifiers removed for confidentiality. Since the intervention for this study is incorporated into the present nursing curriculum with the sole purpose of improving nursing education and because all identifiers are removed, IRB exemption was sought. Due to the potentially stressful nature of taking the SMS assessment, students were assured that if they chose to not participate, or to not complete the assessment once

they had begun, such a decision would have no bearing on their standing in the nursing program. Even though this is part of the curriculum and 100% participation was the aim, participation was voluntary.

Study activity timeline.

Spring 2012: Cohort of 37 students (group B) took the SMS assessment at the end of their nursing program. Feedback was given after the assessment in a written and verbal format, but no training is provided.

Fall 2012: Cohort of 58 students (Group A) took the SMS assessment near the beginning of their nursing program.

Spring 2013: Student in group A were provided with 1:1 feedback and group training to gain increased understanding of the results.

Spring 2014: Booster training was provided to group A followed with re-testing of the SMS assessment.

CHAPTER 4

RESULTS

The purpose of this study was to determine if the addition of Strategic

Management Simulations (SMS) to an associate degree nursing program would increase

decision-making ability in the graduates by the end of their program. SMS is both an

assessment tool as well as a training tool. Study data were collected from two groups of

students. Group A completed the SMS assessment at the beginning of their nursing

program. These participants then had feedback and training at two different times during

the next two years. At the end of their program, they were reassessed using SMS data as

a posttest. Group B was a comparison group of students who took the SMS assessment at

the end of their nursing program, having no prior experience or training in SMS. This

data serves as a comparison with group A, who received the intervention to determine its

efficacy. The study participants were assessed via a computerized simulation, followed

by feedback, and then both group and individual training aimed at developing areas that

scored lower on the initial assessment. SMS has been utilized in many different

populations including graduate medical education but has never before been tested with a

group of undergraduate nursing students. SMS has 25 different parameters of cognitive

behavior which can be assessed; five, identified by the developer of the system, were

used to answer the research questions for this study. The parameters used were: Basic

Activity Level (BAL), Task Orientation (TSKOR), Initiative (INIT), Information

Utilization (INFOUTIL), and Breadth of Approach (BOA) (See Appendix B). Those five

parameters have been determined by the developer to be the most important and relevant

to medicine after working with over a hundred focus groups (U. Satish, personal communication, August 27, 2014).

Subjects and Setting

IRB approval was secured through the Social Science Institutional Review Board at the University of Missouri-Kansas City prior to any data being released to the researchers. The study setting was a suburban Midwestern community college which offers an Associate's Degree in Nursing. The study population was attained using convenience sampling techniques. The study data set reflects 44 participants for Group A (intervention group) and 35 participants for Group B (control group). According to Erdfelder, Faul, and Buchner (1996), when a pre-post design is utilized, this study population provides the ability to determine a moderate effect, with a significance of 0.05. All study data were collected at the study site in a computer lab which was proctored by SMS personnel.

Demographically, the participants in this study (group A and group B) ranged in age from 20 years to 61 years with an average age of 34. The study population was primarily female (86%). Comparing these results to those available from the Department of Health and Human Services and the Health Resources and Services Administration (2010), this study population mirrors those enrolled in other Associate Degree programs. According to that survey conducted in 2008, associate degree nursing students average 32 years of age at the beginning of the program (US Department of Health and Human Services, 2010).

Preliminary analysis of these data was performed to check for assumptions of normality, linearity, homogeneity of variance and multicollinearity. Normality can be

assumed by reviewing the histograms and the skewness, which revealed a fairly normal distribution for all the parameters assessed. Linearity was confirmed with a scatterplot which showed that the variables were related in a linear fashion. Homogeneity of variance was determined with a Levene's test which was conducted using the data from group B. An independent samples *t*-test was done comparing group A to group B. Equal variances were assumed with a Levene's test in all the parameters with the exception of BOA. That specific parameter has a very narrow range of scores, violating the assumption of equal variance. Multicollinearity of these data was assumed, based on the developer's report of 12 orthogonal factors. Thus correlation among the independent variables had been previously validated. Power analysis was done post hoc which revealed a moderate effect size with a power of 0.60 and an effect size of 0.05 (Erdfelder, et al., 1996).

Mean scores on all parameters except *initiative* increased from pretest to posttest in group A. Ranges of scores on all parameters narrowed in group A between pretest and posttest. Mean scores on all parameters except *initiative* increased between group A and group B, with group A's scores being higher than those of group B. Again, the ranges of scores narrowed in all parameters in the data set comparing group A to group B. Consultation with an SMS expert revealed this to be a common finding because with training, one would expect to see more homogeneity within the group assessed. However, since these scores reflect behaviors, it is also expected to see more variability, and the resulting wide ranges in scores, than in other standardized types of tests (U. Satish, personal communication, August 27, 2014).

