Spring 5-2016

An Examination of Undergraduate Sophomore-Level Nursing Students' Personal Reflection Ability Following High-Fidelity Simulation and Video-Assisted Debriefing

Taylor Fawn Edwards

AN EXAMINATION OF UNDERGRADUATE SOPHOMORE-LEVEL NURSING STUDENTS' PERSONAL REFLECTION ABILITY FOLLOWING HIGH-FIDELITY SIMULATION AND VIDEO-ASSISTED DEBRIEFING

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Philosophy

Taylor Fawn Edwards

Indiana University of Pennsylvania

May 2016

Indiana University of Pennsylvania
School of Graduate Studies and Research
Department of Nursing and Allied Health Professions

We hereby approve the dissertation of

Taylor Fawn Edwards

Candidate for the degree of Doctor of Philosophy

Teresa C. Shellenbarger, Ph.D.
Professor of Nursing and Allied Health Professions, Advisor

Kristy S. Chunta, Ph.D.
Professor of Nursing and Allied Health Professions

Christoph Maier, Ph.D.
Associate Professor of Mathematics

ACCEPTED

Randy L. Martin, Ph.D.
Dean
School of Graduate Studies and Research

Title: An Examination of Undergraduate Sophomore-Level Nursing Students' Personal Reflection Ability Following High-Fidelity Simulation and Video-Assisted Debriefing

Author: Taylor Fawn Edwards

Dissertation Chair: Dr. Teresa C. Shellenbarger

Dissertation Committee Members: Dr. Kristy S. Chunta
Dr. Christoph Maier

Simulation provides an avenue to prepare nursing students to provide high-quality nursing care in the complex health-care environment. Debriefing, an aspect of simulation, is used to enhance student learning through a reflective discussion. Limited empirical evidence suggests the best approach to debrief that best enhances nursing students' reflection. Reflection is paramount in developing the type of thinking required for nursing.

This study examined the influence of high-fidelity simulation and video-assisted debriefing (VAD) on the personal reflection ability of undergraduate sophomore-level nursing students. This study also explored if the personal variables of previous healthcare experience and GPA influenced reflection ability. Schön's work on reflection was used to guide this study.

A descriptive one group pre-test-post-test repeated measures design was used before and immediately after three different simulation and VAD experiences. The Groningen Reflection Ability Scale (GRAS) was used to assess reflection ability. The sample included sophomore-level nursing students from a large state university. Descriptive statistics and a mixed between-within subject's analysis of variance were used.

Findings revealed statistical significance regarding reflection ability over time (Wilks' Lambda = .829, F (3, 93) = 6.384, p =.001). The personal variables of previous healthcare experience (F (1, 95) = .511, p = .476) and GPA (F (1, 95) = 1.07, p = .303) had no effect initially on reflection ability. Nor did both personal variables combined reveal statistical

significance (F (1, 95) = .010, p =.922). Also, personal variables did not have statistical significance over time in regards to previous healthcare experience (Wilks' Lambda = .959, F (3, 93) = 1.31, p = .276, partial eta squared = .041), GPA (Wilks' Lambda = .993, F (3, 93) = .205, p = .893, partial eta squared = .007) and the interaction between the two variables over time (Wilks' Lambda = .962, F (3, 93) = 1.227, p = .304, partial eta squared = .038). Although no statistical significance was found regarding the personal variables, the profile plots revealed interesting findings.

The findings from this study provide implications for nurse administrators, simulation specialists, and nursing faculty to encourage the development of reflection during simulation activities. Future studies should focus on measuring reflection using different samples, and debriefing approaches.

ACKNOWLEDGEMENTS

As I conclude my dissertation, I reflect back on the countless hours I have spent completing coursework, reviewing literature, and writing. I could not have fulfilled this life-long dream without the help of many special people. This educational pursuit started many years ago with the inspiration from Dr. Teresa Shellenbarger. Thank you Dr. Teresa Shellenbarger for everything that you have done to help bring my dream to fruition. Words cannot express how thankful I am for your mentorship, guidance, motivation, and your words of encouragement. I would also like to thank my committee members; Dr. Kristy Chunta for your thoughtful feedback and simulation expertise and. Dr. Christoph Maier for all of your expert statistical guidance. Without you I would be stuck in the mire of SPSS.

I would also like to thank all the faculty who prepared me to write this dissertation throughout the PhD program. Your expertise that you provided during the individual courses has helped me tremendously to grow as a professional. I would also like to thank all other faculty involved with the review of the simulation scenarios, recording, and class time used for data collection.

I am also thankful for my cohort. During the past three years, I have developed lifelong friendships. I am especially grateful for Nicole, Brenda, and Amy. You were my motivators to get through the coursework, answer questions, and of course have stress relieving sessions through texts, phone calls, or over appetizers and drinks. I will always remember our group motto(s): “Save you friends”, “Cooperate to graduate”, and “C’s to degrees”.

Last but not least, I would also like to thank my friends and family. Thank you to my friends for supporting this endeavor. I am also so fortunate for my husband, Benjamin, my

children, Macey, Brock, Beau, and Heidi, and my mother and father, Patrick and Shelly Kerr. Without them I could have given up so easily. With four kids (one of them that was born during coursework and the other born just before dissertation defense), I needed a strong support system. You all offered so much by caring for my children while I worked on my dissertation. Thank you for your words of wisdom to keep me going and believing that I could accomplish such a task.

To my children I dedicate this dissertation to you. Thank you for your patience, your love, and your support. I wish you all success in your educational journeys and I will be there for you like you were there for me. I hope I inspired you to work hard to fulfill your dreams. I hope you will follow in my footsteps and I look forward to seeing you through all of your endeavors.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

The Institute of Medicine (IOM) (2011) reports that the primary goal of nursing education programs is to "prepare [nurses] to meet diverse patients' needs, function as leaders, and advance science that benefits patients and the capacity of health professionals to deliver safe, quality patient care" (p. 164). Nursing education programs are tasked with adequately preparing nurses for practice in an ever-changing healthcare environment. Traditionally, programs have relied heavily on clinical experiences to provide hands-on training. However, clinical experiences have inherent limitations due to nursing and faculty shortages (American Association of Colleges of Nursing (AACN), 2012), limited number of clinical sites, shorter hospital admission time, and higher patient acuity (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Also, patient situations are unpredictable and therefore provide an inconsistent experience for students (Dreifuerst, 2010). As a result, clinical simulation experiences have been widely implemented in nursing education programs as an alternative to the traditional clinical learning experience that takes place in healthcare facilities Harder, 2010; Reed, 2012).

Simulation in nursing is used as a teaching methodology to provide a learning opportunity for students to enhance clinical judgment (Lasater, 2007) and critical reasoning skills in a safe, realistic, non-threatening learning environment (Jeffries, 2012; Shellenbarger & Edwards, 2012; Shepherd, McCunnis, Brown & Hair, 2010). Typically, a manikin that can mimic real-life functions such as eye blinking, bleeding, and breathing, is placed in a hospital-like setting. Using simulation, nursing students get to experience patient situations that they may not get exposure to in the clinical setting. Following the simulation, debriefing occurs and

includes a reflective discussion. Some experts have suggested that simulation learning is thought to occur mostly during the reflection and debriefing component of the simulation experience (Cantrell, 2008; INACSL Board of Directors, 2013; Reed, 2012; Shinnick, Woo, Horwich, & Steadman, 2011). However, most of the current literature on reflection and debriefing provides only anecdotal accounts about the best approaches and methods for debriefing and promoting reflection. Experts suggest a variety of debriefing approaches including video-assisted debriefing (Chronister & Brown, 2012), Gather, Analyze Summarize (GAS) (American Heart Association, 2010), Debriefing for Meaningful Learning (Dreifuerst, 2010), and Debriefing with Good Judgment or Advocacy-Inquiry (Rudolph, Simon, Rivard, Dufresne, & Raemer, 2007). Regardless of the approach used to facilitate debriefing, the ability to reflect requires practice (Aukes, Geertsma, Cohen-Schotanus, Zwierstra, & Slaets, 2008; Procee, 2006). Debriefing provides an avenue for students to practice reflecting to promote learning and the development of thinking like a nurse. Reflection through debriefing must be taught overtime through experiences guided by a facilitator (INACSL Board of Directors, 2013).

Since debriefing is critical to simulation learning, this study examined sophomore-level undergraduate nursing students' personal reflection ability during video-assisted debriefing with repeated measures. The students engaged in debriefing after multiple simulations throughout a course. This chapter describes the background and statement of the problem. The purpose, research questions, definitions of key terms, and assumptions will be described. The conceptual framework used to guide this study will also be discussed. This chapter will conclude with a discussion about the significance of the study.

Background

Reflection is a concept that originated during the ancient era and is evident in the Old Testament (Denton, 2011). Over time, several definitions have emerged making it difficult to conceptual define reflection (Dekker-Groen, Marieke, & Stokking 2011; Denton, 2011; Freshwater et al., 2008; Grossman, 2009; Koole et al., 2011; Nolon, 2008). A definition, - from an educational standpoint, - was first developed by John Dewey (1933) where he described 'thinking about thinking' (Koole et al., 2011). Schön (1983; 1987) further described reflection as reflection-in-action and reflection-on-action in relationship to an event. Reflection has also been described by Mezirow (1990) as "examination of the justification for one's beliefs, primarily to guide action and to reassess the efficacy of the strategies and procedures used in problem solving" (p. xvi). Overall, reflection includes a retrospective thought process that enhances student learning and ultimately may aid students in becoming safe, competent nurses.

Personal reflection is a concept recognized in the reflection literature. The ability to personally reflect is described as "exploration of one's own and other's experiences, thus clarifying and creating meaning, for the benefit of balanced functioning, learning and development" (Aukes, Geertsma, Cohen-Schotanus, Zwierstra, & Slaets, 2007, p. 178). Therefore, the concepts of reflection and personal reflection ability are closely linked. Personal reflection requires practice settings to enable students to learn and adapt to patient needs and condition changes (Aukes et al., 2008).

Simulation is a pedagogy used in nursing education to encourage student learning and reflection. One simulation approach includes use of a sophisticated manikin that simulates an actual patient situation where students perform as they would in the clinical setting. The manikins used for a high-fidelity simulation replicate real-life patient capabilities such as eye

blinking, chest rise and fall, palpable pulses, and voice function. The manikin capabilities are manipulated by an operator (simulation specialist or technical staff) to resemble patient responses.

A simulation experience usually involves a clinical group of eight to 10students. Two to four students are assigned to an active role (such as a nurse, nurse assistant, or other care providers) in the simulation scenario while the remainder of students actively observe the simulation. The simulated learning experience includes a pre-briefing session (where students are introduced to the specific scenario), implementation of the clinical scenario, and then a debriefing session. Debriefing involves a reflective period following a simulation where students re-examine the scenario by thinking about the experience, identifying areas for improvement, and suggesting ways to improve responses that occurred during the simulation scenario (Cant & Cooper, 2011; Dreifuerst, 2009; Rothgeb, 2008). Debriefing has been recognized as a critical aspect of simulation. Best practices to enhance learning during debriefing remain understudied. Video-assisted debriefing (VAD) is a method used to facilitate a reflective discussion with recorded segments of the simulation. VAD offers a visual reinforcement of what occurred during the simulation and allows for reflection and discussion. Repeated use of VAD may enhance reflection overtime.

Simulation use in nursing education has increased exponentially in recent years (Garrett, Macphee, & Jackson, 2010; Simones, 2008). With this continued expansion comes a focus on studying the effectiveness of the elements of simulation. The National Council of State Boards of Nursing (NCSBN) (2015) conducted a national three-phase comprehensive landmark study that explored the use of simulation in nursing education. Phase one focused on collecting and analyzing data from a survey that was administered to all faculty in US pre-licensure nursing

programs. The survey focused on several areas related to simulation use including: equipment type, courses that utilize simulation, faculty training, and simulation as a substitute for clinical hours. Phase two of the study investigated the impact of replacing clinical experiences with simulation. Varying amounts of simulation (10%, 25%, and 50%) were examined with 666 students. Hayden et al. (2014) reported the results of this study and suggested that using similar controls, traditional clinical experiences can be replaced with 50% high-quality simulation without negative effects on learning. The findings proposed that there was no significant differences in clinical competency (p=0.688); comprehensive nursing knowledge assessment (p=0.478); and NCLEX ® pass rates (p=0.737) among the study groups. The subjects were also followed into practice as newly-registered nurses. Managers rated the new graduates clinical competency and readiness for practice on a scale from 1 to 10 (1=among the weakest, 10=among the best). Overall, new graduates were rated high for all three groups indicating readiness for practice. Measurements were taken at 6 weeks (p=0.706), 3 months (p=0.511), and 6 months (p=0.527) and resulted in no statistical significant difference among groups (Hayden et al., 2014). Therefore, the results of this study support the use of simulation for up to 50% of clinical hours for nursing education preparation.

With the results of the NCSBN simulation study, simulation use may continue to increase in nursing education. The International Nursing Association for Clinical Simulation and Learning (INACSL) board of directors (2013) developed Standards of Best Practice for simulation that may be helpful for faculty implementing simulation learning in nursing education. These standards were created to offer evidence-based guidelines to improve simulation practices (INACSL Board of Directors, 2013). One of the standards, the Debriefing Process Standard IV, states, “all simulation-based learning experiences should include a planned

debriefing session aimed toward promoting reflective thinking" (s26). Additionally, criteria for successful debriefing include use of: competent facilitator(s) who observed the simulation scenario, evidenced-based debriefing methodologies, structured framework, scenario objectives, learning and outcomes, and safe environment (INACSL Board of Directors, 2013). Interestingly, specific frameworks and debriefing methodologies were not provided. The lack of direction in best practices for debriefing may result in a wide variation in facilitator practice that may hinder student learning (Morse, 2012). While the INACSL standards help to provide direction for nurse education, more evidence is needed for best practices. A literature review conducted by Neill and Wotton (2011) revealed a few key components of debriefing. One component involves nursing faculty serving as a central role in facilitating effective debriefing. Another suggested a component of debriefing is the use of a structured framework to enhance student learning. The authors also indicated that there is limited research in offering frameworks best-suited for debriefing.

To enhance student learning during debriefing, good reflection is paramount. The literature states that reflection occurs during debriefing; however, there is limited empirical evidence measuring personal reflection ability with different debriefing approaches. VAD is one approach that may enhance personal reflection ability. Repeated exposures of such may show improved scores of reflection over time. Experiences help to enhance the ability to reflect (Aukes et al., 2008). Furthermore, other personal variables may influence reflection ability overtime. One example of a personal variable includes previous healthcare experience which has positively influenced reflection ability (Hannans, 2013). Another personal variable that may influence reflection include grade point average (GPA). Overall, a deeper understanding of what

best enhances reflection during debriefing is necessary. The following section will describe the statement of the problem.

