4-29-2016

A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students

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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

A QUALITATIVE STUDY OF THE PROCESS OF LEARNING NURSING SKILLS AMONG UNDERGRADUATE NURSING STUDENTS

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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College of Natural and Health Sciences
School of Nursing
Nursing Education

May 2016

This Dissertation by: Michael Douglas Aldridge

Entitled: *A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students*

has been approved as meeting the requirements for the Degree of Doctor of Philosophy in College of Natural and Health Sciences in School of Nursing, Program of Nursing Practice

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ABSTRACT

Aldridge, Michael Douglas. *A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students*. Published Doctor of Philosophy dissertation, University of Northern Colorado, 2016.

This qualitative, phenomenological study sought to answer the question: How do undergraduate nursing students learn to perform psychomotor skills within the full complement of nursing skills? Nine senior nursing students from a nursing school in the south central United States participated in this study. In-depth interviews using open-ended questions were conducted, recorded, transcribed by the researcher, and then analyzed using Colaizzi's method to identify recurring themes. These themes were validated with the participants using a member checking process. An audit trail was kept to enhance dependability and confirmability. Six themes were identified: (a) the umbrella of emotion; (b) practice, practice, practice; (c) learning through technology; (d) "just pretend" does not produce confidence; (e) teaching matters; and (f) importance of peers. Therefore, the process of learning nursing skills can be described as follows: In a rough sea of emotions, necessity is the mother of invention. Emotions like fear and anxiety punctuated skills learning and participants found creative ways to learn nursing skills despite these barriers. This study updates prior qualitative studies about how nursing students learn skills and is the first qualitative study of how undergraduate nursing students learn skills in the United States. One unique finding in this study was some skills like tracheostomy care and skills involving sterile technique are harder to

learn than others. Faculty members could inform students that these skills will require more practice time. Another unique finding in this study was how fidelity and the broad use of technology across many settings contributed to skills learning. Faculty members could recommend that students use their smartphones to record and evaluate videos of the student practicing skills at home and discuss policies about recording faculty members demonstrating skills in lab. These participants generally found textbooks and videos from YouTube® and Assessment Technologies, Incorporated® to be minimally useful when learning skills. These findings provided current information to nurse educators about the skills learning process and recommendations for effective skills teaching.

Key Words: skill acquisition, nursing skills, nursing students, life experiences, phenomenology

ACKNOWLEDGEMENTS

Although conducting a dissertation is primarily a solitary process, it would not have been possible without the support of many people. First, to my family who has tolerated the long hours required for me to do this work: thank you for understanding and being willing to give me time and space to research and write. Second, to my parents: thank you for providing me with a good foundation to be able to complete a doctorate as well as your unwavering belief in me.

I am also forever indebted to my committee. Dr. Faye Hummel provided me with excellent advice and challenged me to develop this study into something that had deeper meaning than I originally thought it could. Drs. Karen Hessler, Carlo Parker, and Joseph Ososkie helped me immensely with methodological issues as I developed the study. I simply could not have asked for a better committee. This research is stronger due to their efforts.

I have been fortunate to have many supportive colleagues and mentors during my time in academics. Dr. Sharon Dormire planted the seeds in my mind years ago that I was capable of doctoral work. That vote of confidence and her continuing support mean so much. Drs. Keith Ragsdale and Kathy Lauchner have provided a willing ear to listen and the support needed over these last four years to complete this work.

Connie Beard helped me with formatting of this dissertation. I appreciate her knowledge of these details as well as her keen eye. It was helpful knowing this part of the process would be taken care of.

I also would like to acknowledge Concordia University Texas for helping to fund much of my doctoral work. They have been willing to put money behind their goal of having all nursing faculty earn a doctoral degree.

Finally, to the nine nursing students who participated in the study: thank you. In a time of your own lives when you were preparing to graduate, taking a full course load, and looking for jobs, you also agreed to give me your time and to share your stories. It is my hope this study begins a conversation about how we in nursing education teach nursing skills. Your experiences have helped us to better understand what the experience is like for today's nursing students to learn nursing skills.

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LIST OF ABBREVIATIONS

AACN	American Association of Colleges of Nursing
AHRQ	Agency for Healthcare Research and Quality
ATI®	Assessment Technologies, Inc. ®
AV	Arterio-venous
BSIs	Blood stream infections
CA-UTIs	Catheter-associated urinary tract infections
CLT	Cognitive load theory
CMS	Center for Medicare and Medicaid Services
CPR	Cardiopulmonary resuscitation
HRSA	Health Resources Service and Administration
IHI	Institute for Healthcare Improvement
IOM	Institute of Medicine
IRB	Institutional Review Board
IV	Intravenous
NCSBN	National Council for State Boards of Nursing
NG	Nasogastric
QSEN	Quality and Safety Education for Nursing

CHAPTER I

INTRODUCTION

Nurse educators have a responsibility to prepare students to practice safely in a complex environment. There are many aspects of the nursing role that nursing students must learn in order to practice safely including communication, clinical reasoning, leadership, informatics, teamwork, and nursing skills. All of these elements are necessary to create a safe practitioner, which is the primary goal of nursing education.

Improving patient safety and the quality of care has become a priority in today's healthcare system. Despite a call to action over 15 years ago, there has been little measurable progress in improving patient safety (Dolansky & Moore, 2013). In fact, recent estimates indicate approximately 440,000 preventable adverse events leading to death occur each year in U.S. hospitals (James, 2013). In addition to the lives lost, these preventable adverse events have a significant economic cost as well. For example, over a three-year period, Medicare spent $2.57 billion treating pressure ulcers and $1.71 billion treating preventable infections (Thornlow & McGuinn, 2009). The 1.5 million preventable medication errors that occur annually in the United States are estimated to cost $3.5 billion (MacDonald, 2010). In sum total, the cost of preventable errors in the United States may be as high as $17 billion per year (Chenot & Daniel, 2010). Given these statistics, some authors have called medical errors a national public health problem

that should be addressed in the same manner as diseases such as cancer and heart disease (Chenot & Daniel, 2010).

Of all healthcare providers, nurses have the greatest role in preventing errors and improving patient safety (American Association of Colleges of Nursing [AACN], 2008). The most common hazards that affect patient safety include medication errors, nosocomial infections, pressure ulcers, and deep-vein thrombosis (Tella et al., 2014; Thornlow & McGuinn, 2009). Nurse educators spend a significant amount of time in the curriculum teaching skills that should make nursing care safer, e.g., the importance of handwashing, sterile technique, and safe medication administration. Yet, the overall quality of care in many hospitals has either remained the same or worsened (James, 2013). Therefore, further study is needed in order to better understand the process that nursing students go through when learning nursing skills.

This qualitative study of undergraduate nursing students was conducted to gain a deep understanding of how they learn to perform nursing skills. Specifically, this study focused on the setting in which students learned psychomotor skills, which is one aspect of the broader category of nursing skills (see Figure 1). Much of the recent literature about improving quality and safety focused on systems issues and the impact of learning safe nursing skills has been less explored. This study emerged from a lack of detail in the literature about the actual process students go through when learning skills. Although the healthcare system and nurse educators place safety at the forefront of nursing care, it is not clear whether students see safety as a priority when learning any nursing skills, especially psychomotor skills. An understanding of the students' perspective of the

learning process is crucial in order for nurse educators to develop effective teaching methods that could ultimately improve patient safety.

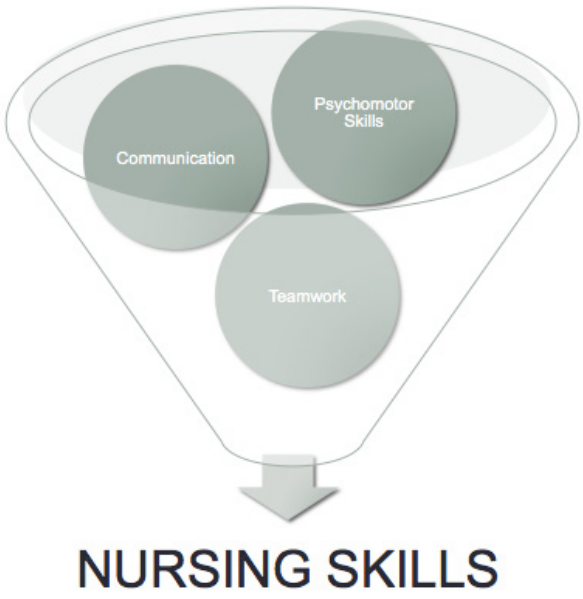

Figure 1. A graphic depiction of some of the elements that comprise nursing skills.

Setting the Stage

Before examining what is already known about patient safety and how nursing students learn to perform nursing skills, the researcher would like to set the stage by describing the broader environment students are educated in and the realities they face as they enter into nursing practice.

The healthcare system is both dynamic and complex. There are nearly 3.1 million nurses in the U.S., comprising the largest number of providers in the U.S. healthcare system (Kaiser Family Foundation, 2015). Although the number of nurses has steadily risen over time, a shortage of nurses is still predicted, which will lead to further stresses

on the overall healthcare system (Health Resources and Service Administration [HRSA], 2013).

The patient--who is the very reason the healthcare system exists--has changed as well. Patients are now living longer and are sicker than before, leading to greater degrees of illness as well as more complexities in their care (Brennan & Daly, 2009). Care is often fragmented, leading to increased costs of care, more avoidable hospitalizations, and greater use of emergency services (Bayliss et al., 2015).

In addition to all these challenges, organizations that reimburse hospitals and providers for care have put an increased emphasis on patient safety by tying reimbursement to health outcomes. This movement began in 2008 when the Centers for Medicare and Medicaid Services (CMS; U.S. Department of Health and Human Services, 2008) informed hospitals it would no longer reimburse for preventable complications patients suffered while hospitalized such as complex pressure ulcers, falls, surgical-site infections, catheter-associated urinary tract infections (CA-UTIs), and vascular blood stream infections (BSIs). These complications, among others, were termed *never events* and the CMS stated these hospital-acquired complications could be prevented with individual and systematic changes in practice (U.S. Department of Health and Human Services, 2008). While the effectiveness of such pay for performance systems has been questioned (Carlson, Sullivan, Garrison, Neumann, & Veenstra, 2010), hospital systems have put greater emphasis on patient safety initiatives to prevent complications and maximize reimbursement.

However, the measures to prevent complications also cost organizations money--such as staff training, special supplies, and monitoring--and in times of financial stress,

organizations often cut nursing education budgets (Levett-Jones, 2005). When organizations within the healthcare system are financially stressed by cost controls, poor nursing care can result (Roberts & Ion, 2014). In addition, unless hospitals make excellent nursing care an organizational priority, there is a tendency to tolerate complacency in basic skills and poor nursing care (Roberts & Ion, 2014), which can lead to complications and poor patient outcomes.

In the face of this every-changing and demanding healthcare system, nurse educators are challenged with preparing future nurses to work in this system. That is a difficult task since no one knows for certain the exact roles nurses will be working in or the kinds of skills they will need throughout their professional careers (Freed & McLaughlin, 2011). For example, as the patient population has slowly shifted out of the acute care setting and into the community setting, fewer nurses are needed to work in acute care; in fact, only 63% of nurses now work in the hospital setting (HRSA, 2013). As a result, nurse educators have a responsibility to prepare students to work in a broad range of patient care settings. No matter what area of nursing a student enters, safety and quality are fundamental expectations of every nursing role.

Nurse educators must also look critically at the nursing curriculum as a whole. Medical and nursing knowledge doubles approximately every eight years, leading to a content-laden curriculum (Dalley, Candela, & Benzel-Lindley, 2008). It remains a challenge to create a curriculum that includes the necessary information about general nursing care in addition to recent initiatives such as information technology, interprofessional education, communication, and patient safety (Pressler & Kenner, 2014). In an influential report from The Carnegie Foundation (Benner, Sutphen,

Leonard, & Day, 2010), nurse educators were called to present knowledge more contextually, integrate clinical and classroom teaching, emphasize clinical reasoning rather than critical thinking, and emphasize formation of professional identity. Nurse educators are constantly adapting their curricula to best prepare students for an ever-changing profession. These curriculum changes have decreased the emphasis and time spent teaching fundamental nursing skills, including psychomotor skills, in some nursing programs (Schneider & Ruth-Sahd, 2015). Both employers and nursing graduates generally state that a significant portion of nursing graduates come to the work place lacking many skills needed to work as a professional nurse (Berkow, Virkstis, Stewart, & Conway, 2009; McCalla-Graham & DeGagne, 2015).

Finally, some of the factors that affect the nursing curriculum are outside the control of nurse educators. Nursing students learn in many settings outside the classroom including inpatient clinical placements, community-based clinical placements, skills labs, and simulation labs. Many hospitals are now limiting student placements entirely or are limiting what they allow students to do in the clinical setting, thereby leading to diminished opportunities for students to practice basic psychomotor skills and medication administration (Kubin, Fogg, Wilson, & Wilson, 2013; Medley & Horne, 2005; Ross, 2012; Sears, Goldsworthy, & Goodman, 2010). As a result, nurse educators have looked for alternative teaching methods to teach these skills and concepts, e.g., simulation (Ross, 2012; Sears et al., 2010).

In total, all of these changes indicate nursing education and preparation for practice is always evolving and nurse educators must constantly adapt their curricula and teaching methods to adequately prepare students to provide holistic nursing care. One

change nurse educators have been called upon to implement is a new focus on patient safety and quality of care.

A Focus on Patient Safety: The Jumbo Jet Analogy

The landmark Institute of Medicine (Kohn, Corrigan, & Donaldson, 1999) report, *To Err is Human*, estimated that 98,000 number of people die annually in hospitals due to preventable medical errors. This report was alarming to the public as well as healthcare providers and organizations. National media drew on an earlier report about patient safety (Leape, 1994) that made the death statistic more tangible: the death rate due to medical error was equivalent to three jumbo jets crashing every two days. Since then, a number of groups have called for changes in the healthcare system to prevent errors from occurring.

Improving patient safety is the responsibility of hospitals, practicing healthcare providers, and schools that educate future providers (Duhn et al., 2012). To promote a focus on the aspects of quality and safety that nursing could influence, the Robert Wood Johnson Foundation funded the Quality and Safety Education for Nurses (QSEN) program in 2005 (Cronenwett et al., 2007). An advisory board created a set of competencies nursing graduates should acquire during their nursing education (Cronenwett et al., 2007). The QSEN was a call for nursing education programs to intentionally embed quality and safety as a thread throughout the nursing curriculum and focused on developing three types of competencies: knowledge, skills, and attitudes (KSAs). Over time, the target audience of the QSEN competencies was expanded to include all nurses-- not just nursing students.

One of the goals of QSEN was for nursing students to create a culture of safety in their nursing practice. A culture of safety requires an examination of both individual and system performances (Cronenwett et al., 2007) as well as a combination of nursing skills (see Figure 2). Over time, nursing schools have incorporated QSEN competencies into their curricula. However, many schools seem to have targeted these competencies toward the individual patient (Dolansky & Moore, 2013). To have a positive impact on patient outcomes, an approach that includes systems thinking is also needed. For example, an individual approach to teach students about handwashing is to observe them washing their hands, while a systems approach teaches students to observe others' handwashing techniques and examine unit design and workflow (Dolansky & Moore, 2013). Another way to expand students' scope of thinking at a systems level is to have them connect nursing skills to national quality and safety initiatives (Armstrong & Barton, 2013).

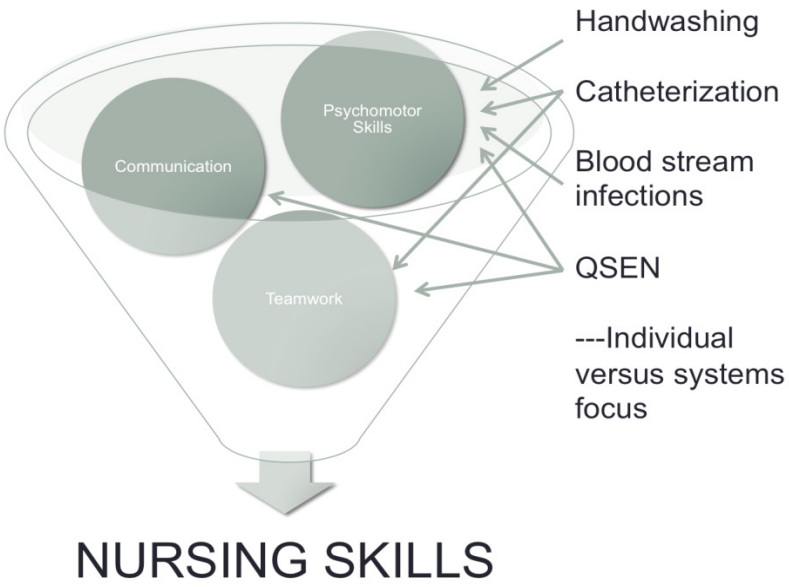

Figure 2. A graphic depiction of how the quality and safety education for nurses promotes a system focus as well as combines multiple elements of nursing skills.

One aspect of quality and safety relates to how nursing students--who will eventually become practicing nurses--view nursing skills in this culture of patient safety. How well these skills are performed, as well as how valued they are, have a direct influence on patient safety. For example, lapses in handwashing and breaches in sterile technique could lead to increased nosocomial infection rates. Many of the "never events," such as BSIs and CA-UTIs, could be prevented simply by performing basic nursing skills in a safe manner every time (Gonzalez & Sole, 2014; Taylor, 2012). To perform a skill safely, students must have the knowledge to perform the skill, the actual motor skill itself, and the attitude about its importance and value. Although checklists for nursing skills included measures to make the procedure safer for the patient, current evidence suggested both students and practicing nurses often failed to consistently perform these measures in actual practice (Bjork & Kirkevold, 1999; Gonzalez & Sole, 2014; Taylor, 2012). However, it was not clear why steps that influenced patient safety were left out of basic skill performance or why some skills such as hand washing were not done at all. Perhaps students and nurses did not see the value in performing the steps; perhaps they did not realize they were breaking sterile technique; perhaps they had learned to take shortcuts; perhaps they did not see these steps as leading to potential patient harm; or perhaps they were educated in a school that did not emphasize fundamental nursing care. Further study is needed to better understand the reasons behind poor nursing skill performance in these settings.

Although many hospital systems and nursing schools have attempted to improve patient safety, data suggest the problem might actually be worse than originally thought (Clancy, 2009). Using recent statistics, James (2013) estimated 440,000 lives were lost

annually due to preventable error, the equivalent of the entire Southwest airlines fleet of jets crashing six times a year. One in seven Medicare patients will suffer an adverse event during hospitalization (Clancy, 2009). Headlines in *The Wall Street Journal* (2012) offered advice to patients in "How to Stop Hospitals from Killing Us." Some authors noted that before Florence Nightingale, hospitals were regarded as unsafe places to be avoided; with the high rate of adverse events that harm patients, we are returning to that model (Reid & Catchpole, 2011).

This lack of improvement in safety is thought to occur due to the overall complexity of the healthcare system (Ebright, 2014). Although one way to improve patient safety is to perform psychomotor skills safely, other elements are also at play. For example, Woods and Cook (1998) pointed out that although progress on improving safety begins with understanding technical work, trade-offs are involved at the core of safety. Therefore, if a nurse has multiple tasks to carry out in a short time, some elements that contribute to patient safety might be omitted.

Patient safety remains an important issue in nursing practice and nurse educators must teach nursing students to practice safely. There are many ways to improve the quality and safety in nursing education and examining how we teach nursing skills is only one of the elements of safe nursing care. Nurse educators have to balance new ideas about what to include in their curricula, and recent reports have led many nursing programs to decrease the time spent teaching fundamental nursing skills. As a part of creating safe practitioners, nurse educators must not only teach students to perform nursing skills safely but must also teach them to understand and value how those skills influence patient safety.

Students' attitudes about how they learn and value these skills remain poorly understood. Although other factors also impact the quality and safety of nursing care, competent nursing skill performance can improve patient safety. Little is known about the process nursing students go through when acquiring nursing skills. Nursing skill acquisition warrants exploration now because the nursing education literature has deemphasized fundamental nursing skills teaching despite the influence these skills have on patient safety. By better understanding the process of nursing skill acquisition, nurse educators could develop teaching strategies to improve patient safety.

Definition of Terms

Nursing Skills

For the purpose of this study, nursing skills are defined broadly as skills needed to perform the nursing role. These skills might include psychomotor skills, which are defined below, but also include things such as teamwork, interprofessional communication, clinical reasoning, use of informatics, and patient education.

Patient Safety

Patient safety is defined as "minimizing a patient's exposure to hazards and near-misses and, likewise, reducing the risk of unnecessary harm associated with health care to an acceptable minimum" (Tella et al., 2014, p. 7). A *hazard* is something that has the potential to harm a patient and a *near-miss* is an event that did not reach the patient (Tella et al., 2014). Near-misses are significant because they represent opportunities to prevent future errors.

Psychomotor Skills

In a classic article discussing psychomotor skills learning among nursing students, Oermann (1990) defined psychomotor skills as activities that involve movement and neuromuscular coordination and typically involve a specific task. There are three categories of psychomotor skills: *fine motor* skills that involve precision-oriented tasks, such as injections; *gross motor* skills that involve using large muscles, such as ambulating a client; and *manual* skills that involve repetitive tasks involving hand-eye coordination, such as manual blood pressure measurement. These activities also involve a cognitive dimension--the scientific principles that form the basis of the skill--as well as an affective component involving care for the client while the skill is being performed (Oermann, 1990).

Skill Acquisition

Skill acquisition is defined as learning how to accomplish a specific task and is usually measured by the ability of a learner to perform the task proficiently and safely (Knight, 1998).

Background and Context

Historical Perspective on Teaching Nursing Skills

As long as nurses have cared for the sick, they have had to learn nursing skills necessary for the role. Historically, nurses were viewed as task-oriented caregivers who needed orders from physicians to carry out those tasks (Keddy, Jones Gillis, Jacobs, Burton, & Rogers, 1986). In the late 1800s, nurses were expected to be proficient in skills such as basic hygiene, feeding, bandaging, and administering enemas (Pfeil, 2003). In addition, certain skills were viewed as too advanced for nurses to perform. For

example, until the 1970s, physicians started intravenous (IV) lines in most hospitals (Rivera, Strauss, van Zundert, & Mortier, 2005). Before the advent of task trainers, manikins, and simulators, students learned how to perform nursing skills by practicing on each other and on patients. In the late 1800s, a handbook for hospital nuns stated that schools should have "models of arms and legs to learn bandaging, a jointed skeleton, and a mechanical dummy" (Lees, 1874, p. 34). In 1911, the creation of Mrs. Chase provided the first mechanical dummy produced for nursing education (Nehring & Lashley, 2010). Mrs. Chase had jointed limbs, thereby allowing her to be positioned like a real patient. Later improvements allowed for invasive procedures such as catheterization, enemas, and injections. In the 1940s, Mr. Chase, a male version of the manikin, was introduced for the armed forces to use in their training (Nehring & Lashley, 2009).

Many nursing students remember using simple task trainer devices to learn how to do specific skills such as using an orange to practice basic injection techniques. Task-trainers continued to see improvements in their design as well. Over time, manufacturers created devices that allowed for practice of specific skills such as arms for venipuncture and chests for central line care. These smaller devices were more economical than purchasing full-size manikins.

As life-saving skills became more complex, manikins were invented to allow for practice of specific skills. Resusci®-Anne was made in the 1960s for training in cardiopulmonary resuscitation (CPR) and was one of the most realistic simulators available due to the necessity of hyperextending the neck to deliver a breath (Cooper & Taqueti, 2004). Simulators evolved rapidly during the 1900s and 2000s and are now capable of simulating complex patient scenarios.

Historically, nurse education was task-focused and nurses relied on physician orders for guidance; independent nursing judgment was not emphasized. Over time, training devices have become more sophisticated and have increased the realism when learning to perform nursing skills. However, nurse educators must still use these devices effectively within their curricula to teach students to become safe practitioners. As nursing has matured as a profession, emphases on clinical reasoning, nursing judgment, and patient safety have become the primary goals of nursing education.

Curriculum Challenges with Teaching Nursing Skills

Nursing skills such as vital signs, medication administration, patient hygiene, and intravenous therapy are taught in most nursing programs (Boxer & Kluge, 2000). There is no standardized list of skills students should be able to perform competently upon graduation from nursing school, although nurse educators have been attempting to define these skills for at least the past 30 years. For example, in her dissertation research, Trekas (1986) identified 155 psychomotor skills deemed essential for baccalaureate graduates. These skills ranged from basic skills such as bathing, measuring vital signs, and hand washing to advanced skills like hemodialysis initiation and management. At that point in time, hospital-based educators reported all of these skills should be learned during nursing school (Trekas, 1986).

A later study (Jones, 2002) identified core groups of entry-level nursing skills nursing students should perform competently upon graduation including medication administration, physical assessment, and Foley catheter insertion. In that study, the majority of nursing faculty believed critical-care nursing skills and machinery-specific skills were not within the domain of entry-level nursing skills. This early literature

demonstrates educators' focus on psychomotor skill performance. Later literature would shift to a broader set of nursing skills that emphasizes quality and safety such as teamwork, interprofessional communication, and leadership (Cronenwett et al., 2007).

