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Performance Differences Between Novice and Experienced Critical Care Nurses: A Replication Study

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The University of Southern Mississippi

PERFORMANCE DIFFERENCES BETWEEN NOVICE AND EXPERIENCED
CRITICAL CARE NURSES: A REPLICATION STUDY

by

Josefina Inoturan Alejandro

Abstract of a Capstone Project
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

May 2013

ABSTRACT

PERFORMANCE DIFFERENCES BETWEEN NOVICE AND EXPERIENCED CRITICAL CARE NURSES: A REPLICATION STUDY

by Josefina Inoturan Alejandro

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This capstone project is a replication study that measures the performance differences between novice and experienced nurses working in an adult intensive care unit (ICU) and identifies the deliberate practice activities they employ to achieve expert performance. In order to assess performance difference between the two groups of participants, nurses were required to manage the physiological crisis of patients with respiratory compromise through four simulated scenarios. This study replicated a portion of Whyte, Ward, and Eccles' (2009) research on the relationship between knowledge and clinical performance of novice and experienced critical care nurses. The replication study used the Mann-Whitney U test to determine statistically significant differences between the novice and experienced ICU nurses. The Spearman rho correlation determined the relationship between the participants' clinical performance and their deliberate practice activities. The results indicated no statistically significant performance differences between the novice and experienced ICU nurses. The deliberate practice of seeking information through reading had a strong negative and statistically significant correlation with the performance of experienced nurses ($r_s [3] = -.949, p < .05$). However, attending seminars had a strong positive and statistically significant correlation with performance among experienced nurses ($r_s [3] = .975, p < .01$). The

results indicated the importance of deliberate practice activities in striving for expert performance.

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CHAPTER I

INTRODUCTION

In order to understand the rationale for this capstone study, one need only recount the dramatic transformation that occurred at the 81st Medical Group, a military teaching hospital in South Mississippi, after Hurricane Katrina hit the Gulf Coast in August of 2005. Newspaper accounts, personal communication from nursing leaders (e.g., chief nurse, squadron leader, and unit commander) and a hospital public affairs officer were used to trace the events that precipitated this capstone investigation.

Intensive Care Unit Setting Pre-Hurricane Katrina

Prior to Hurricane Katrina, the 81st Medical Group operated a 14-bed intensive care unit (ICU). According to the 2012 interim chief nurse,

The ICU was consistently full to capacity with critically ill cardiothoracic, medical, general surgical, and pediatric cases. It was not uncommon to have at least one or two patients with continuous renal replacement therapy daily due to the cardiothoracic surgeries and the acute need for dialysis. (J. Mack, personal communication, May 23, 2012)

In this setting, a continual learning environment was fostered as novice nurses observed experienced colleagues perform nursing care; in turn, experienced nurses mentored newly assigned ICU nurses. There was a wealth of expertise in the unit due to the constant availability of experienced nurses taking care of the many acutely ill patients (J. Mack, personal communication, May 23, 2012).

The 2007 ICU commander concurred that pre-Katrina experienced nurses served as preceptors to orient newly assigned staff. Preceptors and the ICU clinical nurse educator (CNE) observed the performance of new nurses to provide appropriate guidance

in nursing care. This commander further stressed that patients benefited from the high standard of excellence that nurses upheld (K. Hesselrode, personal communication, November 5, 2012).

The 2007 ICU commander attested that striving for expertise in the ICU was manifested by the continuous assessment of the educational needs of the staff. Annually, in cooperation with the ICU nursing leadership, both the hospital and ICU clinical nurse educator, distributed a learning needs assessment questionnaire to the ICU nurses. Contents of the questionnaire included a checklist of continuing education topics (e.g., care of ventilated patients, patients who had undergone cardiac bypass surgery, etc.) that the nursing education staff decided as essential to their learning goals for the year. Based on those topics, staff development programs consisting of nursing grand rounds, skills fairs, and in-services on new procedures and technology were scheduled regularly. Staff meetings became the appropriate venue since all nurses were required to be present for these peer-guided training activities (K. Hesselrode, personal communication, November 5, 2012).

At that time, staff certification from the American Association of Critical-Care Nurses (AACN) was encouraged for individual advancement. Conference participation, like those offered by the National Teaching Institute (NTI), was supported by nursing leadership. In this way, the professional growth of nurses from novice to expert performer was enhanced (K. Hesselrode, personal communication, May 29, 2012).

Intensive Care Unit Setting Post-Hurricane Katrina

This scenario, pro-active and innovative, was radically changed by Hurricane Katrina which devastated the Mississippi Gulf Coast on August 9, 2005. The Gulf surge flooded the basement and first floor of the hospital, destroying generators, electrical

systems, chemotherapy and magnetic resonance imaging (MRI) machines, and other essential equipment.

The main obstacle in reopening the hospital was the repair of the electrical distribution center. This damage, forcing the hospital to shut down, compelled thousands of clients to seek medical care in other health centers (Newsom, 2005). The 81st Medical Group public affairs officer commented that, as a consequence, hospital personnel were then reassigned to other medical treatment facilities (S. Pivnick, personal communication, September 7, 2006).

A year after the hurricane, inpatient services, including intensive care, post-anesthesia care, and same-day surgery units with two beds each for a total of six beds, were opened. An additional 10 beds for medical, surgical, and pediatric units were also available (S. Pivnick, personal communication, September 7, 2006).

Even with the reopening of the hospital, the 2012 interim chief nurse noted that cardiothoracic surgery, pediatric, neurosurgery, and trauma services were no longer in operation in the ICU because of the lack of staff specialists in these areas (J. Mack, personal communication, May 23, 2012). The 2012 Inpatient Squadron commander concurred that the acuity of patients was appreciably lower than prior to the hurricane (S. Bassett, personal communication, May 4, 2012).

The 2007 ICU commander observed that “low patient census and acuity made it difficult to maintain the level of expertise that ICU nursing demands” (K. Hesselrode, personal communication, May 29, 2012), attesting that of the 45 nurses working in the ICU prior to the hurricane only 8 were left for the hospital reopening. Consequently, “previous staff development programs were not as fully implemented as before the hurricane” (K. Hesselrode, personal communication, May 29, 2012).

The 2012 interim chief nurse stated that of the eight nurses previously working in the ICU, seven had been reassigned to other health care facilities. New nurses replaced the former ICU staff (J. Mack, personal communication, May 23, 2012).