Statement of the Problem

Increases in simulation use in nursing education have arisen over the past several years. The NCSBN National Simulation Study sent surveys to 1,729 pre-licensure nursing programs in the United States and obtained a response rate of 62% (*n*=1,060) (Kardong-Edgren, Willhaus, Bennett, & Hayden, 2012). Interestingly while 164 (18%) of respondents indicate that the right amount of simulation is used, 81% of respondents indicated that they should be using more simulation in their programs (Kardong-Edgren et al., 2012). With the increase in simulation use, best practices need solidified. The literature suggests that debriefing, one aspect of simulation, is the most important in contributing to student learning (Cantrell, 2008; INACSL Board of Directors, 2013; Groom, Henderson, & Sittner, 2014; Reed, 2012; Shinnick et al., 2011). Debriefing should be structured to encourage reflection. Structuring debriefing to promote reflection encourages the students to think at a higher level and connect theory-to-practice (Denton, 2011; Padden, 2011). Faculty need to distinguish what debriefing methods work best at promoting learning through reflection. There have been several debriefing methods suggested in the literature to structure a facilitated reflective discussion such as the use of video versus no video, (Chronister & Brown, 2012; Reed Andrews, & Ravert, 2013), DML (Dreifuerst, 2010), Outcome Present State Test (OPT) Model (Kuiper, Heinrich, Matthias, Graham, & Bell-Kotwall, 2008), and Advocacy-Inquiry (Rudolph et al., 2007). One debriefing method is VAD. The technology associated with simulation allows for audio recording for a 'live' view and the option for video playback during debriefing, also known as VAD. Although using VAD may be a common practice during debriefing, very little research exists that examines the effectiveness of

VAD and the impact on student learning. Empirical evidence is needed in regards to VAD effect on reflection. Using the approach of VAD may provide evidence for nurse educators to use to best enhance reflection and student learning. Therefore, this study examined reflection ability over time using a VAD approach with sophomore-level nursing students. The next section describes the purpose.

Purpose

There is a paucity of research that focuses on debriefing and reflection within undergraduate nursing students. The purpose of this study was to examine the influence of VAD and personal reflection ability of undergraduate sophomore-level nursing students. This study used a descriptive one group pre-test-post-test repeated measures design. This type of design allowed for examination of data at multiple points and will be useful in determining if indeed a change in personal reflection ability occurs with simulation and debriefing (Polit & Beck, 2012). The Groningen Reflection Ability Scale (GRAS) was used to assess the personal reflection ability (Aukes, Geertsma, Cohen-Schotanus, Zwierstra, & Slaets, 2007). This scale was administered to a convenience sample of sophomore-level undergraduate nursing students enrolled in a Fundamental Nursing Theory course at a large state-supported academic institution in the northeastern US. The GRAS was administered prior to the first debriefing experience to establish a baseline reflection score. After debriefings scheduled on three separate occasions, the GRAS was re-administered to determine the impact of VAD on reflection ability scores. Therefore this study examined reflection scores with undergraduate nursing students before the initial debriefing and after each VAD to determine the impact of VAD on reflection scores. Additionally, this study examined the influence of personal variables (previous healthcare

experience and GPA) on reflection ability scores initially and then following repeated exposures to VAD with undergraduate sophomore-level nursing students.

Research Questions

This descriptive one group pre-test-post-test repeated measures study answered the following questions regarding personal reflection ability with VAD of sophomore-level undergraduate nursing students:

How do reflection ability scores change over time when undergraduate sophomore-level nursing students' participate in three simulations with VAD?

- H0: Repeated measures of simulation and VAD has no effect on improvement of reflection ability scores
- H1: Repeated measures of simulation and VAD improves reflection ability scores.

How do personal variables influence undergraduate sophomore-level nursing student's reflection ability?

- H0: Personal variables have no influence on undergraduate sophomore-level nursing student's reflection ability.
- H1: Personal variables improve undergraduate sophomore-level nursing students' reflection ability.

How do personal variables influence undergraduate sophomore-level nursing student's reflection ability following repeated simulation with VAD over time?

- H0: Personal variables have no influence on undergraduate sophomore-level nursing student's reflection ability with VAD over time.
- H1: Personal variables improve undergraduate sophomore-level nursing student's reflection ability with VAD over time.

Conceptual Framework

Reflection refers to the use of higher-order thinking about past experiences to help develop new knowledge and elicit a changed behavior (Denton, 2011; Dewey, 1933; INACSL Board of Directors, 2013; Lowe, Rappolt, Jagial, & Macdonald, 2007). Similarly, personal reflection refers to an "exploration and appraisal of one's own and other's experiences, thus clarifying and creating meaning for the benefit of balanced functioning, learning and development" (Aukes et al., 2007, p.178). The ability to personally reflect is developed through experience (Aukes et al., 2008).

Schön (1987) discussed the importance of reflection and its impact on continued learning and development of thinking. The work of Donald Schön (1983; 1987) will provide the conceptual framework for this study. The concepts of reflection-in-action and reflection-on-action were described by Schön. These concepts emphasize the thinking that takes place during and after an event. Schön (1987) explains reflection-on-action as thinking back on an event to discover new understandings of the problem. This type of thinking will then add new understandings to the professional's knowledge base to better handle future situations. Reflection-in-action differs in that the reflection occurs during an action or event. The situation is framed for thinking and reflection to occur. An action is then taken based on previous experience, intellectual knowledge, and the reflection-in-action (Schön, 1987). Furthermore, the process of this concept is paramount in dealing with uncertain or unknown situations (Schön, 1983). Schön (1987) also describes preparing professionals for practice using reflection. To offer and enhance reflection, the students must practice in a suitable environment conducive to learning. An individual must not teach the students to reflect but coach instead. This follows

closely to simulation and debriefing where the students practice patient care and then reflect in a safe environment with a facilitator present.

Schön's work on reflection has been previously associated with simulation and debriefing (Dreifuerst, 2009; Jeffries, 2012; Tanner, 2006). A concept analysis conducted by Dreifuerst (2009) described reflection as a defining attribute of debriefing. Reflection, assimilation, accommodation, and anticipation occur where students can demonstrate knowledge transfer from one situation to the next (Dreifuerst, 2009). Tanner (2006) also described reflection-in-action and reflection-on-action. These concepts were integrated as part of a Clinical Judgment Model. This model has been used as a guide for debriefing. The reflection-on-action component of the model is critical in developing clinical knowledge. The ability to reflect-on-action, or re-examination of the simulation, occurs during debriefing and therefore helps the learner form new understandings. The next section includes a discussion of the definition of terms.

Definition of Terms

There are several terms that are used throughout this research study. The terms and definitions follow:

- Simulation: Refers to a pedagogy that involves student(s) who provide care for a simulated patient placed in an environment similar to the clinical setting, (Jeffries, 2012; Meakim et al., 2013). For the purposes of this study, simulation involves a high-fidelity manikin placed in a simulated clinical environment. The simulation includes a patient situation that the students will observe and then immediately debrief.
- Fidelity: Refers to the degree of realism or believability of a simulation experience categorized as low, medium, or high (INACSL Board of Directors, 2013; Jeffries, 2012).

- Active Participant: Refers to a student who "engages in a simulation-based learning activity for the purpose of gaining or demonstrating mastery of knowledge, skills, and attitudes of professional practice" (Meakim et al., 2013, p. S7).
- Observer: Refers to a student who views the simulation and does not provide direct (simulated) care (Hober, 2012).
- Debriefing: Refers to a reflective thinking period following a simulation where students reexamine the scenario by thinking back to the experience, identifying areas for improvement, and correcting events that occurred during the simulation scenario (Cant & Cooper, 2012; Dreifuerst, 2009; Rothgeb, 2008). Debriefing is facilitated by a debriefer who should have had formal training to stimulate students' reflective thinking. (INACSL, 2013).
- Personal reflection: Refers to "exploration of one's own and other's experiences, thus clarifying and creating meaning, for the benefit of balanced functioning, learning and development" (Aukes et al., 2007, p. 173). This concept differs slightly from reflection as the focus is on individual experience and self-understanding.
- Personal variables: Refers to characteristics of an individual related to items such as previous healthcare experience, and grade point average.
- Reflection: Refers to a higher-order thinking on past experiences to develop new knowledge and elicit a changed behavior (Denton, 2011; Dewey, 1933; INACSL Board of Directors, 2013; Lowe et al., 2007). For this study, reflection will be measured by the Groningen Reflection Ability Scale.
- Video-assisted debriefing (VAD): Refers to the use of video playback of the simulation during debriefing (Chronister & Brown, 2012).

- Interaction: In Statistics, the interaction of factors A and B on the dependent variable occurs when the effect of factor A on the dependent variable differs across the levels of factor B. This is often referred to as the interaction effect of factors A and B on the dependent variable (Maier, 2015).
- Profile Plot: A profile plot is a specialized multiple-line graph in Statistics that shows the effect of factor A on the dependent variable for each level of factor B. The profile plot puts the levels of factor A on the x-axis and the dependent variable on the y-axis. The mean value of the dependent variable for each combination of the levels of factors A and B are plotted on the graph. A straight Line is then used to connect the mean values across factor A for each level of factor B. The slope of each line shows the effect of factor A on the dependent variable for that level of factor B. A steeper line shows a larger effect of factor A on the dependent variable than does a flatter line. As the interaction effect of factors A and B on the dependent variable increases, the lines become more non-parallel (Maier, 2015).

Assumptions

There are several assumptions for this study and they are described below.

1. Every student will be given the same information prior to each simulation scenario.
2. Every student will observe the same high-fidelity simulation scenario.
3. Every student will participate in a similar debriefing experience with VAD.
4. Every student will have no high-fidelity nursing simulation or simulation debriefing experience prior to the study as stated in the inclusion criteria.
5. Every student will complete the pre and post-tests honestly.

Significance

With the ever-changing health care environment, nursing programs must adapt to prepare future nurses to provide high-quality patient care (Benner, Sutphen, Leonard, & Day, 2010; IOM, 2011). In turn, nursing education has adopted simulation as an avenue for student learning opportunities that are similar to patient encounters that may occur in the clinical setting. To meet the needs of successful implementation of simulation, nursing programs need to dedicate a considerable amount of resources (time and money) to this aspect of nursing education. Cost of one high-fidelity manikin alone can easily reach $75,000 or more (Palmer, Edwards, & Racchini, 2014). Simulation in nursing education is expensive to maintain and nursing programs have financial limitations and budgetary concerns. These budgetary concerns may inhibit simulation and debriefing; particularly in regards to committing resources to video technology for use during the debriefing process.

Following a simulation, it is important to debrief to enhance student reflection. The literature anecdotally supports the concept of reflection as a means of improving learning during debriefing. During debriefing, a facilitator encourages students to reflect on the simulation. Successful reflective debriefing discussions are structured to guide students to analyze their own thoughts and think how to become better practitioners (Dreifuerst, 2009; Fey, Scrandis, Danies, & Haut, 2014). If reflection does not occur as it should, decreased learning, inadequate performance, and /or a lack of insight may occur (Hays & Gay, 2011; Koole et al., 2011; & Nolon, 2011).

There are various debriefing approaches that can be utilized to promote reflection. Typically, faculty determine the most appropriate method for debriefing depending on the situation and the learner (Jeffries, 2012). Faculty are also responsible for acting as an expert

guide to teach students to develop skillful reflection to 'think like a nurse' (Tanner, 2006). Decisions on how to best debrief may arise with limited empirical data regarding best practices. Specific debriefing approaches may enhance reflection more so than others. Reflection that occurs during debriefing can ultimately enhance student learning (INACSL Board of Directors, 2013). Therefore, finding a debriefing approach best suited to enhance reflection is necessary.

Although debriefing provides an opportunity for students to think at a higher-level, the measurement of reflection ability has not been documented in undergraduate nursing education literature. Research is limited in areas of debriefing and many questions arise regarding best practices (Groom et al., 2014). Additionally, experts suggest that all aspects of debriefing need to be further researched to aid in the development of best practices (Groom et al., 2014). This study examined the use of VAD and influence on reflection ability with undergraduate sophomore-level nursing students. Literature indicates that debriefing is where the most learning occurs, but empirical evidence is needed to understand the most effective method of debriefing to enhance reflection ability.

Summary

In summary, this study concentrates on examining the influence over time of VAD debriefing after simulation on reflection ability with sophomore-level undergraduate nursing students. This chapter provided the background of reflection, simulation, and debriefing, the problem statement, and the purpose. Also a list of research questions, definition of terms, assumptions, and conceptual framework used for this study were discussed. The chapter concludes with the significance of the study. The next chapter details the literature regarding the variables and survey tool used in this study.

CHAPTER TWO

LITERATURE REVIEW

Simulation

Simulation education originated decades ago in the field of aviation in response to several airplane accidents. The pilots involved in these tragedies were considered skilled and adequately trained. Additionally, they experienced no mechanical errors and had favorable weather conditions at the time of the accident. It was surmised that they lacked training in possible emergency situations. As a result, computer programs that simulated real-life aviation emergencies were developed for pilot training so they would be better prepared to react in similar emergency scenarios in the future (Dismukes, Gaba & Howard, 2006).

Since then, the field of health care has adopted this teaching methodology in the areas of anesthesia, medicine, and nursing (Garrett et al., 2010). Simulation in healthcare has evolved over the last century beginning with Mrs. Chase (one of the first life-size manikins created in 1911 to practice basic nursing skills) to Resusci-Anne (a manikin created for training of cardiopulmonary resuscitation) and then more recently, new sophisticated, high-fidelity manikins that have realistic capabilities such as eye blinking, bleeding, and even birthing a baby (Jeffries, 2012). Along with the influx of realistic manikin features, simulation use over the past 10 years has really expanded in nursing education. A national survey sent to 1060 pre-licensure nursing programs in 2010 revealed 917 nursing programs had incorporated medium-to-high fidelity simulation into the curriculum (Hayden, 2010).