In addition to a lack of clarity about which skills entry-level students need to gain competency in, nursing faculty lack clear evidence-based guidance about how to teach nursing skills effectively. The majority of the nursing literature about teaching skills consisted of anecdotal reports and small studies (Love, McAdams, Patton, Rankin, & Roberts, 1989; McNett, 2012; Snyder, Fitzloff, Fielder, & Lambke, 2000). With the rise in simulation use among nursing programs, the majority of nursing research within the last 5 to 10 years regarding psychomotor skill acquisition has involved the use of low and high fidelity simulators (Ross, 2012; Stroup, 2014). There is general agreement in the literature that there is a lack of well-designed studies to guide faculty members to most effectively teach students how to both retain and transfer skills into their clinical practice (Lynagh, Burton, & Sanson-Fisher, 2007).

The final challenge in the nursing curriculum lies with diminishing opportunities students have to practice nursing skills in the clinical setting. Bjork (1997) traced the change in the settings where nurses have been educated over time. When nurses were primarily educated in the hospital setting, skills were taught at the bedside during numerous clinical hours of training. As nursing education moved into the university setting over time, there were fewer clinical hours, which led to skills being primarily taught in the lab and reinforced at the bedside (Bjork, 1997; Medley & Horne, 2005; Schneider & Ruth-Sahd, 2015). While the lab setting was valuable for learning the steps in a procedure, it was difficult to adequately simulate the complexities of care seen in the

real clinical environment. These complexities are key components to improving patient safety.

In addition, the clinical environment itself has changed and students have fewer opportunities to perform skills during their clinical time (Sears et al., 2010). There are numerous reasons for this change including increased patient acuity, shorter length of stay, nursing shortages, higher numbers of students present in the hospital, and liability concerns from hospitals (Medley & Horne, 2005; Ross, 2012). The end result of these changes is students have fewer opportunities to practice skills in the clinical setting, which appears to affect how well they retain skills. When students do not get the opportunity to perform nursing skills in the clinical setting, they miss seeing how system issues influence patient care. Finally, poor retention of skills leads to decreased competency in the skill, which can negatively influence patient safety (Gonzalez & Sole, 2014; Schneider & Ruth-Sahd, 2015).

Nursing Skills: The Connection to Patient Safety

A lack of specific guidelines about which skills to teach, coupled with an increased emphasis on other nursing competencies and curriculum initiatives, has led to a decreased emphasis on teaching nursing skills in many nursing programs (Schneider & Ruth-Sahd, 2015). Data from nursing graduates support this assertion. Gerrish (2000) compared two groups of nursing graduates: one group who graduated in 1985 and another group who graduated in 1998. The author found the students who graduated in 1985 felt they had acquired the essential clinical skills needed to function as a nurse even if they were not expert in all the skills. In contrast, the group of students who graduated

in 1998 felt they lacked many important skills necessary for the nursing role including administering medications and giving injections.

If faculty members are aware of skills deficits students have leaving education, perhaps they hope students will practice and perfect their skills once they are working full time. However, this assumption is problematic because experience does not guarantee a nurse will develop good nursing skills. A seminal study of skill development during the first year of nursing practice demonstrated some nurses' skills improved, some nurses' skills stayed the same, and other nurses' skills declined (Bjork & Kirkevold, 1999). For example, nurses whose skills declined were noted to not perform hand hygiene or use gloves correctly--basic components of any nursing skill and critical for infection prevention.

These two trends--a decreased emphasis on skills teaching and an expectation that skills will mature during the first year of nursing practice--might have important implications in the current healthcare setting that is focused on patient safety and infection prevention. In recent years, the focus on improving the safety of inpatient hospital care has been driven by reports highlighting the issue as well as refusal of payers to reimburse for hospital-acquired complications (Carlson et al., 2010).

In 2013, the Agency for Healthcare Research and Quality (AHRQ) released a report about patient safety practices that could make health care safer. Of the 42 practices reviewed in the report, 11 of the practices related directly to safe performance of basic psychomotor skills by nurses. These practices included hand-washing, prevention of central-line infections, prevention of catheter-associated urinary tract infections, fall prevention, pressure ulcer prevention, and safe medication administration

practices (AHRQ, 2013). These skills are routinely taught in the nursing curricula but the effectiveness of this skill acquisition remains poorly understood.

Practicing nurses perform basic nursing skills on a regular basis and nurse educators might assume nurses in practice perform these skills often and competently. However, data suggest otherwise. One study of practicing nurses found that although they rated themselves as "competent" or "highly competent" in performing central line care, 86% of the participants breached sterile technique during the procedure (Taylor, 2012). In another study, Swedish nurses working on a medical-surgical unit ranked the frequency they performed various skills (Ewertsson, Gustafsson, Blomberg, Homstrom, & Allvin, 2015). This study found skills such as injections and medication administration were done daily, venipuncture and intravenous (IV) therapy was done weekly, and urinary catheterization and central line care was done monthly. All of these skills, when done incorrectly, could cause infections or other patient safety complications. Further, one-third of nurses in the study stated they did not follow guidelines for best practice when performing these skills (Ewertsson et al., 2015). These studies are consistent with Bjork and Kirkevold's (1999) finding that nursing skill levels did not necessarily improve once nursing graduates entered practice.

Based on these considerations, it is reasonable to conclude that nurse educators should strive to adopt teaching methods where graduates achieve high levels of competency and also value the importance of basic psychomotor nursing skills. However, the best teaching methods to accomplish that goal remain elusive. Although various authors have proposed simulation as a model teaching method to improve patient safety (Kardong-Edgen, 2012), only limited studies showed students carried these

principles from the simulation lab into the clinical setting (Pauly-O'Neill, 2009; Shearer, 2013).

Brief Overview of the Skill Acquisition Experience

Our current understanding of how nursing students learn to perform psychomotor skills is discussed in detail in the next chapter. Students seem to closely associate successful performance of psychomotor skills with the nursing role (Wright & Wray, 2012). Four qualitative studies conducted over the last 10 years discussed the process of psychomotor skill acquisition from students' perspectives (Neacsu, 2006; Redmond, 2013; Roberts, 2008; Strand, Naden, & Slettebo, 2009). These studies identified some common themes. Students saw their peers as an important part of learning psychomotor skills as peers are sources of support and they often learn skills from each other. In addition, students felt they had not mastered their skills until they had performed them with real patients--a process termed by one author as *cementing* the skill (Redmond, 2013). Students also reported they were very aware the skills they were learning would one day be performed on actual human beings; this made the skill different than learning skills in other settings such as biology laboratories.

These studies (Neacsu, 2006; Redmond, 2013; Roberts, 2008; Strand et al., 2009) also noted the faculty and laboratory environment played a role in how students learned skills. Students reported some faculty practices were supportive of student learning and other practices were not supportive. Students stated they needed multiple practice sessions to learn a skill and that having a relaxed environment was important.

Finally, students reported they felt anxious and uncertain when they were learning skills. Some reported having difficulty learning to touch other people--a required

element of most every skill. Differences in equipment between what was found in the skills lab and what was available in the hospital caused them anxiety as well (Neacsu, 2006; Redmond, 2013; Roberts, 2008; Strand et al., 2009).

In these studies (Neacsu, 2006; Redmond, 2013; Roberts, 2008; Strand et al., 2009), themes regarding patient safety did not emerge as students reflected on psychomotor skill acquisition and competency. The United States has been a leader in trying to improve patient safety (Reid & Catchpole, 2011) so it would be useful to have a better understanding of whether students educated in the United States connected patient safety and psychomotor skills competency.

Skill Acquisition and Simulation

As simulators have become more sophisticated and clinical opportunities have decreased, many nursing schools have adopted simulation as a teaching methodology. A recent survey of 139 nursing programs indicated 91% of respondents stated simulation was used in the nursing curriculum (Davis, Kimble, & Gunby, 2014). However, there appears to be wide variation in how extensively these simulators are used within the curriculum--some schools used them fairly minimally and others used them extensively (Davis et al., 2014). For example, Hayden's study (2010) noted the median number of simulations in a program as 13 with a range of 1 to 233.

We know little about the process nursing students go through when learning psychomotor skills in the simulation lab. One qualitative study asked students to reflect on the learning process after completing a simulation using a virtual reality simulator to teach Foley catheter insertion (Johannesson, Silen, Kvist, & Hult, 2013). The students identified four phases to their learning: preparing, watching, practicing, and reflecting. In

addition, the students stated the virtual reality simulator helped them learn the specific skill and they appreciated working with a peer during the simulation (Johannesson et al., 2013). Again, themes about patient safety did not emerge in this study.

A common approach to psychomotor skills training in the simulation lab is for students to first learn the steps of a skill on a low-fidelity task trainer such as an IV arm. Students then incorporate this skill into a high-fidelity simulation that situates the skill into a real patient scenario such as starting an IV on a patient with an arterio-venous (AV) fistula on one arm. In that situation, students would be expected to realize that starting an IV on the arm with the AV fistula was contraindicated and could cause the patient harm. In fact, students did recognize this difference in complexity and were able to demonstrate the progression from basic task completion to application in a simulated clinical scenario (Coffman, 2012). This approach was consistent with calls for nurse educators to move beyond simple rote memorization of a psychomotor skill (Goldsmith, Stewart, & Ferguson, 2006) and is a good example of how simulation could be used to teach principles of patient safety.

Affective Components of Skill Acquisition

Although we traditionally think of psychomotor skills as being a physical process, it is also important to consider how the affective state affects skill acquisition. Historically, many theories about skill acquisition have focused on the cognitive processes involved in performing a skill such as the steps in the task, the rehearsal process, and recall mechanisms (Langan-Fox, Armstong, Balvin, & Anglim, 2002). However, emotional aspects of skill performance are likely present as well. For example, if a nurse who is proficient in venipuncture knows a patient is extremely anxious about

having blood drawn and two other nurses have tried to obtain blood and failed, does that nurse perform the skill with ease? Or do the emotions of the situation affect the nurse's ability to perform the skill? What if there are external interruptions during the procedure such as call bells ringing or family members asking questions?

One model that helps explain the role of one's affective state is to think of the human brain as triune--controlling physical activity, emotion, and cognition (Ferro, 1993). There might be strategies nurse educators could employ when teaching psychomotor skills that could help students be aware of the affective components of skill acquisition such as creating self-awareness or a positive self-concept (Langan-Fox et al., 2002). The role of how affective processes affect skill acquisition or patient safety is not well described. This aspect of skill acquisition deserves consideration since valuing patient safety as a priority in nursing care is a key component of providing safe care.

The Employer's Perspective

Although at least 40% of hires in the acute care setting involve new graduates (HealthCare Advisory Board, 2002), there are significant concerns when hiring these graduates. It costs a hospital system between $40,000 and $64,000 to orient a new graduate and these graduates have turnover rates of 35 to 60% (Theisen & Sandau, 2013). New graduates must possess many competencies to function in the nursing role besides psychomotor skills: communication, leadership, clinical reasoning, organization, and prioritization (Theisen & Sandau, 2013).

Despite decreased opportunities to practice nursing skills during their education, nursing students are expected to carry skills learned in the nursing curriculum into practice. There are conflicting data about how effectively students are able to retain these

skills as they transition into practice. Students educated in the late 1990s reported feeling less prepared to perform basic clinical skills upon graduation when compared to students who graduated in the mid-1980s (Gerrish, 2000). A Finnish study (Kajander-Unkuri et al., 2014) reported on 154 graduating nursing students from nine schools and asked students to self-assess their skills levels in multiple categories. Results from this study indicated half of the students assessed their skills as very good, 33% assessed their skills as good, and 18.8% assessed their skills as low or moderate. Basic skills done repeatedly such as measuring vital signs, hand hygiene, and administering oral medications ranked higher than skills that were more invasive such as administering injections or inserting a nasogastric (NG) tube (Kajander-Unkuri et al., 2014). A study conducted by Sharif and Masoumi (2005) of 90 Iranian nursing students found the students reported feeling incompetent in the clinical setting and felt they lacked knowledge about how to perform any skills other than basic nursing skills related to hygiene and bed making. These studies might reflect the variation in how skills are taught and practiced in various programs and countries as well as the physician-nurse relationship in that particular healthcare system.

Data from nursing employers revealed significant deficits in how new graduate nurses performed a broad range of clinical skills. A nationally representative survey of 5,700 frontline nursing leaders conducted in 2007 found only 66% agreed or tended to agree with the statement that they were satisfied with the clinical skills of new graduate nurses (Berkow et al., 2009). This study examined 36 competencies. The highest rated skill was utilization of information technologies (53% of respondents felt new graduates were proficient in this skill) while the lowest rated skill was delegation of tasks (10% of

respondents felt new graduates were proficient). Twenty-seven percent of respondents felt new graduates were proficient in clinical procedures such as sterile dressing changes and IV therapy. Only 28% of respondents felt new graduates could recognize unsafe practices by themselves or others.

Theoretical Framework

Cognitive load theory (CLT) was the theoretical framework that informed this study. Cognitive load theory (Sweller, 1988) describes how the brain processes information. Briefly, the theory describes how information is taken in by working memory, which has both audio and visual components (de Jong, 2010). Information that is not needed is filtered and forgotten while information that needs to be stored is moved into long-term memory.

Cognitive load theory was well positioned to inform this study because it offered a theory-based educational framework for thinking about the learning process. For example, the principles of working memory help us understand the process of performing psychomotor skills that contain multiple steps and the difficulties of communicating while performing a motor skill. In addition, the theory offered some explanation of the differences in learning complex skills versus learning simpler skills.

Problem Statement

Despite efforts to improve patient safety, the healthcare system remains unsafe for patients today. Nursing students will eventually work in a system where nurses are faced with prioritizing multiple tasks, leading to care that is omitted at times. Nurses have significant opportunities to prevent patient harm but statistics demonstrate that due to the complexity of the healthcare system, little progress has been made in improving patient

safety. Multiple elements create a safe practitioner and improve the quality and safety of the healthcare system. Although many aspects of improving patient safety have been examined in the literature, the role of how nursing and psychomotor skills affect patient safety has been neglected in recent literature.

Nurses' competency in nursing skills can greatly affect patient outcomes. Evidence has suggested both nursing students and practicing nurses have significant breaches in technique, thereby putting patients at risk for nosocomial infections and other complications.

As described above, there is a lack of detail in the literature about the actual process nursing students go through when learning to perform nursing skills. In light of the connection between patient safety and competent skill performance, an understanding of the students' perspective of the learning process is crucial in order for nurse educators to develop effective teaching methods that promote safe patient care.

When students do not gain competence in nursing skills during their nursing programs, they then enter professional practice with the intent that their skills will mature and improve. Instead, the evidence suggested many of their skills remain imperfect and might potentially cause patient complications and infections. In addition, if students do not value the importance of performing psychomotor skills safely, they might be less likely to do so when faced with multiple tasks to accomplish in a limited time.

Current literature clearly demonstrated that safe nursing care and competent skill performance have the potential to improve patient safety, which is an overarching goal of hospitals, payers, and patients themselves. If nurse educators had a better understanding of the process students go through when learning to perform nursing skills, then teaching

methods could be developed that might lead to nurses in professional practice who have better psychomotor skills. Better nursing skill performance, especially psychomotor skill performance, could provide one piece of the puzzle as we work to improve patient safety, decrease complication rates, and decrease costs to the healthcare system.

To answer those questions, we first need to understand students' perspectives about how they learned to perform psychomotor skills in relation to patient safety. We do not know if they focused on patient safety when learning skills and we do not have a good understanding of their attitudes about patient safety when they were learning skills. To integrate QSEN competencies into nursing curricula and ultimately improve patient safety, we need to have a better understanding of this learning process.

Research Purpose

The purpose of the study was to explore the process of how undergraduate nursing students learned to perform psychomotor skills within the full complement of nursing skills.

Research Question

The following research question guided this study.

Q1 How do undergraduate nursing students describe the process of learning nursing skills?

Research Design

The methodology of this study is discussed in detail in Chapter III but is briefly summarized here. This study used a phenomenological approach to discover and describe the process of how nursing students educated in the United States acquired nursing skills. Given the lack of research, psychomotor skill acquisition was of primary

interest in this study. Based on the review of the literature, the researcher expected that participants would primarily associate psychomotor skill performance with the larger category of nursing skills. However, since some participants might also consider other skills such as communication, safety practices, or patient education to be a nursing skill, the researcher opted to leave the research question broad to see which themes emerged.

Since little is known about nursing students' actual experiences with acquiring psychomotor skills, phenomenology was an appropriate qualitative methodology since it sought to understand the immediate experience people have with a given phenomenon (Nelms, 2015). One of the basic tenets of phenomenology is the participants must have directly experienced the phenomenon being studied since the goal was to understand the problem in depth. Therefore, it was necessary to recruit participants who had learned basic psychomotor skills.

Nine senior-level nursing students were asked to participate in an in-depth interview about the process of learning nursing skills. Participants consisted of nursing students from a small liberal arts university in the south-central United States. The rationale for recruiting senior-level nursing students was they would have acquired the basic skills in the nursing curriculum and would likely be able to recall their experiences about learning skills.

After the informed consent process, participants individually shared their experiences in a semi-structured interview lasting approximately one hour. The interview was recorded for transcription. The researcher also took field notes during the interview to help recall non-verbal interactions. After verifying accuracy of the transcriptions, the data were analyzed using Colaizzi's method (1978). This method involved reading the

data numerous times, extracting significant statements, formulating themes, analyzing the themes, and then writing an integrated description of the phenomenon. Data analysis occurred in tandem with ongoing recruitment, which allowed for additional interviewing as needed and also allowed the researcher to identify when saturation had been reached.

Summary

There are many aspects to creating a safe practitioner, which is the overarching goal of nursing education. To improve patient safety, it is important for nursing students and graduates to perform nursing skills competently and safely. Current data suggested that in the traditional educational model, nursing students do not carry nursing skills into practice well, which leads to decreased skill competence that potentially puts patients at risk for complications. In addition, little is known about how nursing students educated in the United States currently acquire nursing skills, especially psychomotor skills. Once that information is understood, additional teaching methods could be developed to improve transferability into clinical practice and potentially improve patient safety. This study used a phenomenological approach to discover how nursing students described the process of learning psychomotor skills within the larger context of nursing skills. In the end, the results of this study might help educators better understand the process of psychomotor skill acquisition. This information might help shape future teaching methods and provide one element to improve patient safety.

CHAPTER II

LITERATURE REVIEW

The purpose of the study was to explore the process of how undergraduate nursing students learned to perform psychomotor skills within the full complement of nursing skills. Although nursing skills are defined broadly, the primary focus of this study was on psychomotor skills. To plan this study, a critical review of current literature relating to skill acquisition was completed. Literature about what students learned about patient safety and its relation to nursing skills was also reviewed. In addition, the review was ongoing throughout the study to integrate new findings into the data collection, data analysis, and synthesis phases of the study.

Multiple information sources were used to complete this review including books, dissertations and theses, Internet resources, and professional journals. These sources were accessed primarily through databases including CINAHL, MedLine, and ProQuest using search terms such as safety, patient safety, motor skill, psychomotor skill, acquisition, teaching methods, simulation, and nursing education. Reference lists of relevant articles were hand searched for additional references. Google Scholar was used to determine if key articles had been recently cited, which provided additional references. Since nursing skills have been taught throughout nursing education, date restrictions were not used to capture any relevant material. Although the majority of references used were

published within the last 15 years, older studies were included if they were significant or if more recent research had not been done.

This critical review is organized into four main parts. Part I of the review examines patient safety and nursing education. Part II of the review discusses the theoretical framework for the study. Part III describes broad research related to how people learn motor skills in general. Much of this research was done outside of the healthcare professions but it served to inform this study and enhanced our understanding of how nursing students acquire psychomotor skills. In Part IV of the review, literature is presented that deals explicitly with qualitative and quantitative research about skill acquisition in the nursing and health literature. A summary of this analysis completes the chapter.

Part I: Patient Safety and Nursing Education

The U.S. healthcare system is complex and fragmented. Although as many as 25% of all hospitalized patients will experience a preventable medical error of some kind (Armstrong & Barton, 2012), patient safety initiatives remain underfunded (Clancy, 2009). Although some tools are provided, much of the work of improving patient safety has fallen to individual hospitals, which is one of the primary reasons little progress has been made in reducing hazards (Clancy, 2009). Clancy (2009) also noted some hospitals had made marked improvements in patient safety, while others had done little.

Within those hospitals, nurses work in a system where they are asked to do many things. Nurses must make decisions about what nursing care is needed, what care can be delivered, and what care can be omitted. The process by which these decisions are made

is termed *stacking*; researchers believe this decision-making process develops with experience (Ebright, 2010).

A related concept to stacking is *missed care,* which is described as required nursing care that is omitted (Kalisch & Xie, 2014). Research revealed basic nursing care is often omitted; the most common tasks omitted include ambulation, turning, assessing the effectiveness of medications, mouth care, and patient teaching (Kalish & Xie, 2014). The strongest contributing factors to missed care are poor staffing levels, lack of material resources, and poor communication. Hospitals with Magnet® status and high levels of teamwork appear to have had fewer episodes of missed care (Kalish & Xie, 2014).

These studies about stacking and missed care helped explain the complexity of the environment where nurses deliver care. They also pointed out significant improvements in patient safety would likely not occur by simply targeting one area of nursing care delivery. Therefore, a better understanding of many processes that affect patient safety is needed.

Nursing education also has a role in improving patient safety. Of all healthcare providers, nurses have the greatest role in improving patient safety and preventing medical errors (AACN, 2008). Nurses learn fundamental skills during their education and nurse educators have an imperative to teach patient safety both on individual and systems levels (Cronenwett et al., 2007). There are two guiding sets of competencies and standards about patient safety in nursing education: QSEN (Cronenwett et al., 2007) and *The Essentials of Baccalaureate Education for Professional Nursing* (AACN, 2008.

Competencies and Standards for Patient Safety in Nursing Education

A complete discussion of the patient safety movement was beyond the scope of this study; however, an overview of key events and reports that relate to nursing education is discussed. After a series of Institute of Medicine (IOM) reports (Chenot & Daniel, 2010) noted the high rate of medical errors in the United States, national media and patient safety groups began to push hospitals to improve patient safety and quality of care. For example, the Institute of Healthcare Improvement (IHI; 2015) launched a campaign to save 100,000 lives over the next year by preventing medical errors and then further expanded the initiative the next year to save 5 million lives. Many of the errors that could be prevented were influenced by the quality of nursing care such as preventing pressure ulcers, blood-stream infections, medication errors, and ventilator-associated pneumonia.

Shortly after the initial IOM reports about medical errors, the IOM issued another report about the state of health professions education (Greiner & Knebel, 2003). Among other recommendations, the report stated that in order to make the healthcare system safer, the way professionals were educated needed to be changed. These reports drove the creation of the QSEN competencies and *The Essentials of Baccalaureate Education for Professional Nursing* (Chenot & Daniel, 2010).

Quality and safety education for nurses. In 2007, the QSEN competencies were released with the goal of preparing nurses to improve the quality and safety of the healthcare system (Cronenwett et al., 2007). Six categories--patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and

informatics--each contain multiple objectives that are divided into knowledge, skills, and attitudes (KSAs).

For example, in the safety category, there are seven knowledge objectives, eight skills objectives, and five attitude objectives. Each objective is to "describe factors that create a culture of safety (knowledge)," "demonstrate effective use of strategies to reduce risk of harm to self or others (skills)," and "value own role in preventing errors (attitudes)" (Cronenwett et al., 2007, p.128). These objectives broaden patient safety to a systems level and call for new teaching methods to prepare students to meet these competencies. The QSEN is designed to be taught throughout the curriculum rather than in a single, stand-alone course (Armstrong & Barton, 2013) and should be embedded in every aspect of the curriculum--classroom, clinical, and lab (Ironside & Sitterding, 2009).

The essentials of baccalaureate education for professional nursing. In 2008, the AACN released *The Essentials of Baccalaureate Education for Professional Nursing* (hereafter referred to as "The Essentials"). This document outlined core competencies for entry-level professional nurses and included content related to patient safety and quality (AACN, 2008). Essential II: Basic Organization and Systems Leadership for Quality Care and Patient Safety includes 12 objectives students should meet. In addition, Essential IX: Baccalaureate Generalist Nursing Practice contains two additional objectives that relate to providing a safe care environment and in performing psychomotor skills safely (AACN, 2008).

The QSEN and *The Essentials* provide a structure for nursing curricula to teach patient safety competencies. However, nursing educators must make significant changes to existing curricula to incorporate these competencies (Cronenwett et al., 2007). In

addition, current nursing faculty might lack knowledge about many of these topics, which makes teaching the competencies even more challenging (Thornlow & McGuinn, 2009).

What Do Students Learn About Patient Safety in their Nursing Education?

Several studies have examined what students learned about patient safety during their nursing education. Despite calls to incorporate patient safety competencies throughout nursing curricula, the data demonstrated nursing education has not done this effectively. Two years after the QSEN competencies were released, Howard (2010) found 9 of the top 10 nursing schools ranked by *U.S. News and World Reports* failed to include dedicated patient safety education in their curricula.

More recent studies continued to document a lack of emphasis on patient safety in nursing curricula (Mansour, 2012; Tella et al., 2014). In their review of 20 studies about patient safety in pre-licensure nursing education, Tella et al. (2014) found that although there was some evidence of patient safety concepts in the classroom and the clinical setting, they were difficult to find and often not specifically identified. They also noted when patient safety concepts were threaded throughout the curriculum rather than in stand-alone modules or courses, the content tended to disappear over time.