Research Question 1

Is there a change in SMS scores after feedback and training in the intervention group?

Table 1 shows the results of the means of both the pretest and posttest for group A. Means increased in all parameters with the exception of *initiative*. The table also shows the ranges of scores for pretest and posttest data.

Table 1: Range of pre/posttest scores and means for Group A.

SMS Parameters	Pretest range of scores	Pretest Mean Scores	Posttest range of scores	Posttest Mean Scores	Mean Difference	%Change of Mean
Basic Activity Level (BAL)	8-150	59	27-187	93	34	+36%
Task Orientation (TSKOR)	0-165	41	17-162	75	34	+45%
Initiative (INIT)	0-73	13	1-52	9	-4	-44%
Information Utilization (INFOUTIL)	1-2	1	1-7	2	1	+50%
Breadth of Approach (BOA)	3-9	6	4-9	7	1	+7%

A paired samples *t*-test was conducted to assess the difference in SMS scores before and after feedback and training. Students in group A participated in the SMS assessment at the beginning of their nursing program in the fall, 2012. Six months after the assessment, the students received 1:1 feedback with a trained expert in SMS, plus a group training session with all the participants, also conducted by an expert in SMS. In April, 2014, toward the end of their nursing program, the group received a "booster" training session which was followed by the retest assessment. Table 2 shows the results of the paired samples (within subjects) *t*-tests.

Table 2: Paired samples t-test for Group A showing significance in SMS parameters between pretest (2012) and posttest (2014) (N=44).

SMS Parameters	Mean Difference	Standard Deviation	*t*	df	Significance (2-tailed)
Basic Activity Level (BAL)	33.4	30.2	7.351	43	**.000***
Task Orientation (TSKOR)	33.7	30.5	7.322	43	**.000***
Initiative (INIT)	-4.1	19.3	-1.410	43	.166
Information Utilization (INFOUTIL)	1.3	1.3	6.404	43	**.000***
Breadth of Approach (BOA)	1.4	1.5	6.300	43	**.000***

*p< 0.05

Research Question 2

Is there a difference between the intervention group's (group A) and the control group's (group B) SMS scores at the end of the nursing program?

As was discovered in the group A pretest/posttest data, the mean scores in the comparison data also revealed an increase in all the means for group A participants, as compared to group B, with the exception of the parameter of *initiative*. Group A had higher scores on the other four parameters on posttest in 2014 than Group B did when they took the assessment at the end of their nursing program in 2012 (see Table 3).

Table 3: Descriptive statistics comparing group A (2014 posttest after SMS training) and group B (2012 end of program assessment with no SMS training).

SMS Parameters	Group B Range of Scores 2012	Group B Means 2012	Group A Range of Scores 2014	Group A Means 2014	Mean Difference	% Change of Mean
Basic Activity Level (BAL)	18-222	**78**	27-164	**91**	13	+14%
Task Orientation (TSKOR)	12-187	**74**	17-162	**79**	5	+6%
Initiative (INIT)	1-98	**11**	1-52	**10**	-1	-10%
Information Utilization (INFOUTIL	0-7	**1.2**	1-7	**2.4**	1.2	+50%
Breadth of Approach (BOA)	1-3	**1.5**	4-9	**7.3**	5.8	+79%

An independent samples *t*-test was conducted to assess the difference between group A, who received feedback and training between assessments, and group B, who was assessed at the end of their nursing program without any prior knowledge or training in SMS. Table 4 shows the results of the independent samples (between subjects) *t*-test.

Table 4: Independent samples t-test. Differences between group B, assessed at the end of program, and group A's posttest, assessed at the end of program (N=35).

SMS Parameters	Mean Difference	Standard Error Difference	t	df	Significance (2-tailed)
Basic Activity Level (BAL)	-12.8	10.5	-1.480	68	.224
Task Orientation (TSKOR)	-5.2	8.8	-.746	68	.560
Initiative (INIT)	1.0	3.5	.316	68	.767
Information Utilization (INFOUTIL)	-1.2	.31	-5.354	68	**.000***
Breadth of Approach (BOA)	-5.8	.25	-28.732	68	**.000***

$*p< 0.05$

CHAPTER 5

DISCUSSION

The data obtained for this study provides the ability to determine the potential for Strategic Management Simulations (SMS) to improve decision-making skills among undergraduate nursing students. Strategies which improve critical thinking abilities among nursing students are desired, as these skills have been linked to decreasing medical errors (Berkow, et al., 2009) and job retention (Anderson, et al., 2012). A review of literature failed to identify supplemental instruction programs, or teaching strategies focused on improving this skill (del Bueno, 2005; Tanner, 2006; Hartigan, et al., 2010; Katander-Unkari, et al., 2013).