Simulation technology in nursing is used as a teaching methodology to provide a learning opportunity for students to enhance clinical judgment (Lasater, 2007) and critical reasoning skills in a safe, realistic, non-threatening learning environment (Jeffries, 2012; Shellenbarger & Edwards, 2012; Shepherd et al., 2010). Additionally, the recent national landmark simulation

study revealed that replacing up to 50% of clinical with high-quality simulation had similar outcomes when compared to 10% or less of simulation time. No statistically significant differences between these simulation groups was revealed related to knowledge assessment (p = 0.478) clinical competency (p = 0.688), and NCLEX pass rates (p = 0.737). Therefore, simulation led to comparable outcomes as traditional clinical experiences in this study.

Although simulation use has expanded and has had positive outcomes, debriefing, a very important component of simulation where students reflect on the scenario, remains understudied. As simulation continues to expand in nursing education, a deeper understanding of debriefing is needed to gauge best practices (Neill & Wotton, 2011). According to the current literature, several debriefing approaches exist. The best approach in debriefing remains unknown. One avenue is incorporating a video recording of the scenario with debriefing. The video allows students to review what occurred during the scenario. This may help to enhance debriefing and result in a better reflection. Very little literature exists regarding VAD and reflection. Therefore, this chapter provides a review of the literature and begins with a discussion of reflection including Schön's work which serves as the theoretical framework for this study and literature related to debriefing and reflection. In addition, debriefing associated with high-fidelity simulation is explored with a focus on structure with and without the use of video. Lastly, the Groningen Reflective Ability Scale (GRAS) will be reviewed in regards to development and use in other studies.

Theoretical Framework

Reflection is a concept utilized since ancient times and is even documented in the Old Testament (Denton, 2011). Since documented use, consistent definitions for reflection vary (Denton, 2011; Dekker-Groen et al., 2011; Freshwater et al. 2008; Grossman, 2009; Koole et al., 2011; & Nolon, 2008) therefore making the idea and implementation of this concept challenging. Dewey (1933) originated the definition of reflection as a type of thinking that requires consideration of knowledge or beliefs. Dewey's work on reflection describes the process of thinking to gain a better understanding of an experience. This concept of 'learning by doing' influenced Schön's (1983) work on reflection. Schön's (1983) interest in reflection differed from Dewey as the focus moved from process towards outcomes (Duffy, 2008). Schön (1987) defined reflection as an act of thinking critically about an unanticipated situation to find resolution or new understanding.

Schön (1983) identified a crisis involving professionals and their ability to solve problems and think through situations that arise. He recognized that the use of Technical Rationality, a type of activity used to guide thinking by problem solving through scientific theory, was inadequate for preparing professionals for unexpected situations that may arise in their practice. When a situation occurs, the professional needs to be able to think through and determine the most appropriate solution. The ever-changing environment in healthcare produces many unanticipated situations, hence, nurses must think at high levels to troubleshoot through these situations to find creative solutions.

Schön realized that professionals needed to go beyond simple problem solving strategies. As a result, he introduced the concepts of knowing-in-action, reflection-on-action, and reflection-in-action. The concept of knowing-in-action is used in day-to-day activities or routine actions (Schön, 1983; 1987). Schön (1983) described this concept of knowing as "ordinary practical

knowledge" (p. 54). For example, there are tasks that nurses tend to complete every day. These day-to-day activities become the inherent knowing for the nurse. The nurse does not have to reflect during or after these activities to complete these activities successfully. The knowing becomes a subconscious action where action occurs without deep thought.

The concepts of reflection-in-action and reflection-on-action take knowing-in-action a bit further. Thinking is taken beyond the practical knowledge or knowing during a situation. Reflection-in-action occurs when a professional tries to make sense of an unanticipated situation while it occurs. This type of thinking differs from problem-solving. Problem-solving involves an anticipated situation in a known setting that leads to actions resulting from application of scientific theory (Schön, 1983). Schön also identified problems occurring in an unanticipated context. Some situations that occur are unique and create uncertainty for the professional. These types of situations require a higher level of thinking. When this occurs, the situation or problem is framed and reflection occurs. Framing the problem gives the professional a 'paused picture' of the situation to give the opportunity to reflect and think. During reflection, the individual thinks about possible actions and then takes an action. The action taken is based on previous situations and the intellectual knowledge built in combination with the phenomena at hand thus resulting in higher-order thinking. As a result of the reflection, new understandings of the situation are formed. If the problem remains after taking action, a reframing occurs and the process of reflection-in-action resumes. During reflection-in-action, the professional will either affirm the results (if desired outcomes occur) or address the results (if undesired results occur). Ultimately, a solution to the problem is gained through reflection-in-action. For example in nursing, a nurse enters a room of a patient experiencing deteriorating health. The nurse assesses the patient and frames or thinks about the current situation. During the framing, the nurse uses his/her

intellectual knowledge and also thinks about previous situations with other deteriorating patients to create a solution. The nurse proceeds with the solution in hopes of success. Once the situation is changed positively, (in this case, the patient stabilizes) new meanings and understandings arise. The next time the nurse is exposed to a similar situation, actions will be based on this exposure.

Schön (1987) also identified the concept of reflection-on-action. Reflection-on-action involves thinking back on the action taken. This reflective activity can take place after or in the midst of a situation. When reflection-on-action occurs during a situation, the reflection does not directly influence the action of the current situation. Reflection-on-action serves to reshape future actions. When a situation transpires, the professional reflects to build upon his/her previous knowledge base. This concept differs from reflection-in-action where thinking takes place in the midst of a situation. Using the previous patient example, now the nurse cares for that same deteriorating patient. The nurse proceeds with assessment, nursing interventions etc. The patient stabilizes therefore the situation resolves. After the situation resolves, the nurse reflects back on the deteriorating patient. This thinking then will help the nurse care for similar patient situations in the future.

Schön's ideas, although originally resulted from his work in architecture, has broad appeal and can be applied to different professions as provided in the previous nursing examples. The situations may differ within each profession, but the process of solving a problem and using reflection remains similar. Ultimately reflection helps to make understandings. Additionally, regardless of the type of reflection used, reflection-in-action or reflection-on action, repeated measures or exposures to situations help to build a repertoire of understanding of the situation (Schön, 1983). For example, the nurse enters that same patient room with a deteriorating

condition. This nurse had repeated exposures to patients in this situation. Therefore the nurse learned to understand this patient problem through reflection (reflection-in-action and/or reflection-on-action). Subsequently, when a patient with the same problem presents, nurses then understand the situation as a whole better than when initially exposed.

According to Schön's idea of reflection, previous health care experiences may impact student's ability to reflect. The students may have already experienced and reflected on patient care situations in practice. These repeated exposures to patient care situations help to build upon a knowledge base through reflection during or after the event therefore possibly impacting the students' reflection ability. In one study conducted by Hannans (2013), previous health care experience was a predictor of level of reflection ($r = 0.37$, $p = 0.04$) and reflection was higher with prior health care experience ($t = 2.98$, $p < 0.01$). Higher reflection may also occur with students that have a good grade point average (Stephens et al., 2012). Students who can effectively think through a situation may perform better and get better grades. Therefore, students who perform well in education (displayed through their GPA) may require higher-level thinking. One study found reflection activities incorporated into a medical course correlated with GPA ($r = 0.3$; $p < 0.001$) (Stephens et al., 2012).

Schön also recognized the concern about the gap between theory and practice. He suggested that education provides a way to assist professionals to problem-solve during unanticipated situations. Professional preparation requires faculty coaching students to build a knowledge base and 'think' appropriately rather than use memorization of appropriate actions. Practice environments provide opportunities for faculty to introduce situations that are controlled and then allow faculty to coach students' thinking.

In nursing education, simulation and debriefing provide a practice environment for students that encourages reflection and builds a knowledge base. As students participate in a simulation scenario, reflection occurs both during and after the simulated scenario and occurs with the guidance of a facilitator who is familiar with best practices in this area. Students participating and/or observing during the simulation have the opportunity to reflect-in-action. During debriefing, the reflective discussion following the scenario, students express their thinking during the scenario. Problems are framed, actions discussed, and best outcomes identified. Students use reflection-on-action during this time. The next time the student experiences a similar situation, the thinking process developed during the simulation should emerge. The student should appropriately process and react to the situation. If the situation occurs in the hospital setting the nursing student uses knowledge from the simulated encounters and can provide appropriate actions. The practice of reflection-in and on-action during this teaching-learning activity then allows the students to practice the type of thinking needed for nursing practice.

Dreifuerst (2009), a nurse, further expanded on Schön's work of reflection and considered application in nursing. She completed a concept analysis of debriefing and identified defining attributes of reflection, emotion, reception, integration, and assimilation and accommodation. Assimilation and accommodation involve learning and transfer of knowledge from one situation to the next. An additional concept of reflection-beyond-action was identified. Reflection-beyond-action involves reflection that looks further than the current situation. Dreifuerst (2009) described this type of reflection as looking forward or anticipating what will happen next. This concept differs from Schön (1983; 1987) as reflection-in and reflection-on-action serve the purpose of thinking now and then on the current situation at hand. The idea of reflection-

beyond-action serves as a different form of thinking. In comparison, all types of reflection discussed by Schön (1983; 1987) and Dreifuerst (2009), suggest the need for facilitation of thinking for novice practitioners. An example of this type of facilitation includes questioning to enhance higher-level thinking.

Further work by Dreifuerst (2010) involved a debriefing method called Debriefing for Meaningful Learning© (DML) that included reflection-on-action, reflection-in-action, and reflection-beyond-action. Again, reflection-beyond-action differs from Schön's ideas of reflection where anticipation of future situations occurs. The six components involved with this debriefing approach include: engagement, evaluation, exploration, explanation, elaboration, and extension, so that the debriefing assists students to reflect-in-action, reflect-on-action, and reflect-beyond-action (Dreifuerst, 2010). Faculty using DML do so by using Socratic questioning and a worksheet (Jeffries, 2012) to assist students to think like a nurse. Initial questioning includes general items such as "what went right?" (Dreifuerst, 2010). After initial questioning, the students complete the worksheet to create a concept map to link assessment findings, interventions and outcomes for each debriefing. The concept mapping, completed individually or as a group, encourages students to reflect-on-action and reflect-beyond action. Once completed, faculty guide the debriefing further by discussing the 'patient's story'. Upon summation of the worksheet, students anticipate future clinical experiences. This debriefing method was created to provide structure and enhance learning and clinical reasoning skills (Dreifuerst, 2010) through reflection.

Reflection and Debriefing

The literature was searched for research relating to reflection and debriefing through Proquest, Cumulative Index to Nursing and Allied Health Literature (CINAHL ®), Medline, and the journals, *Clinical Simulation in Nursing*, and *Simulation in Healthcare*, during the years 2005 to 2015 but very few studies were conducted related to reflection and debriefing. Three studies examined debriefing methods that promote reflection (Dreifuerst, 2010; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013; Morse, 2012) and did so using a variety of study designs. Only one study examined the depth of reflection during debriefing (Husebo, Dieckmann, Rystedt, Soreide, & Friberg, 2012). Findings vary and focus on areas of clinical reasoning (Dreifuerst, 2010), clinical judgment (Mariani et al., 2013), reflection (Morse, 2012), and reflection level (Husebo et al., 2012). These studies will be further discussed in the following paragraphs.

A study conducted by Dreifuerst (2010) examined the effect of DML on clinical reasoning with 238 students from a Midwestern university school of nursing enrolled in an adult health course using the Health Sciences Reasoning Test (HSRT). This valid and reliable tool measures clinical reasoning, critical thinking, and clinical decision-making using 33 questions. The students were placed into two different groups and received either DML or customary unstructured debriefing. The HRST was administered before and after debriefing. Results indicated that there was a statistical significant finding with an analysis of covariance between-subjects effect of DML on total HSRT scores ($F(1, 237) = 28.55$, $p = <.05$) and relation to debriefing method ($F(1, 237) = 623.91$, $p = <.05$). These significant findings suggest that with a pre-test score, DML will lead to better post-test scores than usual debriefing. A regression analysis was also calculated and found a significant correlation ($R^2=.84$, $p<.05$) between HSRT

scores and students' perception of DML. Therefore, results indicate that DML is useful in development of clinical reasoning skills.

Similarly, using the same sample type and design above, Mariani et al. (2013) investigated structured debriefing using DML, versus unstructured debriefing and the effect on clinical judgment with 86 junior-level medical-surgical nursing students at a middle-sized university in the mid-Atlantic region. These researchers used the Lasater Clinical Judgment Rubric (LCJR), used to assess students' clinical judgment ability, which has been demonstrated to be a reliable tool with a reported internal consistency of 0.80 to 0.97 that measures. The students were also placed into either the unstructured debriefing and/or DML. Simulations were scheduled with all students at two different times during the semester. Debriefing occurred after the simulation with each group of students and the LCJR was completed. No statistically significant results were found. These findings differ from Dreifuerst (2010) where a significant change in clinical reasoning was apparent with DML. However, as part of this study, qualitative data was also obtained from focus groups (Mariani et al., 2013). The findings from the focus groups suggested that DML was more learner-focused and increased learning.

Another study conducted by Morse (2011) explored the effectiveness of *Debriefing with Good Judgment*, a structured debriefing model, on acute care nurse practitioner students' (n=22) reflective ability using the valid and reliable GRAS. This study differed from the previous studies (Dreifuerst, 2010; Mariani et al., 2013) in regards to the sample type and design. The GRAS was administered at five different points, at baseline and then after each simulation experience. No statistically significant findings were revealed between groups. However, a statistically significant change in mean scores was evident for the experimental group and revealed through a quartic pattern. This type of pattern denotes a trend with mean scores that

change direction three times (Field, 2013). For example, a line representing mean scores would change direction in a down-up- down-up pattern. Therefore, this pattern indicated that there was change overtime with an increase, decrease, increase, and then decrease in mean scores of the GRAS. Overall, with these changes, the experimental group revealed a significant change from baseline to Time 4.

Husebo et al. (2013) examined reflection differently than all of the previous studies. Their research compared a debriefing approach to usual debriefing with undergraduate nursing and nurse practitioner students using tools that measured reflection ability, clinical judgment, and clinical reasoning. For the Husebo et al. (2013) study, no specified debriefing method was used, rather they just guided debriefing by a facilitator (n = 5) with the use of questions for the 81 nursing students. The study also used a qualitative design where 28 simulations and debriefings were video-taped and then analyzed. The researchers then evaluated reflections using Gibbs' reflective cycle to classify facilitator's questions and student responses regarding leadership. Gibbs reflective cycle includes six stages (description, feelings, evaluation, analysis, conclusion, and action plan) to promote reflective thinking. Data analysis revealed a rater agreement of 0.82 for responses and 0.81 for questions and responses thus supporting scale reliability. The findings revealed that facilitators' more reflective questions promoted less variation of student responses whereas questions in the descriptive stages promoted responses at more reflective levels (evaluative and analytic stages). Therefore, it is necessary to consider the structure and type of questions that facilitators' use during debriefing to best promote student learning thus supporting the findings of Dreifuerst's (2010) study.