Students' perspectives about what they learned about patient safety during their nursing education revealed the focus had been on individual patient and practitioner levels. Duhn et al. (2012) assessed student self-reported confidence among a variety of patient safety competencies and found students generally reported feeling confident in many aspects of patient safety. Areas with especially high levels of self-reported confidence included hand hygiene, safe medication practices, and infection control. Areas of low self-reported confidence included working in teams and recognizing

adverse events. In particular, students did not believe systematic processes about patient safety were taught in the curriculum (Duhn et al., 2012).

There are few studies about nursing student attitudes regarding patient safety; this author could locate none done in the United States. One study of Iranian nursing students found students identified themes of patient comfort and well-being with patient safety (Vaismoradi, Salsali, & Marck, 2011). These students felt although patient safety was a nursing responsibility, their nursing programs did little to prepare them to be well informed about patient safety principles. Studies from the United Kingdom of hand hygiene (Cole, 2009) and infection prevention (Ward, 2012) found nursing students tended to over-estimate their competency level for hand hygiene and often failed to wash hands when they observed mentors not washing their hands. When confronted with hand hygiene guidelines, students explained the guidelines were aspirational and they would not feel comfortable admitting they did not perform a basic skill (Cole, 2009). These studies gave some insight into students' attitudes and how they valued their competence in nursing skills relating to patient safety but further study is needed to better understand this aspect of safe nursing care.

Some evidence indicates students do value learning about patient safety during their nursing education. A study evaluating an elective course in inter-professional patient safety showed nursing students placed a high value on the course (Abbott, Fuji, Galt, & Paschal, 2012). The students reported an increased awareness of patient safety issues and felt nurses should have ownership of making the healthcare environment safer.

In the end, there are still many opportunities for nursing schools to improve how they implement quality and safety education in their curricula (Chenot & Daniel, 2010). Nursing faculty might need to develop expertise in these competencies in order to teach systematic patient safety principles effectively (Thornlow & McGuinn, 2009).

Part II: Theoretical Framework

Cognitive load theory (CLT) is a theoretical framework that informed this study. One of the basic tenets of CLT is the brain can only process limited amounts of material at one time (Sweller, 1988). Information is taken in by the *working memory,* which used to be called short-term memory. Working memory is responsible for the processing of information but is limited to approximately 20 seconds of attention and to about seven pieces of information at a time (Josephsen, 2015). In times of complex analysis or problem-solving, the capacity of working memory might be further reduced to three to five pieces of information (Josephsen, 2015). Working memory has both audio and visual components that appear to function separately (de Jong, 2010). Information not needed is filtered and forgotten while information that needs to be stored is moved into *long-term memory.*

Long-term memory is unlimited in terms of capacity and is organized by *schema*. Schemas are simply ways of organizing multiple pieces of information and of expressing relationships between knowledge (Young, van Merrienboer, Durning, & Ten Cate, 2014). Constructing these schemas is the essence of learning (van Merrienboer & Sweller, 2010). In nursing, an example of a schema is learning what a fever is and then learning fever is one of many potential causes of tachycardia. The ease at which learners form these relationships in long-term memory is one explanation CLT offers of why some

learners are able to learn complex topics more easily than other learners (Young et al., 2014).

Cognitive load theory further describes several types of cognitive load that affect learning. *Germane load* includes processes that help the learner organize material into schemas; for example, an instructor who helps a student recognize patterns among several similar diseases is maximizing germane load (Josephsen, 2015). *Intrinsic load* is the difficulty of the subject matter and cannot be changed while *extrinsic load* includes things the learner has to deal with that do not contribute to learning (de Jong, 2010). Extrinsic load usually relates to poor instructional design such as poor visual aids and redundant material (Josephsen, 2015). In essence, the learner must sort through this additional information to get to the important information to remember; this effort exerts cognitive load.

Finally, *mental load* includes elements that burden a learner's emotional and cognitive resources such as heightened emotions, poor group dynamics, or broken equipment (Josephsen, 2015). These elements are often present in the nursing environment and during psychomotor skills learning and performance.

There are two major criticisms of CLT. First, there currently is no valid and reliable method for measuring cognitive load (de Jong, 2010). Instead, most empirical studies of CLT rely on tools where participants rate their perceived cognitive load or where indirect measures of performance on tasks are considered proxy measures for cognitive load (de Jong, 2010). Second, the theory is difficult to falsify because nearly any outcome can be attributed to germane cognitive load (which is considered desirable),

extraneous cognitive load (which is considered undesirable), or intrinsic cognitive load (which is unchangeable; de Jong, 2010).

Despite these criticisms, CLT was well positioned to inform this study because it offered a theory-based educational framework for thinking about the learning process. For example, once the principles of working memory are understood, it is easy to see how students have difficulty performing skills that contain multiple steps. Because CLT addresses mental load, the affective components of skills learning and the environment are also addressed by the theory. In addition, the theory offers some explanation for why learning complex skills is more challenging than learning simpler skills. Cognitive learning theory also explains how schemas become automated, which is a process where knowledge is extracted from memory and the skill is performed with little cognitive effort (van Merrienboer & Sweller, 2010). This process is consistent with skill acquisition literature where people eventually learn a skill and can perform it without having to think through all the steps. Finally, CLT has been used as a theoretical framework for some nursing studies involving simulation (Josephsen, 2015; Schlairet, Schlairet, Sauls, & Bellflowers, 2015).

Part III: Broad Theories and Research About Motor Skills Learning

Humans learn to perform skills throughout their lives--from learning to eat, walk, write, ride a bicycle, drive a car, and type. Some of these skills are genetically driven while others are learned through practice. The study of motor control and learning is a broad field with researchers from disciplines such as psychology, neurobiology, kinesiology, human performance, healthcare, and rehabilitation (Schmidt & Lee, 2011). A complete review of the concepts of motor skills learning was beyond the scope of this

chapter; the goal here was to describe research that directly related to nursing skill acquisition that could translate to the healthcare setting.

There is no universally accepted theory about how people learn skills. Cognitive load theory, described above, is one such theory that describes the memory processes necessary when learning any new information. Other theories, such as Hull's theory, have attempted to describe how practice and fatigue affect learning and performance (Schmidt & Lee, 2011).

The ultimate goal of learning a skill is that it is indeed *learned*. Many times a skill can be *performed* but it is not truly learned. Performance of a skill consists of completing a series of steps, while learning a skill implies a more permanent change in a person's ability to perform the skill (Wulf, Shea, & Lewthwaite, 2010). Through learning, people are able to transfer a skill to the setting encountered in the real world. This distinction is important when we consider nursing skills. It is one thing to be able to perform a skill in the lab setting but it takes a more complex set of skills to perform the skill safely in the unpredictable clinical setting when real patients are present. The following factors have been identified to improve skills learning and are examined individually.

Feedback

Feedback is an important part of learning a skill correctly (Wulf et al., 2010). Learning is most effective when students hear both positive and negative feedback--with more positive than negative feedback (Wulf et al., 2010). In addition, feedback directly affects motivation to learn; negative feedback appears to have negative effects on learning and confidence.

A study by Oermann, Kardong-Edgren, and Odom-Maryon (2011) provided an example of this factor. In that study, nursing students learned CPR skills using a manikin that measured the depth and rate of chest compressions. If the compressions were too slow or too shallow, the student got immediate feedback from a computer that told the student to compress faster or deeper. The study demonstrated that with only six minutes of practice a month, students were able to not only maintain but also improve their CPR skills (Oermann et al., 2011).

Testing

People learn skills better when they are tested on their performance (Wulf et al., 2010). In one study, two groups of medical students who learned CPR skills were compared (Kromann, Jensen, & Ringsted, 2009). The control group received training only while the intervention group received training as well as testing. Comparison of the two groups showed the intervention group had significantly higher outcomes than the control group. Testing seemed to provide motivation for learning.

Observation and Pairing

Observational practice, when combined with physical practice, also improves learning (Wulf et al., 2010). For example, when students pair up to practice skills, one student observes while the other performs the skill and then the roles reverse. Neuroimaging studies have shown that common neural structures are triggered during action production and observation (Wulf et al., 2010). In addition, the learner who is observing might identify changes in technique he or she could physically not identify during the actual practicing of the task. Indeed, studies have found pairs of students acquire and retain skills more effectively than individuals (Wulf et al, 2010).

Practice

The law of practice states that all other things being equal, more learning occurs if there are more practice sessions (Schmidt & Lee, 2011). Typically, performance of the skill improves rapidly at first and then incrementally smaller; however, there does not seem to be an upper limit to the amount of improvement that can be measured even after thousands of trials.

Some skills become learned so well they become automatic. For example, driving a car is a skill that becomes automatic for most people over time (Schmidt & Lee, 2011). When driving conditions become different than what the driver is used to, the fact that basic driving skills are automatic frees up additional cognitive resources so driving can still be done safely. Automatic processing is also theoretically seen in psychomotor skills used in healthcare. For example, experienced nurses do not have to think in detail about the steps in hand washing and thus can wash their hands while talking to their patient. This statement is not to imply they perform the procedure well--just that they have memorized the steps necessary to complete the task.

Learners benefit from practicing complex tasks multiple times with periods of rest in-between. In a single practice session, little improvement is seen after approximately 30 trials (Schmidt & Lee, 2011) as it appears fatigue begins to set in at that point. Total practice times spread over days, weeks, or months tend to lead to improved learning versus intense practice over a very short time (Schmidt & Lee, 2011). One study that supported this approach was Oermann et al.'s (2011) CPR study. In that study, students received short, six-minute practice sessions of CPR monthly for one year. The students

in that group improved their CPR skills when compared to a control group that received the usual training.

Fidelity

Learning tends to improve when skills are learned in an environment that realistically approximates the setting in which they will be performed (Schmidt & Lee, 2011). In nursing, we refer to this idea as *fidelity*. One study that examined the fidelity of a simulation environment found students performed better on nasogastric tube insertion and urinary catheter insertion when they learned the skills in a high-fidelity rather than in a low-fidelity setting (Grady et al., 2008).

Motivation

Many of the factors described above, including feedback and testing, directly related to one of the most important factors in learning a skill: motivation. If the learner perceives the task to be meaningless, then the effort spent learning the task will likely be minimal. Although nursing students express a general desire to learn nursing skills (Wright & Wray, 2012), it is not known whether they consider some of these skills more important than others. In addition, motivation directly influences the value one places on doing a skill safely. For example, if a student values maintaining sterile technique because that measure will prevent infection, then the student is motivated to pay extra attention to those aspects of the skill. Motivation also influences broad nursing skills such as communication and clinical reasoning. In short, if the student believes those skills are important, then he or she will be motivated to do them.

In summary, multiple factors affect how people learn skills and many have relevance to the methods and environment used in nursing education. We will now examine what the literature says about how nursing students acquire skills.

Part IV: Skill Acquisition in the Healthcare Literature

Students learn nursing skills in various environments including the traditional skills lab, the simulation lab, and the clinical setting. They learn to perform these skills on models, task-trainers, low-fidelity manikins, high-fidelity manikins, fellow students, and real patients. They also learn these skills via many teaching methodologies including demonstration, simulation, individual practice, peer practice, and others. In addition, there is no standardized method by which skills are taught in a nursing program, when they are taught, or how they are taught. This variation must be considered as we examine the literature about skills learning.

In terms of skill acquisition, we will first examine qualitative studies about student perceptions of how they learn skills. We will then follow with quantitative studies about skill acquisition, which often examine specific teaching methods.

Qualitative Studies About Skill Acquisition

Four qualitative studies conducted over the last 10 years discussed the process of skill acquisition from students' perspectives (Neacsu, 2006; Redmond, 2013; Roberts, 2008; Strand et al., 2009). These four studies represented the voices of 249 nursing students from three different parts of the world. The majority of students was in the middle or later parts of their nursing studies; most were typically females in their early 20s. Three of the studies used direct observations and interview methods for data

collection while one study used an open-ended questionnaire. All the studies used thematic analysis to analyze data.

In a method described by Noblit and Hare (1988), these four studies were read and reread to determine relevance to the overarching phenomenon of skill acquisition among nursing students. Using the process of reciprocal translation, common themes among the studies were developed. Themes identified included the importance of peer learning; mastering skills occurs after performing them on real patients; faculty members can help or hinder learning; skills learning takes time and a relaxed environment; a real person will one day receive these skills; and, anxiety and uncertainty are present when learning skills and require coping.

Theme 1: Peers are important when learning skills. Peers were both a source of support and a source of information when students were learning to perform skills. Learning occurred through teamwork (Strand et al., 2009); students taught each other skills and helped each other practice and refine their skills (Roberts, 2008). Students with less experience looked to students with more experience--those who were further along in the nursing program or who worked as a technician--for guidance (Roberts, 2008). Students stated they liked learning from each other (Redmond, 2013; Roberts, 2008); there was benefit for both students in this process. For example, the student receiving the knowledge was able to perform the skill while the student giving knowledge noted a benefit in being in a teaching role (Roberts, 2008). One student captured this idea by describing the mutual benefit of helping another student learn a skill: “I was satisfied that I had helped her gain a basic level of understanding without over facing her with too

much information… In turn it made me re-revise my own basic knowledge"(Roberts, 2008, p. 40).

Students also noted it was not only the presence of peers but also the absence of the instructor they found reassuring (Redmond, 2013). Sometimes the students felt the instructor was scrutinizing their actions and other times, the students reported having a peer close to their own age was comforting when practicing sensitive procedures like catheterization (Redmond, 2013). Students often paired up in the clinical setting to perform basic skills together such as bed baths. An interesting finding from these four studies was no negative stories of working with peers emerged. Given that students often report frustrating experiences when working in groups in other learning settings (Clark, 2008), the role of peer learning and support might be different in the skills lab and clinical setting than in the classroom.

Theme 2: I haven't mastered my skills until I have done them with a real patient. Students tended to be preoccupied with both learning and performing skills (Roberts, 2008) and saw this function as integral to the nursing role. Redmond (2013) termed this process *cementing* with the idea that learning is incomplete until students have actually performed the skill with a real patient. Students stated it was important to be able to practice their skills in the clinical setting as this practice also allowed them to see the differences in theory and practice (Neacsu, 2006).

Theme 3: Faculty and mentors can help or hinder my skills learning. Students reported the person teaching and supporting them during skills learning made a difference in the learning experience. Students stated positive support and constructive feedback were important to them (Neacsu, 2006; Redmond, 2013; Strand et al., 2009).

The environment the faculty created--a safe place where making mistakes was permitted --promoted learning. Students identified several characteristics of effective faculty and mentors including a calm presence, repeated demonstrations of skills, having high expectations, sharing personal stories, and creating context so students understood how skills were done in clinical practice (Redmond, 2013).

On the other hand, students believed some behaviors and teaching methods inhibited learning including close observation and scrutiny of student performance, skills evaluations, and inexperienced instructors (Redmond, 2013). Some students summarized the role of the faculty member as a guide (Neacsu, 2006; Strand et al., 2009). In the clinical setting, students felt mentors--such as staff nurses and preceptors--needed to have similar qualities as faculty members. The students reported feeling less supported and unwanted when nursing staff was busy or the nursing unit was understaffed (Neacsu, 2006).

Theme 4: Learning skills takes time and a relaxed environment. Students spoke of their need for adequate time to learn skills and recognized that spending one day in skills lab learning a skill was only the beginning of achieving competence in that skill (Strand et al., 2009). When the skills lab environment was relaxed, students perceived they had time to think through complex problems (Redmond, 2013). When learning to perform skills that were potentially embarrassing, students used humor to defuse the situation. For example, when learning how to apply adult diapers, they were asked to practice on each other, and:

> Sometimes you'd almost forget you had it on…and I came close a couple of times [to] leaving and going to the cafeteria for lunch wearing my Depends outside of my pants (laughing). I forget what was so funny, but we were just very relaxed and had fun with it. (Redmond, 2013, p.48)

However, the students recognized one drawback to learning skills in an environment that was too relaxed was a lack of context, e.g., how the skill would be carried out in a real clinical setting (Redmond, 2013). In other words, if the skills lab was too relaxed, it did not approximate the real clinical setting as readily and students perceived their learning to be less effective.

Theme 5: There is a person who will one day receive the skill I am learning. Students understood they were not learning skills in isolation and that one day they would need to perform these skills on actual patients. This realization made learning nursing skills different than learning skills in other laboratory settings in the college classroom, such as biology laboratories. For example, one student stated, "I need to know what I am talking about and what I am doing because I am actually going to be doing this! I am not going to be doing a gram stain when I am in the hospital, but I am going to giving someone an injection" (Redmond, 2013, p. 44).

Students noted that concepts connect and build within the nursing curriculum and they seemed to understand there was a purpose to learning these skills. However, knowing the skills they were learning would one day be performed on live human beings led to some anxiety, which connects to the next theme.

Theme 6: Anxiety and uncertainty are present when learning skills and require coping mechanisms. Students reported aspects of skills learning that caused anxiety and uncertainty including having to learn where equipment was and how to navigate some of the unwritten rules of nursing (Neacsu, 2006; Roberts, 2008). When the students encountered different types of equipment, such as safety devices on needles, they had uncertainty about how to use the equipment correctly (Redmond, 2013). For

some students, learning to touch and be touched--a requisite for most every nursing skill--caused anxiety, especially when these skills involved touching intimate body parts (Redmond, 2013; Strand et al., 2009). A student in the third year of study reflected on this process when stating, "I had to cross some personal boundaries [in terms of the body] before the situations became ways of thinking and acting" (Strand et al., 2009, p. 20). Students were also anxious about actually performing their skills on real patients and stated they did not want to hurt the patient or cause complications (Redmond, 2013). One student captured this idea by saying,

> I definitely think about the whole experience for the patient…and it is exciting to think that you are going to be able to do this for a person, also scary to question yourself wondering if you have all the qualifications. You have all this responsibility; [*whispering*] what if you do something wrong? I think about the responsibility most of the time when learning a skill. (Redmond, 2013, p. 75)

Students also believed there were different levels of anxiety with varying procedures. For example, more complex procedures such as catheterization caused them more anxiety than did basic nursing tasks such as measuring vital signs.

Some students believed moderate levels of anxiety improved their learning but high levels of anxiety inhibited their learning (Strand et al., 2009). Students took steps to decrease their anxiety using various coping mechanisms. Some students found relying on the steps of the skill was a helpful strategy for decreasing anxiety since reducing the skill to a sequence of steps gave them a place to start (Redmond, 2013). Other students reported they drew upon previous experiences with either performing skills or with having skills done to them to decrease anxiety (Redmond, 2013). Some students relied on the patient to decrease anxiety. For example, Redmond (2013) described examples of patients with chronic illnesses, such as diabetes, who routinely administered insulin and

did not mind if a student did the procedure. The routine nature of the procedure for the patient made him/her feel less anxious about a student nurse performing the procedure.

Students described faculty members as having an important role in modulating student anxiety when learning and performing skills (Redmond, 2013; Strand et al., 2009). Some students felt their instructor had a calming and supportive role while other students felt like the instructor was primarily there to safeguard the patient and ensure the student did not make mistakes (Redmond, 2013). In addition, students also did not want the instructor to take over the procedure.

Qualitative Studies About Psychomotor Skill Acquisition Using Simulators

Two qualitative studies offered insight regarding the process nursing students go through when learning psychomotor skills in the simulation lab. In the first study, after completing a simulation using a virtual reality simulator to teach Foley catheter insertion, students were asked to reflect on their learning (Johannesson et al., 2013). The students identified four phases to their learning: preparing, watching, practicing, and reflecting. In addition, the students stated the virtual reality simulator helped them learn the specific skill by helping them see the anatomy, feel the resistance when inserting the catheter, and become aware of their performance ability. The students also stated they appreciated working with a peer during the simulation (Johannesson et al., 2013). This finding validates findings in the previous qualitative studies that peer learning is an important aspect to learning psychomotor skills regardless of the environment.

A second qualitative study set in the simulation lab examined students' perceptions of the learning differences between low-fidelity and high-fidelity simulation (Coffman, 2012). Students completed open-ended surveys after a low-fidelity lab where

they learned nasogastric (NG) tube care and again after a high-fidelity simulation where they had to place an NG tube in a clinically realistic scenario. In the low-fidelity simulation, students reported learning the steps in placing and removing an NG tube as well as how to check placement and irrigate the tube. In the high-fidelity simulation, students reported learning how these steps and procedures fit into a complex clinical situation that involved prioritization, assessment, and communication. This learning represented a progression from basic task completion to application in a simulated clinical scenario (Coffman, 2012) and supported the benefits of contextualized learning promoted by Benner et al. (2010).

Discussion of Qualitative Studies

The findings from this synthesis of the literature about how students perceived learning nursing skills offered insight into what this process was like for students. The importance of peer learning was a key theme and students reported how they saw peers as a source of support when learning skills. This finding was not surprising given the research from the motor skills literature that supported the effectiveness in learning skills in dyads (Wulf et al., 2010). In addition, students reported many causes for anxiety and uncertainty related to learning skills. They believed faculty members could decrease student anxiety by being supportive, present, and offering gentle correction.

An interesting finding was students reported being very aware of the fact they were going to perform these skills one day on real patients and they spoke of their focus on caring behaviors when learning and performing skills. For some students, there was a genuine concern for the patient that superseded the students' skills learning. This finding ran counter to some beliefs that students are less sensitive to patients' psychological

needs, comfort, and well-being when learning skills (O'Connor, 2006). In addition, some students reported that learning to touch and be touched was a difficult part of learning skills. Specific teaching strategies could help students become more comfortable with this process.

This review and synthesis of the literature about student perceptions of learning nursing skills also revealed some limitations. Existing studies have had participants who were primarily young Caucasian students--a common strategy in qualitative research in order to capture the phenomenon more readily (Merriam, 2009). However, the result of this approach is we know little about the views of older students, non-traditional students, and males. Given the differences in outcomes and attrition rates among minority students (Gardner, 2005), it would be interesting to learn more about how these students learned nursing skills.

Although students spoke of caring behaviors and putting patients' needs first, students did not specifically discuss patient safety considerations when learning nursing skills. Given the emphasis on patient safety and the connection between good skill performance and patient safety, the role of patient safety in learning nursing skills needs further exploration.

We also know students do not consider their skills mastered until they have performed the skill on real patients. Many hospitals are now limiting student placements entirely or are limiting what they allow students to do in the clinical setting, thereby leading to diminished opportunities for students to practice basic nursing skills and medication administration (Kubin et al., 2013; Medley & Horne, 2005; Ross, 2012; Sears

et al., 2010). It is not known whether other teaching methods could help students cement these skills and transfer them to the clinical setting.

Quantitative Studies About Skill Acquisition

The majority of quantitative studies of nursing student skill acquisition came from the simulation setting and examined students' abilities to apply skills previously learned on a task-trainer to the simulation environment.

Skills examined in these studies included airway management, pulse oximetry measurement, and blood pressure measurement (Alinier, Hunt, Gordon, & Harwood, 2006); assessment and safety skills (Radhakrishnan, Roche, & Cunningham, 2007); basic life support and CPR (Ackermann, 2009; Madden, 2006; Moule, Wilford, Sales, & Lockyer, 2008; Oermann et al., 2011); urinary catheterization, medication administration, and sterile dressing change (Jarzemsky & McGrath, 2008); nasogastric tube insertion (Cason et al., 2015); and intramuscular injection (Ross, 2015).

A small study examined the effect of group size on basic life support skill acquisition among nursing students (Grieg, Elliott, Parboteeah, & Wilks, 1996). The study found students who were taught in a group of six students performed better on all aspects of CPR skills than did students who were taught in groups of 15 to 20 students.

The focus of many of these studies has been to determine whether simulation teaches skills more effectively than traditional methods. An examination of this literature as a whole found that simulation works equally well when compared to traditional methods used to teach nursing skills (Ross, 2012; Stroup, 2014; Vincent, Sheriff, & Mellott, 2015).

Some nursing faculty members have questioned whether simulation can effectively substitute for traditional clinical education in the acute care setting (Miller & Bull, 2013). Recently the National Council for State Boards of Nursing (NCSBN; Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014) released their findings from a two-year multi-site longitudinal study designed to determine if a percentage of clinical hours could be replaced effectively by simulation. Three groups of students were studied: a control group that received no more than 10% of clinical time in simulation, an intervention group that spent 25% of clinical time in simulation, and another intervention group that spent 50% of clinical time in simulation. Outcome measures included nursing knowledge assessed through standardized Assessment Technologies, Inc.® (ATI) exams, clinical competency with an evaluation rubric, and NCLEX-RN® pass rates (Hayden et al., 2014). The study found equivalent outcomes in all three groups, indicating up to 50% of simulation time could be effectively substituted for traditional clinical experiences (Hayden et al., 2014).

However, nursing faculty members need to be aware that very specific conditions were used to achieve these results. In the study, faculty members were trained in simulation methods, an adequate number of faculty members supported the simulation program, debriefing was used, and adequate supplies and equipment were present (Hayden et al., 2014). In short, best practices in simulation were used to achieve these results.

The ultimate goal of teaching nursing skills is students carry them into the clinical setting and perform them safely. Although the NCSBN study (Hayden et al., 2014) demonstrated that simulation time could substitute for traditional clinical experiences,

other studies have failed to support the idea that students are able to carry the skills learned in the simulation lab into clinical practice or to ultimately affect patient outcomes (Stroup, 2014). For example, in a study about using simulation to improve medication administration practices, over half of the students did not administer the medication safely (Bowling, 2015).

Summary of Skill Acquisition Literature

Improving patient safety is an imperative for nursing education and practice. However, significant numbers of preventable errors and deaths are still occurring daily in hospitals. Competent nursing skill performance might decrease those errors. Although nurse educators have attempted to embed patient safety principles in nursing curricula, many of the principles continue to focus on the individual patient rather than on systems theory, which has greater potential to improve patient safety. In addition, literature suggested many schools fail to include information about patient safety in their curricula and nursing students do not believe patient safety is emphasized effectively in many nursing curricula.