With the arrival of new nurses, acknowledged the 2012 ICU commander, nursing performance is now based primarily on their past experience instead of peer-guided training implemented prior to the hurricane. Experienced nurses in this environment as well as on-site learning programs were no longer available. The need for assessment of education and training has now become imperative (W. Tennyson, personal communication, May 30, 2012).

Responding to this indicated need, this capstone study measuring performance differences between novice and experienced nurses was proposed to the 2012 ICU commander and later approved by the hospital internal review board (IRB). Using the deliberate practice questionnaire (DPQ), the study also sought to identify learning activities nurses employed in pursuing superior levels of performance.

Because of low patient census and acuity, this researcher utilized high fidelity simulation manikins to evaluate nurses' performance, replicating a portion of the study of Whyte, Ward, and Eccles (2009), which used simulation to determine the relationship between knowledge and clinical performance of novice and experienced critical care nurses. Five research questions were addressed by Whyte et al.'s study, but only the question on performance differences between novice and experienced critical care nurses in respiratory management scenarios was replicated. The deliberate practice questionnaire used in Whyte et al.'s study was also revised by the PI for this project.

CHAPTER II

REVIEW OF LITERATURE

Determining Expertise

An expert, as defined by Green and Gilhooly (as cited in Ginns, 2002), is “an individual who possesses a large body of knowledge and procedural skill . . . tied to a particular area of expertise (while) a novice is usually seen as a beginner, a person whose performance lacks the speed, accuracy, and efficiency of the expert” (p. 36). According to Ericsson (2000), the term *expert* includes any individual who has attained superior performance by extended practice and instruction while expertise refers to “the mechanisms underlying the superior achievement of an expert . . .” (para.1).

In psychology, Chi (2006) states that “the nature of expertise has been studied in two general ways” (p. 21). One type of research, called absolute or exceptional expertise studies, assumes that creativity arises from the unique innate talent of the individual, such as science or sports. The second type of research, called relative approach, compares experts to novices. The goal of this approach is to understand how less skilled or experienced persons can become more skilled assuming that expertise can be attained. Therefore, Chi (2006) defines expertise as a level of proficiency that novices can achieve. The definition of expertise can be relative in the sense that the more knowledgeable group can be considered the *experts* and the less knowledgeable group the *novices*. Expertise can also be defined with a little less precision since experts are defined as relative to novices on a continuum (Chi, 2006). This capstone study follows Chi’s definition of expert and expertise.

Methods of Measuring Expertise

Ericsson, Prietula, and Cokely (2007) explained that determining expertise first requires performance which must be consistently superior to the expert's peers. For example, master chess players must win tournaments in order to make them experts in the game. In addition, expertise must result in concrete results. For instance, surgeons must not only be skilled with the scalpel, but they should have successful outcomes with their patients. Lastly, expertise can be replicated and measured in the laboratory. For example, emergency room nurses in Ericsson, Prietula, and Cokely (2007) were presented with simulated life-threatening situations and their reactions in the laboratory were later compared with actual outcomes in the "real world."

Benner (2001) identified five levels of competency in clinical nursing practice: novice, advanced beginner, competent, proficient, and expert. These levels were described by nurses who were interviewed and observed either in small groups or individually. Benner's descriptive research attempted to ascertain the differences in clinical performance and situation appraisal of novice and expert nurses using 21 pairs of preceptors and newly graduated nurses and 51 experienced nurses. The findings showed that "beginners have had no experience of the situations in which they are expected to perform" (Benner, 2001, p. 20). The expert nurse, on the other hand, does not rely on rules but judges conditions based on experience, thus operates with deeper understanding of the situation (Benner, 2001).

Twenty semi-structured interviews to determine different learning processes by novice and expert nurses were analyzed by Daley (1999). Findings showed that novices learned through formal mechanisms, such as reviewing policy and procedures, reading journals, and attending continuing education programs. Experts, on the other hand,

obtained information from a variety of less formal sources, including shared knowledge through peer-dialogue, leading to enhanced understanding of patient conditions.

Many other previous studies have been used to measure expertise (Rieman & Gordon, 2007; Sandie & Heindel, 1999). Determining years of experience is one method used, but studies have shown that professionals may not become experts in a year's time (Haag-Heitman, 2008; Lehmann & Ericsson, 1997; Shanteau, Weiss, Thomas, & Pounds, 2003; Whyte et al., 2009). Expert performance research shows that the years of experience in a discipline is not pertinent to acquiring expertise, but the deliberate effort to improve is vital (van Gog, Ericsson, Rikers, & Paas, 2005; Whyte et al., 2009). The longer physicians have been absent from training; for example, the less able they are to identify rare illnesses of lungs and heart. Since these illnesses are rarely seen, physicians have difficulty diagnosing them unless a refresher course is taken (Shanteau et al., 2003).

The fundamental premise of the expert-performance approach (EPA) is that it is possible to identify representative tasks of sufficient difficulty that capture essential activities associated with superior performance specifically in nursing practice (Ericsson, Whyte, & Ward, 2007). Such tasks can be presented to both novice and experts under standardized conditions to identify individuals who consistently perform at a superior level compared to others (Ericsson, Whyte, & Ward, 2007). Whyte et al. (2009) used the EPA to examine actual behavior of novice and experienced critical care nurses in clinical situations using simulation. Findings in this study showed that novice and experienced nurses did not differ in their performance in four simulated scenarios to control respiratory crisis. However, differences in performance were found among nurses who were board certified versus those who were not board certified (J. Whyte, personal communication, May 15, 2012). The researchers concluded that individuals who

engaged in deliberate and self-motivated activities which encompass deliberate practice attain a level of expert performance (Whyte et al., 2009).

Deliberate Practice

Deliberate practice (DP) is a form of practice that involves focused, effortful engagement in activities which improve current performance (Ericsson, Krampe, & Tesch-Römer, 1993). Developing expert performance requires deliberate practice which is specific and sustained. For instance, experienced leaders or managers who must convince coworkers of the merits of a project can benefit from practicing speeches in front of a coach to be more effective (Ericsson, Prietula, & Cokely, 2007). Moreover, Ericsson, Whyte, and Ward (2007) affirmed that in music, sports, and medicine, deliberate practice contributes to a higher level of performance, especially in a simulated task environment.