Several limitations were evident in all of the studies. Sample sizes were adequate for only the Dreifuerst (2010) study. A study with a large sample size suggested that using DML, a type

of debriefing that promotes reflection, does indeed enhance clinical reasoning. However, the tool utilized for this study was not specific to nursing and subjects were not randomized. Although the Mariani et al., (2013) study results differed using similar sample and design, inconsistent raters were used for completion of LCJR and there was variation of unstructured debriefing used in control (Mariani et al., 2013). Other issues with samples of these studies include low power (Mariani et al., 2013), no randomization (Dreifuerst, 2010) and small sample size (Husebo et al., 2013; Morse, 2012). All of these studies accrued subjects from one location therefore limiting generalizability (Dreifuerst, 2010; Husebo et al., 2012; Mariani et al., 2013; Morse, 2012). Two studies examined junior-level undergraduate nursing students (Dreifuerst; Mariani et al., 2013), one study third year nursing students during their last semester and debriefing facilitators' (Husebo et al., 2013) and one nurse practitioners (Morse, 2012). Some of the study designs were similar, but only two studies collected data for repeated measure (Mariani et al., 2013; Morse, 2012). Interestingly, the repeated measures revealed no statistical significance between groups. However, different samples and tools were used for each of these studies. Additionally, no studies examined reflection of sophomore-level undergraduate nursing students over time. Also no studies measured debriefing and reflection on students with no prior simulation experience. Overall, the findings of these studies reveal inconsistent results regarding reflection and debriefing and suggest the need for further research.

Summary

In summary, Schön's work on reflection using the concepts of reflection-in-action and reflection-on-action will provide the framework for this study. These concepts work adjunctively with simulation and debriefing as students reflect to enhance their learning. The literature was searched and revealed very few studies that examine reflection and debriefing and

those that did studied undergraduate nursing students, facilitators, and nurse practitioners. Existing studies examine debriefing methods that promote reflection, DML and *Debriefing with Good Judgment*. The findings from these studies yield inconsistent results related to reflective debriefing in regards to clinical judgment, and clinical reasoning, and reflection. Overall, given the limited research in this area, further research is needed to examine reflection over time with beginning nursing students.

Video-Assisted Debriefing

Debriefing, a critical component of simulation, provides the opportunity for students to critically reflect upon and discuss the events of a simulation to enhance student learning (Cantrell, 2008; Ha, 2014; Reed et al., 2013). According to the literature, debriefing should be structured and guided by a facilitator (Ha, 2014; Reed et al., 2013). The most effective approach, as gauged by students' learning, to structuring debriefing sessions remains unknown (Grant, Dawkins, Molhook, Keltner, & Vance, 2014). One suggested approach to structuring debriefing involves making a video recording of the simulation that is then shown to students after the simulation as a means to stimulate and guide discussion during the debriefing process (also known as video-assisted debriefing [VAD]) (Reed et al., 2013). Simulation audiovisual equipment allows for the recording of the scenario while students actively participate in pre-determined roles (e.g. nurse, nurse assistant etc.). The video captures the scenario for play back during the debriefing thus allowing both participants and observers (those viewing the simulation live in another classroom) an opportunity to review, reflect, and discuss the key events following the scenario. During video playback, students recall and analyze events that transpired during the scenario. Audiovisual recording equipment is therefore necessary in implementing video play back during debriefing. Several companies offer simulation technology to allow for video

recording while students are participating in the scenario and many nursing programs have purchased this technology. Yet, there is limited guidance on how to effectively utilize this technology during the debriefing process. Options exist in regards to the amount of video used during debriefing.

The video play back capabilities offer the opportunity for the facilitator to show either select clips or the entire video segment during debriefing. When the entire video is used during debriefing, the video can be paused as necessary to encourage a reflective discussion with cues, prompts, or questioning by the facilitator about the specific actions during the viewed segment. Alternatively, the facilitator can show specific clips of the video instead of the entire recording. When using video clips or segments, the facilitator determines pertinent events to play back. A guideline for using video clips during debriefing suggests using no more than 2-4 segments (Jeffries, 2012). Fast forwarding or selecting exact times that the events occurred can be used to locate video clips to play. Regardless of the amount of the video that is played back during debriefing, review of the simulation may be enhanced with this method.

In addition to video use, several other debriefing approaches have also been described in the literature. The literature documents the use of creating reflective questioning, cues, or prompts when using the video to enhance the debriefing (Bryne,2002; Dusaj, 2014; Grant, Moss, Epps, & Watts, 2010; Grant et al., 2014). For example, Think-Pair-Share (Angelo & Cross, 1993) was incorporated with debriefing in the study conducted by Dusaj (2014). The students were asked to 'think' about items that went well and identify an area for change in performance. During this video review the students viewed the entire video and took notes about student performance. Next the students 'paired' off to discuss their observations. Then each group 'shared' one item that went well and an area needing improvement. The remaining debriefing

time was guided with questioning such as ‘what were the key assessment findings?’ and ‘what intervention did you or would you have performed for this patient?’. Other options to guide discussion with the video review include focusing on a specific topic (such as nontechnical skills) (Savoldelli et al., 2006; Welke et al., 2009) or addressing the stated objectives of the scenario (Chronister & Brown, 2012). Another approach used to enhance VAD is incorporating a debriefing approach typically used with debriefing alone. One such approach, ‘Debriefing with Good Judgment’ was used in the study conducted by Sawyer et al. (2012) who compared VAD with verbal debriefing for improving performance in neonatal resuscitation with 38 pediatric and family medicine residents. This approach differs from the prompts, cueing, or questioning approach described above because an advocacy-inquiry type of method is used. An advocacy statement is paired with an inquiry during this debriefing. Regardless of the approach, questioning, prompts, or cues used, the facilitator uses the video to complement verbal interaction that occurs during debriefing.

With the various approaches used in conjunction with the video, faculty need to consider several factors when deciding upon use. Documented advantages and disadvantages exist regarding VAD. An advantage in using VAD is that it offers a visual reinforcement of the events that transpired during the scenario (Krogh, Bearman, & Nestel, 2015; Reed et al., 2013). Those actively participating in nursing roles during the simulation may not realize the impact of their actions during the scenario until they see the events reviewed on video play back. Also, since the simulation is a complex situation and multiple events may occur simultaneously, observers may miss key aspects of the simulation. VAD is thought to enhance student engagement during the debriefing process and that ultimately may help contribute to learning (Reed et al., 2013).

The video serves as a reinforcing mechanism of key points of the scenario and facilitates student discussion by acting as a reminder of what occurred.

Although advantages are evident, disadvantages must be considered by faculty. One documented disadvantage of VAD reported in the literature involves the time needed to replay the segment and hold a reflective discussion during debriefing (Chronister & Brown, 2012; Reed et al., 2013). When video is not used, facilitators have more time to verbally prompt students to mentally recall events and reflect on the scenario. Use of video during debriefing also requires appropriate audiovisual equipment thereby increasing cost (Chronister &Brown, 2012; Reed et al., 2013). Additionally, facilitators and/or simulation experts need the skillset to operate the equipment involved in recording, saving, and playing back the video. Issues with technology regarding access and potential problems with video playback are also recognized as a disadvantage (Krogh et al., 2015).

To fully understand how VAD was used following a simulation, the literature was searched through Proquest, Cumulative Index to Nursing and Allied Health Literature (CINAHL®), Medline, and the journals, *Clinical Simulation in Nursing,* and *Simulation in Healthcare*, during the years 2005 to 2015. Simulation use rapidly expanded during these years; therefore, the search focused only on this recent time period. Further literature was also reviewed through a manual search of reference lists. Eleven articles were reviewed. Six studies examined VAD use with undergraduate nursing students, three on anesthesia residents/anesthetists, one on medical students, and one on simulation experts. Nine studies used a quantitative design, one qualitative, and one used the 'Q' methodology, which includes both qualitative and quantitative findings. The quantitative designs were varied and included a comparative crossover, quasi-experimental, prospective randomized, and a randomized control.

The studies reported about variables of performance (Byrne et al., 2002; Dusaj; 2014; Grant et al., 2010; Grant et al., 2014; Savoldelli et al., 2006; Sawyer et al., 2012; Welke et al., 2009), response times (Chronister & Brown, 2011), and student perceptions (Ha ; Krogh et al., 2015; Reed et al., 2013) thus the following review will be organized around these themes.

Performance

There were several studies reviewed that focused on performance related to: neonatal resuscitation (Sawyer et al., 2012), clinical judgment (Dusaj, 2014), patient safety, communication, assessment, prioritization, interventions, and delegation (Grant et al., 2010; Grant et al., 2014), and task management, team working, situation awareness, and decision making (Savoldelli et al., 2006; Welke et al., 2009). A majority of the studies' findings revealed that performance resulted in no statistically significant difference between groups that received oral debriefing alone and VAD (Bryne, 2002; Grant et al., 2010; Grant et al., 2014, Sawyer et al, 2012; Savoldelli et al., 2006; Welke et al., 2009). Although there were no statistically significant differences when comparing VAD and verbal debriefing with some of the studies examining performance, overall improvement was shown with both types of debriefing. Additionally, differences were revealed between study designs and subjects. Further discussion of the following studies provides insight on VAD.

The design of a study conducted by Savoldelli et al. (2006) differed from most of the other studies measuring performance. Three groups of anesthesia residents (n=42) enrolled in year one, two, and four were randomized into a control group (which received no debriefing), an experimental group (which received verbal debriefing), and a group which received both VAD and verbal debriefing. Using the Anesthesia Nontechnical Skills Scoring System (ANTS) tool, a valid and reliable tool that measures behaviors related to task management, team working,

situation awareness, and decision making, measurements were collected during pre-test and post-test. In this study, both the verbal and VAD demonstrated increased mean scores in performance (p<0.0005) in comparison to the control group receiving no debriefing. Therefore, the findings reveal better performance with either VAD or verbal debriefing.

Using a similar study design, Welke et al., (2009) compared two treatment groups; however, a third group receiving no debriefing was not assigned. Similar to the previously discussed Savoldelli et al. (2006) study, the sample included 30 first and second-year anesthesia residents. The subjects were randomized into either a computer-based multimedia tutorial or VAD following simulation. The multimedia group received debriefing through a learner-controlled multimedia presentation developed by the researchers. The groups were comparable prior to the intervention (p=0.14) and improvement was shown from pre-test to post-test (p=0.97) and pre-test to retention (p=0.84). The study results revealed similarities to Savoldelli (2006) where no statistical significance differences between groups receiving verbal debriefing or multimedia instruction and VAD.

Although overall no statistically significant differences were found between groups (VAD and verbal debriefing or multimedia debriefing), some studies revealed a larger mean score for groups using VAD (Byrne et al., 2002; Grant et al., 2014; Sawyer et al., 2012). The mean scores were higher for the VAD group with behaviors such as patient safety, communication among team members, assessment, prioritization, and delegation (Grant et al., 2014), neonatal resuscitation (Sawyer et al., 2012) and problem-solving (Byrne et al., 2002). Grant et al. (2014) studied 48 junior-level undergraduate nursing students using VAD and an adapted Clinical Simulation Tool (CTSE) that measures patient safety, communication among team members, basic and problem focused assessment, prioritization of care, appropriate

interventions, and delegation to health care team members. The subjects' mean scores of behavioral performance increased more with VAD (6.62; SD= 6.07) than verbal debriefing (4.23; SD=4.02). Even though the Fleiss kappa coefficients which assessed interrater reliability for this tool resulted in strong values of 0.75 to 0.80, this study lacked a control group that received no debriefing. Without a control group there is no comparison group and group difference could possibly account for a difference of improvement with the VAD group. Additionally, like many of the other studies discussed, the sample size was small and data was collected one time.

Sawyer et al. (2012) also conducted a study comparing the effectiveness of video-assisted debriefing to verbal debriefing alone at improving performance in neonatal resuscitation with 38 pediatric and family medicine residents. The subjects were randomly assigned to the verbal debriefing or VAD after each simulation. The performance was measured using the Neonatal Resuscitation Performance Evaluation (NRPE) tool and findings revealed performance scores improved in both groups ($P< 0.001$); however, a larger improvement in neonatal resuscitation scores resulted with the VAD group but they did not show statistical significant findings (p=0.59).

Additionally, problem-solving was better with VAD and a smaller decreased mean in chart error was shown in a study conducted by Byrne et al., (2002). This study randomly placed 32 anesthetists from four hospitals into either verbal debriefing or VAD. Performance was measured by time to solve the problem (onset of clinical problem to the last significant intervention) and number of chart errors. The subjects receiving VAD showed a decrease in chart error (median ratio = 0.83) whereas those receiving verbal debriefing had a larger decrease in chart error (median ratio = 0.63). The time to solve problems was more evident in the VAD

group (median ratio = 0.68) than the verbal debriefing group (median ratio = 1.18). Several data collection concerns were evident with subjects completing poor data recording. Overall, the results for problem solving and chart error were not statistically significant when comparing groups (p >0.05). Increased mean scores were evident for the VAD in some of the studies (Byrne et al., 2002 Grant et. al., 2014; Sawyer et al., 2012); however, no statistical significance was found between these groups.

In contrast to the above studies, statistically significant improvements in student performance is recognized in the research about clinical judgment (Dusaj, 2014), response times (Chronister & Brown, 2012), and behaviors (patient identification, team communication, and assessment of vital signs) (Grant et al., 2010). These studies suggested improvement in behaviors with VAD in comparison to verbal debriefing alone. Chronister & Brown (2012) randomly placed nursing students in a VAD group or verbal debriefing group and completed a 10-point knowledge pre-test prior to the first simulation. Debriefing occurred following the simulation according to the particular method assigned. Students' skills were also evaluated using Emergency Response Performance Tool (ERPT). The ERPT reports internal consistency of r=.87 and Cronbach's alpha of .92 and includes a checklist of 19 skills that are scored from 0 to 2. One week later the same groups repeated the simulation; this time, the debriefing methods were switched. A similar knowledge exam was administered as a post-test. Pre-test scores for the VAD means ranged from 4.95 to 6.30; whereas verbal debriefing means ranged from 5.14 to 5.56. The pre-test and post-test scores showed a statistical difference between the debriefing groups (p = .008) indicating the knowledge retention was greater in the verbal debriefing group. Chronister & Brown (2012) found response times to initiate shock (p= .042), and resuscitation (p= .028) were faster with VAD when analyzing the data using a paired sample t test. When

comparing this study with others previously reported, this study suggested that those students in the verbal debriefing group had increased knowledge retention (p= .008). Additionally, similar to other studies, both groups of students benefited from the repetition of the simulation (p=.025). Although the findings from this study are statistically significant, reliability and construct validity were not reported; therefore, results related to student knowledge retention is questionable.