When examined together, the current literature base demonstrated the methods used to teach nursing skills are changing. Nurse educators are exploring simulation as a methodology to teach and reinforce psychomotor skills. Current evidence supports the idea that simulation works at least as well as traditional teaching methods. Evidence is emerging that students do not retain their nursing skills well over time and lapses in skill performance could jeopardize patient safety. There is a poor understanding of barriers that prevent nursing students from providing safe care (Bowling, 2015).

Students' perceptions about how they learn skills tells us they value peers during the learning process, that skills learning is incomplete until it is done on real patients, that the teaching environment is important, and that they realize they will one day perform their skills on living patients. However, students in these studies did not specifically discuss whether they considered patient safety as part of their skills learning process. It is also not well understood which types of nursing skills they considered important. For example, do students consider communication a nursing skill or do they consider nursing skills to be hands-on skills? Further exploration of whether patient safety is part of how nursing students acquire nursing skills could inform future teaching practices.

In summary, our understanding of how nursing students learn nursing skills remains incomplete, especially when student attitudes or other factors that could affect patient safety are involved. By deeply exploring how nursing students experience nursing and psychomotor skill acquisition in today's curriculum, we might have a better understanding of how to improve patient safety and the overall quality of nursing care.

CHAPTER III

METHODOLOGY

Introduction and Overview

The purpose of the study was to explore the process of how undergraduate nursing students learned to perform psychomotor skills within the full complement of nursing skills. The following research question guided this study:

Q1 How do undergraduate nursing students describe the process of learning nursing skills?

Qualitative research is based on the philosophy of social constructivism and is a naturalistic inquiry characterized by understanding meaning, delineating the process of an experience, and rich description (Merriam, 2009). In qualitative research, the primary instrument of data collection and analysis is the researcher and analysis is done using an inductive approach. Qualitative research uses a distinctly different approach than quantitative research, which is associated with understanding causation, tight control of variables, and statistical analysis of numbers (Polit & Beck, 2012). To best answer the research question, phenomenology was selected as the most appropriate qualitative methodology to use in this study since a deep exploration of the process of skills learning was needed.

In this chapter, the researcher discusses how the study was designed, how it was conducted, and how data were analyzed. Ethical considerations are also explored.

Research Design

Nursing educators have the primary responsibility of creating safe practitioners. It has been well documented that the healthcare system remains a hazardous place for patients (James, 2013) and nurses are the group of healthcare providers who can most significantly decrease hazards to patients (AACN, 2008). Despite calls for nursing education to thread elements of patient safety throughout the curriculum (Cronenwett et al., 2007), evidence suggests many nursing schools have failed to do so effectively (Mansour, 2012; Tella et al., 2014). Although many elements of learning and practice make a practitioner safe, the role of nursing skills and patient safety has not been well studied. Therefore, this study examined how students perceived the process of learning nursing skills, specifically psychomotor skills, during their education. By better understanding this process, the researcher hoped the findings would help nurse educators examine the methods used to teach nursing and psychomotor skills and potentially improve the safety of nursing care.

To best answer the research question about how nursing students described the process for learning nursing skills, a phenomenological design was used. This design was an appropriate choice to answer this research question since senior nursing students have experienced learning nursing skills and have the ability to reflect on those experiences. Cognitive load theory (CLT) underpinned this study as it helped explain the complex steps needed to remember information and later recall it from memory (Josephsen, 2015). The researcher expected CLT would be especially helpful in understanding findings that emerged from this study since CLT focuses on actual processes of learning and the research question also examined the process of learning.

Phenomenology arose from the work of Edmund Husserl (1859-1938; Laverty, 2003), a German mathematician who later shifted his study to philosophy. After becoming disillusioned with the positivistic approach psychologists were taking to study the human experience, Husserl believed it was necessary to study the primary sources of an experience (Nelms, 2015). People who had this direct experience possessed intuition and insight about it and should serve as the primary source of understanding. Further, Husserl believed the essence of phenomenology was to describe the lived experience of the phenomenon (Nelms, 2015). Since then, other philosophers and researchers who have made notable contributions to advancing the phenomenological method include Heidegger, Spiegelberg, Colaizzi, Giorgi, Van Kaam, van Manen, and Munhall (Nelms, 2015).

Although there were differences among various authors' approaches, phenomenology does have some common themes. The researcher attempted to understand the participants' world through immersion into their world; these experiences were often drawn out with deep narrative interviews (Conroy, 2003). The researcher also maintained a questioning attitude to gain a deeper understanding of the experience and accepted that the participant interpreted those experiences through his or her own lens (Conroy, 2003).

Cognitive load theory (CLT) is philosophically congruent with phenomenology since CLT helps us understand how people experience new learning environments (Reedy, 2015). For example, CLT helps us understand the limits to the amount of information learners can process at one time and the difficulty in learning simple versus complex tasks. Participants might describe these factors as a part of their experiences in

learning nursing and psychomotor skills. Thus, the theory could better help the researcher understand participants' overall experiences with the phenomenon.

Research Participants

To best answer the research question, senior-level nursing students were asked to participate in an in-depth interview about the process of learning nursing skills. One of the basic tenets of phenomenology was the participants must have directly experienced the phenomenon being studied since the goal was to understand the problem in depth. Therefore, it was necessary to use purposive sampling--a type of sampling where the researcher seeks out participants who possess certain criteria (Merriam, 2009). In this study, the researcher recruited participants who had learned basic nursing skills and could reflect on their experiences.

These participants were recruited from a group of 24 senior baccalaureate students at a small liberal arts University in central Texas. A letter of support from the Director of Nursing is provided in Appendix A. Details about this site are included in the next section. Participants were students of the researcher in prior semesters but were no longer taught, evaluated, or graded by the researcher. In addition, the researcher did not teach courses these students had remaining in their coursework so he would not teach them again. To further distance the researcher from former students and minimize any feeling of coercion to participate, the researcher enlisted the help of a colleague to assist with recruiting. The majority of these students were Caucasian women in their 20s but there were small numbers of older students and students of non-Caucasian ethnicities. Recruitment occurred through email, posters, and personal invitations. Inclusion criteria for this group of participants consisted of the following: a senior-level nursing student

greater than age 18 who would be willing to participate and speak freely with the researcher in a recorded interview lasting approximately one hour.

Nine participants consented to participate in the study. Data analysis was done in tandem with interviews to refine the interview questions and to detect saturation, which occurred by the ninth interview. Participants completed a brief form so the demographics of the sample could be described, as well as any previous experience with learning or performing nursing skills outside of the nursing curriculum. That information is summarized in Table 1.

Table 1

Sample Characteristics

Participant	Age	Gender	Ethnicity	Have Other Experience with Nursing Skills?	If yes, length of experience?	Types of skills you did during this time
1	38	Female	Caucasian	Yes	4 years	Administer injections
2	31	Female	Black	Yes	2 years	Assessment; vital signs; health history
3	23	Female	Hispanic	Yes	6 months	Patient interaction
4	23	Female	Hispanic	Yes	2 years	Basic patient care, vital signs, assessment, oxygenation, resuscitation
5	22	Female	Asian	No	n/a	n/a
6	25	Female	Hispanic	No	n/a	n/a
7	25	Female	Hispanic	No	n/a	n/a
8	23	Female	Hispanic	Yes	1 year	Basic patient care: toileting, dressing, transfers, feeding, nail care
9	33	Female	Caucasian	Yes	5 years	Positioning, medication administration, oxygen therapy

Research Site

The primary research site was a small liberal arts university located in central Texas. This site was selected for this study because the researcher is on faculty and has access to potential participants. In addition, the participants met the inclusion criteria for the study and could provide information that answered the research question.

The nursing school has had a nursing program since 2010 and graduated its first class in 2012. The program has approximately 100 students in upper-division nursing courses and nine full-time faculty members. Basic nursing skills are taught during the junior year of the curriculum during skills and simulation lab courses. The senior year focuses on specialty nursing areas such as pediatrics, maternity, mental health, and community health nursing.

Overview of Information Needed

This section briefly describes the types of information needed to adequately answer the research question: contextual, demographic, perceptual, and theoretical.

Contextual

Contextual information refers to the context in which the participants learn and describes the environment of the setting (Bloomberg & Volpe, 2012). This information is important since the setting in which students learn could influence their behavior and perceptions. To collect contextual data, the researcher listened for any descriptors about the environment in which the learning occurred.

Demographic

Demographic information for this study included descriptors such as age, gender, ethnicity, and experience in the healthcare setting other than in the student role (for

example, participants who worked as medical assistants or home health aides). This information was used to describe the participants and helped the researcher interpret findings that emerged from the study. To collect these data, participants completed a brief demographic form after the interview (see Appendix B).

Perceptual

Perceptual information refers to the participants' perceptions of the phenomenon being studied (Bloomberg & Volpe, 2012). This study examined participants' perceptions of the process of learning nursing skills. The primary source of perceptual data came from in-depth, semi-structured interviews.

Theoretical

Theoretical information arose from the literature and included both theories of learning as well as prior studies about the phenomenon of learning nursing skills. Although the current literature was summarized in Chapter II, the researcher continued to read the literature for emerging studies related to the phenomenon throughout the study. This information was used in order to analyze the findings as well.

Methods of Data Collection

Participant Interviews

Nine senior-level nursing students participated in in-depth, semi-structured recorded interviews. Participants were recruited via email, posters, and personal invitations from the researcher. After verifying eligibility, the researcher scheduled an interview at a mutually agreeable time. It was expected the interviews would last approximately one hour.

Interviews were conducted in a small conference room the researcher had reserved. Informed consent was obtained prior to beginning the interview (see Appendix C). The researcher answered any questions the participant had and the participant was given a copy of the informed consent to keep. The participant was also informed that he or she could withdraw from the study at any time without penalty or loss of benefits.

The recording began at this time using an MP3 recorder. An interview guide (see Appendix D) was used to guide the interview. Following the phenomenological tradition, questions were broad and open-ended (Creswell, 2013). Since the researcher was a novice interviewer, the interview guide was used to prompt additional questions and discussion about the process of learning nursing skills when needed. In addition, the questions in the interview guide were pilot tested with two volunteers consisting of students who recently graduated, thereby allowing the researcher to revise the questions as needed prior to actual data collection. The questions were developed based upon reading the existing literature about the process of learning nursing skills. The researcher also took field notes during the interview to help recall non-verbal interactions. The recorded interviews were transcribed into text and verified by the researcher for accuracy of the transcription.

At the conclusion of the interview, participants were asked if they would be willing to talk with the researcher again if additional information was needed. They were also informed the researcher would contact them prior to the end of the study for member checking. Participants were given a $10 gift card and a nursing pen as a small token of thanks for their time and participation.

Data Handling Procedures

Participants were assigned a number that was used in place of any personally identifiable information. That number was used to label the MP3 file and the transcription. The MP3 files were downloaded to the researcher's personal home computer, which was password protected. The files were then erased from the MP3 recorder. The data were transcribed and verified for accuracy.

Any data on paper form including printed transcriptions, field notes, and informed consents were stored in a locked file cabinet in the researcher's home office.

Data will be stored for either five years or until the results from the study are published; then they will be deleted or shredded. Per protocol, the research advisor will retain the informed consent documents for three years.

Confidentiality was further preserved in the reporting of the results of the study. Pseudonyms were used to refer to participants and the study location was referred to only by geographic area.

Data Analysis and Synthesis

After verifying accuracy of the transcriptions, the data were analyzed using Colaizzi's (1978) method. This method is commonly used in phenomenological analysis and involves the following steps (Shosha, 2012):

1. Read and re-read each transcript to obtain a general sense about the whole content.
2. Extract significant statements that pertain to the phenomenon from each transcript. Record these statements in a separate document, noting their page and line number.

3. Formulate meanings from these statements.
4. Sort the formulated meanings into categories or themes. Coding might be used to label themes.
5. Integrate these themes into a detailed description of the phenomenon being studied.
6. Describe the fundamental structure of the phenomenon.
7. Validate the findings with the participants to compare the researcher's descriptive results with their experiences (the "member check").

Data analysis occurred in tandem with ongoing recruitment, which allowed for additional interviewing as needed and also allowed the researcher to identify when saturation had been reached. Saturation is the point in data collection where no new information or themes are noted; essentially, it is when the data yield no new insights (Creswell, 2014).

During data analysis and synthesis, the researcher also considered how emerging themes were either supported or not supported by CLT--the theory that informed this study.

Ethical Considerations

Ethical issues are central to every research study and bear close consideration from the researcher prior to and during the study since every researcher has a moral obligation to conduct research in an ethical manner. In this study the researcher adhered to the ethical protocols of the University and the University of Northern Colorado's Institutional Review Board (IRB). Potential ethical issues in this study included informed consent, maintaining confidentiality, and risks to participating.

Informed Consent

After approval by IRBs of both UNC and the study site (see Appendix E), the study was explained to participants and they were asked to read the informed consent document. Since this population of participants was senior level college students, the researcher made the assumption they could read the informed consent document. The researcher ensured the participants comprehended what they had read by asking them a series of short questions (for example, "If you decide part-way through the interview that you do not want to finish, is that okay?"). The researcher acknowledged an inherent power imbalance between students and professors and was careful to not intentionally make students feel they must participate in the study. Participants were reminded their participation was voluntary and they could withdraw from the study at any time without penalty or loss of benefits.

Maintaining Confidentiality

Measures to maintain confidentiality were taken during this study and were described in the section about data handling above. Anonymity could not be guaranteed in this research study since it was impossible to conduct face-to-face interviews anonymously (Carpenter, 2011). The researcher acknowledged that during the interviews participants might share sensitive information about themselves, their instructors, and situations encountered with peers or patients. For that reason the researcher took multiple measures to maintain confidentiality.

Risks to Participating

All studies carry some risk and discomfort to the participants so potential risks of participating must be balanced by the benefits of participating. Some participants might

feel uneasy with knowing the conversation was being recorded and would be analyzed at a later time. For some participants, the questions posed in the interview might bring about some emotion or stress if they recalled negative or stressful experiences with learning nursing skills. In the unlikely event a participant had a strong emotional reaction during the interview, the researcher would refer the participant to the institution's on-campus counseling center for further consultation with counseling professionals.

The benefits in participating in this study were twofold. First, the participant might gain some insight when recalling prior experiences with learning nursing skills and these observations might be helpful as he or she continues to learn skills in the future. Second, the participant might gain some indirect benefit by knowing he or she is helping in a research project and contributing to the scholarship of nursing education research.

In the final analysis, the researcher believed the benefits of participating in this study outweighed the risks to the participants.

Enhancing Trustworthiness of the Study

In quantitative research, studies are deemed to be scientifically sound when they are done in a controlled, rigorous manner; elements that determine rigor include internal validity, external validity, reliability, and objectivity (Polit & Beck, 2012). However, in qualitative research, the nature of knowledge is subjective and dynamic (Reiners, 2012). As a result of this difference, sound qualitative research is deemed "trustworthy" (Morse, Barrett, Mayan, Olson, & Spiers, 2002) and is classically characterized by credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985; Sandelowski, 1986). These references describe measures taken in this study to enhance trustworthiness and are described individually.

Credibility

Credibility asks whether the findings are credible based on the data collected as well as how much confidence the researcher has in the truth of the findings. Some authors consider credibility to be the most important aspect of trustworthiness in qualitative research (Krefting, 1991). Several methods were used to enhance credibility in this study.

The interview technique a researcher uses is important for enhancing credibility. Since a basic philosophy of phenomenological inquiry is truth is subjective and based on participants' experiences, it is important for the researcher to ask open-ended questions and not lead the participant to any pre-conceived answers the researcher might have. In this study, the researcher listened to each interview before conducting the next interview in order to identify leading questions and adjust his interviewing technique.

Member checking, which is going back to the participants after data analysis to see if the themes and findings ring true, is the primary method of verifying credibility since in qualitative research the participants themselves are the best judge of their own experiences (Creswell, 2014; Krefting, 1991; Merriam, 2009). This action also prevents the researcher's biases from dominating the study findings. This study used member checking by going back to interview participants during data analysis to see if the themes were consistent with their own perceptions of the process they used to learn nursing and psychomotor skills.

Transferability

Transferability asks whether the findings can be applied to other contexts and settings. There are varying views among qualitative researchers about transferability,

which is analogous to the concept of generalizability in quantitative methodology. Some authors argue there is little transferability of qualitative findings to other settings because each study is done in a naturalistic setting with many variables (Krefting, 1991). In addition, since truth is subjective, one group of participants might experience a phenomenon differently than another group of participants (Reiners, 2012). Other authors believe if the findings of a qualitative study fit into the context of a similar situation, then the findings could be relevant; however, the burden is on the reader to make this judgment call (Lincoln & Guba, 1985). In order for the reader to be able to do that, the original researcher must include sufficient descriptive data to allow for the comparison to be made. In addition, it is helpful if there is "thick" description from the participants rather than "thin" data since thick description yields more detail. Therefore, in this study, the researcher provided detailed information from the participants during the interviews as well as provided detailed results in the findings to improve transferability.

Dependability

Dependability considers whether the findings of the study could be repeated in another group. Variability is expected in qualitative research and the researcher should make attempts to explain variability rather than control for it (Krefting, 1991). An audit trail is a journal kept by the researcher for the duration of the study that describes the study events. In this study, dependability was enhanced by providing a dense description of the research methods and by keeping an audit trail.

Confirmability

Confirmability refers to the internal coherence of the data and could be tested by an independent researcher following the steps of the study by using an audit trail. Using multiple data sources and teams of researchers can also enhance confirmability. In this study, reviewing the audit trail enhanced confirmability.

Limitations and Delimitations

Limitations

All studies have limitations that should be considered and acknowledged by the researcher. In this study, participants might have had a bias in sharing what they thought the researcher would like to hear rather than sharing their true experiences. In addition, because this study recruited volunteers, there might have been differences between students who volunteered to participate versus those who did not volunteer. In that case, the study results might not have captured the experiences for nursing students as a whole. Another limitation was students who were interviewed were recalling experiences from their past. Memories might be inaccurate or less detailed than if the interviews were done in a different timeframe.

In addition, because this study primarily involved senior-level students, there were some students who are not eligible to participate because they failed to progress in the nursing curriculum to become a senior-level student. Thus, there might have been aspects of learning nursing skills unique to that group, which would not be represented in the group of senior students.

Delimitations

Delimitations refer to boundaries of the study. Given limitations on time and resources, this study examined students' experiences with learning nursing skills at one university. In addition, this study captured students' experiences at the point in time when students were learning nursing skills. Experiences might be different for students educated in the past or in the future.

Finally, this study focused on student perceptions of the process of learning nursing skills. Other aspects of nursing education might have been relevant to how students learn nursing skills such as faculty experience, teaching methodology, equipment, or clinical experiences. However, these aspects were not specifically explored in this study unless the participants brought them up as part of the interviews.

Summary

This study used a phenomenological method to answer the question regarding the process nursing students went through when learning nursing skills. In-depth, semi-structured interviews were used to answer the research question. Data were analyzed for common themes with the goal of describing the process of learning nursing and psychomotor skills in detail. In the end, having a deeper understanding of this process will help nurse educators teach nursing skills in a manner that potentially improves patient safety.

CHAPTER IV

RESULTS

The purpose of this study was to explore the process of how undergraduate nursing students learn to perform psychomotor skills within the full complement of nursing skills. The following research question guided this study:

Q1 How do undergraduate nursing students describe the process of learning nursing skills?

The primary goal of the analysis was to extract, categorize, and describe the participants' experiences when they learned nursing skills. The researcher conducted the interviews, transcribed the data, and completed an additional verification to ensure the interviews had been transcribed accurately. This process allowed the researcher to become immersed in the data. Throughout this process, the researcher attempted to bracket himself by keeping a journal of his personal feelings, thoughts about the study, and ideas about what the participants were saying.

As the transcripts were repeatedly read, the researcher obtained a general idea of the content. Significant statements were noted and codes were developed to mark these statements in the transcripts. Decision-making points about coding were recorded to create an audit trail. Interpretations of the meaning of these statements were also noted. After numerous readings, these coded statements were then transferred to individual documents to group like statements together.

These statements were then sorted into categories for themes using Merriam's (2009) criteria--categories should answer the research question, be exhaustive, be mutually exclusive, be conceptually congruent, and have a name that adequately describes what is in the data. Further, she suggests no more than five or six themes be ultimately described. In this study, the final analysis revealed six themes--each with several sub-themes that met the criteria.

These themes were then used to create a detailed description of the process for nursing students to learn nursing skills. A summary of the themes and a detailed description were then sent to participants for member checking. Participants were asked if the themes, sub-categories, and overall descriptions of the skills learning process reflected their experience with the phenomenon. In addition, participants were given the opportunity to add any additional information they had thought of since the interview. All participants indicated the themes, sub-categories, and overall description adequately described their experience in learning nursing skills.

Themes Identified in This Study

Six themes identified in this study describe the process of how nursing students learned nursing skills. These themes, along with their sub-categories, are noted in the Table 2 below. Detailed descriptions of each theme, along with quotes from participants, served as this chapter's framework to present these results.

Table 2

Themes and Sub-Categories of the Process of Learning Nursing Skills

Theme Number	Theme	Sub-Categories of Theme
1	The Umbrella of Emotion	Evaluation is stressful Concern for patient safety
2	Practice, Practice, Practice	Learning happens everywhere Some skills are harder to learn than others Some skills are more valued than others
3	Learning Through Technology	Videos, webcams, and smartphones Knowing how I learn
4	"Just Pretend" does not Produce Confidence	Poor fidelity equals poor learning Skills learning is completed on real patients Confidence improves with real patients
5	Teaching Matters	Learning through explanation, demonstration, and feedback Consequences of inconsistencies Faculty must be clinically current Nurses as teachers
6	Importance of Peers	Collaboration Support

How the Participants Defined Nursing Skills

During the interview, participants were asked to define what the phrase "nursing skills" meant to them. Nearly all participants said they first thought of nursing skills as hands-on skills; common examples were drawing blood, placing Foley catheters, and starting IVs. While some participants defined nursing skills only in terms of psychomotor skills, other participants had broad definitions of nursing skills as illustrated here:

> Assessment is a nursing skill, uh, documentation…um…medication administration…dosage calculation, um…, figuring out fluid, IV pump rates. Using a pump, using a feeding pump, a Kangaroo pump…um. Plus your basic IV insertion, blood draws. I mean, anything that a nurse *does.* Communicating, that's a skill. Talking with your patient, patient's family, talking with nurses, the doctors. All those. Anything a nurse does is a skill that you have to learn in nursing school. (Participant 1)

When participants spoke of non-psychomotor skills they believed were also nursing skills, the most common skill identified was communication. Participant 6 stated, "For some reason, I don't know why…therapeutic communication, 'cause we're talking about it. We talk about it so much." Finally, Participant 3 wondered if the title of the course had influenced how she defined nursing skills: "[Nursing skills are the] hands-on skills that you do as a nurse--to me, that's what comes to mind. But I don't know if that's because that's what we called the class that we learned all those things in or if it's my idea."

In summary, all participants believed nursing skills involved psychomotor skills. Many of the participants also included additional aspects of the nursing role in their definition of nursing skills with the most common being communication skills.

The Environment

To capture contextual data, participants were asked to describe the environment where they learned nursing skills. All the participants described various rooms in a skills lab setting that had been set up when an existing hospital closed. Therefore, the environment looked just like a typical hospital unit with individual rooms containing manikins, headwalls, oxygen outlets, and sinks. Some participants described the lab as being cold and smelling like a hospital and, at times, being dark with few windows. In terms of space, some participants felt there was plenty of space while others stated the

space was quite small and confining. Some participants felt the space was quiet and it was easy to hear, while others felt like it was noisy and full of distractions:

> It was loud, because we were in the downtown…hospital, so there was constantly drunk and homeless people out of the windows. You know, just sitting down, or sometimes you'd even see them doing drugs out of the windows, or knocking on the windows to try and get your attention. So that was kind of distracting. And we're right by the freeway. Like, the main freeway, so you could always hear ambulances and cars and just…really noisy. A lot of times we would just shut the blinds. (Participant 6)

Based on the participants' descriptions, some variability in the environment depended upon which specific skills lab room they were using at the time. Some rooms were located on the interior of the building and were dark and quiet, while others were on the outside of the building and had more distractions.

Theme One: The Umbrella of Emotion

Emotion overarched all aspects of learning nursing skills. Participants described a range of emotions they experienced when learning skills including stress, nervousness, anxiety, confusion, worry, disappointment, inadequacy, frustration, intimidation, fear, being flustered, and being terrified. These kinds of emotions overshadowed most participants' descriptions of the overall skills learning process. A few participants also described crying and psychosomatic feelings associated with these negative emotions such as nausea. On the other hand, participants felt some other emotions during skills learning including relief, excitement, happiness, pride, and a sense of accomplishment. On the whole, participants described learning skills as a very stressful process.

Some participants described the professor's teaching approach as having an influence over their emotional state:

> The attitude of the professors…was kind of, like, "sink or swim," type attitude. So that made it scarier… the, "you have to know this, you have to know that,

> you're going to kill your patient if you don't recognize this," and…it seemed daunting... And you don't want to fail on the first day of nursing school. So, yeah, it was scary. (Participant 2)

On the other hand, some participants described feelings of excitement when learning nursing skills, especially once the initial learning had been done and they felt ready to attempt the skill in the clinical setting.