The role of practice in attaining levels of performance was explored by Ericsson et al. (1993). The importance of deliberate practice in achieving expert performance was first demonstrated in research conducted in a music academy in Berlin, Germany. From analyses of diaries and other biographical materials, the researchers concluded that expert musicians practiced by themselves approximately 4 hours every day, including weekends, concentrating on improving specific aspects of music performance as directed by their music teachers (Ericsson et al., 1993).

In sports, experts develop skills through deliberate practice performed under conditions of high concentration and effort to maximize physiological and cognitive adaptations (Baker, Horton, Robertson-Wilson, & Wall, 2003). Runners who complete a mile in less than 4 minutes can reproduce their exceptional running times repeatedly in practice and in different competitions (Ericsson, 2004).

Deliberate practice in medicine is noted in a research study by Wayne et al. (2006). The researchers assessed internal medicine residents on their baseline proficiency in advanced cardiac life support (ACLS). A pretest/posttest design without a control group was used. After a baseline evaluation, residents had four 2-hour ACLS education sessions using a medical simulator. Following the posttest, residents who did not reach the minimum passing score (MPS) were given deliberate practice time that enabled them to practice activities that were not successfully performed. Performance improved significantly following the deliberate practice.

While intense and focused practice in sports and music contribute to expert performance by consistent and repeated exercises, Haag-Heitman's (2008) study on expert performing in nursing found that participants described working in a variety of job roles as a self-directed approach to building knowledge and skill throughout their careers. In critical care nursing, deliberate practice comes from experiences in other clinical areas, such as emergency room or post-anesthesia care unit (PACU).

Haag-Heitman (2008) also described participants engaging in lifelong experiential learning activities that constitute deliberate practice. For instance, a nurse who consistently takes care of a ventilated patient and becomes skilled at providing sufficient sedation and maintaining adequate blood pressure is an example of learning by experience. Furthermore, Haag-Heitman (2008) revealed that deliberate practice involves learning from preceptors who guide novice nurses in the care of challenging patients and also provide opportunities to continue education through staff development programs or self-directed pursuits. Participants in Haag-Heitman's study discussed a variety of methods used to advance their knowledge and skill, including attending

seminars and clinical in-service classes, attaining specialty certifications, and using electronic resources, journal articles, and references in written articles.

The studies summarized here have shown that performance differences between novices and experts can be measured both by “real world” standards as in sports and music or in simulation using representative tasks as in medicine and nursing. While both deliberate practice and learning by experience contribute to high-level performance and expertise, deliberate practice is less well-defined and nursing research in this area is lacking.

Theoretical Framework

The theoretical framework for this project was Henderson’s (1969) definition of nursing which is elaborated in the 14 basic human needs that guide nursing care. One of these is the need for the patient to breathe normally and its corresponding nursing component: assisting the patient to breathe effectively. This need was the key point addressed in this capstone project.

Relationship Between Theoretical Framework and Capstone Project

Henderson views the nurse as the “authority of basic nursing care” (1991, p. 22). As such, Henderson emphasizes that “the nurse who operates under a definition that specifies an area of expertness, must assume responsibility for identifying problems for improving the methods she uses” (1991, p. 53). The intent, then, of this capstone study was to assess the need for education and training of nurses working in the adult ICU. For this reason, Whyte et al.’s (2009) study, which analyzed the differences in performance levels of novice and experienced nurses, specifically in controlling the physiologic deterioration of simulated patients with respiratory compromise, was

replicated. This research also identified deliberate practice activities that nurses performed to achieve expert performance in the scenarios.

In a typical ICU scenario where an intubated patient with an oxygen saturation of 85% is presented, the critical care nurse is expected to (a) observe and assess the need for suctioning secretions, (b) evaluate the correct placement of the endotracheal tube, and/or (c) increase oxygenation by supplementing oxygen using an Ambu bag. The accuracy and speed of assessment are critical components of the nurse's responsibility in these situations and may differ based on experience. It is reasonable to assume that the novice nurse would require more time to stabilize the patient than the experienced nurse. This difference may result in a desirable or disastrous outcome for the patient. Henderson (1969) stated the following:

The danger of turning over the physical care of the patient to relatively unqualified nurses is twofold. They may fail to assess the patient's needs adequately but, perhaps more importantly, the qualified nurse, being deprived of the opportunity while giving physical care to assess his needs, may not find any other chance to do so. (p. 13)

Indeed, Henderson affirms that the "quality of care is drastically affected by the preparation and native ability of the nursing personnel . . ." (1969, p. 13).

By evaluating the performance differences between novice and experienced critical care nurses, this study will attempt to determine the need for continued education of the nursing staff and assumes that this need is readily apparent and may be assessed. Once the need is assessed, an appropriate level and type of instruction, specifically in controlling respiratory crises, can be adequately planned, executed, and conveyed to nurses who lack the necessary expertise.

Henderson and Nite (1978) stressed that “it is the responsibility of every nurse” to identify ways of improving his/her practice. The authors concur that continuing education is needed, particularly in health occupations due to “a developing body of scientific knowledge and rapidly expanding technology” (p. 106). Furthermore, Henderson and Nite (1978) described continuing education as learning experiences following the basic preparation for a chosen profession—in this case, nursing. Continuing education and training may help to improve proficiency in stabilizing critically ill patients.

Continuing education may be provided through in-services, interdisciplinary rounds, critical care nursing certification, and reading textbooks and other evidence-based reports such as nursing journals. According to Henderson and Nite (1978), in-service education is necessary “regardless of the quality of the worker’s preparation since the purpose and programs of agencies, conditions of work, personnel, facilities, and equipment differ” (p. 105). Nurses need orientation when newly employed in a facility, especially in the critical care area, and also benefit from ongoing education programs to keep abreast of developments in nursing practice (Henderson & Nite, 1978).

Participation in nursing and interdisciplinary rounds provides a better understanding of patients’ needs (Henderson, 1991). To assure the quality of healthcare and the competence of nurses, Henderson and Nite (1978) emphasized the importance of certification—in this case, critical care nursing. Moreover, in order for the nurse “to have a safe minimum of knowledge about . . . the individual’s needs arising from his specific disease or condition, the nurse must extend her experience through reading” (Henderson, 1991, p. 88). Books, journals, and internet websites provide a variety of resources from which the nurse can acquire information on patients’ problems and possible resolutions.