Similarly, better performance was reported with clinical judgment scores for the VAD group conducted by Dusaj (2014). Dusaj (2014) examined differences in student outcomes of clinical judgment, self-confidence, and learning satisfaction using video debriefing and traditional debriefing with (n=74) second year associate degree nursing students randomly placed in control and experimental groups. The LCJR (Lasater Clinical Judgment Rubric) (alpha reliability of .88 to .95 with no reports of validity), and Student Satisfaction and Self Confidence in Learning (SSSL) (alpha reliability of .87 to .94) tools were administered to both groups. Clinical judgment scores ($F(2, 53) = 13.79$, $p<.000$) were higher with the VAD group.

Another study by Grant et al. (2010) examined overall performance for VAD and revealed similar findings as Chronister and Brown (2012) and Dusaj (2014). The sample included 40 nurse and nurse anesthetist students divided equally into the experimental group and control group. Both groups participated in a simulation and were guided with either VAD or verbal debriefing alone. Again, the adapted Clinical Simulation Tool (CSET) was used to record behaviors related to patient safety, communication among team members, assessment, prioritization, interventions, and delegations (also used in Grant et al., 2014 study). Grant et al. (2010) found no statistically significant difference between groups for total behavior; however, the VAD group performed better in the areas of patient identification (p <.01), team

communication (p=.013), and assessment of vital signs (p=.047), therefore indicating that VAD may be useful for increasing clinical behavior performance in these particular areas. No statistically significant difference in total performance was revealed; however, VAD had higher mean scores on most desired behaviors. The findings of these studies support the use of VAD in improving performance in the areas of response times (Chronister & Brown, 2012), clinical judgment (Dusaj, 2014), and improvement in specific behaviors (Grant et al., 2014). In addition to performance, research has also examined perceptions of VAD.

Perceptions of VAD

Faculty and student perceptions of VAD have been reported in the research literature. Perceptions of VAD provide insight to better understand the approach. More specifically, faculty perceptions are important in understanding current practices of VAD to support learning (Krogh et al., 2015). Additionally, review of student perceptions may offer best practices for VAD (Ha, 2014; Reed et al., 2013).

One study examined 24 medicine, nursing, midwifery, paramedic and allied health faculty perceptions of VAD to explore current practices (Krogh et al., 2015). This study differed from other studies examining perception as the sample included faculty rather than students (Ha, 2014; Reed et al., 2013). Overall, VAD was described as a supporting tool to facilitate discussion. Faculty described inconsistent use of VAD where expert practice developed over time. Use of VAD depended on equipment, scenario, objectives, number participating in the simulation (participants and learners), and group dynamics. Results also revealed that with VAD only short clips were used to enhance debriefing rather than the entire video to provide objective perceptions of time, space, and use of equipment to encourage a reflective, focused discussion while removing the facilitator from criticizing students (Krogh et al., 2015). Challenges of VAD

were also identified as VAD may distract the facilitator and students. Additionally technological issues may arise. This study provided faculty perception regarding the use of VAD. Overall, very few studies discuss faculty perceptions of VAD. Research regarding student perceptions of VAD were also reviewed.

In other studies, the focus was on student perceptions of VAD (Ha, 2014; Reed et al., 2013). Reed et al. (2013) conducted a study with 64 undergraduate nursing students enrolled in a critical care course who were randomized into two groups, VAD and verbal debriefing. Following the debriefing, each group completed the Debriefing Experience Scale. Overall, students learned with and without video and few differences were noted. One difference between groups was revealed with the students' perception that there was enough time allotted for VAD based on the statement "I had enough time to debrief thoroughly" (p=.039) (Reed et al., 2013). In contrast, Ha's (2014) findings revealed that video was perceived as tiring. Ha (2014) evaluated attitudes of students using 'Q methodology'. This type of methodology synthesized data to clarify a subject's perception about a phenomenon. The process of Q methodology includes development of statements, sample selection, and then sorting the collected data. The data is then analyzed by varimax rotation for factor analysis to identify and label the most agreeable and disagreeable statements. Thirty-nine statements resulted following review and pilot testing. The statements were provided to 44 third-year undergraduate nursing students. Subjects ranked the statements, data was analyzed, and resulted in three factors associated with VAD: "video helps self-reflection", "video makes us tired and humiliated", and "video boosts self-confidence" (Ha, 2014). The other factors measured in the findings included: "video helps self-reflection (strategic view)" 10 students and 6 statements loaded, and "video boosts self-confidence (forward view) 28 participants' loaded based on eight statements. These two factor

results can be comparable to the other statistically significant finding revealed in Reed et al. (2013) described above "Debriefing helped me to make connections between theory and real-life situations" (p=.007). The students perceive VAD positively relating to the aspects of learning. Comparing these statements, the perception of VAD tends to indicate learning resulting from a combination of increased reflection, self-confidence, and connecting theory to practice. However, overall Reed et al. (2013) found no evidence that VAD was perceived better than verbal debriefing.

There are several concerns with Reed et al.'s (2013) study relating to sample, generalizability, and tool. The study sample included 62 students and was underpowered. To reach power, an *N* of 64 in each group was needed. Additionally, generalizability is limited due to data collection at only one study site. Ha (2014) research also used only one sample (*n*=44) and accrued from one university. Therefore, more research is needed in regards to VAD with larger sample sizes. Limitation related to research by Krogh et al. (2015) includes self-report of practice of 'experts' of simulation (expert was not measured). However, the sample was broad representing various health care professions from different locations. Overall, more research is needed with larger sample sizes. Further critique of the studies discussed revealed inconsistencies and need for more research related to VAD.

Conclusions

As discussed previously, study findings that focus on VAD vary. Additionally, several factors may contribute to the inconsistencies and lack of generalizability that raise concerns about use of these findings in nursing education. Most of the studies were conducted at a single site with a homogeneous sample thus limiting generalizability of the findings (Chronister & Brown, 2012; Dusaj, 2014; Grant et al., 2014; Savoldelli et al., 2006; Sawyer et al., 2012). One

study collected data with a mixed sample of senior-level nursing students and nurse anesthetists (Grant et al., 2010). Only two studies collected data from multiple sites (Byrne et al., 2002; Krogh et al., 2015). Multi-site studies provide a more diverse sample. Additionally, the sample sizes were small and ranged from 30 to 64 (Chronister & Brown, 2012; Dusaj, 2014; Grant et al., 2010; Grant et al., 2014; Sawyer et al., 2012). Small sample sizes lead to less representation of the population of interest and may result in type II errors (Polit & Beck, 2012). Most studies examined advanced practice health care professions: nurse anesthetists (Grant et al., 2010), anesthesia residents (Savoldelli et al., 2006; Welke et al., 2009) and medical residents (Sawyer et al., 2012). One study examined simulation experts (Krogh et al., 2015). Only three studies (Chronister & Brown, 2012; Grant et al., 2014; Grant et al., 2010) examined undergraduate nursing students and they used differing student groups and small sample sizes. No research has been done with sophomore nursing students with no prior simulation experience. Hence, drawing definitive conclusions about the results of VAD seem preliminary.

There are other methodological concerns that raise questions about the conclusions generated in the reviewed studies. Some studies used more than one facilitator to conduct debriefing (Grant et al., 2010; Grant et al., 2014). There is a chance of inconsistent debriefing or reliability concerns when more than one facilitator is used. Interestingly, some of the studies that focused on performance indicated that the same debriefing times were allotted for the verbal group and VAD (Chronister & Brown, 2012; Sawyer et al., 2012). Using the same debriefing time for VAD results in limited verbal feedback as compared to verbal debriefing alone. When the same allotted time is used for VAD some of the time is taken away with viewing the video. Other studies stated that no time limits were set for debriefing (Savoldelli et al., 2006) or did not report the time spent on debriefing. When the VAD time is set for 30 minutes, some of the time

must be dedicated to physically viewing the video; whereas verbal debriefing alone is spent with facilitator feedback and reflective discussion. The video takes away from the time available for verbal feedback/discussion during debriefing.

Other concerns, such as single data collection points were evident in the studies. One time data collection is insufficient in determining long-term effects of VAD. Additionally, comparative cross over designs provide an inconsistent exposure to either verbal debriefing or video debriefing through the study which was evident with the Chronister & Brown (2012) study. With a comparative crossover design, previous exposure to the first methodology has a questionable effect on the results of the data from that group. The research reviewed related to VAD reveal some inconsistencies and questions regarding adequacy of results. Further research is needed.

Summary

Overall, inconsistencies exist with the data collection methods and results of the studies reviewed, making it difficult to conclude whether VAD is more beneficial than verbal debriefing alone in structuring debriefing. Various literature was examined in areas of nursing, anesthesia, and medicine. Inconsistencies were evident in these different areas in regards to performance and student perceptions. Some studies that focused on students' performance improvement was evident in both groups receiving either verbal debriefing or VAD. In other studies, some improvement was more evident with the VAD, comparatively. Perceptions also varied in these studies and very little significance was evident between VAD and verbal debriefing. Some students find debriefing with video "tiring", whereas others perceive it as beneficial, helping with transfer of knowledge, confidence, and self-reflection.

Given the inconsistencies and conflicting results, more studies are needed examining VAD. It is recommended that these studies should have larger sample sizes to ensure adequate power. Studies with insufficient power pose a risk for type two errors or false negative results (Polit & Beck, 2012). Additionally, larger sample sizes are more representative of the population of interest (Polit & Beck, 2012). Additionally, the literature reviewed revealed very few studies that investigated similar subject groups making it difficult to arrive at conclusions on VAD. Also, all of the sample sizes were small and generalizability was limited.

There are no studies that measure VAD and the effect on reflection using repeated measures. Additionally, very few studies conducted repeated measures of VAD. Repetition of VAD with simulation over time may result in different findings. One-time exposure to VAD may not be sufficient to determine differences in performance (Grant et al., 2010). Additionally, no studies have investigated sophomore-level undergraduate students with no previous simulation exposure. Having no previous simulation exposure may reveal a deeper understanding of how reflection improves once simulation is introduced and then over time. Capturing this learner group may indicate the effect of structuring debriefing with the use of video on reflection.

Debriefing Without Video

Other literature provides insight on debriefing without the use of video. As described previously, video was one approach used to structure debriefing. This structure provides the opportunity to improve reflection, assist students' understanding of concepts, and enhance student-learning outcomes such as clinical judgement (Mariani, Cantrell & Meakim, 2008). To enhance learning, educators need to use debriefing, regardless of the structure or approach used, after every simulation encounter (INACSL Board of Directors, 2013). The literature was

searched during the years 2005 to 2015, through Cumulative Index to Nursing and Allied Health Literature (CINAHL®), Medline, and the journals, *Clinical Simulation in Nursing,* and *Simulation in Healthcare* to understand what is already known about simulation without the use of VAD. Additionally, a manual review of reference lists revealed further research relating to debriefing. Not many empirical studies exist related to debriefing. Eight studies were reviewed that used different methodologies, samples, and variables explored. These studies reported about variables of faculty role (Fey et al., 2014; Cantrell, 2008; Mariani et al., 2008; Dieckmann, Friis, Lippert, & Ostergaard, 2009), outcomes (Lavoie, Pepin, & Boyer, 2013; Shinnick et al., 2011; Weaver, 2015) and timing (Cantrell, 2008; Fey et al., 2014; Wotton, Davis, Button, & Kelton, 2010) thus the following review will be organized around these themes.

Facilitator Role

One theme emerging from the studies that explored debriefing without video focused on facilitator role (Cantrell, 2008; Fey et al., 2014; Mariani et al., 2008; Dieckmann et al., 2009). Facilitator, an INASCL Standard of Best Practice, is described as important in guiding and supporting debriefing to enhance student learning (Boese et al., 2013). Additionally, a competent facilitator is needed for successful debriefing (INACSL Board of Directors, 2013). The empirical findings related to the idea of the facilitator role focus on student perceptions (Fey et al., 2014; Cantrell et al., 2008) and faculty perceptions (Dieckmann et al., 2009; Mariani et al., 2008). A majority of these studies examined the impact of the facilitator role on debriefing in order to enhance learning during debriefing (Cantrell, 2008; Dieckmann et al., 2009; Fey et al., 2014; Mariani et al., 2008). Additionally, most of the studies focusing on facilitator role used a qualitative design and focused on perceptions.

Some studies discussed the facilitator role and student feedback during debriefing. Overall, the facilitator needs to encourage a reflective discussion for all participants. To ensure a good debriefing, findings reveal that students perceive the importance in the facilitator role in guiding interactions among peers (Cantrell, 2008; Fey et al., 2014). Fey et al. (2014) conducted a study with 28 nursing students from a public university in the mid-Atlantic region of the United States. The students were enrolled in an adult medical/surgical course and integration course and participated in simulations and then debriefed using the Debriefing with Good Judgment Model. After debriefing, data was collected through focus groups where the following themes emerged that related to facilitator guidance: Safe environment, debriefing to explore thoughts, feedback from multiple perspectives, all in this together, and group facilitation. Most of these themes provide guidance for the facilitator in how to encourage discussion during debriefing. Students commented on the benefits of not only hearing from the facilitator but also from all of their peers. They viewed the facilitator more as one who guided the debriefing rather than conducting most of the talking. Additionally, the findings revealed the importance of acknowledging students' mistakes and emotions to provide a safe environment.

Similar findings related to facilitation were also revealed in a study conducted by Cantrell (2008). Similarities were evident with the facilitator's presence of support during simulation and debriefing. Students prefer that facilitators provide direction rather than continual criticism. Students perceived the importance of the facilitator role to organize supportive feedback of what occurred during the simulation. Providing supportive feedback helps to promote reflection and student learning. Using a similar design and sample type as Fey et al. (2008), Cantrell (2008) studied 11nursing students that participated in a videotaped simulation followed by video debriefing. Two weeks later a structured debriefing with the videotape was used to collect data

during focus groups explored if a structured debriefing enhanced the value of clinical simulations. The study results revealed three critical components that influenced learning: Adequate preparation for the simulation, demeanor of the faculty involved in the simulation, and debriefing immediately following a simulation. Like the previously reported study by Fey et al. (2014) the facilitator played a crucial role during debriefing. Both of these studies used a qualitative design with nursing students to describe debriefing.