> I thought that learning new nursing skills were really fun. Because, I actually felt like it's related to nursing. I mean, I know that learning content is relatable as well, but just doing the actual nursing skill and being able to be, like, "Oh, once I get checked off I can actually do this on a patient." I was very excited to learn…I felt more capable, instead of just being a helpless nursing student. Like, once I learned a new skill and once I got checked off I was like, confident and like, "I can't wait to practice in the hospital…I can't wait to try this out on an actual person." (Participant 5)

Evaluation Is Stressful

In this sub-category, participants described their nursing program's academic policy of skills evaluation, also known as skills check-offs: after three unsuccessful attempts at passing a skills check-off, the student fails the course, is removed from the program, and must apply for readmission the following semester. Nearly all participants described significant anxiety when their professor evaluated their skills performances. Participants also experienced feelings of pressure, anxiety, fear of failure, and even nausea prior to these evaluations. These feelings were described as being different than the anxiety experienced during written exams:

> The nauseous part, for me, was unique to the skills. Because I'm just so nervous. It's like the roller coaster feeling almost, when you're like so close and you're at the top of the roller coaster…like if I mess up. Like, your stomach is just…it's topsy-turvy. And I don't get that feeling with exams. Because in an exam you… don't have somebody watching you make that decision, so…I feel that would have been unique to skill, 'cause you have somebody sitting there…hovering over you. Watching you. So it's a little bit more nerve-wracking….than a regular exam. [Pause]. And I think that's what I would most worry about, over any other exam or testing would be the skills check-offs. (Participant 6)

The fear of failure--and the ensuing consequences--caused significant stress. Several participants described knowing students in their cohort who had not passed the skills check-offs and some described direct experiences with their own failure:

> I would be super, super nervous or scared when it came to the test day. Even though we've done it so many times before, it was just still that pressure, and being like, "Ok, all eyes are on me now…" I ended up having a really bad skill [check-off]. It was our final check-off, and I hadn't failed *any* of my skills, ever... And…I just remember I did one thing, and I immediately caught that I did it wrong. And it was with the NG insertion. But I had an instructor who was not very…helpful…or nice, and ended up just making it worse, and just like tapping her foot and being like, "This is taking forever." So I *know* already now that I'm taking too long with the skill, and then she's, like, already tapping her foot and sighing and I just remember all of that just *completely* making me want to break down. And I just remember telling her, "I'm going to finish this off, but I'm not here with it anymore." Like I get it, I failed. And so I ended up finishing it off because I *can't* quit, and…yeah, I just remember it being, like, super painful. And I did immediately, like, cry afterwards…'cause I was like, "Dang it, I *knew* I had this." But…it just didn't work out that way. It wasn't my day. (Participant 4)

In summary, the process of being evaluated and observed was stressful in addition to the ever-present fear of failure. Since participants typically knew of students who had failed skills check-offs or had experienced failure themselves, this threat was even more real to them and was on their minds whenever they were learning to perform skills.

Concern for Patient Safety

Participants were aware they were learning these skills to eventually do with real patients. They described measures they used to prevent infections and errors; they saw this as part of their duty as nurses. Participant 3 stated, "I am a little anal about scrubbing the hub [of the IV site with alcohol]…I feel like these patients come in and trust us…and I would be sad if I mindlessly did something that I could have prevented."

The participants saw the value in learning skills in a safe environment, such as the lab, where the potential for harm to patients was lessened. Participant 8 explained, "[I]

can't hurt a manikin…but it would be *emotionally devastating* if I were to royally screw up on my first attempt and…harm somebody or cause an infection."

Participants recognized there might be consequences to the patient when skills are not performed safely:

> Hands-on skills could possibly harm the patient if I don't do them right...So, those I feel are definitely skills that need to be mastered. With a central line dressing change if we did break sterility and that person ended up getting an infection, that's deadly too. Pretty much all the bad scenarios that we could think about with doing something hands-on or pricking them…all of that could have a bad turnover. (Participant 4)

One interesting aspect of how the participants described safety was a differentiation was made between safety around psychomotor skills and around medication administration. While most participants recognized there was a potential for harm with both types of skills, they generally viewed medication administration as having an increased likelihood of significant harm to the patient if an error was made:

> You give the wrong medication to somebody, or you give the wrong dose or you give it the wrong way and it can kill a patient. Whereas you do a urinary catheter wrong…I mean, it's [an] error but it's not going to necessarily…you can *redo it* if you put it in wrong or, you know, something like that it's not, whereas if you give the wrong medication it could kill a patient. (Participant 9)

In summary, theme one--the Umbrella of Emotion--was characterized by an ever-present stream of emotions during the skills learning process. Emotions described were predominantly fear and anxiety but emotions like excitement were present as participants gained confidence with learning and performing skills. Participants felt a lot of anxiety and stress during skills performance evaluations, partly due to nervousness with being observed and evaluated as well as a fear of the consequences of failing a skills check-off. Finally, participants explained they had concerns about patient safety and described medication administration as being a skill with a high potential for harm.

Theme Two: Practice, Practice, Practice

Each participant described practice and repetition as being extremely important when learning nursing skills. There was both a desire and a need to practice skills on a regular basis. Participant 1 stated, "Just repeat it, repeat it, practice again, practice again." Participant 8 explained,

> Repetitively practicing over and over again is what helps me the most in learning skills, 'cause you can tell me all day long that…this is a stopcock, and you turn it left for this and right for this, but until I see it and use it multiple times, it's not going to sink in. Not going to understand it.

Some participants specifically connected repeated practice with learning the steps of the procedure. "Some of it is memorizing the steps and some of it is perfecting how it works for you," explained Participant 2. Some participants explained they wrote out the steps over and over again in order to help commit the steps to memory.

Participants also described a desire to practice between semesters. For example, participants in this cohort of students did not have nursing classes over the summer, leading to nearly four months with few opportunities to practice skills. This situation was seen as challenging and stressful since students had a comprehensive skills evaluation at the beginning of each semester: "And you haven't been able to practice, to be in that mindset. So I wish that we had opportunities during those long breaks that we could come in and have equipment available that we could practice" (Participant 1). "If I don't review it and practice it enough and actually implement it, then I forget it and I have to re-learn everything. So that can be kind of stressful" (Participant 8).

This theme contained three sub-categories: learning happens everywhere, some skills are harder to learn than others, and, some skills are more valued than others. Each sub-category is discussed individually.

Learning Happens Everywhere

This sub-category revealed that practice time in the lab setting, which occurred once a week, was not viewed as an adequate amount of time to learn nursing skills. Participants also practiced skills in an open lab, at home, and in the clinical setting.

Open lab. This nursing program did not own its own skills labs and rented space from a local hospital system for lab courses. An open lab was available for students in this nursing program to use but faculty members did not staff it. The open lab had set hours when it was open and students from any nursing program could use the space and equipment. Many participants generally viewed this arrangement as a barrier to skills learning: "There was open lab…but…I don't think I ever went. It was always at an inconvenient time, or we would go and supplies wouldn't be out, and they weren't very accommodating for helping us outside the normally scheduled class time" (Participant 3).

A few participants did take advantage of the open lab hours and described the necessity of practicing outside the regularly scheduled class time:

> Normally once a week I would go to open lab, depending on my work schedule. But a lot of times I would just go up for an hour with one other person or two other people, and we would just do the mini-check off again. So it wasn't something that you could just go home and forget about. You definitely have to study, especially because it's all new skills to us. (Participant 6)

Home setting. While not all participants used open lab to practice, each participant described some form of skills practice at home. Sometimes this practice was done individually and sometimes it was done in groups with classmates. In the home setting, participants generally did not find friends or family members helpful when learning skills. Participant 4 related,

> I would have someone like my sister…watch the check list. That I didn't find as helpful, because they're non-nursing, so even though I may have missed

> something really critical and it's not on the list, or it was on the list, they just…they're like, "Oh, you did so good, I didn't even think about looking at the list." And then, that would be annoying at times. So pretty much doing it by myself and going through it slowly with the checklist was most beneficial for me.

With permission from their faculty members, most participants took home kits from the lab to practice some skills including Foley insertion trays and tracheostomy care kits. Most participants stated practicing a skill at home was a less effective way to learn skills because much of the equipment was not available in the home setting. Participant 3 explained, "Once you get home, I have a kit, but...it's harder 'cause you don't have the manikin there. You can't, like, practice on someone."

Several participants described methods they used to try to make the home practice setting more realistic. In particular, Participant 7 stated,

> I'd try to make it seem as much as I could like the sim lab. And just make sure I didn't have any clutter on my bed. And I would prop up, it was a stuffed animal that I had, I'd prop it up like the patient. And so I would try to make it as much as possible to where I had a bedside table next to me, and then I had my sterile field or what I was going to use as the bed. So that was really helpful to…keep it as close as possible to the way I was practicing it at school.

These participants believed making the home setting more like the lab setting benefitted their skills practice. Setting up a simulated sterile field at home allowed them to practice maneuvering without contaminating the field. Props such as stuffed animals allowed them to practice positioning and provided a surface to perform the skill. One participant even described using straws to simulate a central line when she was practicing central line dressing changes. As will be seen in Theme Four, improving realism and performing all the steps in a procedure is a key part of effective skills learning.

Clinical setting. Prior to performing a skill in the clinical setting, students in this nursing program were required to have learned and passed the skills evaluation on the

skill in the lab. Participants performed many skills in the clinical setting and some participants performed skills repetitively. Participant 7 shared, "I was able to be in the Emergency Department a couple of times with my Capstone, and …I mean I practiced, probably six or seven IVs within that six or seven hours that we were there."

This sub-category showed that due to the constant need for practice to effectively learn nursing skills, other settings must be used to learn skills besides the regularly scheduled lab time. Some of these settings were more ideal than others and some participants made modifications to make the setting more realistic.

Some Skills Are Harder to Learn Than Others

This sub-category revealed participants had more difficulty learning certain skills than others and these harder skills required more practice. The two most difficult skills involved tracheostomy care and any skill that involved sterile technique as these skills had many critical elements that could lead to failure if omitted during the skills evaluation. Participants offered several other reasons as to why these skills were difficult to learn.

Tracheostomy care was seen as a "delicate" skill that had an emotional component; if done incorrectly, it could easily harm the patient. Most participants spoke of the difficulty of this skill:

> It was…just the thought of, you know, you're sticking this tube down someone's *airway*,…kind of freaks you out, just the thought of it, you know. So I think that was a hard one for me…you want to try to get mucus out so it hopefully will improve without making it worse, and it's just very delicate. (Participant 1)

> I remember the trach. That was probably one of the most difficult. It was suctioning the trach and then cleaning the dressing, changing out the dressing. It was difficult because it had multiple steps. So one was a sterile part of the skill, so we would actually go and suction the trach. So I think because it had different

> steps within that same skill, it was more things to remember, and just knowing that you had a time limitation. You didn't want to rush through it, but you didn't want to take your time either. (Participant 7)

Skills that involved sterile technique were also seen as difficult because sterility could be broken easily and the participant might not have been aware the sterile field had been contaminated. Participant 5 also describes the time element in sterile procedures:

> If I'm doing something that is non-sterile and I'm just going, going, going…but once I get to sterility, I have to stop myself and become more aware of my environment, and things I can touch and cannot touch. So that prevented me from learning it as quickly because I would have to go back and watch out for sterility, and just basically just stop myself more often.

While some psychomotor skills are more difficult to learn than others, Participant 3 noted psychomotor skills were actually easier to master than other nursing skills:

> I think bedside manner and communication and small-talk with patients…are all way harder to master than starting an IV or things that are pretty, like, routine… If you're going to start an IV on most people it's going to be the same, whereas everybody has different personalities and having to adapt to those personalities and make them happy and communicate with them…I think that's harder to learn than the actual skill.

In summary, most participants described tracheostomy care and skills involving sterile technique as being the most difficult to learn. Common reasons these skills were more difficult included the high potential for patient harm and the difficulty in maintaining a sterile field. Skills with more steps, more complexity, and those involving time limits were also seen as more difficult.

Some Skills Are More Valued Than Others

In this sub-category, participants reflected on the importance of nursing skills. They recognized that skills prepare a nurse to function in the real world and they would be using these skills daily as nurses. The belief that these skills were a valuable part of

the nursing role motivated participants to practice them. As Participant 1 stated, "I'm going to be using it [skills]. I need to know how to do it…so I can be an effective nurse and help people." Many participants believed *all* nursing skills--not just psychomotor skills--were important and should be valued. Participant 5 described how psychomotor skills and critical thinking are integrated in the nursing role:

> I believe that having a good foundation of nursing skills is important because I know a huge part of nursing is critical thinking. But in order to complete the whole nursing, you need to have a foundation of nursing skills to help you back up your critical thinking. So let's say during a situation I'm dealing with someone who needs critical care. And if I am able to critically think *through* that situation but I can't perform the skill, then that puts me behind on what I'm trying to do.

However, participants also spoke of how their thinking about nursing skills had changed over the two years of their upper-division nursing coursework. Participant 6 stated,

> I think if you'd asked me last year, I would have said IV skills and Foley skills [were most important]. But now, as a senior student, I would say communication skills… because I've noticed a lot of nurses who are even practicing do not have very good therapeutic communication skills. Um, and I think that's kind of an invaluable tool that you can speak confidently and, like, have a rapport with patients, nurses, anybody on the unit. And anybody can teach you how to do an IV skill… But now I'm more focused on talking with the patient and am I saying the right thing…versus, *doing*.

Over time, psychomotor skills became less important to the participants as they learned, practiced, and gained confidence in performing them. Their focus was then shifted to other aspects of the nursing role.

In summary, theme two--Practice, Practice, Practice--was characterized by a desire and a need to practice nursing skills repetitively as a mechanism of learning. Since practicing once a week was not enough, participants described other settings they used to practice skills including open lab, home, and clinical sites. Skills involving sterile

technique and tracheostomy care were viewed as more difficult to learn than other skills and required more practice. Participants believed nursing skills were a valuable part of the nursing role and they would use those skills in their nursing practice, which motivated them to practice and learn them.

Theme Three: Learning Through Technology

Nearly all participants indicated technology played a significant role in how they learned nursing skills. Technology was used not only because it was available but also because participants believed it was superior to other resources, such as textbooks, and helped them learn effectively. Participants watched pre-made videos of skills being performed on YouTube® or from Assessment Technologies, Inc.® (ATI), an education and testing program to which this nursing program subscribed. However, participants also used their smartphones to make their own videos of instructors, peers, and themselves performing skills. The participants stressed the importance of using visuals to learn as they believed they learned skills best by watching and doing them. Printed resources such as skills textbooks were not seen as helpful resources for learning skills. Two sub-categories emerged within this theme: videos, webcams, and smartphones; and knowing how I learn.

Videos, Webcams, and Smart Phones

The participants used videos from several sources in multiple settings when learning nursing skills. Since all the participants had smartphones, they were able to view these videos anytime, anywhere: in the lab, at home, or in the clinical setting.

In the lab setting, participants described how they recorded their instructor demonstrating a skill. Participant 9 recalls:

> We asked one of the instructors to show us exactly how…when we first started an IV, or dressing change. We would record their exact maneuver and how they [did the] skill…then we would post it on YouTube® and share it with the class so that everybody could go back and use it over and over again.

Initially, participants started recording videos--with the consent of the instructor--because they had difficulty seeing the demonstration. Therefore, one student near the front of the group would record the demonstration and share it with the rest of the class. Sometimes the file could be shared immediately using an application on certain phones, while other times the file was uploaded to YouTube®, DropBox®, or GoogleDrive® for other classmates to download. Participants then used these videos as they practiced the skill in the lab. As Participant 7 described, "We were immediately able to share those videos, so then as we were practicing those skills we could follow along with the professor while we were practicing on our own manikins. So that was a big help."

These videos of instructors were seen as a trustworthy source of information and gave the instructor a mobile presence. The participants stated that when they watched a video of their instructor performing a skill, they knew exactly what the instructor expected. In addition, all the equipment the instructor used was the same equipment the participants would use in both practice and skills testing.

Several participants also described recording each other performing skills in the lab setting during practice sessions. There was no uniform agreement, however, as to whether this was acceptable to the instructors. Some participants described recording their peers while other participants stated their instructors were uncomfortable with peer recording and asked them not to do it. For those who did record their peers doing skills, Participant 3 described the process: "We would get that person to do the skill and then another person would be in the background reading out what exactly that person was

doing." Sometimes they assigned roles to each other during the skills recording including primary nurse, assistant, and a person to read the steps. These videos were used to critique each other and as a reference when studying individually at home.

In the home setting, videos were used to further learn and practice the skill and also to prepare for skills evaluations. Participant 4 described how using a video of the instructor was helpful when studying skills at home: "Then we could go home and if we forget…we could see what their techniques were…which was *super* helpful, I think. So I can go back and look at it, versus looking at the PowerPoint and the book that we have, our skills book."

Participant 7 described how she helped prepare for skills check-offs by using a webcam on her computer:

> I recorded myself with my computer, so then I knew that if I missed something that I didn't catch--that I had possibly contaminated or touched something I wasn't supposed to--I was able to go back and view the recording and then just catch little things that I couldn't catch by myself.

Therefore, this method helped her spot errors she had made in the procedure, which might be difficult to detect in the moment when practicing the skill, especially by yourself.

In the clinical setting, videos were used as a refresher when the participant needed to perform a skill she had not done recently. Participant 3 was discussing what it would be like if she had to perform tracheostomy care--a difficult skill that was rarely done in the clinical setting--and stated, "I would definitely…look up my video on my phone before I went into the room – just to remember the sterility aspect I think." Other participants recalled watching skills videos from YouTube® during their clinical experiences and also referenced skills checklists stored on their phones. In short, the

smartphone had become a mobile visual and print reference for these participants in each of the settings where they described learning skills.

It was also clear the participants had preferences about where the source of the videos came from. As discussed above, videos of their instructor performing the skill were usually preferential to other sources because the equipment was familiar and the steps matched on what they were being tested. Videos from YouTube® were used but were less ideal than the instructor's demonstration: "Trying to find a video on YouTube® where they use the same equipment that we have is also hard… You couldn't just go Google 'trach care' and find, like, one gold video. You definitely had to search around to find like, a newer video" (Participant 3).

However, participants did use videos from YouTube® when other sources were not readily available. The skills videos from ATI® were also used, especially at home when trying to learn the steps of the skill. These videos were extremely detailed and included explanations of the steps; they were helpful when the skills were complicated or when the participant was confused about how to do the skill. As Participant 5 said, "The ATI® nursing videos were just from *my* benefit, just to, I guess have the professor at home…to teach it." Other participants found the length of the ATI® videos, which typically exceeded 30 minutes, were too long to be useful. Participant 8 explained, "It's just such a *long process*. And they're really *slow* about it, which does help me understand each step, but sometimes I lose focus." Therefore, some of these resources were helpful at times and less helpful at other times.

This sub-category was characterized by a use of technology in multiple settings to learn nursing skills. The smartphone allowed participants to record, archive, and view

videos, Internet sources, and documents that aided skills learning. Some participants also used these resources in the clinical setting prior to performing skills on real patients. In addition, videos of instructors performing a skill were often seen as more trustworthy than videos from the Internet or ATI®.

Knowing How I Learn

Participants described themselves primarily as learning skills with visual and kinesthetic methods. Participant 1 stated, "I'm a very visual learner. I'm a kinesthetic learner. I like to see it, then I like to do it." The kinesthetic part of skills learning was seen as particularly important as noted in this example by Participant 2: "You can't learn to take a pulse by watching someone else…you have to do it to learn it." Participant 5 connected these two methods of learning by saying, "The visual part helps me learn and the hands-on part is more for, like, muscle memory and just getting the feel and…making sure all the sterility steps are properly done."

Participants did not describe reading or listening as a primary way they learned skills; some specifically stated they did not learn skills effectively by reading. Participant 6 explained, "Reading about the skills didn't help me… I would rarely ever read as much as they wanted us to because…I'm not going to learn that way."

Since participants had a belief about what learning methods worked best for them, they used some learning resources more than others. As described above, participants primarily used videos and supplies they brought home from lab to practice skills at home. Most participants said they did not find the skills textbook helpful. Some said it was out of date or the equipment shown in the book did not match what was used in the skills lab. Others said there were too many resources that contradicted each other and they needed

to focus on one set of steps to learn. Therefore, they chose to do what their instructor said since that was how they would be tested on their skills evaluations.

Finally, some participants described an advantage they saw to using videos over the skills textbook. Participant 4 explained:

> [In the video] we got to see not just the motion but the movements of how the nurse actually got from the little skills kit set up to the patient and not breaking sterility, versus in the book it just has some pictures step by step, so we don't really see how they *get* to it. In between. We don't really get to see the struggle in between that [laughs].

The advantage of the video was the participant saw how to get from one point in the procedure to the next, which led to a complete series of motions to learn.

In summary, theme three--Learning through Technology--was characterized by the presence of technology in the lab, home, and clinical setting. Videos of skills demonstrations were most trustworthy when an instructor was recorded but videos from the Internet and from ATI® were used to learn skills as well. Participants also used technology by recording each other performing skills and sometimes themselves performing skills. These videos were critiqued to improve skill performance. Participants believed using visuals, primarily videos, and hands-on practice were the best methods to learn skills. They saw little value in the skills textbook.

Theme Four: "Just Pretend" Does Not Produce Confidence

Theme four revealed the importance of having a realistic learning environment when learning skills. In the lab and simulation setting, the attempt to make a procedure realistic and closely mimic the clinical setting is termed *fidelity* (Jeffries & McNelis, 2010). Participants described examples of poor fidelity such as manikins that do not simulate a skill well, being asked to "just pretend" something has happened, or leaving

steps out of procedures. When poor fidelity occurred, participants stated that skills learning was not as effective. Since the lab setting was not entirely realistic when compared to a clinical setting, participants believed skills learning was not complete until the skill was done on a real patient. Thus, there was a strong desire to perform skills in the clinical setting. Once skills were performed on a real patient, participants believed their confidence improved. This theme can be explored by examining the three sub-categories: poor fidelity equals poor learning, skills learning is completed on real patients, and confidence improves with real patients.

Poor Fidelity Equals Poor Learning

All the participants shared stories about poor fidelity in the lab setting, which made it more difficult for them to learn nursing skills. Participants described equipment shortages and having to reuse equipment as being a source of poor fidelity. For example, Participant 6 was describing a skills lab involving venipuncture. There was a shortage of collection tubes for the blood, which meant the tubes had to be reused:

> Once you break the seal [on the tube] it doesn't work…So they'd [faculty] be like, "Oh, just pretend." So. When you have to "just pretend" on something that you're actually going to do on the unit, it's less effective. You can't just pretend in the hospital.

Some participants explained that although it probably was not practical in terms of cost or environmental waste, they would learn skills more effectively if they always used new supplies. Participant 8 described how reusing supplies made learning more difficult:

> A lot of the time people don't put the supplies in the packet back in the proper order. So it messes up my thought process and how I perform the skill. And I think it's just how my brain works… I like to do things in the same order every time--many times--and if I'm reusing supplies it doesn't translate equally for me into the hospital, because I'm not going to be reusing supplies there.

Many participants described the manikins used to practice skills as being a source of poor fidelity. Participant 9 gave several examples of how poor manikin fidelity made it harder to learn the skill:

> When you try and do the dressing change the stuff [prior dressing] won't come off properly. So you break sterility doing that, because it's *so sticky* from everybody doing that. And then the NG [nasogastric] tube does not go down all the way, so I've never really physically put an NG tube in all the way. You only put it in five inches, and they're like, "Ok, well we know that you know what you're supposed to be doing." So, it's just some of the instances aren't realistic because …you're not doing it the way you would in clinical all the way. And so if something's missing you skip over that part. Then when you actually do it, you're not *used* to doing that part, 'cause you just automatically skip over it. It doesn't become natural I guess. It's not just second nature to do it.

There was agreement among the participants that the manikins were often unrealistic when learning skills. They shared many stories about how inserting intravenous lines was unrealistic since the skin on the manikin's arms had been stuck repeatedly by other students. In addition, when the intravenous catheter was correctly placed in the manikin's vein, there was rarely a flash of blood, which in a live person would be an indication of correct placement. Foley catheterization was also described as unrealistic as the manikin's legs were difficult to position and urine was rarely obtained when the catheter was placed in the bladder, which is the primary indication of correct placement in a live patient. In both these procedures, participants said the manikin did not give reliable feedback about whether the procedure had been done correctly, leaving the participant to wonder whether it was a problem with her technique or with the manikin's fidelity. Essentially, participants were unsure if they had done the procedure correctly or not.

Some participants did differentiate between the low-fidelity manikins used primarily to learn psychomotor skills and the high-fidelity manikins used in simulations.

Participant 4 described working with a high-fidelity manikin: “The teachers could really tell if you…know what you were doing by checking if you did get the right blood pressure. And so that was helpful.” Participant 9 believed the high-fidelity manikins more closely mimicked the clinical setting:

> It actually is real time and it changes when you look on the monitor and the heart rate was changing, or it was going into a dysrhythmia. Those ones are really helpful and they made you think on your toes, because it was like you were in a real life situation.

Despite the limitations with the manikins, most participants believed using the manikins was a necessary step in the skills learning process. While they did not feel the manikins completed their skills learning, it did prepare them to transition the basic steps of the procedure to the clinical setting. Participant 8 explained, “If I were to just look at pictures or have somebody explain it to me, that wouldn’t be enough for me. Like, I need to practice on the manikins. It is a good step…up to human.”