The statistical analysis determined that, despite some limitations, there was a difference in outcomes following the SMS feedback and training in some parameters of cognitive behavior. Because of these findings, further research would be warranted to establish if the addition of SMS to a nursing curriculum could enhance graduate's ability to make sound clinical decisions for their patients as they enter the workforce.

Research Question 1 Conclusion

The results of this study indicated there was an increase in SMS scores after feedback and training on the posttest assessment in all parameters except *initiative*. The parameters showing the largest change were *basic activity level* (36% increase), *task orientation* (45% increase), and *information utilization* (50% increase). The parameter of *breadth of approach* increased by 7%. The parameter of *initiative* actually decreased on posttest by 44%. Finding no research that has been done which would analyze the possible unique attributes of nursing students, one could ponder whether that finding was

38

an anomaly or perhaps consider that nursing students tend to already possess a high level

of initiative upon entering a nursing program, which could explain the aberrant finding.

Paired sample *t*-tests showed a statistically significant difference between the means of

the pretest and posttest assessment in group A (within subjects). Again, all parameters

except *initiative* were significant (p < 0.05). See Table 2 for a summary of the paired

sample *t*-tests.

Research Question 2 Conclusion

The results of the study for this research question indicated an increase again in

all parameters with the exception of *initiative* for group A, which participated in feedback

and training. All study participants completed the SMS assessment at the end of their

respective nursing programs. Group B was at the end of a "business as usual" program

and had no prior knowledge or training in SMS. Group A was also assessed at the end of

their program after having been exposed to SMS at the beginning of their program, and

then had feedback and training prior to their retest two years later. Percent changes

ranged from +6% for *task orientation* to +79% for *breadth of approach*. An independent

samples *t*-test was conducted on these data, comparing group B to group A, with results

demonstrating a statistically significant difference between the means for group B and

group A for the parameters of *information utilization* and *breadth of approach* (p <0.05).

See Table 4 for a summary of the independent samples *t*-test.

Implications for Nursing Education

The literature cited supports the idea that despite the best efforts of nurse

educators to prepare students for the workplace, their ability to think critically and make

decisions for their patients is a skill that takes many years to attain. Teaching strategies

such as high-fidelity simulation (Kneebone, 2004; McKeon, 2009), problem-based learning (Brunt, 2005; Popil, 2011), critical incident discussions (Alphonso, 2007) and concept mapping (Wahl & Thompson, 2013) have all had some success in helping students to learn to think critically. The reality remains that new nurses report feeling ill-equipped to manage their patients for up to 10 years post-graduation (Sportsman, et al, 2012). This reality was further supported by del Bueno's research using the Performance-Based Development System, which determined that only 35% of all newly graduated nurses were able to critically think through a patient situation and make appropriate decisions for them with optimum outcomes (2005).

According to the American Association of Colleges of Nursing (AACN), the nursing profession in the United States will be challenged with a serious manpower shortage over the next decade. Considering replacements for retiring nurses, as well as the aging population in our country increasing the need for more health care providers, the AACN and the Bureau of Labor Statistics estimates there will be a need for just over a million new nurses by the year 2022 (Rosseter, 2014). That number includes approximately 500,000 nurses who are facing retirement in the next 5-10 years. The sobering thought of a half million experienced nurses being replaced by a half million new nurses who do not have the ability to make sound decisions should certainly give pause to consider what that could mean for the care of our nation's people. This critical need does not allow for the luxury of time to develop new nurses at the pace formerly accepted by nursing education. The industry must consider alternatives to former educational pedagogies if nurses are expected to be prepared at graduation to handle the demands of the job.

Significance of SMS parameters.

The findings of this research indicated that a strategy such as SMS could be an

important link that could be infused into nursing curricula with a desired outcome of

graduate nurses who are more able to make sound clinical decisions for their patients.

Cognitive behavior is complex and must be understood by educators in order for the

concepts to be taught to students. While some of the parameters in SMS are considered

lower level skills, the more complex behaviors considered to be high-level skills were

determined to be those which attained the most significance when comparing group A to

group B. Group A's pretest-posttest results on the paired samples *t*-test revealed a

significant increase in all but one parameter measured (*initiative*). However, even more

compelling is the fact that when comparing those results from group A, who had

exposure to SMS concepts through feedback and training, to group B, who did not, the

parameters that were statistically significant were the high level cognitive behaviors of

information utilization and *breadth of approach* (see Table 4).

Information utilization is a parameter that deals with how information is

determined to be appropriate and useful to the situation at hand. According to SMS

experts, this behavior is more amenable to training and development because it is more

structured. Nurses are faced with a never-ending barrage of information and so how that

information is interpreted and then used is vital to patient outcomes.