Interestingly, Dieckmann et al. (2009) findings revealed some inconsistencies with the previous findings that suggested the importance of promoting a reflective discussion among peers. The findings from this study differ where most interactions that occurred during the debriefing involved the facilitator who conducted most of the discussion through explanation of medical issues. The previous study by Fey et al. (2014) suggested gaining feedback from multiple perspectives meaning that interactions should involve students more so than primarily faculty. Similarly, Dieckmann et al. (2009) investigated eight debriefing interaction patterns between three facilitators who took turns debriefing with eight anesthesiologists. They participated in the simulation in groups of four. During the debriefing, the researcher observed the debriefing to explore the interaction patterns between the facilitator and participants. The observers coded interactions between the simulation instructor and four participants using a recording form. The interactions were coded with items such as a question or medical condition comment. Several interaction patterns occurred that revealed most interactions were conducted with the facilitator and one participant, facilitator and two participants, and the facilitator and every participant with very little interaction between participants. The interactions amongst both instructor and participants was only recognized during two of the eight debriefings. Additionally, the questions posed by the facilitator indicated that most interaction from the

facilitator involved comments about medical content. Participants were more interactive during the debriefing if they were assigned the most active role in the scenario. Overall, these results indicate that the facilitator influences different debriefing dynamics which was also revealed by Fey et al. (2014) and Cantrell (2008) studies. However, students prefer feedback from both peers and facilitator (Fey et al., 2014). Feedback from both peers and facilitators was demonstrated in only two of the eight observed debriefing. Therefore, these finding reveal that what facilitators and students perceive as important is not being practiced. Overall, the results of these studies display evidence, through qualitative data, that the facilitator role is important in providing debriefing to enhance student learning.

The findings from another study reveal that facilitators need to take time to learn and understand debriefing to successfully debrief (Mariani et al., 2008). Overall these findings relate to the Fey et al. (2014) and Cantrell (2008) studies with the recognition that the facilitator role remains important to enhance student learning. Using focus groups, Mariani et al. (2008) investigated perceptions about structured debriefing in clinical with 22 nurse educators from seven nursing schools. Two themes emerged that suggest that debriefing requires time and creates changes in faculty's teaching practices. To adequately encourage reflection, faculty feel that debriefing takes time to successfully master, meaning that facilitators have to take the time to learn debriefing through practice. Additionally, findings suggest that faculty, once proficient in facilitating debriefing, learn to teach differently so they can help students reflect and make connections between theory to practice. Overall, these findings relate to Fey et al. (2014) and Cantrell (2008) studies in that the facilitator role is central to student learning during debriefing. Facilitator's must learn to debrief to encourage interactions amongst the entire group of

participants. Overall, most of the studies related to facilitator role use a qualitative design and describe nursing student and faculty perceptions.

Outcomes

Other studies were examined that reported on the outcomes of debriefing that focused specifically on knowledge (Shinnick et al., 2011), clinical judgment, (Lavoie et al., 2013; Weaver, 2015), prioritization, and assessment (Lavoie et al., 2013). The results of these studies indicated that debriefing enhances student outcomes in each of these areas. Studying outcomes related to debriefing is critical in understanding how to most effectively debrief to enhance student learning. Anecdotally, literature reveals that the debriefing component is the most beneficial; however, minimal empirical evidence supports this information. Although these studies exist related to outcomes of debriefing, a lack of research remains which results in preliminary conclusions.

Outcomes were examined to determine when knowledge is most enhanced during the simulation experience. One study conducted by Shinnick et al. (2011) investigated 162 pre-licensure nursing students using a two group repeated measure design from three different schools using a High-Fidelity Clinical Knowledge Questionnaire to measure knowledge to determine where knowledge was gained during the simulation experience. Mean scores of the High-Fidelity Clinical Knowledge Questionnaire were determined before and after the simulation (prior to the debriefing) and resulted in a decrease in knowledge scores (M = -5.63, SD = 3.89). However, mean scores significantly increased when the High-Fidelity Clinical Knowledge Questionnaire was administered again following the simulation and debriefing (M = 6.75, SD = 4.32, $p < .001$). Additionally, results revealed a statistically significant difference ($p < .001$) between the knowledge scores prior to the simulation and following the debriefing (M =

6.75, *SD* = 4.32). Therefore, the results indicate that most learning occurs during the debriefing component of simulation; however, results must be interpreted with caution because of limitations of this study. Students had variations in previous simulation and clinical experiences. The study sample was accrued from three different sites which resulted in inconsistent simulation experiences. Additionally, clinical experiences can vary among clinical groups due to factors such as different sites, types of patient, etc. In addition, the data was collected during one simulation and debriefing experience. Further measurements may have produced different results.

Similar finding were evident in other studies that focused on the structure of debriefing and the effect on student outcomes. Clinical judgment was improved when structuring a debriefing using the plus/delta method and model demonstration (Weaver, 2015). A model demonstration involves the faculty who models correct procedures and decision making during a simulation scenario. Weaver (2015) debriefed using a five-minute video-recorded model demonstration of the faculty participating in the same simulation as the students. The faculty displayed correct performance during the simulation. The experimental group of 96 sophomore-level baccalaureate nursing students debriefed with a review of the model demonstration and discussion using the plus/delta approach where the control group debriefed using the plus/delta approach only. Both groups experienced a simulation and debriefing two times scheduled one week apart. Clinical judgment, self-confidence, and satisfaction were measured during the first and second simulations (scheduled one week apart) using the NLN Student Satisfaction and Self-Confidence in Learning instrument and LCJR tools. Structuring debriefing with a model demonstration yielded statistically significant findings related to improving clinical judgment [$F(1,94) = 60.051$, $p < .001$]. Self-confidence scores measured after time one and time two also

approached statistical significance [$F(1,94) = 3.601$; $p = .601$]. Additionally, the experimental group's mean score for self-confidence from time one to time two was larger than the control group. Although significant findings were evident in this study, limitations include items such as limited time between each measurement (one week). Assimilation of knowledge may not have occurred during this short time frame. Also, the experimental group only received the model demonstration during time one. During time two both groups received plus/delta debriefing with no model demonstration. The data obtained after the debriefing during time two may have resulted differently since no model demonstration was used. Additionally, the plus/delta method limits debriefing questions to correct actions and areas for improvement related to the objectives of the simulation. Therefore, this approach limits the potential of encouraging reflection during debriefing.

In comparison to Shinnick et al. (2011), both study findings suggest that debriefing positively enhances nursing student learning outcomes. Interestingly, each study used a different debriefing approach. The Weaver (2015) study suggested an improvement in clinical judgment outcome with debriefing using a model demonstration and plus/delta approach while Shinnick et al. (2011) did not specify an approach. The Shinnick et al. (2011) study recognized that debriefing is essential to student learning outcomes and is more important than the physical simulation experience alone. Whereas, Weaver (2015) determined that structuring a debriefing using the model demonstration method produced better clinical judgment scores when compared to debriefing sessions that utilize the plus/delta method only.

Debriefing also enhances clinical judgment, prioritization, and assessment. Lavoie et al. (2013) conducted a study that resulted in similar finding as discussed with Shinnick et al. (2013) and Weaver (2015) studies where debriefing positively affects student outcomes. Lavoie et al.

(2013) completed a pilot study using a qualitative design to gain insight on five nurses' perception, which had recently finished an orientation program of reflective debriefing. The nurses' perceptions revealed that reflective debriefing using Tanner's Clinical Judgment Model, that focuses on noticing, interpretation, and responding helped cognitive processing and enhanced clinical judgment, prioritization, and assessment. The nurses completed an open-ended questionnaire created to gain insight on their perceptions of simulation and reflective debriefing. Examples of the questions included: 'What did you learn today?', 'What did you like the most/least about the activity?', and, 'How did this activity contribute to the development of your clinical judgment? In response to the open-ended questionnaire, the nurses' perceptions suggests that reflective debriefing using Tanner's Clinical Judgement Model is beneficial in enhancing student thinking. In comparison to Shinnick et al. (2011) and Weaver (2015), all studies used a different debriefing approach and study design but yielded similar results. However, limitations with Lavoie et al. (2013) included a pilot study with a small sample size of only five nurses. Further research is warranted with a larger sample.

Although the reviewed studies used different approaches to debriefing, results revealed increased knowledge (Shinnick et al., 2011), improved clinical judgment (Lavoie et al., 2013; Weaver, 2015), and enhanced prioritization and assessment skills (Lavoie et al., 2013). Overall, the debriefing approaches appeared to enhance student thinking and learning; however, since few studies exist focusing on the areas of outcomes, conclusions about best practices are preliminary and are difficult to determine. Difficulty remains in determining best practices regarding debriefing. Conclusions seem preliminary based on the little empirical literature available. Future research related to specific debriefing approaches impact on student learning is needed.

Timing

Other simulation studies focused on the timing aspect of debriefing exploring the most appropriate time to debrief following a simulation. Timing of debriefing is essential for student learning. Overall, the studies that focused on timing used a qualitative design and are based upon nursing student perceptions. The findings suggest that debriefing should take place immediately following the simulation (Cantrell, 2008; Fey et al., 2014; Lavoie et al., 2013; Wotton et al., 2010). This is not surprising since most of the data was gathered from study participants who had experienced a simulation and debriefed immediately following. They expressed perceived benefits of debriefing immediately following the simulation. In a previously discussed pilot study by Lavoie et al. (2013), the researchers examined five nurses following a simulation and reflective debriefing session. They found that participants' perceived that debriefing immediately following the simulation as ideal. However, the study yielded a small sample size. Additionally, nothing was mentioned that the nurses experienced any other simulation experiences prior to this study.

Debriefing immediately following a simulation is also supported in other studies that reported on nursing students (Cantrell, 2008; Fey et al., 2014; Wotton et al., 2010). Along with the previous study where nurses expressed their thoughts on a reflective debriefing (Lavoie et al., 2013), nursing students also perceive immediate debriefing as beneficial to learning. Wotton et al. (2010) conducted a study with 300 third-year nursing students to evaluate student perceptions of simulation using an evaluation form with 11 Likert-style and three open-ended questions. The students completed the evaluation form immediately following the simulation and debriefing. Based on the responses, the students preferred immediate debriefing because the timing of debriefing promoted reflection of the simulation.

Another study also reported similar findings to Lavoie et al. (2013) and Wotton et al. (2010) where nursing students felt that immediate debriefing was useful (Fey et al. 2014). This study investigated 28 nursing students who experienced a simulation and debriefed immediately following. Then, the students participated in focus groups and explained that immediate feedback provided during debriefing was a critical aspect for learning. Again, this response was based on qualitative data.

Cantrell's (2008) findings were also similar to the previously discussed studies where 11nursing students perceived immediate debriefing as beneficial. In this study, the nursing students reported that "the medium for debriefing was not as essential as the timing of it" (p. e 21). Immediate debriefing allowed the students to recall the simulation more accurately. Additionally, having just completed the simulation, the students were still engaged and wanted to discuss the events that occurred. Although the results were similar to the previously-mentioned studies, this was the only research that conducted simulation and debriefing over various times. They conducted the debriefing immediately following the simulation and then used the videotaped simulation and conducted a second debriefing two weeks later. Results from each of the other studies indicate that the participants preferred debriefing immediately following; however, immediate debriefing was the only exposure provided to the students with the exception of Cantrell (2008) where students were exposed to debriefing immediately after and two weeks following. However, a concern raised with Cantrell (2008) study includes the data was audiotaped, transcribed, and re-verified; however, the students did not verify the themes that occurred from the focus groups.

Overall, students prefer debriefing immediately following the simulation and see it as beneficial for their learning. Each of these studies explored nurses' and students' perceptions

regarding timing of debriefing. The findings were based on qualitative data that lay the groundwork for future research. No formal measurements of debriefing and timing are evident in the literature. Additionally, only one study exposed students to a debriefing immediately following the simulation and debriefing at a later time, thus in other studies, students may not have other comparisons from which to judge.

Conclusions

Although the literature exists related to the themes of facilitator role, outcomes, and timing of debriefing, research in this area remains scarce. Conclusions about debriefing seem preliminary. Overall, consistencies in perceptions were apparent in all of the studies focusing on the facilitator role, which is important in providing a quality debriefing to enhance student learning. Additionally, some studies demonstrated that certain debriefing methods improved student outcomes. The literature also revealed the importance of immediate debriefing after a simulation based on students' and nurses' perception. Although consistent findings were evident in the literature related to these themes, several concerns are raised with the presented studies.

Each study used a different debriefing approach including plus/delta and model demonstration (Weaver, 2015), Debriefing with Good judgment (Fey et al., 2014), DML (Mariani et al., 2008), and Tanner's Clinical Judgement Model (Lavoie et al., 2013). Another study focused debriefing using questions such as 'what were the patient's goals for this episode of care' (Cantrell, 2008). Other studies did not specify the exact debriefing approach (Dieckmann et al., 2009; Shinnick et al., 2008; Wotton et al., 2010). Therefore, since these studies used different approaches when examining debriefing, it is hard to conclude which debriefing approach is best. Additionally, more research is needed using similar approaches to determine how best to debrief.

Most of the research related to debriefing without video was conducted through qualitative research and yielded results related to perceptions of debriefing. Some of the qualitative studies (Cantrell, 2008; Dieckmann et al., 2009; Lavoie et al., 2013; Mariani et al., 2008) did not discuss verification of themes by the participants and/or did not state if data saturation occurred leading researchers to believe that the data may not provide an accurate description of the phenomena studied (Polit & Beck, 2012). Again, more research is needed to better gauge best practices for debriefing.

Another inconsistency among the scarce debriefing literature includes the subjects. The subjects studied varied and included facilitators and anesthesiologists (Dieckmann et al., 2009), nurse educators (Mariani et al., 2014), nurses (Lavoie et al., 2013) undergraduate nursing students (Cantrell, 2008; Fey et al., 2014; Weaver, 2015), and pre-licensure nursing students (Shinnick et al., 2011). Therefore, difficulty remains in drawing accurate conclusions based on a specific population since such diverse subjects have been studied.