This sub-category revealed that in the lab setting, participants often experienced poor fidelity with the equipment used to teach nursing skills. Limitations of the manikins as well as equipment shortages and reusing supplies contributed to poor fidelity. The result of poor fidelity was the participants had to modify steps in the procedure or leave them out entirely. Any time steps were left out of the procedure, it was harder to do all the steps correctly as the flow of the procedure was disrupted, which made learning the skill more difficult. Despite these limitations, participants recognized the manikins were a necessary part of their skills learning and prepared them to do the skill on a real person.

Skills Learning Is Completed on Real Patients

This sub-category showed that while participants recognized the skills lab was part of learning nursing skills, they did not believe they had truly learned a skill until they had performed it on a real person, which was usually done in the clinical setting. The clinical setting offered the complete picture: a patient with real anatomy who responded during the procedure and needed explanation about what was happening. Participants also learned how to deal with complications that occurred during procedures and parts of procedures that could not be simulated in the lab setting. For example, Participant 2 described her experience with suctioning a tracheostomy in the clinical setting: "I actually saw it in real life and how it [secretions] flung like, *10 feet*. I was like, 'Well I'll be darned! It really does fly.'" The clinical setting offered a more realistic setting than the lab was able to do.

In this nursing program, students were not allowed to practice invasive procedures on each other. They did practice non-invasive skills such as vital signs, assessment, positioning, and assisting with ambulation with peers. However, the program has official policies prohibiting students from taking needles and IV catheters from the lab. The most common stories participants shared about completing skills in the clinical setting involved invasive procedures. Participant 3 described how giving an injection was different in the clinical setting than the lab setting:

> So then once we go into the clinical setting and we're able to practice and be able to read the patient you're working on and gauge their reactions…you know, what you should tell them before you do it; holding pressure; doing all that sort of thing. It's definitely different than the skills [lab]. I mean, especially with injections we literally sit there [in lab] with the pad like this [motions giving an injection, in and out] and we just practice poking it, but that doesn't make me confident in the clinical setting. It just means that I know what angle to go in.

> But I was still so nervous, 'cause, you know, peoples' arms are different and you might have a tiny Grandma whose bone is literally right there and, that's not a pad.

The patient's underlying condition and reaction to the procedure as well as the environment of the room were also noted as important aspects of learning how to fully do the procedure in the clinical setting. Participant 5 explained:

> It's just the fact that everyone--every patient in the hospital is so different. I have to consider the environment around the patient. The room that they're in, their condition, their disorders. Instead, if I were just to learn in the lab, you know, I *know* that manikin, I know its veins, I know how it sounds like. [In the hospital] I get to learn how patients will react. So that also benefits my nursing skill. Just having that actual reaction and how to deal with it helps me learn the nursing skill.

Most participants described a desire to perform skills in the clinical setting and believed it was a necessary part of their skills learning. However, there was variability in the degree to which the participants had been able to actually perform skills in a clinical setting. Some participants stated they had done most of the skills taught in the skills lab in a clinical setting, while others stated they had done only a limited number of skills in the clinical setting. This variability seemed to depend on the clinical site where the participants were as well as the types of patients in their care. As Participant 2 noted, "Sometimes [skills are] hard to come by--the actual experience. 'Cause not everybody needs something when you're there."

Common skills most participants stated they had done in the clinical setting included assessment, medication administration, venipuncture, IV insertion, and Foley catheter insertion. Skills done by fewer participants included nasogastric tube insertion or care, tracheostomy care or suctioning, and central line dressing changes. At the

hospital where many participants did their clinical rotations, the hospital routinely did central line dressing changes on Sunday, a day when the participants were not present.

One interesting finding was several participants described doing many skills in their community rotations. In this nursing program, community rotations included sites such as home health and hospice nursing. Participants at those sites described the settings as good places to practice nursing skills in addition to the traditional hospital setting.

In summary, this sub-category indicated the participants believed skills learning is completed with real patients. When a skill was done with a real patient, the participant had to consider the patient's underlying condition, the anatomy, the environment, and potential complications. The number of skills completed in clinical settings was variable, and community settings offered opportunities to practice skills in addition to the hospital setting.

Confidence Improves with Real Patients

This sub-category revealed that doing a skill on a real person is the key to developing confidence in skill performance. Participant 6 captured this idea by describing her feelings about doing a skill for the first time in the clinical setting:

> The first time is meaningful for all the skills and just having that confidence that you can do it and you've done it before, um, and not saying that it's your first time to a patient but acting confident about it. And then once you've done it once you feel 10 times better that you can do it again.

Participant 3 clearly believed confidence came from practice in the clinical setting and not the lab setting. When asked what made her more confident, she answered, "Just

doing…being able to do a skill over and over in the clinical setting. On a person [chuckles]…and not a manikin."

Participant 4 believed repetition in addition to doing the skills in the clinical setting improved confidence. She stated, "I just did a couple of them [IVs] last week in a row… I do feel pretty confident with the skills after doing them a couple of times on real people." In addition, some participants stated if they had not done a particular skill on a real patient, then they did not feel confident. For example, when describing a skill she had not done in the clinical setting, Participant 9 said, "For the most part I've got to practice and try it [a skill] at least once. I wouldn't say I've *mastered* them or feel confident."

Therefore, this sub-category showed the participants believed confidence arose from doing skills with real patients. On the other hand, they tended to feel less confident with skills they had not done with real patients.

In summary, theme four--"Just Pretend" Does not Produce Confidence--indicated learning skills was more difficult when fidelity was poor. Being told to "just pretend" led to incomplete learning. Since the lab was often unable to adequately represent a procedure in a realistic manner, participants believed they had not truly learned how to do the skill until they had done it on a real patient. Once they had done the skill with real patients, confidence improved. The participants did not gain confidence simply from the lab setting.

Theme Five: Teaching Matters

Theme five centered on faculty members who taught skills as well as the teaching methods they used. Participants described teaching methods that improved their skills

learning including succinct explanations, demonstration of the skill, observation of student practice, and prompt feedback about performance. When faculty members were encouraging and supportive during lab, participants believed skills learning was facilitated. Inconsistencies among faculty members in how skills were demonstrated or evaluated inhibited learning and led to frustration. In addition, when there were inconsistencies among faculty members who taught skills lab and those who taught clinical courses, participants were confused about how to perform the skill. Participants believed faculty members who taught skills needed to have recent clinical practice and were quick to note outdated information being taught. Finally, participants described practicing nurses in the clinical setting as being good resources who aided in skills learning. This theme is examined by descriptions of four sub-categories: learning through explanation, demonstration, and feedback; consequences of inconsistencies; faculty must be clinically current; and nurses as teachers.

Learning Through Explanation, Demonstration, and Feedback

Participants described several teaching methods that improved their skills learning. Faculty members typically provided background content and information at the beginning of a lab prior to demonstrating the skill. The participants generally viewed this background information as being helpful since it gave them basic knowledge about how to perform the skill, potential complications, and trouble-shooting. Sometimes this information was presented through lecture or discussion; other times PowerPoint slides were used in a separate classroom prior to going to the practice lab. Some faculty members preferred to separate the explanation and the demonstration, while others included the explanation as part of the skills demonstration.

Participants generally preferred that these lecture and demonstration sessions be brief as they wanted to have the majority of their lab time to practice. Some faculty members tended to go into a lot of detail during these explanations; that was seen as a less effective teaching method because it was easy to lose focus and become overwhelmed with too much detail. Participant 5 noted:

> Professor A and Professor B tend to go through the skill, like, pretty quick and simple. They gave simple instructions and simple explanations. Just taught us, like, really quickly. And then for Professor C, she would take more time explaining things and she would use personal experience to relate *how* she learned the skill… I guess she went into more details on the skill than some of us would like… So it was a little bit harder to retain *all* of her information…because we just wanted [to know] how do we do it instead of just standing there and just watching her and listening to her… It's just she went into so much detail and she spent so much time on it that I just stood there for a really long time and I was just like, "Oh, I just want to practice already!" But, she just kept going into detail…detail. That made me, kind of, tired of wanting to listen or wanting to learn the skill.

The participants generally believed the demonstrations were helpful because they saw the steps done together and saw the specific equipment used in the procedure. The participants said they were able to ask questions and then some faculty members would repeat the demonstration from start to finish with no interruptions. These demonstrations tended to focus on the psychomotor components of the skill; a few participants expressed a desire for a more holistic demonstration. Participant 3 said:

> [The demonstration would be more effective by] just listening to them communicate with the patient and how you're going to walk in a room and say, "I'm about to start an IV, this is what it's going to feel like." Knowing what to say to the patient while you're doing those things. I think touching on that is actually really important because it's not always easy to go in and *explain* something to a patient in terms that *they* will understand, as opposed to terms that we learned in class.

Once the demonstration and explanation were complete, participants then divided into groups of two or three and practiced the skill on a manikin in small rooms. Faculty

members circulated to informally observe and offer feedback. This approach was seen as a useful teaching method that helped participants learn to perform the skill correctly:

> We got to [practice] with our instructors there and…walking by…and it definitely was helpful when it came to keeping sterility. We may *think* we're keeping sterility, but then the instructor would be able to see, "Oh, no, you just crossed, or contaminated…or you just have your hand over it, that's not okay." I guess subconsciously we think we're doing the right thing. So that was super helpful. (Participant 4)

Some participants made a point that because the feedback was given quickly they were more likely to learn to perform a skill correctly since they were not practicing it using poor technique. Thus, succinct explanation and demonstration as well as prompt feedback were viewed as preferred methods to teach skills.

In addition, participants described the attitude of faculty members in skills lab as being a component of how they learned skills. Participants noted encouragement and support from faculty members was an important part of successful skills learning:

> A lot of the success is due to encouraging instructors, and I think that in skills that is so important because you feel…I mean, you're coming into something that you've never done before, and you need that encouragement. And somebody that's going to believe that you can do it, even if it's a little hard. So I think that instructors in skills in particular *have to be* engaging and encouraging and current and…you know, *nice*. And not make you feel that you can't do the skill or that you're doing something wrong. Even if you're doing something wrong, be able to speak nicely about it. I think that that has made all the difference. (Participant 6)

In summary, this sub-category showed the participants felt the skills were taught effectively through brief explanations and demonstrations followed by prompt feedback from faculty members during practice time. Supportive and encouraging faculty members were also seen as being important when learning nursing skills.

Consequences of Inconsistencies

This sub-category revealed that learning skills was inhibited when there were inconsistencies in how skills were demonstrated or evaluated by faculty--the result was frustration. In addition, when there were inconsistencies between faculty members who taught skills lab and faculty members who taught clinical courses, there was confusion about how to perform the skill.

In this nursing program, two to four faculty members teach the skills lab courses. All the faculty members participate in both teaching and evaluation. Nearly all the participants shared stories of inconsistencies in how they were taught to perform skills. While they acknowledged every nurse has his or her own method of doing skills, they also stated that as beginners they needed one consistent method to effectively learn the skill. Multiple methods left them confused and frustrated, especially when they had to perform skills check-offs or translate a skill into the clinical setting. These participants related:

> So one…instructor would do something *completely different* than the [others]… Which is fine – everybody has their own ways – but for me, I like to have, like, *one* way and I like to know, "This is the step, this is what I need to do." (Participant 3)

> We had three or four different instructors in the same class. And each of them taught a different way, so if you got that one professor and you didn't do it their way, it was harder. So I guess the inconsistency is also what made it hard to learn it. (Participant 9)

While it was difficult to learn skills with these inconsistencies, participants described frustration with how these inconsistencies affected them when they were evaluated during skills check-offs. The faculty member who primarily taught the skill was not necessarily the faculty member who would be testing them. Several participants

shared stories of themselves or fellow students failing a skills check-off when this happened. For example, Participant 4 related:

> What one instructor told us was still sterile is technically not still sterile to *her* [the faculty member doing the skills check-off], and so this particular student did what… she thought was ok and ended up *failing* because it was not okay to the instructor. Although it was something that if we had another instructor we believe would have been okay.

Because failure was an ever-present threat to these participants and carried the potential consequence of being expelled from the nursing program, these stories were common. Some participants described strategies the group used to deal with these inconsistencies, e.g., having all the instructors give them feedback on a skills performance to learn how each instructor varied the procedure. In addition, students who completed their skills check-offs first would give hints to the students who had not yet tested about what the instructor who had tested them was looking for.

There were also inconsistencies in how faculty members in the skills lab taught skills as opposed to how clinical faculty members taught skills. Participant 7 remembered a skills faculty member telling the class, "We're going to do it one way here, but you'll probably see it a different way in the hospital." The participants expressed a desire for more uniformity among all the faculty members in how they taught skills in order to prevent confusion. Participant 9 explained:

> When we go on the floor and they [the clinical faculty] come in with us, they're like, "Oh, that's the way you were taught in lab. You can do that to pass the check off, but in real life you wouldn't do that." Just because they know that's not how you do it in real life, but they know that's what we're being taught. So they're like, learn that way, but that's not how you have to do it in clinical. So that was confusing too.

Participants also offered suggestions for addressing this concern such as having all nursing faculty members agree on one way to teach and evaluate each skill. Most

participants felt individual variation in skills practice was better learned once in practice because learning the procedure one way was less confusing than learning it in multiple variations. Some participants also suggested faculty members make a video demonstrating a single way to perform the skill that could be used as a reference for both faculty members and students for teaching and evaluation purposes.

In summary, this sub-category showed many inconsistencies in how the participants were taught to perform skills in the lab and clinical setting. When presented with multiple ways to perform a skill, the participants reported confusion and frustration because the skill was then harder to learn. Inconsistencies in skills check-offs were especially stressful since the result of failing a skills check-off could be removal from the nursing program.

Faculty Members Must Be Clinically Current

This sub-category revealed skills learning is facilitated when faculty members who teach it are current in their clinical practice. Participants believed when faculty members were not current in their practice, faculty members were often unaware of changes in certain procedures and practices in the clinical setting. This made it especially difficult for the participants to translate what they learned in skills lab to the clinical setting.

In this nursing program, there was a mix of nursing faculty members who taught the skills courses including some faculty members who had been out of practice a long time and others who were still in practice full-time and taught as adjunct faculty. The participants quickly could detect a difference between these two categories of faculty members:

> And a lot of the professors that were teaching us haven't practiced in, like, 20 years. And so that was also really hard, 'cause they were teaching us ways that they were taught 20 years in the hospital…things are changing all the time… So we're still doing it and we go into the hospital and our nurse that we're working with [is] like, "Why did you do that? Are they still teaching that?" And we're like, "Yeah, that's how we were taught." It doesn't seem up to date. (Participant 9)

Participants expressed a desire to learn the most current evidence-based practice as part of their education. Participant 1 described the frustration she felt when her skills lab faculty member was teaching about an outdated practice:

> My first professor said they still use heparin locks...I was like [raises hand], "No we don't. Miss, no we don't." [That was] frustrating because we're doing these skills and learning…because this is our job. So…they teach you one way…but that's not what we practice in real life. So…are you trying to prepare me for real life? Which I thought was what nursing school would do--prepare me to be an effective nurse. Or am I just wanting to pass the class?

Some participants also described how some nursing faculty members who were still in clinical practice recognized students were sometimes taught information that was no longer clinically current. Participant 6 related:

> They [faculty not in practice] don't know what's really going on in the hospital now, so it would be hard, like, "Oh, we need to do this to pass the check off, because you're saying to, but we really are not going to be doing that in the hospital. We're just doing it because you're telling me to." …After skills [class] the other instructors would say, "Well, we actually do it a different way. So just pass your check off, but that's not how we do it on the floor."

In summary, the participants described differences between nursing faculty members who were still in practice and those who were not. Skills knowledge changes too, which makes it challenging for faculty members who are no longer in practice to teach current information about skills procedures. Participants felt frustrated when they learned outdated information and felt less prepared to perform the skill correctly in the clinical setting. Finally, some clinical faculty members were aware outdated methods

were still taught by faculty members no longer in practice and discussed the issue with the participants.

Nurses As Teachers

The last sub-category of this theme demonstrated the participants felt the nursing staff in the clinical setting was a part of their skills learning as well. Nursing staff offered support, advice, and supervised the participants performing skills when nursing faculty members were not available. Some participants expressed a desire to perform skills with their nurse rather than their nursing faculty members because it was less intimidating.

Nursing staff members were generally described as being helpful and willing to supervise the participants with skills in the clinical setting. Participant 1 stated:

> The nurses that I've had were very…. glad I was there, one, and were willing to teach me and show me. Even though I said, "Yes, I know that skill but I have never been able to actually practice it on a real patient." So they were very understanding with that.

Participants described a feeling of partnership with the nursing staff. Many nurses were close to the participants' ages and some participants said the lack of age difference made the relationship less intimidating than with their faculty members. A few participants were very intimidated by their clinical faculty members, which led them to seek out their nurse whenever possible. Participant 8 shared:

> I feel more comfortable working with my nurses in the clinical setting than my professors because …once I get into a patient room they…take on a different role and it's more intimidating and…for the most part the nurses that I get paired with are more willing to verbally walk me through a skill, whereas a professor just watches and it's kind of like a check-off situation, which is already intimidating …I feel so much more comfortable asking my nurse questions than my professor, because I feel like my professor already expects me to know it.

However, not all participants had positive experiences with the nursing staff. At times, nursing staff members were too busy to help the participants or were intimidating to work with; Participant 9 recalled:

> Some of the nurses that we work with…they don't realize that we *can* do it and that we're okay to do it, and so they're kind of hesitant on letting us do it. Some nurses can kind of be intimidating when you're doing a skill. If they kind of stand back and just let you do it I'm fine, but if they're over here, like, watching you, saying, "Ok, now do this; now do this; now do this," *that's* a little intimidating.

This final sub-category revealed most nursing staff members were seen as a helpful partner in teaching nursing skills in the clinical setting. Some participants preferred to perform nursing skills with their nurse rather than with their clinical faculty member.

In summary, theme five--Teaching Matters--showed the participants believed nursing skills were most effectively taught through brief explanation and demonstration, followed by practice with prompt feedback. Long, detailed explanations and demonstrations were confusing to the participants who also lost focus on the topic. Inconsistencies in teaching and evaluation were present in both the lab and clinical setting; this was both frustrating and confusing to the participants. They generally preferred one single method for performing a skill. Suggestions for improving inconsistencies included faculty members agreeing on one way to teach a skill and making a video for both students and faculty members to reference for teaching and evaluation purposes. Faculty who were no longer in clinical practice were seen as often teaching outdated information about nursing skills, which caused frustration because the participants wanted to learn current information and feel prepared to perform the skill in the clinical setting. Finally, nursing staff members were generally seen as partners in the

skills teaching process; most participants had experiences where nursing staff members were supportive and willing to supervise skills performance in the clinical setting.

Theme Six: Importance of Peers

Theme six describes the role peers played in the skills learning process. Participants described two main ideas. First, they believed collaboration helped them learn skills. Working together in pairs or small groups allowed for increased practice time and there were also benefits to observing a peer perform the skill. Participants tended to choose partners based on practice style and found that partners who liked to practice in similar ways facilitated skills learning for both.

Second, participants described how overall group cohesiveness and peer support made a difference in skills learning. Participants offered several examples of how they supported each other while learning skills. Each of these sub-categories--collaboration and support—is described separately.

Collaboration

This sub-category revealed the participants saw benefits to learning nursing skills when they collaborated with peers. Small groups allowed for increased practice time and most participants described benefits to being the one doing the skill as well as the one observing someone else perform the skill. Participants tended to work with the same peers when possible and often selected partners based on how they felt they learned best.

Skills were primarily learned in groups of two or three people, which allowed them to practice the skill multiple times. Participant 2 said, “When you have the opportunity to do it [the skill] and do it multiple times and not just try it once…it gives you the time to *understand* it better.”

Participants also described several benefits of being the person in the group who was not actively performing the skill. Being the observer allowed that person to spot errors, give suggestions to improve technique, and see how others did the skill. Participant 3 said:

> We would all take turns watching one another do it [a skill]. And, you know, one person might be able to point out that you broke sterility, where if you were doing that by yourself you would probably have no idea you just broke sterility. And having all of the different girls' opinions to kind of correct you and put you back on track was a good thing for me, at least.

A few participants described how they preferred to have another student perform the skill first as they saw benefits to seeing another demonstration of the skill. They also felt seeing someone else handle the equipment first helped them perform the skill more smoothly when it was their turn. Participant 4 related:

> I always watch my partner go first. I don't know if anyone's caught on to it, but that's what I do. I'm like, "Alright you go first and then I'll go." And that is where I can get one more check at looking at the check list, seeing how another student does it, and usually the first person who does the skill with a partner, we take the longest because we have so many questions and we're getting used to this kit and trying to figure it all out together. So, I get to see all that…and then, being the *last* one to go I *should* have a smoother transition on how to handle the kit 'cause we figured it out together the first time. So, I *like* going last.

Most participants stated they preferred to work with the same partner when possible. Sometimes this was simply because they knew each other and were friends but often it was because they felt they had similar ways they liked to learn skills. These two participants captured this idea well as they had very different styles in how they learned skills:

> There were…certain people that I liked working with better because we had similar learning styles. They would want to go through the skill as many times as I would, and we would just keep switching off. Or they would be looking at the check off sheet and reading it as I was verbalizing and doing the skill. And they too would want to be stopped if they missed something. Um, and others just

> wanted to get out of skills lab as quick as possible, so they would blow through the skill and just kind of look at the sheet as they were doing the skill and call it good. Like, one time. Which, was *not* how I learn. (Participant 8)

> They [another student] were more…detail-oriented and… perfectionist…They would do everything just real slow and question everything and think that they *didn't* have it, whereas I'm…practice it – I do it, and if I do it wrong then I go back and see what I did wrong and then fix those changes and then go through and do it. So that's different learning ways. (Participant 9)

In summary, this sub-category described how working together in a collaborative way helped the skills learning process. Working in small groups allowed for increased practice time but also had benefits to the person who was observing a peer perform the skill. Participants tended to choose their partners based on how they each liked to learn skills, e.g., the level of detail and number of times they practiced the skill.

Support

This sub-category was characterized by the idea that the overall cohesiveness of the group and the support of peers played an integral part in the skills learning process. Participants described how they offered assistance and support to each other as they learned skills including extra efforts to support peers who had failed skills check-offs.

Participants described their group as being very cohesive and felt like this made it easier to learn skills together. There was an overall sense they were having this experience together and being supportive made it easier for everyone. Participant 9 explained:

> I think our class is very, very supportive. And we've always stuck by each other and…we're not cliquey at all…We rally together if somebody needs help or if somebody is struggling with something. Even if it's skills or if it's class or if it's anything, we've always stepped it up and helped each other out when people have struggled or needed help. So I definitely think, if I was in another group, my experience would have been a lot different. If you get frustrated and you're not getting a skill, there's always somebody there that will stay after and be like, "Ok,

> let's practice." …So I think that makes a huge difference. Just having that support system.

Another participant described her own experience with failing a skills check-off involving tracheostomy care and how her peers helped her during the process:

> I definitely reached out to my classmates and I was like, "Hey. Make sure I have this down so I don't have to worry about it and maybe I can pass it the second time." [They were] supportive and they were willing to, even though they had already passed the skill, they were still hanging out with me after class to make sure that, you know, *I* had the skill down. (Participant 7)

In this group, several participants spoke about knowing fellow students who had failed a series of skills check-offs and had been removed from the nursing program as a result. Participant 4 described how the group felt when that happened:

> We had one person who failed…with us, and that was really hard…I think our… class, ended up taking it a little bit hard because we had one person left behind…and I think that made us more motivated to keep helping each other and making it through the rest of the skills.

In summary, this sub-category showed peer support and overall group cohesiveness facilitated skills learning among these participants.

Therefore, theme six--Importance of Peers--described the role peers played in the skills learning process. Participants stated collaboration helped them learn skills because they had increased practice time in small groups. There were also benefits to observing a peer perform the skill including getting to see the skill again and learning different techniques. Participants often chose partners based on practice style and found that partners who liked to practice in similar ways facilitated skills learning for both. Participants also stated overall group cohesiveness and peer support made a difference in skills learning.

Summary of the Process of Learning Nursing Skills

In summary, the process of learning nursing skills was characterized by six themes. Theme one--the Umbrella of Emotion--described an ever-present stream of emotions during the skills learning process. Theme two--Practice, Practice, Practice--was characterized by a desire and a need to practice nursing skills repetitively in the lab, home, and clinical settings as a mechanism of learning. Theme three--Learning Through Technology--described the presence of technology in the lab, home, and clinical setting. Videos of skills demonstrations were most trustworthy when an instructor was recorded, which gave the instructor a mobile presence. Participants also used technology by recording themselves and each other performing skills.

Theme four--"Just Pretend" Does not Produce Confidence --indicated learning skills was more difficult when fidelity in the lab setting was poor. Once skills were done on a real patient, the learning process was seen as complete and confidence in the skill improved. Theme five--Teaching Matters--showed both nursing faculty members and nursing staff members teach skills. Inconsistencies in teaching and evaluation made learning more difficult and faculty members who teach nursing skills have to remain clinically current to teach effectively. Theme six--Importance of Peers--described how collaboration, observing others, and supporting each other made skills learning easier.

Therefore, the process of learning nursing skills can be described thus: In a rough sea of emotion, necessity is the mother of invention. This metaphor helps us understand that when these participants learned nursing skills, emotions such as fear and anxiety were always present. The participants knew they needed to learn nursing skills to

function as a nurse and provide safe patient care and they created ways to accomplish that goal despite barriers that were present.