Henderson emphasized that when the nurse is given the opportunity to provide the full range of nursing care of the patient she will need a thorough knowledge that can be acquired only through reading about all facets of the problems the patient presents and familiarizing herself with the community resources for helping the type of patient under consideration. (1991, p. 88)

The methods of improving practice discussed by Henderson (1991) and Henderson and Nite (1978) are deliberate practice activities that contribute to superior performance. Whyte et al. (2009) also identified the deliberate practice activities of nurses effective in attaining better performance. However, deliberative practice activities in Whyte et al.'s research were not specifically pursued. Unlike Whyte's research, deliberate practice activities of nurses were identified in this capstone study because they have been demonstrated to contribute to effective nursing care and improved nurse competence.

CHAPTER III

METHODOLOGY

Purpose of the Study

The purpose of this capstone project was twofold. The first purpose was to measure differences between novice and experienced critical care nurses through their performance of representative tasks in a simulated environment. Determination of these differences will serve as the basis for continuing education to improve staff efficiency. The second-purpose was to determine the deliberative practice activities of participants through the use of the DPQ. Information obtained from the completed questionnaires enabled the principal investigator to identify activities contributing to the expert performance monitored in the simulated task environment (STE) and to facilitate their use among the nurses' peers.

This study replicated a portion of Whyte et al.'s (2009) research on the differences between knowledge and clinical performance in novice and experienced critical care nurses. Specifically, the nurses' ability to obtain control of the respiratory parameters in four 3-minute scenarios requiring airway and respiratory management was observed and measured. The respiratory scenarios were chosen by Whyte et al. (2009) because of the universality of these events in the critical care area and the current focus on rescue, an important outcome in the quality of healthcare (Institute of Medicine, 1999, 2001).

Participants

Intensive care unit (ICU) nurses from the 81st Medical Group on the Mississippi Gulf Coast were given the opportunity to participate in this study. Information regarding the purpose of the research was given to the ICU nursing leaders and to the staff by the

principal investigator. Based on their years of adult critical care experience, participants were assigned to novice or experienced groups. Criteria for the novice group included a minimum of one year working in an adult ICU, ability to comprehend written English, and willingness to participate in this study. Criteria for the experienced group were more than 3 years of experience working in an adult ICU, ability to comprehend written English, and willingness to participate in the study. Nurses who met these criteria signed a consent form (see Appendix A) prior to participation in the study.

Procedures

This study used a quasi-experimental design based on the expert performance approach, which identifies representative tasks in a discipline reproducible under controlled conditions to measure and analyze individual expert performance. The study implemented four 3-minute simulated respiratory scenarios to assess novice and experienced critical care nurse performance used in Whyte et al.'s (2009) research. Similar to the same research, the simulated task environment (STE) for this capstone study utilized a Medical Education Technologies, Inc., Sarasota, Florida (METI)[©] human patient simulator and a room replicating an actual ICU setting. Respiratory scenarios were also selected from (METI)[©] references.

The scenarios were initially piloted by one experienced critical care nurse to assure their resemblance to authentic, real-life circumstances and establish timeframes needed for testing. The same experienced critical care nurse evaluated the scenario instructions during the pilot testing to ensure clarity. Additionally, two other experienced critical care nurses were tested on time needed to complete the revised deliberate practice questionnaire (DPQ) (see Appendix B).

The revised DPQ consisted of demographics, including level of education and sources of continuing education. Participants completed the DPQ prior to performance of simulation activities. At the test site, the principal investigator gave a brief overview of the environment, activities, supplies, and equipment to familiarize the participants with the task simulation. Written and oral instructions on the objective of the scenarios were given to the participants. Written scenarios were provided before performing the simulated tasks. They were then directed to describe verbally the steps they were undertaking to stabilize the patient and to identify the reasons behind their actions. This verbalization corroborated the PI's comprehension of the participants' interpretation of the scenarios. A practice scenario further clarified understanding of the activities to be performed.

The four written 3-minute scenarios were conducted in the same sequence for all participants. The PI used a stopwatch to measure the amount of time taken by the participants to obtain and maintain oxygen saturation of the simulated patient at 90% and above (normal oxygen saturation is 90 to 100%). Designated simulation laboratory personnel programmed the monitors based on the scenarios. The performances were videotaped for review at a later time.

Ethical Protection of Human Subjects

Approval for this research was obtained from the 81st Medical Group Institutional Review Board (IRB) (see Appendix C). Subsequent approval was obtained from The University of Southern Mississippi Institutional Review Board (see Appendix D). Participants received an explanation of the research procedure and were also assured that participation would not affect their performance rating or their job assignment.

Furthermore, participants were advised of their right to withdraw. No financial award was offered.

Videotapes of the scenarios were stored on the government simulation laboratory hard drive which is password and common access card (CAC) protected. Completed DPQs were placed in a locked, password-protected box in the PI's residence to be kept for 5 years.

CHAPTER IV

ANALYSIS OF DATA

Descriptive statistics were utilized to determine the characteristics of age, gender, and education of the participants. The Mann-Whitney U test was used to determine statistically significant difference between novice and experienced nurses. The Mann-Whitney U test, also known as Wilcoxon Mann-Whitney, is a nonparametric analysis statistically verifying the likelihood that two independent groups have been taken from the same population (Cronk, 2008). Groups should be independent because “the Mann-Whitney U test is based on the comparison of each observation from the first group with each observation from the second group” (Nachar, 2008, p.14). In other words, the Mann-Whitney U test enabled the researcher to observe and compare differences between the performance of the novice and experienced nurses.

Assumptions of the Mann-Whitney U test are that (a) two investigated groups be randomly taken from the target population and (b) each observation or measurement corresponds to a different participant. In statistical terms, there is mutual independence between groups and independence within groups. The third assumption is that the data measurement scale is ordinal. The Mann-Whitney U test is the nonparametric equivalent of the t test for independent samples and uses mean ranks of the data. Nonparametric tests can be used when the sample is small (5 to 20 participants), the data are at least ordinal, and there are no assumptions about the shape of distribution (Cronk, 2008; Nachar, 2008). This capstone study met these assumptions. On the other hand, the independent samples t test uses the mean values of parametric data (Cronk, 2008). Parametric analyses means that certain requirements are met with respect to population parameters such as those data having a normal distribution (Nachar, 2008).