Breadth of approach (BOA) is another high-level behavior that requires the

individual to have the capacity to differentiate and use multiple approaches in a given

situation in order to achieve optimal performance. BOA is tied to strategy and is linked

to leadership. The individual must be able to both differentiate the information given, as

well as integrate the information to make the best decisions. BOA could be considered by nursing education as a terminal objective for a graduate, as this behavior allows a nurse to adapt to a situation and quickly make decisions.

The findings of the independent samples *t*-test between the two groups of students revealed a significant change in these high-level cognitive behaviors after exposure to SMS, making it seem reasonable to posit that exposure to the process of thinking could impact nursing student's ability to think more critically after graduation. Nursing students come to their respective programs with a set of attributes that has prompted them to seek out a career in health care. Based on the findings of this study, perhaps nursing students already come with a certain aptitude for *initiative* and maybe even *basic activity* and *task orientation*. The higher-level parameters, such as *information utilization* and *breadth of approach,* that are so crucial to safe nursing care, may not be present until exposure and training spurs the student to consider the "how" and not just the "what" of their thinking. The reality is that the number of people leaving the profession is increasing, thus nursing educators must develop and implement new strategies to facilitate the development of those skills and attributes necessary for new graduates to safely and competently navigate through their entry into this career. The health care industry cannot afford to have a 5-10 year gap in which retired nurses are replaced by novice nurses who do not possess the ability to provide safe, competent care. The findings of this small study support the need for nurse educators to include supplemental methods which improve these skills while enrolled in a nursing program.

Recommendations for Future Research

The encouraging results from this study could be the impetus needed for future research in nursing education aimed at the development of critical thinking and decision-making ability. A study such as this could be replicated with all students being assessed and only some getting training prior to retest, but beyond that, other ideas for future work could include, looking at links to academic scores, links to the use of high-fidelity simulation, and possibly a mixed method study which could include focus groups and interviews with nursing graduates.

Research among various populations, specifically demographically diverse by age, gender, previous educational exposures, and geographical setting would identify the student who would attain the greatest benefit from SMS. Thus, cost-effectiveness of the program could be determined while capturing and intervening for the student most at risk for program incompletion, or providing safe, effective care upon graduation.

Cognitive behavior and the link to academic scores.

SMS provides a glimpse into the activity of the brain in terms of the processes used in making crucial plans and decisions. Colleges and universities have a plethora of data stored on each student regarding their academic success, such as admission grade point averages (GPA), scores from standardized tests such as SAT and ACT, as well as evaluations on exams and clinical activities throughout a nursing program. These data points could be linked with scores on SMS to determine if there are any connections between academic success and cognitive ability. The SMS model could even be considered for use as an admission criteria variable if it was determined that scores on certain parameters seemed to pair with ultimate success in a program. To be sustainable,

the SMS tool would need to be modified for length and complexity to make it both affordable and reasonable in the timeframe allotted. With the goal of developing the most competent nurses possible, faculty who work with those students in the clinical settings could be asked to rank them based solely on their observations of them in the clinical setting. Any links between those perceived "best" nurses and their individual strengths noted on SMS as well as their scores of academic success could all be analyzed for possible significant correlations.

SMS and high-fidelity simulation.

In order to facilitate student's understanding of the concepts of the process of thinking, educators must first understand those concepts and then include them into the language of the instruction so that students become familiar and are then able to develop their cognitive ability. Students are being placed more and more in simulated clinical activities due to the controlled and safe environment that educational strategy provides. When a student is in a simulated setting, they can be allowed to make mistakes, even critical ones, without harming a live patient. This experience provides the learner with a unique opportunity to gain confidence and skill in decision-making, even more so than in a live setting since in the simulated setting, they are placed in the role of the nurse, not a student. This setting, in conjunction with SMS, or exposure to the concepts of SMS, could challenge the student to think even more about the process of their thinking in a way that would enhance their learning and ultimately graduate a more confident and effective decision-maker. Students could be given a version of SMS at the beginning of the program to determine a baseline of their ability. As they progress through the program, with subsequent exposure to the language of the process of thinking, including

during simulation debriefings, they could then do self-evaluations after each simulated activity which would cause them to reflect on their cognitive behavior and decision-making skill development. A reassessment with SMS at the end of program could reveal important findings regarding their cognitive development.

Mixed methods study.

Adding a qualitative component to a study could provide descriptive data which would provide rigor and depth to this topic. Following a program of study in which the concepts of cognitive behavior and critical thinking are embedded and discussed regularly, graduates could be asked to return at set intervals of time over a two year period following graduation. Focus groups and interviews could be done in which graduates would be asked to consider their development and success in those first two years of working as a nurse. Surveys could also be done simultaneously which would provide quantitative data as well.