In this study, nursing skills were primarily conceptualized as psychomotor skills; however, over time, the concept of nursing skills expanded to include other aspects of the nursing role--the most common was communication skills. The findings of this study answered the research question of how undergraduate nursing students described the process of learning nursing skills. This detailed description has several interesting implications for nursing faculty members, which are discussed in the next chapter.

CHAPTER V

DISCUSSION

The purpose of this study was to explore the process of how undergraduate nursing students learn to perform psychomotor skills within the full complement of nursing skills. The following research question guided this study:

Q1 How do undergraduate nursing students describe the process of learning nursing skills?

This chapter examines the findings of the study in relation to prior research and also provides recommendations for nurse educators. To provide a full discussion, each of the six themes identified in the study is examined individually. Limitations of the study, recommendations for nurse educators, and opportunities for future research are also discussed.

The Participants

Nine participants who were in their last semester of nursing school participated in this study and demographic data were collected by self-report from each participant. Although any senior nursing student was eligible to participate in this study, this group of participants ended up being rather diverse. Six of the participants would be classified as traditional undergraduate nursing students as they were women in their early twenties. Three of the participants would be classified as non-traditional students as they were women in their thirties. In this particular cohort of senior students, there were no men so

no men were eligible to participate in the study. The participants were a diverse group in terms of ethnicity with five Hispanic participants, two Caucasian participants, one Black participant, and one Asian participant. Thus, the sample in this study was homogenous in terms of gender but diverse in terms of age and ethnicity. It is unclear whether the demographics of this sample influenced the results of the study but it is fair to say this sample was different in terms of age and ethnicity when compared to other studies about nursing students' experiences in learning nursing skills (Redmond, 2013; Strand et al., 2009). Those studies focused on the experiences of Caucasian nursing students in their early twenties.

The majority of participants had some experience with nursing skills outside the nursing school setting. Several participants had worked as home health aides, nursing home caregivers, or had cared for family members who had acute or chronic illnesses. One participant had been an emergency medical technician for two years. The most common nursing skills the participants reported having experience with in these settings included basic patient care, vital signs, positioning, and oxygenation. Those who had cared for family members in the home setting also reported experiences in administering medications. It was difficult to separate the participants' prior experiences with nursing skills from what they learned in nursing school as some participants also described skills practiced during their work experiences.

For example, skills a participant had already mastered in her own work experience such as vital signs or bed making were seen as simple skills to learn in the nursing school setting. Therefore, that participant's experience with learning those skills in school was different than a participant who was learning those skills for the first time.

It might be helpful for nursing faculty to assess those students in their skills courses who had had prior experience with nursing skills and to use those students as resources for other students who were learning the skill for the first time.

Definition of Nursing Skills

In this study, all the participants believed nursing skills involved psychomotor skills; however, upon further reflection, several participants also believed other aspects of the nursing role were considered nursing skills, primarily communication skills.

This finding might reflect maturation in both skill level and general comfort with patient care. Some participants described a trajectory of skills learning where they were initially focused on the psychomotor skill itself and could devote little attention to the patient. As they became more confident in the skill, they could free up additional cognitive resources to talk to the patient and perform patient teaching. This finding was consistent with the literature on cognitive load theory (CLT), which notes a finite amount of cognitive resources is available at a given time (Sweller, 1988). Once material is organized into schema in long-term memory, cognitive resources are then available to devote to other things such as communicating with a patient (Young et al., 2014).

Participants considered communication a skill because it was threaded throughout the curriculum--in lab courses, clinical courses, and theory courses. In essence, they received a consistent message about the importance of communication skills as part of the nursing role. This finding suggested nursing faculty could broaden students' concept of nursing skills by threading key non-psychomotor skills through multiple courses in the nursing curriculum.

In addition, one participant wondered whether the title of the course in which she learned primarily psychomotor skills (the lab courses titled "Nursing Skills I" and "Nursing Skills II") influenced her concept of nursing skills being primarily psychomotor in nature. This point suggested nursing faculty could alter how nursing courses are titled and described to students as another way to broaden their concept of nursing skills.

The Environment

Since the skills labs were conducted in several different rooms, participants generally described the environment in the skills lab as being variable. Some rooms were dark and quiet while others were bright and noisy. Distractions were present including sounds from the highway that ran adjacent to the lab building and homeless people tapping on the windows. Participants did not view the environment as contributing to or detracting from their skills learning and described specific strategies to minimize distractions such as closing the blinds.

The most important aspect of the environment seemed to be the realism that was present. This particular skills lab was part of a larger teaching facility set up to make use of an abandoned hospital. Thus, the setting, which was previously an intensive care unit, closely mimicked what a real clinical setting looked like. Some studies suggested improving the realism of the learning environment enhanced the overall learning process (Grady et al., 2008).

Themes Identified in This Study

Theme One: The Umbrella of Emotion

The first theme was characterized by an ever-present stream of emotions during the skills learning process. The predominant emotions described included anxiety,

confusion, worry, fear, inadequacy, frustration, intimidation, and disappointment. These emotions seemed to intensify during a skills check-off evaluation; some participants cried and experienced nausea prior to the check-off. Participants stated this level of anxiety and stress was different than anxiety felt during written exams; they believed being observed by a faculty member and the potential consequences of failing a skills check-off contributed to their emotions. While some anxiety is known to improve performance, excessive anxiety can inhibit performance and become paralyzing (Schmidt & Lee, 2011).

It is well known that nursing students find nursing school as a whole to be a stressful experience. For example, a study of Canadian nursing students (Chernomas & Shapiro, 2013) found approximately 40% of students had mild, moderate, severe, or extremely severe levels of stress, anxiety, or depression. The students in that study identified financial concerns, feeling overwhelmed, and the stress associated with clinical courses as being primary contributing factors to their emotional state. The stress and emotions nursing students experience in the clinical setting are also well established in the literature (Admi, 1997; Moscaritolo, 2009; Ratanasiripong, Park, Ratanasiripong, & Kathalae, 2015) and seem to arise from a fear of making mistakes, being evaluated by faculty, performing clinical skills, and feeling a lack of support from nursing staff.

Students also reported feeling significant emotions when learning nursing skills in the lab setting. Certain aspects of learning skills heightened anxiety, e.g., figuring out where supplies were (Neacsu, 2006; Roberts, 2008) and what to do when they came across differences in equipment (Redmond, 2013). In previous literature, students described high levels of anxiety when learning to touch other people as a part of learning

nursing skills (Redmond, 2013; Strand et al., 2009). In this study, participants did not describe physical touch as a contributing factor to anxiety. Instead, they described their anxiety as primarily arising from being observed by nursing faculty as well as a fear of failure. Nursing faculty should be aware of the potential for anxiety when students are learning nursing skills, especially during observation and evaluation. The faculty member's presence and behaviors might serve to heighten anxiety beyond a productive level for the student. An examination of failure policies around skills check-offs could help decrease student anxiety. Some investigators found positive results in decreasing student anxiety in the clinical setting including using peer instructors as mentors (Moscaritolo, 2009) and meditation (Ratanasiripong et al., 2015). Future studies that could help educators understand this issue better would involve measuring anxiety in the skills lab setting and determining the effect of emotion on skills learning.

On the other hand, participants also reported some other emotions associated with the skills learning process such as confidence, relief, happiness, pride, and a sense of accomplishment. These emotions were usually experienced after a skills check-off or when a skill had been performed on a patient in the clinical setting. It appeared that part of the emotional trajectory of the skills learning process was anxiety followed by confidence once the skill was performed well. One study assessed 86 nursing students' emotional sources of stress during their nursing program (Zupiria-Gorostidi et al., 2006). The authors found significant emotions experienced at the beginning of nursing school included a lack of competence, uncertainty, emotional involvement, relationships with peers, and contact with suffering. By the end of nursing school, all of those emotions had decreased except for relationships with peers and emotional involvement. It might be

helpful for nursing faculty to be aware of these emotions and be prepared to discuss these feelings with nursing students.

Participants were aware they were learning these skills to eventually do them with real patients and described measures they used to prevent infections and errors. They expressed a desire to learn to perform skills safely and to not harm patients. These findings were similar to those in Redmond's study (2013) where participants also described a desire not to harm patients or cause complications when performing nursing skills.

One interesting finding was a differentiation between safety around medication administration and other psychomotor skills. While most participants recognized there was a potential for harm with both types of skills, they generally viewed medication administration as having an increased likelihood of harm to the patient if an error was made. They stated medication safety was "drilled" into them with every medication administration experience in both the lab and clinical setting so it was always on their minds.

While participants spoke about other psychomotor skills as also carrying some risk to the patient if performed poorly, it was primarily in the context of infection. Specifically, these participants did not make two distinctions between preventing errors. First, there was no distinction among various types of medication errors; rather, all medications errors were seen as having the potential for killing a patient. In reality, there is a spectrum of severity in medication errors and not all medication errors carry the risk of severe harm to a patient. Second, there was little recognition of the potential for poorly performed psychomotor skills to cause significant harm to patients. For example,

the risk of infection from a Foley catheter insertion was not seen as severe when in fact a urinary tract infection could lead to urosepsis and death in certain patients.

Based on previous literature, the perception of risk and lack of recognition of the potential harm from procedures was not surprising. In a simulated environment, nursing students identified only some of the potential risks for patient harm yet perceived themselves as being very aware of safety issues (House, Dowell, Fox, Vickers, & Hamilton, 2016). In another study (Duhn et al., 2012), a survey of nursing students found that in terms of patient safety, students felt most confident in hand hygiene, safe medication practices, and infection control. In that study, students did not feel systematic processes about patient safety were taught in the curriculum. Therefore, it made sense the students perceived activities that could harm patients as things that were emphasized in every interaction: hand hygiene, maintenance of sterility, and safe medication administration. They might fail to see the larger context of the nurse's role in patient safety because it had not been made explicitly clear to them.

Full implementation of the QSEN competencies could help nursing students be more aware of safety practices and also understand the multiple aspects of care that contribute to safety. However, data suggested the majority of nursing schools have not embedded QSEN into the nursing curriculum (Howard, 2010) and there is an overall lack of patient safety content in most nursing curricula (Mansour, 2012; Tella et al., 2014). Much like medication administration, QSEN is designed to be taught throughout the curriculum and be embedded in every aspect of the curriculum--classroom, clinical, and lab (Ironside & Sitterding, 2009). Research demonstrated students value nursing

programs that embed safety competencies in their curricula (Weatherford & Viveiros, 2015).

In addition to embedding QSEN competencies in nursing curricula, there are other opportunities for nursing faculty to strengthen students' connections between psychomotor skills and safety. For example, Belizario (2015) described how nurses on one hospital unit significantly decreased the incidence of catheter-associated urinary tract infections by initiating a two-person insertion protocol. One nurse was responsible for inserting the catheter in a sterile fashion while the other nurse assisted with positioning and watched for any breaks in sterility; that nurse was empowered to stop the procedure if a break in sterility occurred. Given that prior studies suggested many students and practicing nurses break sterility during procedures or do procedures incorrectly (Bjork & Kirkevold, 1999; Gonzalez & Sole, 2014; Taylor, 2012), it seemed logical that having two nurses present made the procedure safer. In addition, the nurses in this study reported increased satisfaction with the process because the insertion procedure went faster and they always had help with the procedure (Belizario, 2015). Nurse educators could incorporate innovative methods that make procedures safer into lab courses, thereby helping students understand the potential danger these procedures pose to patients when they are done poorly.

In addition, CLT might help to explain why students do not readily see the nurse's role in safety. For the most part, nursing students are learning the steps in the skill and the majority of their cognitive resources are devoted to those steps. After the steps are mastered, CLT suggests cognitive resources are freed up for other activities (Sweller,

1988). These other activities could include a broader view of how nurses ensure patient safety.

Theme Two: Practice, Practice, Practice

Theme two was characterized by a desire and a need to practice nursing skills repetitively as a mechanism of learning. Practicing skills once a week in the lab setting was not enough so participants practiced in other settings such as open lab, home, and clinical sites. Skills involving sterile technique and tracheostomy care were viewed as more difficult to learn than other skills and required more practice. Participants believed nursing skills were a valuable part of the nursing role and recognized that they would use those skills in their nursing practice, which motivated them to practice and learn the skills.

In this study, participants believed nursing skills were learned most effectively with repetitive practice and it was necessary to practice several times a week. A previous study (Strand et al., 2009) of how nursing students learn skills identified this theme as well. This concept of repeated practice is consistent with what is known about motor skills learning in general. The law of practice states that all other things being equal, more learning will occur with more practice sessions (Schmidt & Lee, 2011). In addition, skill performance tends to improve dramatically at first and then in incrementally smaller amounts. Motor skills learning also seems to be more effective when the learning is spread out over days, weeks, or months rather than in very short, intense practice sessions (Schmidt & Lee, 2011).

It was interesting to note that the participants in this study identified skills learning was most effective when practiced not only many times but also in short sessions

versus a single long session. They also noted that feedback from faculty members and peers helped them learn skills. This combination of ideas was consistent with the concept of *deliberate practice* described by Ericsson in the early 1990s and has been applied to many disciplines including nursing (Oermann, Molloy, & Vaughn, 2015). The premise of deliberate practice is a skill learned most effectively when it is practiced repetitively in short sessions with consistent feedback (Clapper & Kardong-Edgren, 2012; Oermann et al., 2015). For these participants, the skills lab was scheduled as a six-hour course one day a week; they stated it was difficult to learn and practice the same skill for that length of time in a single day. Skills learning could be more effective if the course was divided into two or three shorter days.

The participants did identify barriers to practicing outside of the scheduled lab time. Many participants did not use open lab hours due to scheduling problems, a lack of faculty presence in open lab, and a lack of practice supplies, which was a finding noted by others authors as well (Cason et al., 2015). While each participant practiced her skills at home, supplies and equipment were often lacking and it was sometimes difficult to make the home setting realistic. This finding suggested practice time was most effective for nursing students when faculty attended the open lab sessions to provide feedback to students and facilitated equipment being present. In addition, faculty could give students specific suggestions about how to improve fidelity in the home setting such as simulating a sterile field or central line during a dressing change.

In this study, the participants also noted tracheostomy care and any skill involving sterile technique were the most difficult skills to learn. They believed tracheostomy care was a complex yet delicate skill and that skills requiring sterility carried a high potential

for unknowingly contaminating the sterile field. This differentiation of skill difficulty fits with CLT--some learning has a higher intrinsic cognitive load or difficulty of the material to learn. A review of prior studies about skills learning and of nursing education textbooks contained no discussion about how students perceived the difficulty of various nursing skills. This finding reflects new information nursing faculty could use to inform students about the potential difficulty of certain skills. If students knew certain skills were likely to be more difficult, they could then plan extra practice time to help learn the skill and faculty members could plan extra practice time in the course schedule.

Participants in this study believed all nursing skills were valued since they would be using them as a part of their nursing role to help patients. Because they believed there was value to learning these skills, they were motivated to learn them well. This finding was consistent with the literature about motor skills learning that identified motivation as one of the most important factors in effective skills learning (Schmidt & Lee, 2011).

Finally, as participants mastered various psychomotor skills, they saw those skills as less important and shifted their focus to other nursing skills such as communication and patient education. This finding was also consistent with CLT, which states cognitive resources are limited (Sweller, 1988). Once the student no longer needs to focus on the steps of the skill itself, attention can be devoted to other things instead. This is not a new concept for nursing educators who have taught basic skills or clinical courses; deYoung (2009) termed it *tunnel vision*. Tunnel vision implies the student can only focus on carrying out the steps in the procedure and cannot effectively interact with the patient. When tunnel vision occurs, faculty members might need to be the person who talks to the patient while the student focuses on the steps of the procedure. As the student matures

and becomes more confident in the procedure, he or she could then turn some attention to communicating with the patient.

Theme Three: Learning through Technology

Theme three focused on the participants' preference to use various forms of technology as a primary method to learn nursing skills. All of the participants in this study described various ways they used technology in the skills lab, home setting, and clinical setting.

One of the most interesting forms of technology was how the participants in this cohort of nursing students began recording their skills lab faculty member demonstrating skills during lab instruction. Initially they did this because it was difficult to see the details of the steps in the large group demonstration. However, they later discovered the videos were useful to their learning process and described using them while practicing skills their individual stations, studying skills at home, and prior to performing a skill in the clinical setting.

Discussion of nursing students creating their own videos of nursing faculty demonstrating skills could not be found in the literature. However, some authors described making videos of faculty demonstrating skills and posting them to YouTube® or the course's Learning Management System for students to access (Hansen, 2011; McAlister, 2014; Phillippi & Wyatt, 2011). Research regarding the effectiveness of this technique appeared to be quite limited. A pilot study of nursing students who were given access to instructor-made as well as professionally made skills videos found no increase in competence or confidence when compared to students who did not have video resources (Hansen, 2011). However, the author noted both groups scored well on the

skills performance and the sample size was small, thereby making a difference difficult to detect. McAlister (2014) surveyed occupational therapy students who had access to instructor-made videos of manual skills and found students viewed the videos from the Learning Management System and reported increased confidence in performing the manual skills. One advantage to the videos was students were able to play them multiple times and stop them at any point to process the information. This aspect of learning is consistent with CLT in that students are able to limit the amount of incoming information and allow themselves time to create schema to organize the information in memory. The lack of robust research on whether these videos improved skills learning or transfer of skills to the clinical setting is an area for further research.

In this dissertation study, the participants noted several advantages to having a video of their own faculty member demonstrating the skill rather than using professionally made videos or videos from YouTube®. When they saw their own faculty member demonstrate the skill on a video, they knew exactly what the expected procedure was from the person who would be evaluating their skills performance. The participants frequently stated they needed to learn one consistent way to perform a skill and variation in steps or equipment easily confused them. The participants also generally believed their faculty member would teach them evidence-based practice and safe methods to perform the skill.

Some participants said it was difficult to find useful videos of nursing skills on YouTube®, stating the equipment was different, the steps were different, or the level of explanation was too advanced. These factors caused confusion and made a skill more difficult to learn. Several studies supported these participants' experiences. Carr,

Alexandrou, Jackson, and Spencer (2013) examined 50 YouTube® videos relating to insertion of central venous catheters and peripherally inserted central catheters. These authors found the majority of the videos did not demonstrate current evidence-based guidelines and could ultimately lead to harm for the patient. Another study of 56 YouTube® videos about cardiac and respiratory assessment found only 16 of the videos provided educationally useful information (Azer, Algrain, Alkhelaif, & Aleshaiwi, 2013). Finally, a study of 100 YouTube® videos consisting of 10 common nursing skills found only one video scored as "good" on a scale of good, satisfactory, poor, or unsatisfactory (Duncan, Yarwood-Ross, & Haigh, 2013). In that study, 31 of the videos demonstrated poor infection control techniques, which could also cause harm to patients if the student failed to learn proper infection control techniques as a part of the skill performance. This sampling of literature supported these participants' belief that the videos they recorded of their faculty member demonstrating a skill was a higher educational quality than many of the videos they might find on YouTube®. This is useful information for nursing faculty who refer students to YouTube® when learning nursing skills. Faculty members could screen videos to identify the most educationally useful videos available, thereby directing students away from videos depicting unsafe practices.

Another practice in the lab involved some participants recording other students performing a skill. They later reviewed the videos as a part of learning the steps of the procedure and to detect errors in performance. Among the participants in this study, some stated they recorded fellow students in the lab while others stated they did not. Some participants said while faculty members were comfortable with the students recording the instructor demonstrating a skill, they were not comfortable with students

recording fellow students. Recording is a common practice in some settings but students must consent to be recorded (Johnson-Russell & Bailey, 2010); that could be accomplished with a blanket consent at the beginning of a course. In a study of nursing students' experiences with being recorded during a simulation, students reported some initial anxiety with knowing they were being recorded (Nystrom, Palsson, Hofsten, & Haggstrom, 2014). However, the students saw a benefit to being able to review their own performance and believed the practice increased their self-knowledge. Nursing programs should consider their own policies about students recording other students in the skills lab setting and make sure appropriate consents are obtained.

The presence of these videos on the participants' smartphones gave them access to their skills lab faculty member outside the skills lab. In essence, the faculty member's presence was extended beyond the traditional skills lab. In addition to using the videos to review and practice skills at home, participants also reviewed the videos as needed in clinical prior to performing a procedure on a real patient. Phillippi and Wyatt (2011) stated anecdotally that this is a common practice among some nursing schools. Participants also reported using their smartphones in the clinical setting to access skills checklists and perform searches for information on the Internet prior to performing a skill. Given this educationally useful practice, nursing schools should consider having a policy that students acknowledge about using smartphones in the clinical setting. This policy should discuss the importance of confidentiality, not taking pictures with the phone, and acceptable use of the Internet. There is also little evidence that smartphones are a source of bacterial contamination in the clinical setting. A recent study of clinical staff found that while only about one-third of participants cleaned their phones regularly,

no pathogenic or drug resistant strains of bacteria were isolated from swabs of the phones (Mark et al., 2014).

Another interesting use of technology some participants described in this study involved the use of webcams and video recording during home practice sessions. While practicing for skills check-offs, some participants recorded themselves performing the skill and then went back to review and evaluate their performance. They would then be able to detect steps they had omitted or note breaches in sterility. They also stated if they had not reviewed their performance on the video, they likely would not have known they had made these mistakes. The literature supported the value of self-evaluation during skills learning. For example, a study of nursing students found those who reviewed their own recorded skills performance had increased competence and motivation to learn when compared to the group that received only a checklist as an evaluation tool (Yoo, Yoo, & Lee, 2010). Nursing faculty might suggest this method to students when they practice skills at home.

Finally, the participants in this study clearly stated they preferred to learn nursing skills from videos, demonstrations, and practice; they saw little benefit of having a textbook of nursing skills. Most admitted to rarely using it with the exception of some of the skills checklists. It is well established in general education literature that many college students read very little of the assigned reading for a course (Ryan, 2006). A study of psychology students found the students read only 27% of the assigned reading before coming to class (Clump, Bauer, & Bradley, 2004). Contributing factors to this issue included assigning unrealistic amounts of reading, textbooks that were difficult to

read, and a belief that reading the textbook did not help the student achieve a better course grade (Ryan, 2006).

The participants in this study noted the skills textbook did very little to help them learn to perform the actual skill. They described the difficulty in reading the steps and trying to figure out how to get from one step to the next. McAlister (2014) noted most people learn motor skills by watching another person perform the activity and then imitating it; that mode of learning is in direct contrast to reading a list of steps from a textbook. Nursing faculty should be aware of this finding since nursing skills textbooks typically cover other aspects of nursing skills beyond the actual steps to perform the skill. For example, information about contraindications to performing a skill or what to do if a problem is encountered while performing the skill are important for students to know in order to perform a skill safely.

Theme Four: "Just Pretend" Does Not Produce Confidence

This theme emphasized the importance of creating a realistic environment when learning nursing skills. Participants in this study believed learning skills was more effective when the skills were practiced in a realistic setting.

Participants shared stories of experiences where they had to "just pretend" a step in a procedure had been completed, as well as times when they could not use equipment in a realistic way. These practices made it harder for them to learn the skill. This was not a surprising finding since the literature supported the idea that motor skills learning occurs in a sequence of steps (McAlister, 2014). If the series of steps is disrupted or altered, then the procedure becomes less clear. This idea is analogous to a movie that has scenes missing; the result is a confused and muddled story.

Participants shared many stories of "just pretending" in this study. For example, participants were told to pretend that the nasogastric tube they were inserting into the manikin actually passed all the way into the stomach when in actuality the tube could not be advanced beyond the nares. In addition, since it was not feasible to open new supplies every time they practiced a skill, participants rarely practiced opening packages in a sterile fashion. They were also told to pretend they had opened the chlorhexidine ampules to disinfect the skin prior to IV insertion when in actuality they did not open the ampules since the chlorhexidine damages the manikin's plastic skin. One participant described how when she went to insert an IV in the actual clinical setting, she did not know how to open the chlorhexidine since she had never used it in the lab setting. This example illustrates when students are told to pretend things have happened or to leave out steps altogether, they have difficulty translating the full procedure into the clinical setting.

In addition, these examples represented critical steps in the procedures. The limitations of manikins and having to reuse supplies clearly impacted the learning process. This would be analogous to trying to teach someone to drive a car by saying, "Just pretend that you can turn the steering wheel--on a real car, it will actually turn." We would not be surprised if that person had trouble driving a car nor would we feel safe in letting them drive if that was how they were taught. When students have to leave out critical steps when learning procedures but are expected to fill in those gaps with real patients, we should question whether they could perform the skill safely.

The literature had mixed data about how fidelity influences learning outcomes as most studies examined the question in terms of fidelity in the simulation setting. Some

studies found high-fidelity simulation (HFS) led to better learning outcomes when compared to low-fidelity simulation (LFS; Brady, Bogossian, & Gibbons, 2015; Grady et al., 2008; Weaver, 2011). These studies were consistent with the findings in this study as the participants believed increased fidelity as well as HFS improved their skills learning.

However, other studies suggested HFS did not always improve learning outcomes. A study by Chen, Grierson, and Norman (2015) found nursing students learned to identify breath sounds better in a LFS setting than in a HFS setting. The authors theorized that in a HFS setting, students have many extraneous stimuli, which might inhibit learning. In a LFS setting, the instructional goals are more targeted and extraneous cognitive load is minimized. This effect would be similar to taking a nursing student into an intensive care unit and asking him or her to focus on only one aspect of the patient. In reality, the student would likely be distracted or even overwhelmed by everything happening in the room and with the patient. Therefore, nursing faculty need to choose the appropriate level of fidelity for the learning outcomes of the skill.