Spearman's correlation coefficient was employed to determine the relationship between the participants' performance and their deliberate practice. The correlation coefficient, or rho, is a nonparametric procedure that requires ordinal data. Normal distribution is not necessary. The correlation coefficient is a number between +1 and -1, signifying the magnitude and direction of the association between two variables, magnitude being the strength of the correlation (Archambault, 2000). Generally, correlations > 0.7 are considered strong, correlations < 0.3 are considered weak, and correlations between 0.3 and 0.7 are considered moderate (Cronk, 2008). The direction of the correlation tells how the two variables are related. If the correlation is positive, the two variables have a positive relationship meaning as one increases the other also increases (Archambault, 2000). For example, taller participants tend to weigh more (Cronk, 2008). Negative correlation denotes that two variables have a negative relationship (as one increases, the other decreases). As self-esteem increases, anxiety decreases (Archambault, 2000).

In this study, the performance score of novice and experienced nurses represented one variable, which was calculated based on the average of the amount of time (in minutes) spent by participants in each simulation scenario. This variable was correlated with each participant's deliberate practice activities, including continuing education credits obtained, seminars attended, certification, study hours per week, and frequency of information seeking.

Results

Demographics

Table 1 displays the characteristics of the volunteer participants: 5 experienced (mean age = 35.2 years, age range = 28-53 years) and 4 novice nurses (mean age = 29,

age range = 26-33 years). The experienced group comprised 3 males (60%) and 2 females (40%). The novice group consisted of 2 males (50%) and 2 females (50%). Each participant had obtained an academic degree of Bachelor of Science of Nursing except one, who graduated from a 3-year diploma nursing course. Each group had one certified critical care nurse (CCRN). One experienced nurse had a certification in emergency care nursing (ECN).

Table 1

Sample Sizes, Means, and Standard Deviations for Percentages of Participants in the Experienced and Novice Groups

Variables	Experienced			Novice		
	<i>n</i>	M	SD	<i>n</i>	M	SD
Age	5	35.2	10.69	4	29	2.94
Gender						
Male	3	60		2	50	
Female	2	40		2	50	
Highest nursing degree achieved						
Bachelors	3	80		4	100	
3-year Nursing	1	20				
Board certification						
CCRN	1	20		1	25	
ECN	1	20				

Performance Results

The Mann-Whitney U test results are summarized in Tables 2 and 3. Table 2 illustrates the summary of the mean ranks of experienced and novice nurses, while Table 3 outlines the results of the test. Mean ranks represent the time it took participants to complete the scenario. In both scenarios 1 and 4, experienced nurses' mean rank was 3.60 while novice nurses' mean rank was 6.75 ($U = 3.000, p > .05$). This finding, while numerically different, indicates that no statistically significant difference existed between experienced and novice nurses. In scenario 2, experienced nurses' mean rank was 4.80 while that of the novice nurses was 5.25. This result also suggests that there was no statistically significant difference ($U = 9.000, p > .05$) between experienced and novice nurses. In scenario 3, mean rank of experienced nurses was 4.60 while that of novice nurses was 5.50. The Mann-Whitney U test similarly revealed no statistically significant difference between the experienced and novice nurses ($U = 8.000, p > .05$).

Table 2

Summary of Mean Ranks of Experienced and Novice Nurses

Scenario	Group	n	Mean rank	Sum of ranks
1	Experienced	5	3.60	18.00
	Novice	4	6.75	27.00
	Total	9		
2	Experienced	5	4.80	24.00
	Novice	4	5.25	21.00
	Total	9		

Table 2 (continued).

Scenario	Group	<i>n</i>	Mean rank	Sum of ranks
3	Experienced	5	4.60	23.00
	Novice	4	5.50	22.00
	Total	9		
4	Experienced	5	3.60	18.00
	Novice	4	6.75	27.00
	Total	9		

Table 3

Summary of Mann-Whitney U Test in Four Scenarios

	Scenario			
	1	2	3	4
Mann-Whitney <i>U</i>	3.000	9.000	8.000	3.000
Wilcoxon <i>W</i>	18.000	24.000	23.000	18.000
<i>Z</i>	-1.715	-.245	-.490	-1.744
Asymp. Sig (2-tailed)	.086	.806	.624	.081
Exact Sig [2*(1-tailed Sig.)]	.111	.905	.730	.111

Relationship Between Performance and Deliberate Practice

Results from the Spearman correlation coefficient for both novice and experienced nurses are outlined in Tables 4 and 5, respectively. The Spearman rho was calculated for the relationship between the performance of novice nurses and attainment of continuing education credits. A strong positive but nonsignificant correlation was found ($r_s [2] = .816, p > .001$). A strong negative and not statistically significant relationship between the novice nurses' performance and seminars attended was found ($r_s [2] = -.949, p > .001$). The novice nurses' performance and certification had a weak negative and nonsignificant relationship ($r_s [2] = -.211, p > .001$). Correlation between novice nurses' performance and hours of study per week revealed a moderately positive but not significant relationship ($r_s [2] = .632, p > .001$). The correlation between the novice nurses' performance and frequency of seeking information had a moderate negative relationship and was also not statistically significant ($r_s [2] = -.400, p > .001$).

Table 4

Relationship Between Performance and Deliberate Practice Among Novice Nurses

Continuing Education	Seminars	Certifications	Hours of study per week	Frequency of seeking information	<i>p</i>
.816					.184
	-.949				.051
		-.211			.789
			.632		.368
				-.400	.600

Table 5

Relationship Between Performance and Deliberate Practice Among Experienced Nurses

Continuing Education	Seminars	Certifications	Hours of study per week	Frequency of seeking information	<i>p</i>
.866					.058
	.975*				.005
		.112		.858	
			-.264		.668

*Correlation is significant at the 0.01 level (2-tailed). **Correlation is significant at the 0.05 level (2-tailed).

The relationship between the experienced nurses' performance and the continuing education credits obtained was found to be strongly positive but not statistically significant ($r_s [3] = .866, p > .001$). Performance of experienced nurses had a strong positive and statistically significant relationship with the seminars attended ($r_s [3] = .975, p < .01$). Performance and certification of experienced nurses had a weak positive and nonsignificant relationship ($r_s [3] = .112, p > .001$). The relationship between the experienced nurses' performance and hours of study per week was found to have a weak negative and statistically nonsignificant relationship ($r_s [3] = -.264, p > .001$). The experienced nurses' performance and frequency of information seeking had a strong negative and statistically significant relationship ($r_s [3] = -.949, p < .05$).