Studies such as this were cited in the review of literature (Chapter 2) of this dissertation wherein graduates were surveyed for perceptions of their ability as a new nurse (Standing, 2007), as well as preceptors for those new nurses being asked how they felt the new graduates were performing (Hartigan, et al., 2010). In both studies, the new nurses and the preceptors felt there was a lack of ability and confidence regarding decision-making for their patients. The difference with this proposed study would be that the students would have been more exposed to concepts of the process of thinking in both classroom settings as well as simulated and live clinical settings. The mere exposure could enhance self-awareness and understanding to the point of seeing a more significant improvement of ability.

Final Thoughts

        The nursing shortage in the United States is a critical reality with estimates of nearly half a million experienced nurses retiring in the next five years, coupled with the aging population, which will lead to even more demand for health care workers. The nursing profession is challenged to educate and prepare a new workforce of nurses who can be ready to take up the charge expected of them. Previous efforts at teaching the principles of critical thinking and clinical decision-making have been less than effective. Nurse residency programs are effective but costly. Now is the time to foster new ways of developing nurses and their ability to be safe and competent care providers. The results of this study show that the addition of even a small amount of exposure and training in the concepts of cognitive behavior afforded significant findings and should encourage further research to determine the most effective strategy for teaching these concepts. These concepts must be introduced at the beginning of the program and be threaded throughout, permeating all areas of the program, including the classroom, the simulation lab, and acute care settings. Graduates must be followed into the workplace to ensure they are thriving in a challenging workforce that demands and deserves competence.

Appendix A

Total SMS Parameters (Satish, U. & Streufert, S., 2002).

1. Basic activity level: number of actions taken

2. Applied activity: opportunistic actions

3. Focused activity: strategic actions in a narrow endeavor

4. Response speed: delay between information receipt and action

5. Task orientation: focus on concurrent task demands

6. Contextual responsiveness: responses to immediate context

7. Basic initiative: development of new (creative) activities

8. Independent applied activity: creative goal directed activities

9. Applied initiative: opportunistic creativity

10. Information orientation: openness to and search for information

11. Emergency responsiveness: decisiveness during emergencies

12. Response timing: rapidity of decisive emergency action

13. Strategic emergency optimization: use of strategy to handle an emergency

14. Applied emergency optimization: use of opportunism in handling
    emergencies

15. Basic recovery: return to a strategic planning mode after resolution of
    emergency conditions

16. Independent applied activity: capacity to shift from information based
    responses to self-initiated ideas and utilization of those ideas in an
    opportunistic fashion

17. Breadth of approach: flexibility in approach to the task

18. Breadth of strategic initiative: capacity to develop and plan actions that are not directly suggested by external events, yet interrelate diverse activities

19. Planning distance: the length of time over which plans extend

20. Balanced planning: interrelating multiple plans toward strategy

21. Follow-through: capacity to change action plans upon drastic changes in the situation

22. Basic strategy: the number of strategic actions

23. Planning strategy balance: proportion of plans that are translated into strategic action

24. Encompassing strategy: strategic action sequences that interconnect diverse areas of endeavor

25. Advanced strategy: interconnections among multiple strategic plans and their action sequences toward multiple goals

Appendix B

Measured SMS Parameters

1. Basic Activity Level (BAL)

   This is a basic parameter that includes both applied and focused activities. Activity includes many things—can be complex and multifaceted. This is the beginning of decision-making—what a person will do—what's going on in their mind.

2. Task Orientation (TSKOR)

   This is a measure of responsiveness and indicates a level of commitment. Students draw on commonalities searching for a frame of reference. This also requires the ability to draw on prior experiences to know what to do with the situation at hand.

3. Initiative (INIT)

   Self-generated actions which are related to innovation and creative thinking. Requires application and focus to be useful.

4. Information Utilization (INFOUTIL)

   Self-generated search for information followed by the determination if the information is appropriate, useful, or random. The learner ponders if the information will enhance the plan or performance.

5. Breadth of Approach (BOA)

   High-level cognitive behavior in which optimal performance will rely on the capacity to differentiate and use multiple approaches. High scores would indicate

an ability to develop, plan, and carry out goal-desired actions. BOA allows the

learner to adapt to fast-changing situations and make appropriate decisions.

UMKC
Office of Research Services

UMKC
5319 Rockhill Road
Kansas City Missouri
TEL: 816 235-5927
FAX: 816 235-5602

NOTICE OF EXEMPT DETERMINATION

Principal Investigator: Peggy Ward-Smith
School of Nursing
Kansas City, MO 64108

Protocol Number: 14-242
Protocol Title: Developing Critical Thinking Skills in Undergraduate Nursing Students Using Strategic Management Simulations
Type of Review: Administrative Review

Date of Determination: 05/16/2014

Dear Dr. Ward-Smith,

The above referenced study was reviewed and determined to be exempt from IRB review and approval in accordance with the Federal Regulations 45 CFR Part 46.101(b).