In this study, participants believed their skills learning was incomplete until they had performed the skill on a real patient. Redmond (2013) identified a similar theme in her study of skills learning and termed it *cementing*. In the clinical setting, all the aspects of a skill come together: the patient's unique anatomy, the patient's response to the procedure, and communication about the procedure. One way to bring some of these aspects into the skills lab setting is to use standardized patients--actors who play the role of patient. A study of nursing students learning to measure blood pressure found the group using standardized patients performed the skill better than the group who learned on a task trainer (Sarmasoglu, Dinc, & Elcin, 2015).

Most participants in this study had performed the majority of skills learned in the lab setting on real patients. Some skills such as central line care were not performed since there were no opportunities to do so; all central line dressings were routinely changed in that hospital on a day when the participants were not present. In that case, nursing faculty could create more intentional practice sessions using standardized patients to help students retain and begin to cement these skills. In addition, participants in this study performed a significant number of skills in the community setting. Nursing faculty could explore sites outside of the traditional hospital setting to augment skills learning.

Finally, participants in this study believed once they completed skills on a real patient, their confidence in the skill increased. They specifically did not gain confidence from performing skills in the lab setting alone. This finding spoke to the need to identify opportunities for students to practice skills with real patients.

Theme Five: Teaching Matters

Theme five centered on the importance of good teaching. It was not surprising senior-level nursing students recognized that good teachers enhanced learning and inconsistencies in teaching inhibited learning. Specifically, participants valued faculty members who provided succinct didactic information about the skill, a well-organized demonstration of the skill, and prompt feedback about students' performance of the skill. These practices are all recommended teaching methods found in nursing education textbooks (deYoung, 2009). Previous qualitative studies identified providing positive support and constructive feedback were important qualities for faculty members to have when teaching nursing skills (Neacsu, 2006; Redmond, 2013; Strand et al., 2009).

In addition to repetitive practice spread over short sessions, quality feedback is an important part of deliberate practice (Oermann et al., 2015). The basic premise of the role of feedback is that a person can practice a skill many times but without feedback about what they can improve, his/her actual performance will likely improve very little. In this study, participants valued prompt and honest feedback from their faculty members. This finding spoke to the importance of faculty members being active participants in the lab setting and giving feedback as often as possible during skills practice sessions.

In the skills lab, participants encountered multiple faculty members who both taught and evaluated students' skills performances. Inconsistencies in teaching and evaluation were particularly frustrating for the participants, which was an issue in the lab setting other authors had also noted (Clapper & Kardong-Edgren, 2012). As described previously, the participants desired one consistent method for performing a skill and multiple methods only confused them. While it was recognized each faculty member brought his or her own personal experiences and training to the lab, students seemed to benefit most when faculty members all used the same series of steps in a skill (Cason et al., 2015). Some participants suggested that faculty who teach in the skills lab create and post a video showing how to perform the skill. Both students and faculty could then use the video for learning and evaluation purposes.

Another other aspect of skills teaching participants noted was the clinical currency of the faculty who taught in the skills lab. Among this particular faculty, some were still currently practicing while others had been out of practice for as many as 20 years. The participants described clear differences between these two groups; they noted

those faculty members still in practice were able to teach current evidence-based practice the participants saw in the hospitals. Faculty who had not been in clinical practice were more likely to teach outdated methods or discuss aspects of skills no longer considered evidence-based, e.g., routine heparin–locks in peripheral IV catheters. Similar examples of faculty members teaching outdated information have been described by other authors as well; students expressed feelings of frustration with the mismatch of information in skills lab and clinical (Corlett, 2000).

It is worth noting that limited evidence suggested nursing students and nursing clinical faculty have differing opinions about faculty members' clinical competence. A recent study found clinical faculty rated themselves as more clinically competent than their students perceived them to be (Lovric, Prlic, Zed, Puseljic, & Zvanut, 2015). It was not clear whether the students in that study did not understand or recognize their instructors' clinical competence or whether the faculty members over-rated their own clinical competence.

This issue of maintaining nursing faculty members' clinical skills and knowledge is complex and may be part of the broader issue of the theory-practice gap. This concept, which has been present in the nursing literature for several decades now, is a discrepancy between theoretical aspects of nursing--which are typically taught by nursing faculty members--and practical aspects of nursing seen in the clinical setting (Corlett, 2000; Dadgaran, Parvizy, & Peyrovi, 2012). Historically, when little nursing research was done in the clinical setting, new knowledge tended to flow from the academic setting into the clinical setting. For example, in an article published 10 years ago, Billings and Kowalski (2006) highlighted many examples of nursing practices that were demonstrated to be

effective by academic nursing researchers but took many years to be adopted into clinical practice. However, within the last decade, hospitals have employed more nursing researchers and have involved bedside nurses in the research process (Correa-de-Araujo, 2016). This movement has largely been in response to calls for improved safety and accountability as well as the Magnet® Recognition Program developed by the American Nurses Credentialing Center (Correa-de-Araujo, 2016). To achieve Magnet® designation, hospitals must develop and disseminate evidence-based practice and are, at times, choosing to collaborate with other hospitals for research initiatives (Centrella-Nigro et al., 2015). This is a very different model for generating new nursing knowledge.

Many hospitals also have blurred the lines between traditional research and quality improvement programs, which often focus on specific initiatives to improve patient safety or outcomes. As a result, more hospital-based, quality improvement teams are publishing their findings aimed at improving the safety and consistency of nursing care. An informal reading by this author of two widely circulated nursing practice journals, *American Journal of Nursing* and *MedSurg Nursing*, found several of these types of articles published within the last three months (for example, see Godlock, Christiansen, & Fielder, 2016; Hoke & Guarracino, 2016). As more hospitals continue to advance their own practices based on research and quality improvement projects, it becomes clear why nursing faculty members--who often have limited presence in the hospital setting--struggle to maintain currency. New information about best practices no longer seems to always flow from the academic setting into the practice setting but instead might also originate in the practice setting and not be communicated to nursing faculty members. Indeed, a qualitative study of nursing students (Dadgaran et al., 2012)

found students perceived the nursing staff to possess more current clinical knowledge than did their nursing faculty.

In light of the nursing faculty shortage, many nursing programs have teaching positions going unfilled as well as a wave of faculty approaching retirement (American Association of Colleges of Nursing, 2016). In this particular program, such shortages are filled with adjunct faculty, many of whom are retired nurse educators. There might be a belief that any nurse educator can teach a nursing skills course since the content is foundational. However, with rapidly changing nursing practice and national initiatives such as QSEN to improve patient safety, that belief might no longer be true. Nursing programs should examine this issue and ensure that all faculty members who teach skills courses either have current clinical practice or are up-to-date on changes that have occurred in basic skills performance. Regular meetings with hospital nursing staff educators or quality improvement staff could help nurse educators obtain information about updated practice changes in the clinical setting.

Theme Six: Importance of Peers

Theme six described how peers collaborated to learn skills as well as the overall benefit of group cohesiveness and support when learning skills. Given that nursing students spend many hours per week with each other in relatively small groups, it was not surprising peer support emerged as a theme in this study. Peer support also emerged as a theme in other qualitative studies about learning nursing skills (Redmond, 2013; Roberts, 2008; Strand et al., 2009). In addition, other studies have found working with peers could improve skill performance (Cason et al., 2015).

In terms of skills learning, one interesting aspect of the participants' descriptions about peers involved the benefits they saw to observing each other perform skills. Being the observer allowed that person to spot errors, give suggestions to improve technique, and see how others did the skill. Neuroimaging studies supported the idea that observation improves learning as common neural structures are triggered during action production and observation (Wulf et al., 2010). Nurse educators could recommend that students work in pairs when practicing skills in all settings rather than just the lab setting.

Recommendations for Nursing Faculty Members

The findings of this study provided nurse educators with a current description of how undergraduate nursing students in the United States learn nursing skills. Based upon these findings, a number of recommendations arose from the study:

1. Implement QSEN competencies throughout the curriculum including skills lab courses and help students understand the potential danger these procedures pose to patients when they are done poorly. For example, to better understand the connection between urosepsis and Foley catheter insertion, faculty could plan to cover content in the classroom about urosepsis at the same time as students learn to insert Foley catheters. Case studies or a simulation about a patient who got urosepsis from poor technique during catheter insertion could reinforce the importance of the skill students were learning in the skills lab at the same time.
2. Schedule skills lab courses or practice sessions in short blocks of time over several days rather than a long block on a single day. Cognitive load theory and research about deliberate practice support the idea that learning is most

effective when it is done in short blocks of time versus long blocks of time. As the practice session gets longer, cognitive resources become taxed and less learning occurs. In addition, repetition of a skill several times a week produces better learning outcomes than when practice occurs once a week. If students are able to practice in the skills lab, they also have the benefit of access to nursing faculty members for feedback as well as access to practice equipment and supplies. Therefore, break up long skills lab days into shorter days.

3. Provide students with suggestions to increase fidelity of skills practice in the home setting. While not all students will use supplies to practice in the home setting, this study suggested many would. Recommend that students set up conditions as close to the clinical setting as possible. For example, if practicing central line dressing changes, they could use a nightstand as a bedside table; a stuffed animal or roommate as the patient; straws or rubber bands could represent the central line; and plastic film could represent the dressing. Even though packages are open, students can still simulate sterile procedures. For example, they can draw a one-inch border around the drape to provide a visual cue that anything that goes past the border is no longer sterile. They can practice dropping items onto the sterile field or pouring liquids onto a cup in the sterile field. Students described nursing skills involving sterile technique as being difficult since there were many chances to contaminate the sterile field. More realistic and repetitive practice in the home setting might help them become proficient at sterile technique.

4. Since students stated recording videos of faculty members and fellow students demonstrating a skill was helpful, have a discussion among the nursing faculty members about whether or not this practice would be acceptable to them. While there might be advantages to student learning in terms of minimizing inconsistencies during learning and evaluation as well as having a video available whenever it is needed, some faculty members might not be comfortable being recorded or with other students being recorded. Since inconsistencies among faculty policies are particularly frustrating for students, the nursing faculty should seek consensus about whether students might record the faculty or other students performing skills demonstrations. As an alternative, faculty members could record and produce a video themselves and make it available to students. That approach would give faculty members more control over the process as well as the opportunity to edit the video to improve its quality.
5. Tell students some skills, such as tracheostomy care and skills involving sterile technique, are harder to learn and might require more practice time. Given the complexity of these skills as well as the high likelihood of contamination, students might find significantly more practice time is needed to become proficient at these skills. Faculty members could schedule extra time in the skills course to allow for increased practice time as well as advise students to plan for practice time at home or in an open lab setting. This approach might help students be more successful in learning

these skills and decrease the time nursing faculty members spend remediating students who are unable to pass the skills evaluation.

6. Suggest students record themselves practicing skills in the home setting and watch the recording using a rubric to identify errors. In the home setting, students often do not have a second qualified person who can observe them perform the procedure and evaluate their performance. Therefore, the student might think he or she performed the procedure well but in reality might have made many errors. Nursing faculty members could develop evaluation rubrics of nursing skills students could practice at home. Students could then record themselves performing the skill using a webcam or smartphone and then use the rubric to evaluate their own performance. Students could then potentially identify errors, e.g., steps they left out of the procedure or breaks in sterile technique. This practice could ultimately improve their skill performance and make home practice sessions a more active, reflective process that encompassed many aspects of learning: motor skills practice, repetition, evaluation, and analysis.
7. Evaluate all resources used in the skills learning process for effectiveness and utility. For example, consider the role of the skills lab textbook in the skills learning course since participants in this study reported they rarely read or used it as a part of skills learning. In addition, students in this study often found the ATI® skills videos to be less than ideal because of the length of the video. All of the resources nursing faculty members require or recommend cost money to the student or the program so faculty members

have an obligation to be good stewards of these financial resources. If the resources are not effective or not being consistently used, consider other alternatives that might meet the needs of the students.

8. Minimize the number of times students are asked to "just pretend" a part of the skill has happened. Rather, try to include every step and aspect of the skill possible during practice sessions. The goal of this approach is to help students string together a complete "movie" of the procedure in their minds. Sometimes there are simple ways to achieve this goal. For example, participants in this study reported their instructors would not allow them to use chlorhexidine ampules as a part of IV catheter insertion due to potential damage to the manikin's skin. One participant reported that as a result, she did not know how to open the chlorhexidine ampule once she got to the clinical setting and needed to place an IV. Instead of having the student omit that part of the procedure all together in the skills lab, nursing faculty members could place an old piece of manikin skin that is no longer used next to the IV arm the student is using for the procedure. Then when it is time to cleanse the site, the student could use the chlorhexidine on the old manikin skin. That would allow for a more complete "movie" of the procedure to be formed in the student's mind and costs nothing to implement. With creativity and brainstorming, many of the steps we ask students to omit could be practiced more realistically.
9. When multiple faculty members teach a skills lab course, work together to determine one method to teach a skill to minimize inconsistencies in

teaching and evaluation. To achieve this goal, faculty members would need to collaborate and choose a consistent way to perform a skill. Rubrics could be developed that are used for teaching as well as evaluation. Ideally, these rubrics would reflect current practices and equipment students will also see in their clinical sites.

10. Recognize that nursing skills knowledge changes over time; have faculty members who teach skills labs be familiar with current policies and procedures used in the clinical setting. Partner with staff educators and quality improvement staff in the clinical sites to become familiar with current practices and protocols relating to nursing skills. Nursing programs will likely continue to need to hire faculty members who no longer practice clinically. In addition to the above suggestions, these faculty members could shadow the program's clinical faculty one or two days a semester so they could see current practices in patient care. This strategy might help skills lab faculty members be more aware of what the students are seeing in their clinical sites.

Limitations of the Study

All studies have limitations and it is important to acknowledge the potential limitations of this study. First, the researcher had predicted CLT would be useful during the data analysis phase of the study. In actuality, CLT had some utility in informing the researcher about how the participants in this study learned nursing skills but not as much as was hoped.

Another limitation to this study was the personal connection between the researcher and the participants. The researcher had taught these participants in a prior course and that might have influenced which participants chose to volunteer. Those who opted not to volunteer might have had different experiences with learning nursing skills that were not captured by this study.

Although confidentiality was assured, the researcher was still a faculty member at the school and the participants were still students at the school. They might have felt they could not be completely truthful when discussing aspects of their experiences that portrayed other faculty members unfavorably.

In addition, many of the participants in this study had prior experience with learning and performing nursing skills in settings other than nursing school. It was not possible to completely separate those experiences from their experiences in nursing school, which could have influenced the findings of the study. Participants who were already proficient at certain nursing skills likely had different experiences with learning these skills in nursing school versus those participants who had not already learned the skills.

Suggestions for Future Research

This study raises several questions that could be explored in further research about effective skills learning. While the participants in this study were ethnically diverse, all the participants were women. We still know little about the process that male nursing students go through when learning nursing skills. There could be aspects of skills learning that are different for men.

One overarching theme in this study was just how emotional the skills learning process was for students. While some emotions like excitement and confidence were identified by these participants, most of the emotions they described included fear, anxiety, and inadequacy. These kinds of emotions made skills learning more difficult. It would be useful to measure the anxiety students experience in the skills lab and further explore how emotion affects skills learning.

In this study, participants also described using technology extensively to learn nursing skills. In particular, their initiative in recording videos of their faculty members demonstrating skills seemed to be a very effective method for how these participants learned skills. Recordings the participants made of themselves performing skills in the home setting also appeared to be a useful learning strategy. However, there is currently little research about the effectiveness of these types of videos in the literature. Studies to determine whether these videos improve skills learning or transfer of skills to the clinical setting is an area for further research.

Finally, there is an overall lack of research on how nurse educators can effectively teach nursing skills. In most nursing education texts, the topic of teaching nursing skills is given scant, if any, coverage. A holistic examination of all the elements of skills teaching, including emerging concepts such as deliberate practice and the role of simulation, would help guide our teaching.

Unique Contributions of This Study

This study provided some unique information about how undergraduate nursing students learn nursing skills. First, the findings from this study updated and validated prior qualitative studies done 3 to 10 years ago about how nursing students learn skills.

Many of the themes identified in this study--emotional aspects of learning skills, the need for repetitive practice, the importance of peers, and the role of good teaching--were also found in prior qualitative studies done in other countries. This finding told us that despite which country and educational system they are from, there are some universal experiences nursing students have when learning nursing skills.

This study appeared to be the first qualitative study of how undergraduate nursing students learn skills in the United States in today's ever-increasing digital world. One of the unique findings in this study was the participants described how some skills, such as tracheostomy care and skills involving sterile technique, were harder to learn than others. Faculty members could use this information to inform students that these skills will require more practice time. In addition, faculty members could structure their courses to allow for additional time to achieve proficiency with these skills.

The importance of fidelity in relation to learning nursing skills was also a key finding in this study. Asking students to "just pretend" they have done part of a skill in the lab or simulation setting interfered with learning and drove a desire to perform skills in the clinical setting. As nursing programs use simulation in the lab setting more often, it will be necessary to determine how best to balance simulation, skills lab, and clinical learning experiences.

The other unique finding in this study was how the broad use of technology across many settings contributed to how these participants learned skills. If faculty members are in agreement, they could recommend that students use their smartphones to record videos of the faculty member performing a demonstration or of the student practicing a skill at home. These participants described many benefits to using technology to learn nursing

skills and generally found textbooks and videos on YouTube ® and ATI® to be minimally useful when learning skills.

Conclusion

This phenomenological study sought to understand how undergraduate nursing students learned to perform psychomotor skills within the full context of nursing skills. The literature implied peers were an important part of skills learning, faculty members could help or hinder the skills learning process, skills were not truly learned until they were done with real patients, and anxiety and uncertainty were present when learning skills.

Nine participants described their experiences with how they learned nursing skills and the findings produced six themes: (a) the umbrella of emotion; (b) practice, practice, practice; (c) learning through technology; (d) "just pretend" does not produce confidence; (e) teaching matters; and (f) importance of peers. Therefore, the process of learning nursing skills can be described as follows: In a rough sea of emotion, necessity is the mother of invention. These participants felt learning nursing skills was a process punctuated by significant emotions such as fear, anxiety, and intimidation as well as feelings of excitement and confidence. They felt a need, a desire, and a duty to learn these skills to become effective nurses. They used creative methods to accomplish that goal and overcome barriers to learning.

These findings provided current information to nurse educators about the skills learning process as well as recommendations for effective skills teaching. The findings from this study suggest to nurse educators that while there are universal aspects to learning nursing skills, we cannot assume skills learning is a static process. These

participants described a learning process that emphasized technology and fidelity in addition to elements of practice, peer support, and good teaching. Currently, there is little evidence available for nurse educators to use when determining effective methods for teaching nursing skills. As we move into the future and consider how to best teach nursing skills in light of concerns about patient safety and the role of simulation, we will need more evidence to guide our teaching. This study suggested areas we can examine more critically and provided some evidence of what undergraduate nursing students found to be helpful teaching methods when learning nursing skills.

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APPENDIX A

LETTER OF SUPPORT FROM CONCORDIA UNIVERSITY

CONCORDIA UNIVERSITY TEXAS

August 10, 2015

Faye Hummel, PhD, RN

Research Advisor, University of Northern Colorado

Dear Dr. Hummel,

As you know, Michael Aldridge is a full-time faculty member here at Concordia University. The purpose of this letter is to express our support for his doctoral research study and to document that he will have access to nursing students enrolled in our nursing program as potential participants for his study. Specifically, Mr. Aldridge plans to do qualitative interviews with senior-level nursing students and field observations with junior-level nursing students in the skills or simulation lab.

We also understand that the University of Northern Colorado's IRB will review his study, as well as the Concordia University IRB.

If I can be of further assistance, please contact me.

Sincerely,

Kathy Lauchner

Kathy Lauchner, PhD, RN

Director of School of Nursing and Assistant Dean, College of Science

Kathy.lauchner@concordia.edu

APPENDIX B

PARTICIPANT DEMOGRAPHIC FORM

Demographic Form

Participant ID Number:_____(to be completed by researcher)

Age:_____

Gender:_____

Ethnicity:_____

Other than being a nursing student, do you have any other experience providing care to others? (such as working as a medical assistant, home health aide, volunteering on a patient care unit, caring for an ill loved one)

Yes:_____ No:_____

If you checked "yes," please answer the following two questions:

How long did this experience last?

Describe any nursing skills that you learned during that experience:

APPENDIX C

INFORMED CONSENT TO PARTICIPATE IN HUMAN RESEARCH

UNIVERSITY of NORTHERN COLORADO

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

Project title: A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students

Researcher: Michael D. Aldridge, MSN, RN, CNE School of Nursing
Phone: 512-496-6142 email: maldridgern@yahoo.com

Research Advisor: Faye Hummel, RN, PhD, CTN-A School of Nursing
Phone: 970-351-1697 email: faye.hummel@unco.edu

Purpose and Description: You are invited to participate in a research study. The primary purpose of this study is to explore how you think you learn nursing skills as a nursing student. I am hoping to better understand the process that nursing students go through when they are learning nursing skills in order to eventually see if there are other ways nursing faculty can teach students to learn nursing skills.

If you agree to participate, you will be asked to participate in an interview that will last approximately 60 minutes. The interview will be recorded for transcription and analysis. Some basic demographic data will be collected first, such as your age, gender, and other experiences with learning nursing skills. During the interview you will be asked some fairly open-ended questions, such as, "Tell me about a typical day when you were learning skills?" and "What kinds of feelings did you have when you were learning nursing skills?" We may also explore situations where you believe skills were harder or easier for you to learn. I do not anticipate that any of the questions asked are of a sensitive nature. I may contact you after the initial interview to clarify my interpretations or ask additional questions.

What will happen to the data? I will take every precaution to keep your data confidential. You will be assigned a number in place of your name, so that only the researcher knows your identity. Your name, school you attend, and area you live will not be disclosed in written reports of this study. Data collected in this study will be stored in a locked file cabinet (written data) or on a password-protected computer (electronic data) that only the researcher has access to. After three years, the voice recordings of the interview will be erased and the consent forms will be destroyed.

What are the risks and benefits to participating in the study?

All studies carry some minimal risk and discomfort to the participants, although the researcher believes that risks in this study are no greater than those normally encountered. For some participants, the questions posed in the interview may bring some emotion or

stress if they have had negative experiences when learning nursing skills. If you experience emotional reactions during this study please contact Annie Ferrera in the Concordia Counseling Services office [512-313-5032] for access to on-campus counseling resources.

There are some benefits to participating in the study. Upon completion of the study, you will be given a $10 gift card and a nursing pen as a token of my thanks for participating in the project and in recognition of your time. At the end of the project, I am happy to share the results with you at your request.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Sponsored Programs, Kepner Hall, University of Northern Colorado, Greeley, CO, 80639. 970-351-2161.

You may also direct any questions or concerns about your participation or experiences in this study to Dr. Nickles Chittester, Chair of the Concordia University Texas Institutional Review Board [512-313-5403, or nickles.chittester@concordia.edu].

_____

Participant's signature Date

_____

Researcher's signature Date

APPENDIX D

INTERVIEW GUIDE

Interview Guide

Broad questions are listed early in this guide. More specific questions may be used to probe for additional information.

1. "Grand tour question:" - I want you to think back to a day when you were learning nursing skills. Walk me through that day…

2. When I say "nursing skills," what kinds of things come to mind?

3. How did you learn nursing skills?

4. I'd like you to think about one nursing skill you learned and tell me how you learned that skill. What helped you learn the skill? What didn't help you learn the skill?

5. What kinds of feelings did you have when you were learning nursing skills?

6. What is your attitude about the importance of nursing skills?

7. Tell me about some of the skills that were harder for you to learn. What made them harder?

8. What advice would you give a new nursing student about learning nursing skills?

Summarize: "What I'm hearing you say is…"

Final Question: Is there anything we haven't talked about that you would like to add?

Prompts:
-What does that mean?

-Say more about that…

-Then what happened?

-Walk me through that experience.

-What did you do then?

-Would you explain that?

-I noticed that you…(comment on body language [frowned, sighed, smiled, laughed]) when you said that…tell me more about that.

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL LETTERS

CONCORDIA UNIVERSITY TEXAS

22 October 2015

Dear Mr. Aldridge,

In conjunction with the Concordia University Texas Institutional Review Board and the Vice Provost for Student and Enrollment Services, I have reviewed your request to recruit participants from among students at Concordia University Texas to support your research entitled, "A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students." Based upon this review, your request to recruit from our student body has been approved. This approval will expire on **October 22nd, 2016;** if you wish to continue to recruit participants after that date, please contact me so your request may be reviewed.

I wish you the best in your research!

Sincerely,

Dr. Erik Ankerberg
Acting IRB Administrator
Provost
Concordia University Texas
11400 Concordia University Dr.
Austin, TX 78726
Phone: (512) 313-5001
Erik.Ankerberg@Concordia.edu

UNIVERSITY of NORTHERN COLORADO

Institutional Review Board

DATE:	October 8, 2015
TO:	Michael Aldridge, MSN, RN
FROM:	University of Northern Colorado (UNCO) IRB
PROJECT TITLE:	[807104-2] A Qualitative Study of the Process of Learning Nursing Skills Among Undergraduate Nursing Students
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE:	October 7, 2015

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.