In summary, the relationship between performance of experienced nurses and seminars attended showed a strong positive and statistically significant relationship.

However, a strong negative and statistically significant relationship between experienced nurses' performance and their frequency of seeking information was found.

CHAPTER V

SUMMARY

Relationship of Capstone to Intensive Care Unit Situation

The 81st Medical Group ICU commander states that the rapid succession of nurses assigned in the ICU necessitates education and training of incoming staff (W. Tennyson, personal communication, October 12, 2012). In an effort to assess the need for continuing education of nursing staff, this capstone project of determining the performance differences between novice and experienced ICU nurses was proposed and approved by the ICU commander and the hospital IRB. This study replicated a portion of Whyte et al.'s (2009) research on the relationship between knowledge and clinical performance in novice and experienced critical care nurses. Only the performance differences between novice and experienced critical care nurses in controlling respiratory crises in simulated scenarios were replicated. Whyte et al. (2009) also identified the deliberate practice activities that contributed to the high level of performance of the nurses in their research although there was no specific research question that addressed it. This study, on the other hand, investigated and identified deliberate practice activities affecting performance of both novice and experienced nurses by correlating performance and deliberate practice activities in which nurses engaged.

Summary and Interpretation of Participant Demographics

Five males and 4 females of the 81st Medical Group ICU volunteered to participate in this capstone study. In the United States there are 3.1 million licensed registered nurses (U.S. Health Resources & Services Administration, 2011). Approximately 168,181 RNs are male, 5.8% of the total nursing population (U.S. Department of Health & Human Services, Office of Minority Health, 2009). In the

military, 30% of the nurses in all three branches (Army, Navy, and Air Force) are male. Statistically, men prefer the nursing specialties of ICU and anesthesia because of their technical aspects (Quan, n.d.). The convenience sampling used in this research showed the availability of male participants, thus outnumbering their female counterparts.

The age range of the participants in this study was 26 to 53 years. Fifty-five percent of the 9 participants were aged 26 to 29 years. The 81st Medical Group ICU commander stated that the average age range of the ICU staff (from where the participants were taken) is 26 to 35 years (W. Tennyson, personal communication, September 27, 2012). The average age of employed registered nurses (RNs) in the U.S. is 45.5 years. The participants of this capstone study constitute a younger population of registered nurses in this country.

Nurses in this research had obtained their baccalaureate degree, except one who had earned a diploma. In the United States 50% of nurses have baccalaureate degrees while 20.4% graduated with a diploma degree (U.S. Health Resources & Services Administration, 2008 National Sample Survey of Registered Nurses, 2011). Military nurses are required to have a baccalaureate degree in nursing (BSN) but may have an associate degree (ADN) if the individual is within 12 months of obtaining a BSN.

Summary and Interpretation of Mann Whitney U Results

Although no statistically significant difference was found in the performance of the novice and experienced nurses, calculating the average scenario completion time in minutes between the two groups yielded a numerical difference in performance. After calculating the average time of both groups in obtaining and maintaining oxygen saturation of 90%, the experienced nurses had a mean of 2.25 while the novices had 2.83. Clinically, 35 seconds or 20% difference between the two groups may be significant to

the patient. Respiratory conditions necessitate vigilant observation and immediate response to offset rapid deterioration of the client. For example, suctioning of the airway may take a second; repositioning of the endotracheal tube to assure its correct placement may also take seconds. Placing a nasal cannula with the appropriate amount of oxygen may take less than a second. These procedures can raise the oxygen saturation of the patient above 90% in a real-life patient. Through accurate assessment, the judgment of the nurse to choose the right course of action can result in adequate oxygenation, thus preventing further deterioration of the patient.

The experienced nurses in this capstone study were able to correctly assess and expeditiously intervene to attain the objective of the scenarios. This difference in performance may be due to experience gained through consistently caring for seriously ill clients or engaging in deliberate practice activities, such as reading journals, books, or internet websites specifically on care of patients with respiratory conditions.

Summary and Interpretation of Spearman Correlation Test

The Spearman rho correlation used in this study showed that the frequency of seeking information about patients' conditions, new procedures, and/or equipment was a deliberate practice that had a negative and statistically significant relationship with the performance of experienced nurses. This correlation meant that with increased frequency of seeking information, experienced nurses took less time (35 seconds) on average to complete the scenarios. Frequent updating of knowledge through internet websites and critical care books, and journals may result in nursing care that can aid in prompt restoration of a patient's well-being and ability to recover.

Resources used by participants in seeking information at least 2 to 3 days a week on the average include the *American Association Critical Care Nurse (AACN)*

publication, *Critical Care Nurse*; the *AACN Procedure Manual*, and the internet website, *Web MD*. In addition, electrocardiogram books, *Essentials of Critical Care Orientation (ECCO)*, *Acute Trauma Nursing*, *Critical Care Nurse*, *Lexicomp*, *Core Curriculum for Critical Care Nursing*, and *Medscape* are other reading materials that contributed to better performance of the experienced nurses.

Attendance in seminars showed a statistically significant and positive relationship with performance of the experienced nurses in the simulated scenarios. This meant that even as experienced nurses reported more seminars attended than novice participants, their performance did not statistically differ from each other. Data about the type of seminars attended by the experienced nurses were not collected; therefore, the PI was not able to determine if the seminar topics were related to the respiratory conditions depicted in the scenarios. It is likely that respiratory or other related seminars may improve the performance of the experienced nurses.

While Whyte et al.'s (2009) study also determined no significant difference between the experienced and novice nurses, the sample was large enough to differentiate another group of nurses displaying superior performance. Whyte et al. determined that 6 individuals who maintained the patient's oxygen saturation above 90% within the last 6 seconds of the scenario performed at a superior level compared with those who did not. Whyte et al. (2009) found that 5 of these nurses obtained certification in critical care while one participant was an active instructor in a paramedic program aside from attaining instructor certification in advanced cardiac life support (ACLS) and pediatric advanced life-support (PALS) courses. This capstone project, however, found no statistically significant relationship between certification and performance of the

participants. Furthermore, there were no ACLS or PALS instructors among the participants; therefore, no correlation test was done with this variable and performance.

Limitations of the Study

The participants in this capstone project were limited to the ICU staff of the 81st Medical Group. All the novice nurses working in the ICU were part of this study. The experienced nurses in the staff were also limited because 2 were asked to answer the DPQ to establish time to complete, and one participated in the pilot for the scenarios. Other nurses usually working in the unit were either on leave or deployed.