This study was classified as exempt in accordance with exemption criteria #4 in the Federal Guidelines 45 CFR Part 46 as follows: "Research involving the collection or study of existing data, documents, records, pathological specimens or diagnostic specimens, if these sources are publicly available or if the information is recorded by the Investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to subjects."

This approval includes the following documents:
Attachments
      KLaMartina IRB supervisory approval form
      Research Proposal(2)
      SMS parameters KLaM study
      IRB letter

You are required to submit an amendment request for all changes to the study, to prevent withdrawal of the exempt determination for your study. When the study is complete, you are required to submit a Final Report.

Please contact the Research Compliance Office (email: umkcirb@umkc.edu; phone: (816)235-5927) if you have questions or require further information.

Thank you,

Simon MacNeill
AHSIRB

References

American Association of Colleges of Nursing (2008). *The essentials of baccalaureate education for professional nursing practice*. Washington, D. C.: Author.

Alphonso, C. (2007). Reflection on a critical incident. *Contemporary Nurse*, *24*(1), 89-92. Doi: 10.5555/conu.2007.24.1.89

Anderson, G., Hair, C., & Todero, C. (2012). Nurse residency programs: An evidence-based review of theory, process and outcomes. *Journal of Professional Nursing*, *28*(4), 203-212. Doi: 10.1016/j.profnurs.2011.11.020

Berkow, S., Virkstis, K., Stewart, J., & Conway, L. (2009). Assessing new graduate nurse performance. *Nurse Educator*, *34*(1), 17-22. Doi: 10.1097/01.NNE.0000343405.90362.15

Brunt, B. A. (2005). Models, measurement, and strategies in developing critical-thinking skills. *The Journal of Continuing Education in Nursing*, *36*(6), 255-262.

Chan, Z. (2013). A systematic review of critical thinking in nursing education. *Nurse Education Today*, *33*(3), 236-240. Doi: 10.1016/j.nedt.2013.01.007

Clark, C. M., & Springer, P. J. (2012). Nurse residents' first hand accounts on transition to practice. *Nursing Outlook*, *60*, E2-E8. Doi: 10.1016/j.outlook.2011.08.003

del Bueno, D. (2005). A crisis in critical thinking: Why can't new registered nurse graduates think like nurses? *Nursing Education Perspectives*, *26*(5), 278-282.

Dickson, G. L. & Flynn, L. (2012). Nurses' clinical reasoning: Processes and practices of medication safety. *Qualitative Health Research*, *22*(1), 3-16. Doi: 10.1177/1049732311420448

Dowding, D., Gurbutt, R., Murphy, M., Lascelles, M., Pearman, A., & Summers, B. (2012). Conceptualising decision making in nursing education. *Journal of Research in Nursing*, *17*(4), 348-360. Doi: 10.1177/1744987112449963

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments and Computers, 28*, 1-11.

Ertmer, P. A., Strobel, J., Cheng, X., Chen, X., Kim, H., Olesova, L., Sadaf, A., & Tomory, A. (2010). Expressions of critical thinking in role-playing simulations: Comparisons across roles. *Journal of Computing in Higher Education*, *22*(2), 73-94. Doi: 10.1007/s12528-010-9030-7

Facione, P. A. (1990). The California critical thinking skills test: College level technical report #1—Experimental and content validity. Milbrae, CA: California Academic Press; ERIC Document ED 327-549.

Facione, N. C., Facione, P. A., & Sanchez, C. (1994). Critical thinking disposition as a measure of competent clinical judgment: The development of the California critical thinking disposition inventory. *Journal of Nursing Education*, *33*(8), 345-350.

Facione, P. A., Sanchez, C. A., Facione, N. C., & Gainen, J. (1995). The disposition toward critical thinking. *The Journal of General Education*, *44*(1), 1-25.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction (8th Edition)*. Boston: Pearson Education.

Greene, M. A. (2010). Paying for nursing orientation. *Journal for Nurses in Staff Development*, *26*(6), E3-E7. Doi: 10.1097/NND.0b013e3181fc0459

Guhde, J. (2010). Using online exercises and patient simulation to improve student's

    clinical decision-making. *Nursing Education Perspectives*, *31*(6), 387-389.

Hartigan, I., Murphy, S., Flynn, A. V., & Walshe, N. (2010). Acute nursing episodes

    which challenge graduate's competence: Perceptions of registered nurses. *Nurse*

    Education in Practice, *10,* 291-297. Doi: 10.1016/j.nepr.2010.01.005

Kajander-Unkari, S., Meretoja, R., Katajisto, J., Saarikoski, M., Salminen, L., Suhonen,

    R., & Leino-Kilpi, H. (2014). Self-assessed level of competence of graduating

    nursing students and factors related to it. *Nurse Education Today, 34*(5), 795-801.