Another concern stems from data collection. Only one study used a repeated measure design. The study that used a repeated measure design was limited to one week between data collection times whereas more time or repeated data collection may have demonstrated different results (Weaver, 2015). Repeated measures allows for data collection at multiple points (Polit & Beck, 2012) and may result in different findings. A repeated measure approach also helps to determine if any change occurs over time. Current simulation practices in nursing education involves several simulation and debriefing exposures in a course of just one semester. However, most of the literature misrepresents this practice and measures only at one point in time. Overall, more research is needed to determine how debriefing affects student learning over time.

Summary

In summary, further research is needed regarding debriefing. Inconsistencies are evident with the debriefing approach examined, making it difficult to formulate best practices for debriefing. Additionally, very little literature exists on debriefing, making these conclusions preliminary. Diverse groups of subjects were studied and included nursing students, anesthesiologists, and facilitators. Most of the studies revealed findings based on student or facilitator perceptions. The facilitator role in debriefing is pertinent in enhancing student reflection and learning. Also, student outcomes are improved with debriefing. Additionally, based on some literature, timing of debriefing immediately after the simulation may be essential for student learning. Overall, not a lot of research exists in any one area of debriefing. More research is needed to determine how to best structure the debriefing to enhance student learning. The following section discusses the GRAS.

Groningen Reflection Ability Scale

One tool that measures personal reflection ability is the Groningen Reflection Ability Scale (GRAS) originally developed and tested in Dutch and then translated to English. The GRAS is a self-reported, one-dimensional scale that contains 23-items that measures reflection (Aukes et al., 2007) The scale includes three relevant subscales: self-reflection (10 items) (such as 'I take a close look at my own habits of thinking'), empathetic reflection (6 items) (such as 'I am aware of the possible emotional impact of information on others'), and reflective communication (7 items) (such as 'I am open to discussion about my opinions') (Aukes et al, 2008). Although these subscales exist, the GRAS measures personal reflection as a single score. The statements in which the subjects respond include items such as 'I am aware of the emotions

that influence my thinking' and 'I test my own judgments against those of others'. The term reflection is not used in the directions or in any of the items.

Subjects can easily complete the scale in 10 minutes (Aukes et al., 2007). Each item on the scale is measured using a 5-point Likert scale ranging from a score of one, totally disagree, to a score of five, totally agree. The individual items are then summed to generate a total scale score. A total score ranges from 23 indicating low reflection (negative) to a maximum of 115 indicating very high reflection (positive). A "good" score is not defined or included for this scale. Five of the items in the scale are negatively worded (items 3, 4, 12, 17, 12) so reversal of the Likert scale is needed when scored.

The GRAS was initially developed for medical students and doctors in Dutch and underwent psychometric testing (Aukes et al., 2007). Items for the scale emerged from a review of the literature related to reflection, personality theory, and educational practice. Medical teachers and faculty members reviewed the items to determine face validity. The revised scale was pilot tested with 350 first-year medical students and 38 faculty at a university. Based upon testing, the GRAS was revised again. Items with a 1.0 standard deviation on a 5-point Likert were sufficient and were retained while items that scored less than a 0.75 standard deviation were removed. Following this preliminary testing, content validity was established with 19 experienced medical staff members. Two measurements were then conducted to establish internal consistency. The first measurement included a sample of 538 first-six year medical students, 38 medical teachers, and 14 experienced teachers in medical skills. The second measurement included 1029 first-year to sixth-year medical students. The Cronbach's alpha was reported between 0.83 (first measurement) and 0.74 (second measurement). A Cronbach's alpha above a 0.7 is considered acceptable (Pallant, 2013). Explorative factor analysis and Kaiser-

Meyer Olldin with varimax rotation, a test to measure sampling adequacy for factor analysis, (Pallant, 2013) was also used during development to explore the possibility of subsets of items. These results indicate that the GRAS is a one-dimensional scale with three relevant aspects self-reflection, empathetic reflection, and reflective communication.

Aukes (2008) further validated the GRAS by examining the correlation with other reflection scales (four Korthagen reflection scales, Need for Cognition (NFC) scale, Open-Mindedness scale, and Personal Need for Structure Scale (PNFS)). The GRAS and four Korthagen reflection scales were correlated and analyzed in a study. The four Korthagen (1993) reflection scales include the domains of Self-internal orientation (SI), Self-external orientation on learning (SE), Fellow-students internal orientation on communication and cooperation (FI), and Fellow-students external orientation on communication and cooperation (FE). Aukes (2008) discussed personal reflection linking most closely with SI than with SE, FI, and FE. Therefore, Aukes (2008) formulated the hypothesis that correlation levels with the GRAS would decrease from SI to FE. Results revealed that indeed the hypothesis was correct. Most correlations between the scales were significant ($r=.32$ to $.75$, $p<.01$, two tailed). A small correlation was found between FE and Empathetic Reflection ($r=.19$, $p<.05$, two tailed) and Reflective Communication ($r=.15$, n.s.). The highest correlation was with the SI scale ($r=.67$) and lowest with the FE scale ($r=.32$).

The second study reported by Aukes (2008) examined the correlation between the GRAS and NFC, PNFS and Open-Mindedness scales. A positive correlation with the NFC and Open-mindedness scales was predicted due to the nature of the scales focusing on feelings and values. A negative or neutral correlation between the GRAS and PNFS was hypothesized because structure may hinder reflection. The correlation between the GRAS and each scale were all

significant ($p < .01$) and are as follows: NFC (r=.56) and Open-Mindedness scale (r=.56) and low negative correlation with the PNFS (r=-.14). Aukes (2008) study results of the correlations between the scales support the GRAS as a valid and reliable tool in measuring personal reflection ability.

There are limited further reports of the use of the GRAS in the literature. One study used the GRAS to measure reflection with medical students (Aukes et al., 2008), one study measured reflection using the GRAS with nurse practitioners (Morse, 2012) and another study further validated the tool (Anderson, O'Neill, Gormsen, Hvidberg, &Morcke, 2014). The study conducted by Aukes et al. (2008) examined the effect of experiential learning on personal reflection in undergraduate medical students. The GRAS was administered to the experimental group (n=394) who participated in the experiential learning program and to the control group (n=403) that participated in the standard problem-based learning program. The participants did not complete the GRAS during all measurements. Measurements for the experimental group were taken at 1 month with n=252 (*M* GRAS score = 50.2; SD 4.55); 9 months with n=237 (*M* GRAS score = 53.9; SD 4.80) and 14 months with n=265 (*M* GRAS score = 55.1; SD 4.10). The control group measurement with n=78 at 21 months (*M* GRAS score = 52.9; SD 5.00) 28 months n=172 (*M* GRAS score = 55.6; SD 4.03), and 33 months with n=59 (*M* GRAS = 56.0; SD 4.91). There was statistically significant findings ($p< .001$), for development of personal reflection with those participating in the experiential learning group. Further psychometric testing on the GRAS was not provided in this report.

Another study conducted by Morse (2012) explored the effectiveness of *Debriefing with Good Judgment*, a structured debriefing model, on acute care nurse practitioner students (n=22) reflective ability and perspective transformation with clinical simulation. The GRAS was

administered at five different points, as a baseline measure and then after each simulation experience. The GRAS Cronbach's alpha for each measurement was .853, .853, .865, .842, and .782. These results suggest reliability as a Cronbach's alpha above 0.7 with scales having more than 10 items are considered acceptable; Cronbach's alpha above a .8 is considered good (Pallant, 2013). Most measurements of the GRAS, based on the findings for this study, resulted above a .8 indicating reliability.

The original GRAS scale exists in Dutch and English. As mentioned previously, the psychometric properties of the scale are appropriate. However, the GRAS was also translated and validated in a Danish setting (Anderson et al., 2014). The scale was completed by 361 medical students. One month following the initial administration, the post-test was completed by 112 students, yielding a 65% response rate. A number of variables were also explored and include: age, gender, study year, extracurricular activity, and choice of electives. The Cronbach's alpha for this study was 0.87 and inter-item covariance was 0.22. Five outliers showed high disagreement between test and retest. However, since the scale was translated, differences in the meaning of each statement within the scale could explain the negative findings. Additionally, the confirmatory factor analysis did not confirm the one-dimensional or the three factor model. As discussed previously, the scale includes one-dimension measuring reflection with underlying factors that consist of self-reflection, empathic, and reflective communication. The authors conclude that further testing is needed for the Danish version of the GRAS.

Overall, the initial development of the GRAS had good psychometrics (Aukes et al., 2007). Additionally, the GRAS correlates positively with other scales that measure reflection therefore further validating the tool (Aukes, 2008). One further validation study concluded with issues regarding psychometric properties (Anderson et al., 2014). However, translation of the

tool from Dutch to Danish occurred and may have possibly resulted in inconsistencies in the meaning of tool statements. There has been limited use of the tool beyond initial development and validation. However, the two documented studies (Aukes et al., 2008; Morse, 2012) suggest that the GRAS is a sufficient tool in measuring reflection. These studies were conducted in two different countries (Netherlands and United States) with one study measuring medical students and the other measuring nurse practitioners. No studies exist that use the GRAS with undergraduate nursing students. The scale is thought to be useful in measuring reflection over time (Aukes et al., 2007) which was the methodology in Morse (2012) and Aukes et al. (2008) studies. A change in reflection can be captured with measurements overtime.

Chapter Summary

This chapter provides a review of the literature relevant to this study. Schön's work, as well as an overview of reflection, was discussed. Literature relating to reflection and debriefing was provided. Additionally, specific research focusing on debriefing with and without video was presented. Lastly the GRAS was discussed. A critique of the studies and need for future research was incorporated throughout this chapter. The following chapter discusses methodology of the study.

CHAPTER THREE

METHODOLOGY

Chapter three explains the methods used in this research study. This chapter begins with a discussion of the study design. The setting and sample, instrument, and procedures are also described. Data analysis concludes the chapter.

Design

The primary purpose of this study was to examine personal reflection ability following a high fidelity simulation and VAD with sophomore-level undergraduate nursing students. This study used a descriptive, one group pre-test-post-test repeated measures design. A one-group approach provides a "reasonable choice only when intervention impact is expected to be dramatic and other potential causes have little credibility" (Polit & Beck, 2012, p. 218). Therefore, for this study, the influence of VAD on personal reflection ability scores over time is thought to be significant. Also, a repeated measures design allowed for a collection of data over multiple points in time before and after an intervention (Polit & Beck, 2012).

Setting and Sample

The study took place at a large state university in western Pennsylvania. The simulation facility at the university included a control room with a one-way mirror that views a simulated hospital-like patient room that houses a high fidelity manikin (Laerdal, SimMan®). This control room allows the simulation operator to manage the scenario through manipulation of video cameras, manikin software, and an intercom for patient voice. The audio-visual equipment allows for a video-recording of the simulation for 'live' feed into another classroom for students to observe the scenario and/or video recording to use during debriefing or another time.

At this university, simulation experiences begin during nursing courses that occur at the end of the first semester, sophomore year. To capture students that have no simulation experience, this study used a convenience sample of undergraduate prelicensure nursing students enrolled in a first-semester sophomore-level Fundamentals I Theory course at this academic institution. This course is an introductory course to nursing that focuses on the nursing discipline, process, values, and standards. All participants were enrolled in this course during the fall 2015 semester. This particular group of students was chosen because they should not have had any previous simulation experience. Inclusion criteria for this study included:

1. no previous simulation or debriefing experience.
2. first-time enrollment in the Fundamentals I course during Fall 2015.

Exclusion criteria for this study included participants who:

1. repeat the course; and
2. have had previous exposure to simulation

The analysis was set to detect a medium interaction effect (f=.25) between the four time points and a fixed factor at two levels with an alpha of .05 and a level of power of .80. Correlation between the replicated measures was set at a conservative level of 0.2. The analysis indicated a required sample size of 38 for a repeated measure ANOVA with one fixed factor. Because the software only allows one fixed factor, the sample size was doubled to account for the study's two fixed factors, previous health care experience (no vs. yes) and GPA (low vs. high).

The diversity of the actual sample of sophomore level nursing students was anticipated to be similar to the overall demographics of the nursing program. There are a total of 589 students in the nursing program at the determined location of the study. The diversity of the selected

academic institution nursing demographics includes 14% males, and 86% females (C. Kitas, personal communication, October, 15, 2014). The diversity according to race includes: 91% White Non-Hispanic, 4% black, 1% multiracial, and the remainder Asian or Pacific Islander, Hispanic, Unknown, and Non-Resident Alien. There are 94% full-time students. In-state residents account for 95% of the students. Eighty-one percent of the nursing students are equal to or less than 21 years of age; 13% include 22-25 years old. Demographics for this study were gathered during data collection. The following section discusses the instrument used to measure reflection.

Instruments

This study used the Groningen Reflective Ability Scale (GRAS) (see Appendix A) to measure personal reflection ability. Permission to use the tool was obtained from one of the tool developers (see Permission letter- Appendix B). This tool was originally designed to measure the personal reflection ability of medical students and doctors in Dutch; it then underwent psychometric testing, and was translated to English (Aukes et al., 2007). Items for the GRAS materialized through a literature review of reflection, personality theory, and educational practice. Eleven medical teachers and 20 faculty members reviewed and revised each item to determine face validity. The revised GRAS was pilot tested with 350 first-year medical students and 38 faculty at a university. Following, the GRAS was revised by removal of items that scored less than a 0.75 standard deviation on a 5-point Likert scale. Content validity was established with 19 experienced medical staff members. This process involved scoring of each item on a scale of one to five (one meaning not relevant at all to five very relevant). All items with a mean score of greater than four were kept on the GRAS. Tool psychometrics using factor analysis was also measured on two occasions to establish internal consistency. The first GRAS psychometric testing involved 538 medical students and 52 medical teachers and the second measurement

included 1029 first thru six year medical students. Cronbach's alpha was reported between 0.71 and 0.83. Research described in chapter two, reported Cronbach's alpha coefficients of .782 to .865 (Morse, 2012) that is similar to the original psychometric testing by Aukes and colleagues (2007). Internal consistency was also calculated for this study: Time 1 = .715, Time 2 = .828, Time 3 = .878, Time 4 = .838. Again, indicating good reliability. Exploration of a possible subset of items revealed the GRAS as a 23-item one-dimensional scale that measures personal reflection with three relevant aspects of self-reflection, empathetic reflection, and reflective communication.

Items on the scale avoid use of the term reflection and include statements such as 'I test my own judgments against those of others' and 'I am accountable for what I say'. When answering each item on the GRAS, participants select from a 5-point Likert scale (1=total disagree to 5=totally agree). Subjects can easily complete the scale in 10 minutes (Aukes et al., 2007). Once completed, each item on the scale is added to determine the total reflection score. A maximum point value of 115 indicates very high reflection whereas the minimum score of 23 indicates very low reflection. Calculation of a total score occurs after each administration of the GRAS. The GRAS is thought to be useful in measuring reflection over time using a repeated measures approach (Aukes et al., 2007). In addition to the GRAS, participants answer seven demographic questions (see Appendix C) created by this researcher and these items were used to describe the sample. The next section will discuss procedures of the study.