Anecdotally, the participants in this capstone study showed support of the project by expressing a strong desire to participate. Some had asked when the study would start even before completion of the approval process. One novice participant expressed willingness to perform the scenarios to test skills and learn from them. One staff member expressed that the unit needed an assessment on how the staff uses clinical judgment at the bedside so that the appropriate in-service may be offered. These are strong indications that many staff members want to improve the nursing care practices of the ICU.

Importance of Findings

Based on the amount of time the experienced nurses took to resolve the simulated respiratory crisis, a need for deliberate practice activities to improve performance became apparent. Seeking information through reading books, journals, and internet websites was cited by the participants as a deliberate practice activity. However, in conjunction with the 2012 ICU operating instructions (OI) to conduct classes and quality improvement projects for training, this researcher proposed to the ICU leadership that a skills fair be held at least semi-annually. The ICU nurses' deliberate practice activity of

seeking information through reading can be augmented by a regular performance of skills through simulation, especially with the current low patient acuity and census. High fidelity simulators can be used for the skills fair to improve the nurses' assessment and intervention capabilities.

Since this capstone study showed no statistical difference in the performance of novice and experienced ICU nurses based on the respiratory scenarios presented, there is a need to enhance current in-service education classes to improve response to these crisis situations. Therefore, this researcher suggested to the ICU nursing education staff that further assessment of performance be initiated using other research-based simulation scenarios, such as care of patients with myocardial infarction, sepsis, and trauma.

Assessing the performance skills in these scenarios can be the basis for improved training and the development of learning strategies that contribute to effective deliberate practice activities.

Implications for the Doctor of Nursing Practice

One of the recommendations of the Institute of Medicine (IOM) 1999 report, *To Err is Human: Building a Safer Health System*, is that health professions should influence the training, education, and practice of the provider. This capstone project provides the DNP graduate the opportunity to follow this recommendation by assuming the leadership role in planning continuing education programs for critical care nurses by assessment of their performance. Following the findings of this capstone study regarding the difference in response time of novice and experienced nurses in respiratory crises scenarios, the DNP graduate can become a mentor by initiating the designing, directing, and evaluating of methods to improve patient care. Being a mentor to guide and support other nurses to achieve expertise in nursing practice fulfills the DNP competency that the American

Association of Colleges of Nursing (2006) Essential VIII describes as advanced nursing practice (see Appendix E).

Due to this capstone study's findings on the beneficial effect of seeking information through reading on performance, nurses should be supported in this deliberative practice activity. Monthly discussions about evidence-based topics read that are relevant to the current patient population can be accomplished during staff meetings. Such discussions can be in the form of role-playing or interdisciplinary rounds. The exchange of ideas generated by these discussions can constitute in-service education, which is another deliberate practice activity accessible to the staff. The current emphasis on obtaining continuing education credits can be augmented by selecting topics geared toward certification for critical care nursing. Opportunities for both achieving continuing education credits and certification are deliberate practice activities that abound in the ICU.

Recommendations for Further Research

Research on performance differences between novice and experienced nurses with more participants and different scenarios is recommended to direct continuing education in the ICU. Furthermore, research is recommended to identify other deliberate practices that can contribute to better performance. Future research may determine the effect of the simulated clinical performance to real-life situations.

This capstone study can also be performed with a larger sample in inpatient areas other than the ICU to determine the need for augmenting training and education. The diversity between males and females regarding their reaction times to crisis situations can be further explored. Moreover, the effect of a variety of deliberate practice activities engaged in by nurses to improve performance in nursing care can also be studied. After

all, nurses continually strive to improve their practice to assure that patients achieve their goal for well-being and comfort.

Ultimately, Henderson's desire for nurses to meet the patient's basic needs was the guiding framework of this capstone (Henderson, 1969, 1991). It is her work of defining nursing that has provided a structure on which nurses can strive for excellence in patient care.

APPENDIX A

THE UNIVERSITY OF SOUTHERN MISSISSIPPI AUTHORIZATION
TO PARTICIPATE IN RESEARCH PROJECT

Consent is hereby given to participate in the study titled:

Performance Differences Between Novice and Experienced Critical Care Nurses:
A Replication Study

1. Purpose: First, determine differences between novice and experienced critical care nurses in this sample, which will become the basis for continuing education of the staff. Second, distinguish learning activities that nurses engage in with the use of the deliberate practice questionnaire (DPQ).
2. Description of Study: This study will use the quasi-experimental research design. Five novice and five experienced critical care nurses will be observed on their ability to maintain oxygen saturation levels above 90% in a simulated client. Four 3-minute respiratory scenarios will be used to measure performance differences of these two groups. It will take a total of 12 minutes to complete the four scenarios. A deliberate practice questionnaire (DPQ) will be used to distinguish learning activities undertaken by these participants that lead to expert performance. Completion of this questionnaire will take approximately 5 minutes. Participants will be asked to volunteer for this study.
3. Benefits: There are no anticipated direct benefits to the participants.
4. Risks: There are no anticipated risks to your participation. Inconveniences in this study include volunteering time to participate in the study during off duty days.

5. Confidentiality: Only the principal investigator will observe the participants during the simulation scenarios. The videotapes/PI information will be stored on the Investigator's government hard drive, CAC protected, and data stored on H:/drive will be accessible only to the Investigator. Completed DPQ will be placed in a locked, password-protected box in the PI's residence for five years. Information learned from this study may be published or disseminated in journals or presentations. Your identification will not be disclosed in any publication, presentation or other form of dissemination.
6. Alternative Procedures: Participants can refuse to participate in the study at any time without fear of reprisal. Your participation or withdrawal will not affect your performance appraisals or other aspects of your work at this facility.
7. Participant's Assurance: Whereas no assurance can be made concerning results that may be obtained, the researcher will take every precaution consistent with the best scientific practice. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to Josefina I. Alejandro at 228 831 4713. The project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147,

Hattiesburg, MS 39406-0001, 601 266-6820. A copy of this form will be given to the participants.

- 8. Signatures: In conformance with the federal guidelines, the signature of the participant or parent or guardian must appear on all written consent documents. The University also requires that the date and the signature of the person explaining the study to the subject appear on the consent form.