    Doi: 10.1016/j.nedt.2013.08.009

Kneebone, R. L., Scott, W., Darzi, A., & Horrocks, M. (2004). Simulation and clinical

    practice: Strengthening the relationship. *Medical Education*, *38*, 1095-1102.

    Doi: 10.1111/j.1365-2929.2004.01959.x

Kong, L. N., Qin, B., Zhou, Y., Mou, S., & Gao, H. M. (2014). The effectiveness of

    problem-based learning on development of nursing students' critical thinking: A

    systematic review and meta-analysis. *International Journal of Nursing Studies*,

    51(3), 458-469 Doi: 10.1016/j.ijnurstu.2013.06.009

L'Eplattenier, N. (2001). Tracing the development of critical thinking in baccalaureate

    nursing students. *Journal of the New York State Nurses Association*, *32*(2), 27-32.

Mann, J. (2012). Critical thinking and clinical judgment skill development in

    baccalaureate nursing students. *The Kansas Nurse*, *87*(1), 26-30.

McKeon, L. M., Norris, T., Cardell, B., & Britt, T. (2009). Developing patient-centered

    care competencies among prelicensure nursing students using simulation. *Journal*

    of Nursing Education, *48*(12), 711-715. Doi: 10.3928/01484834-20091113-06

54

Popil, I. (2011). Promotion of critical thinking by using case studies as teaching method.

 Nurse Education Today, *31*, 204-207. Doi: 10.1016/j.nedt.2010.06.002

Profetto-McGrath, J. (2003). The relationship of critical thinking skills and critical

 thinking dispositions of baccalaureate nursing students. *Journal of Advanced*

 Nursing, *43*(6), 569-577.

Purling, A., & King, L. (2012). A literature review: Graduate nurses' preparedness for

 recognizing and responding to the deteriorating patient. *Journal of Clinical*

 Nursing, *21*, 3451-3465. Doi: 10.1111/j.1365-2702.2012.04348.x

Quaas, B., & Bjorklund, P. (2012). Start-up of a simulation center in an acute care

 hospital. *The Journal of Continuing Education in Nursing, 43*(6), 277-283.

 Doi: 10.3928/00220124-20120215-51

Rochester, S. Kelly, M., Disler, R., White, H., Forber, J., & Matiuk, S. (2012). Providing

 simulation experiences for large cohorts of 1st year nursing students: Evaluating

 quality and impact. *Collegian, 19*, 117-124. Doi: 10.1016/j.colegn.2012.05.004

Rosseter, R. (2014). Nursing shortage. *AACN online newsletter*. Retrieved from

 www.aacn.nche.edu/media-relations/fact-sheets/nursing-shortage

Satish, U., Krummel, T., Foster, T., & Krishnamurthy, S. (2005). Using strategic

 management simulation to evaluate physician competence: A challenge and a

 vision. *ACGME Bulletin*, 19-21.

Satish, U., & Streufert, S. (2002). Value of cognitive simulation in medicine: Towards

 optimizing decision-making performance of healthcare personnel. *Quality and*

 Safety in Health Care, *11*(2), 163-167. Doi: 10.1136/qhc.11.2.163

Satish, U., Streufert, S. & Eslinger, P. J. (2008). Simulation-based executive cognitive

 assessment and rehabilitation after traumatic frontal lobe injury: A case report.

 Disability and Rehabilitation, *30*(6), 468-478.

Satish, U., Streufert, S., Marshall, R., Stanley-Smith, J., Powers, S., Gorman, P., &

 Krummel, T. (2001). Strategic management simulations is a novel way to

 measure resident competencies. *The American Journal of Surgery*, *181*, 557-561.

Sportsman, S., Poster, E., Curl, E. D., Waller, P., & Hooper, J. (2012). Differentiated

 essential competencies: A view from practice. *The Journal of Nursing*

 Administration, *42*(1), 58-63. Doi: 10.1097/NNA.0b013e31823c1900

Standing, M. (2007). Clinical decision-making skills on the developmental journey from

 student to registered nurse: A longitudinal inquiry. *Journal of Advanced*

 Nursing, 60(3), 257-269. Doi: 10.1111/j.1365.2648.2007.04407.x

Stewart, S., & Dempsey, L. F. (2005). A longitudinal study of baccalaureate nursing

 student's critical thinking dispositions. *Journal of Nursing Education*, *44*(2), 81-

 84.

Stone, C. A., Davidson, L. J., Evans, J. L., & Hansen, M. A. (2001). Validity evidence

 for using a general critical thinking test to measure nursing students' critical

 thinking. *Holistic Nursing Practice*, *15*(4), 65-74.

Streufert, S., Pogash, R., & Piasecki, M. (1988). Simulation-based assessment and

 managerial competence: Reliability and validity. *Personnel Psychology*, *41*, 537-

 557.

Tanner, C. (2006). Thinking like a nurse: A research-based model of clinical judgment

 in nursing. *Journal of Nursing Education*, *45*(6), 204-211.

Tanner, C. A. (2010). Transforming prelicensure nursing education: Preparing the new

nurse to meet emerging health care needs. *Nursing Education Perspectives*,

31(6), 347-353.

Tesoro, M. G. (2012). Effects of using the developing nurses' thinking model on nursing

students' diagnostic accuracy. *Journal of Nursing Education*, *51*(8), 436-443.

Doi: 10.3928/01484834-20120615-01

Thrall, T. H. (2007). Shock absorbers: Hospital residency programs smooth the bumps

for new nurses. *Hospitals and Health Networks*, *81*(6), 60-64.

Trepanier, S., Early, S., Ulrich, B., & Cherry, B. (2012). New graduate nurse residency

program: A cost benefit analysis based on turnover and contract labor usage.

Nursing Economic$, *30*(4), 207-214.

U.S. Department of Health and Human Services; Health Resources and Services

Administration (2010). *The registered nurse population: Findings from the*

2008 national sample survey of registered nurses. Retrieved from:

http://bhpr.hrsa.gov/healthworkforce/rnsurveys/rnsurveyfinal.pdf

Victor-Chmil, J. (2013). Critical thinking versus clinical reasoning versus clinical

judgment: Differential diagnosis. *Nurse Educator*, *38*(1), 34-36. Doi:

10.1097/NNE.0b013e318276dfbe

Wahl, S. E., & Thompson, A. M. (2013). Concept mapping in a critical care orientation

program: A pilot study to develop critical thinking and decision-making skills in

novice nurses. *The Journal of Continuing Education in Nursing*, *44*(10), 455-460.

Doi: 10.3928/00220124-20130916-79

Wangensteen, S., Johansson, I., & Nordstrom, G. (2008). The first year as a graduate

nurse—an experience of growth and development. *Journal of Clinical Nursing,*

17, 1877-1885. Doi: 10.1111/j.1365-2702.2007.02229.x

Welding, N. M. (2011). Creating a nursing residency: Decrease turnover and increase

clinical competence. *MedSurg Nursing*, *20*(1), 37-40.

Whitehead, T. D. (2006). Comparison of native versus nonnative English-speaking

nurses on critical thinking assessments at entry and exit. *Nursing Administration*

Quarterly, 30(3), 285-290.

Yuan, H., Williams, B. A., & Fan, L. (2008). A systematic review of selected evidence

on developing nursing students' critical thinking through problem-based learning.

Nurse Education Today, 28, 657-663. Doi: 10.1016/j.nedt.2007.12.006

VITA

Karen Kay (Shaw) LaMartina was born in Kansas City, Missouri in 1961 and was raised in Prairie Village, Kansas. She attended public schools in the Shawnee Mission School District, graduating from Shawnee Mission East High School in 1979. After graduating from high school, Ms. LaMartina went to work for a group of physicians where she discovered her passion for health care. She began her studies to become a registered nurse and graduated in 1987 from the University of Kansas School of Nursing.

After graduation, she started her nursing career in the Pediatric Intensive Care Unit at Children's Mercy Hospital. After three years there, the LaMartina family relocated to Jefferson City, Missouri, where she found her niche working in the pediatric unit at St. Mary's Hospital as a staff nurse and also working as a house supervisor at the same facility. After a year and a half, the family relocated back to the Kansas City area where Ms. LaMartina continued her work as a pediatric nurse at St. Joseph Health Center. One day, she was approached by a nurse educator from a local college who asked her if she would consider filling in for a faculty member going on a leave of absence. In 1994, she began teaching pediatric nursing at Johnson County Community College. A position that might have only lasted a short time, grew into a full-time career and after earning her Master's in Nursing in 2002, she was hired as an Associate Professor at the same college. In 2012, Ms. LaMartina assumed the role of nursing program director at Johnson County Community College, where she remains currently.

Ms. LaMartina has had an article published and has presented her dissertation findings at local and regional conferences. She received funding through the Greater Kansas City Foundation through a donation made by Drs. David and Mary Zamierowski.

After earning her Doctor of Philosophy degree, Ms. LaMartina plans to continue her research in nursing education, striving to find the most effective ways to develop students ability to think critically and make clinical decisions that lead to the best patient outcomes.