Signature of the Research Participant

Date

Signature of Principal Investigator

Date

APPENDIX B

QUESTIONNAIRE FOR REGISTERED PROFESSIONAL NURSES

Please complete this questionnaire to the best of your ability. If you have any questions about any item please place an asterisk (*) in the margin next to the relevant question and the experimenter will provide assistance when you return the questionnaire. If a question is not applicable to you, write N/A (not applicable).

Please write as legibly as possible – it would be very unfortunate if you had taken time out to fill in the questionnaire only for us to discover we could not read your writing and, thus, not include your questionnaire as part of our research

We appreciate that this questionnaire is long but please consider each answer you give very carefully. Thank you for this.

Section One: Biographical Information

- (1) Gender: Male ___ Female ___
 (2) Year of birth: ___

Section Two: College/University Education

- (1) Do you hold an Associate Degree in nursing? Yes ___ No ___
 (2) Do you hold a Baccalaureate or Bachelor's Degree in nursing? Yes ___ No ___
 (3) Do you hold a Master's Degree in nursing? Yes ___ No ___
 (4) Do you hold a Doctoral degree in nursing or a health related field?
 Yes ___ No ___

Section Three: Continuing Education

- (1) Have you attended any seminars or courses either since you graduated or that were not part of your degree(s) that directly contributed to your education of health- and medical-related issues relevant to nursing? Yes ___ No ___
 (2) If 'Yes', please indicate approximately how many seminars or courses you attend each year. ___
 (3) Please state whether you currently hold any of the following certifications AND the date you were certified.
 Critical care nurse (CCRN) Yes ___ No ___ Date ___/___
 Post Anesthesia Care Nurse (CPAN) Yes No ___ Date ___/___
 Emergency nurse (CEN) Yes ___ No ___ Date ___/___
 Other (please specify): _____ ___/___

- (4) How many hours per week do you spend on average in some other form of study (journals, books, on-line sources) related to health care or nursing? _____ hrs/wk

Section Four: Self-development and Self-regulated Learning Since Graduation/Certification

- (1) Please list all the resources (e.g., books, journal articles, magazines, websites, TV/radio shows, etc.) to which you have regularly referred (i.e. more than once a month) SINCE you graduated from your highest degree college AND became certified as an RN:

Name of specific resource:

- (2) When was the last time that you actively sought out information that was related to a specific problem you wanted to resolve or a patient's specific disease, for you whom you had cared.

Please do not include efforts to gain information about a medication that you were preparing to administer.

Never _____ OR _____ (approximately month/year)

- (3) Where did you look for this information? _____

- (4) How often do you typically seek information for the purposes of resolving a specific problem or helping a specific patient?

Frequency (e.g. days per week/month/year):

(Please specify): _____

APPENDIX C
APPROVAL OF DEPARTMENT OF THE AIR FORCE
INSTITUTIONAL REVIEW BOARD



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

24 July 2012

MEMORANDUM FOR: INSTITUTIONAL REVIEW BOARD (IRB)
ATTN: FAITH LEE

FROM: 81 MDG IRB MEMBER

SUBJECT: INITIAL DETERMINATION OF EXEMPT RESEARCH PROPOSAL

1. I have reviewed the proposal referenced below and based on the information provided I have determined it meets all the necessary criteria for an exemption and hereby designate it to be Exempt IAW 32 CFR 219, Section 101, (b), (2) on this date.

Protocol Number: FKE20120019E

Title: "Performance Differences Between Novice and Experienced Critical Care Nurses: A Replication Study"

Principal Investigator/Office Symbol: Josefina Alejandro, GS-11, 81 IPTS/SGIC

2. Please notify the investigator of this determination and the 81MDG IRB at the next convened meeting.

A handwritten signature in black ink, appearing to read "Matthew Carroll".

MATTHEW CARROLL, Lt Col, USAF, MC
Chairperson, Institutional Review Board
81 Medical Group

APPENDIX D
APPROVAL OF THE UNIVERSITY SOUTHERN MISSISSIPPI
INSTITUTIONAL REVIEW BOARD

INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

The risks to subjects are minimized.

The risks to subjects are reasonable in relation to the anticipated benefits.

The selection of subjects is equitable.

Informed consent is adequate and appropriately documented.

Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.

Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.

Appropriate additional safeguards have been included to protect vulnerable subjects.

Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".

If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 12081601

PROJECT TITLE: Performance Differences Between Novice and Experienced Critical Care Nurses: A Replication Study

PROJECT TYPE: New Project

RESEARCHER/S: Josephina Alejandro

COLLEGE/DIVISION: College of Health

DEPARTMENT: Nursing

FUNDING AGENCY: N/A

IRB COMMITTEE ACTION: Expedited Review Approval

PERIOD OF PROJECT APPROVAL: 08/21/2012 to 08/20/2013

Lawrence A. Hosman, Ph.D.

Institutional Review Board Chair

APPENDIX E

ESSENTIALS RELEVANT TO CAPSTONE

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice (EBP)	
1. Use of analytic methods to critically appraise existing literature and other evidence to determine and implement the best evidence for practice.	Reviewing literature for this capstone project has afforded a broad view of expert performance and deliberate practice. The large amount of references helped analyze the best EBP suited for the project.
2. Design, direct, and evaluate quality improvement (QI) methodologies to promote safe, timely, effective, efficient, equitable, and patient-centered care.	Determining performance differences between novice and experienced critical care nurses will initiate the designing, directing, and evaluating of methods to improve patient care in the ICU. This determination will be the basis of staff development projects, such as orientation and ongoing evaluation.
3. Apply relevant findings to develop practice guidelines and improve practice and the practice environment.	Findings of this capstone will eventually be used to improve practice of the ICU staff and develop guidelines which the staff can implement in the future.
4. Disseminate findings from EBP and research to improve healthcare outcomes.	Findings of this project will guide novice nurses through research-based and structured educational activities. Expert nurses can provide coaching and teach their less experienced colleagues using the findings.
Essential VIII: Advanced Nursing Practice	
1. Guide, mentor, and support other nurses to achieve excellence in nursing practice.	This capstone, which uses simulation to enhance teaching at the bedside, can further assist in understanding concepts and facilitate critical thinking in a non-threatening environment. Eventually, excellence in nursing care will be achieved through simulated scenarios.
2. Educate and guide individuals and groups through complex health and situational transitions.	As more representative tasks for simulation are selected and used, individuals and groups can practice through various health and situational issues.

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