Procedures

Approval from the Institutional Review Board (IRB) was obtained prior to data collection. Access to the participants was gained through an email to the course instructors teaching the sophomore-level Fundamentals I Theory course at the selected academic institution. Once permission was obtained from the course instructors, coordination of research involving

simulation and debriefing occurred. A discussion of possible scenario topics and timing of activities during the fall semester also occurred with the teaching faculty. The course instructor and researcher determined three different dates during the fall semester to allow for data collection of repeated measures over time. In addition, the syllabus was provided by the teaching faculty to help select simulation scenarios appropriate for the scheduled class time. During the scheduled simulation times, the class topics included vital signs, oxygenation, and therapeutic communication. Three different scenarios scheduled on three dates were chosen to provide the students more exposures with simulation. The scenarios were developed by the PI based on the topics of vital signs, oxygenation, and communication with a patient admitted in heart failure. For the first scenario, the patient was admitted in the hospital for one day. The same patient was used for the two other scenarios for familiarity of the case. During the second scenario the patient was admitted for two days. The third scenario the patient was admitted three days prior and now ready for discharge. Three subject experts were used to establish validity for the scenarios. Each scenario had 100% expert agreement that they adequately represented the simulation topic.

To ensure consistency in delivery with the simulation and VAD the researcher prerecorded the simulations to use in the study. With a prerecorded scenario all students in the sophomore-level fundamental class observed the exact same simulation. Students who observed the scenario gained valuable learning related to the content of the simulation. Empirical evidence revealed no difference of learning with those who observe or participate during a simulation (Kaplan, Abraham, & Gary, 2012). In one study, no differences in testing outcomes were found with those that participated or observed (p=.97) during the simulation (Kaplan et al., 2012). Additionally, prerecording the simulation also allowed for consistency of performance

during each simulation. Nursing laboratory staff (simulation specialist) acted in the nurse's role for the simulation. The nurse's role was scripted to include correct and incorrect behaviors to discuss during debriefing. For example the scenario was scripted to include an incorrect action of the nurse taking an oral temperature immediately after the patient took a drink of cold water. A correct action for this scenario included appropriate blood pressure measurement. The laboratory staff who volunteered to participate in the simulation reviewed and practiced each scenario as many times as needed until she enacted the scenario following the script. Once there was an accurate performance, a recording of the scenarios occurred. The prerecorded scenarios were reviewed and guided the creation of debriefing questions utilized with the VAD. Additionally, specific segments of the video were selected to play back during debriefing. For example, the segment of the nurse taking the temperature was selected for video play back to the student. The debriefing question included for this segment "Is there anything that you have noticed that the nurse did while obtaining vital signs that you would have maybe done differently?" This type of question was created to prompt a reflective discussion amongst the students.

Course instructors teaching the sophomore-level Fundamentals I theory course were present during the simulation and debriefing. Faculty teaching the course were asked not to provide any information, cues, or prompts to the students during the VAD or during data collection. This helped control for any extraneous variables that could possible obscure the relationship between VAD and personal reflection ability (Polit & Beck, 2012). While the students were completing the demographics and GRAS each time, the faculty teaching the course was asked to leave the classroom.

During the first scheduled simulation the researcher provided the students with information about the study regarding participation and consent. All nursing students enrolled in the sophomore-level Fundamentals I Theory course were given an opportunity to participate in the study. This was also necessary to accrue an adequate sample. Participation in the study included viewing a simulation scenario and active involvement during the debriefing. Again, none of the participants actively served in nursing roles during the simulation scenarios. They observed the scenario via a prerecorded simulation. A cover letter (see Appendix D) was given to all nursing students enrolled in this course as the study details are shared. The cover letter described the study. The cover letter informed the students that participation in the study was voluntary and did not affect their grade. They were also informed of the potential risks and benefits. A potential benefit of the study was that the data from the activity may be used to guide best practices for debriefing. They were also informed that they were free to withdraw from the study at any time by making a formal request to the researcher. Consent was implied upon survey completion. Those students who did not consent participated in the simulation experience but did not complete the GRAS. Non-participants were informed that they would have an alternative assignment of writing a one-page reflection of the debriefing following each simulation experience. Therefore, data was not collected from those participants who did not consent.

The participants completed a one-time demographic form as well as the pre-test (Time 1) of the GRAS prior to the first simulation viewing. This data collection established a baseline personal reflection ability score for each subject. The participants were asked to write their university email on the pre-test and each post-test to enable tracking of the personal reflection ability score overtime. The researcher explained that each student was issued a unique identifier

once the data was entered into the statistical software. Additionally, the pre and post-tests were completed using a Scantron form to allow for electronic uploading of the data. The students entered their email alias on the Scantron to match scores over time. Following completion, the researcher collected the pre-test and then explained the process of viewing the scenario and then debriefing. The students were instructed to take notes of what occurred during the scenario paying particular attention to actions or activities that were appropriate and correct and those that were not. A description of debriefing was also provided to the students; however, the term reflection was not used in this overview. After this description, the PI gave the students report and they viewed the scenario. The researcher remained in the room with the participants to ensure proper functioning of the video recording and to monitor for distractions or problems. During the simulation, the students viewed approximately 5 minutes of the prerecorded scenario.

After viewing the simulation scenario, the researcher conducted a VAD. Each VAD was conducted by the researcher to ensure consistency. Selected portions of the video were played back during debriefing to guide the discussion and allowed for the participants to actively reflect on the scenario and performance. Guided questions were also used along with the selected video-segments. The debriefing component lasted approximately 20 minutes. Immediately after the debriefing, the students completed the GRAS (post-test one) (Time 2). They again provided the unique identifier used on the initial survey. The survey took under 10 minutes to complete each time. An identical simulation viewing and data collection process after debriefing occurred during two other scheduled simulation days during the semester. The students only completed a GRAS post-test on the second and third data collection points (Time 3 & 4). In total, the students completed one pre-test and three post-tests following three different simulation activities. The data collection procedure is depicted in Figure one. In accordance with federal

guidelines, all consents and pre- and post-tests were collected and stored in a locked box and will be retained for three years. The next section discusses data analysis.

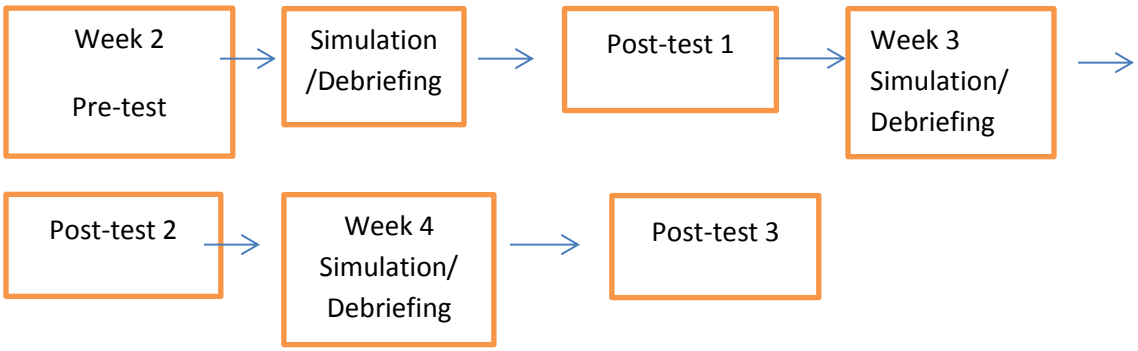


Figure 1. Steps for data collection.

Data Analysis

Once data was collected, steps for data analysis occurred. The Statistical Package for the Social Sciences (SPSS ®) software version 22 for windows was used to analyze the collected data. A code book was developed for the coding of the collected data once entered into the software. The completed GRAS for each subject was uploaded electronically for automatic entry and totaling of the scores following each data collection time. Every total GRAS score was given a unique identifier to track data over time. After data entry, the data was cleaned and readied for analysis. The data was examined for errors and missing information. Any missing data was marked as 'missing' in SPSS. Normality was explored through box plots and histograms. Then the data was checked prior to statistical analysis to verify the assumptions were met by checking linearity, homogeneity, and sphericity. An additional assumption is used with this statistical test and includes checking homogeneity of intercorrelations through a Box's M statistic (Pallant, 2013). No non-parametric tests are used with mixed between-within

ANOVA (Pallant, 2013). The following section discusses the statistical tests that used for demographic data and research questions.

Demographic Data

Demographics for this study included gender, age, race, previous healthcare experience, number of nursing courses, number of credits taken during the current semester, and grade point average. Descriptive statistics were used to describe the sample demographics (Pallant, 2013). Frequencies were computed for gender, previous health care experience, and race. Means, standard deviations, and ranges were completed for age, grade point average, and number of credits taken during the current semester. Also, a description of pre-simulation GRAS scores for students provided baseline data on personal reflection ability.

Research Questions

The research questions include the following:

1. How do reflection ability scores change over time when undergraduate sophomore-level nursing students' participate in three simulations with VAD?
2. How do personal variables influence undergraduate sophomore-level nursing student's reflection ability?
3. How do personal variables influence undergraduate sophomore-level nursing student's reflection ability following repeated simulation with VAD over time ?

Statistical Analysis

The statistical analysis that was used to answer the each of the research questions included a mixed between-within subjects analysis of variance (ANOVA). This test examined the mean scores on four different occasions. The mixed between-within subjects ANOVA measures independent variables between subjects and within subjects (Pallant, 2013). For this

study, this specific test measured the impact of VAD on reflection ability levels following VAD and the impact of personal variables on reflection ability within the same group. This test determined if there is a change in reflection ability over the four time periods (main effect for time). It also compared personal variables in term of their effectiveness in increasing reflection ability (main effect for group). Finally, this test explored the change in reflection ability scores over time is different for each variable (interaction effect). The level of significance for the statistical analysis was set at $p < .05$.

Summary

This chapter described the methodology used for this study. The descriptive one-group repeated measures pre-test-post-test design was described. An overview of the sample and setting was included. The validity and reliability of the GRAS was discussed. Study procedures were described. This chapter concluded with an overview of data analysis which included the statistical methods used for each research question. The follow chapter discusses results of the study.

CHAPTER FOUR

RESULTS

This chapter discusses the results of the statistical analyses of this study. The chapter will start with a description of the sample. Descriptive statistics include gender, age, ethnicity, GPA, number of enrolled credits, and previous health care experience. Results of this study relating to the research questions and hypotheses are also included and described.

Sample Description

The study subjects included sophomore-level nursing students enrolled in a Fundamentals I Theory Course at a large state university. These subjects had no previous simulation and debriefing experience nor were they repeating the course. A total of 188 students were enrolled in this course during the fall 2015 semester. Participants that did not complete all four data collection points were excluded from the analysis. There were 188 potential subjects for this study. Some of the demographic items were not completed or the students were not it class on this particular day. Therefore the final number of respondents for the descriptive statistics was157 but some surveys had incomplete items.

The overall sample (n=157) was predominately female (82.2%). The subjects' age ranged from 18–34 years (M= 19.7, SD = 2.07) with 87% between 19–20 years. Most of the participants were Caucasian (91%). The characteristics of this sample resemble the overall demographics of the nursing program as discussed in Chapter Three. The characteristics of this sample mostly differ from the NLN (2014) Biennial Survey of Schools of Nursing for the academic year 2013-2014 with the exception of a similar number of male nursing students. Table 1 presents a summary of these demographic characteristics.

Table 1

Demographic Characteristics of the Sample (N=155-157)

Variable	n	%
Gender		
Female	129	82.2
Male	28	17.8
Age		
18	5	3.2
19	101	65.2
20	34	21.9
21	4	2.6
22	2	1.3
23	2	1.3
24	1	0.6
25	2	1.3
27	1	0.6
28	1	0.6
32	1	0.6
34	1	0.6
Ethnicity		
Caucasian (non-Hispanic)	142	91.0
African American	11	7.1
Hispanic/Latino	2	1.3
Asian/pacific	1	0.6

Note. Total responses ranged from 155-157 due to missing items.

Other demographic information included number of nursing course failures, number of credits taken during the current semester, grade point average, and previous healthcare experience. The majority of the students did not have any nursing course failures (98.7%). The participants were enrolled in 6 to 19 credits (M =13.6, SD = 2.34). Grade point averages ranged from 2.6 to 4.0 (M = 3.5, SD =2.74). After dichotomizing GPA, the participants were grouped into a category of low GPA (2.60 to 3.49) or high GPA (3.50 to 4.00). Low GPA included 58 participants while high GPA resulted in 91 participants. Of the total sample, 36 participants

(23.2%) have had previous healthcare experience i.e., nurse assistants, dietary aides, and emergency medical technicians. Table 2 provides a detailed summary of these demographics.

Table 2

Distribution of Other Demographic Variables

Variable	n	%
Course Failure		
Yes	2	1.3
No	155	98.7
Number of credits		
6	6	3.8
7	1	0.6
9	1	0.6
10	1	0.6
11	1	0.6
12	16	10.2
13	73	46.5
14	10	6.4
15	9	5.7
16	25	15.9
17	11	7.0
18	2	1.3
19	1	0.6
GPA		
2.60-3.49	58	38.9
3.50-4.00	91	61.1
Previous health care experience		
Yes	36	23.2
No	119	76.8

Note. Total responses ranged from 155-157 due to missing items.

Research Questions

This study investigated sophomore-level undergraduate nursing students' reflection ability following a high-fidelity simulation and VAD. Using a descriptive, one group pre-test post-test repeated measure design, three research questions were investigated and are discussed below. Participants that completed all data collection points (demographics, pre-test, and post-test 1, 2, 3) were included in the study. A total of 104 participants completed the GRAS at each time point. Descriptive statistics and a mixed between-within ANOVA was conducted to answer each of the research questions discussed below. During the analysis, outliers were recognized with very low GRAS values located on the box plot for time 3. Since the GRAS scores were all inconsistent on this same day, these participants were eliminated from the study. Figure 2 represents the GRAS scores over four time points. Figure 3 represents the five outliers eliminated from the study. The outliers may have occurred during time 3 because an exam was scheduled during class time. These particular students may have been more focused on the exam rather than completing the GRAS. The final sample resulted in 99 participants who completed information.

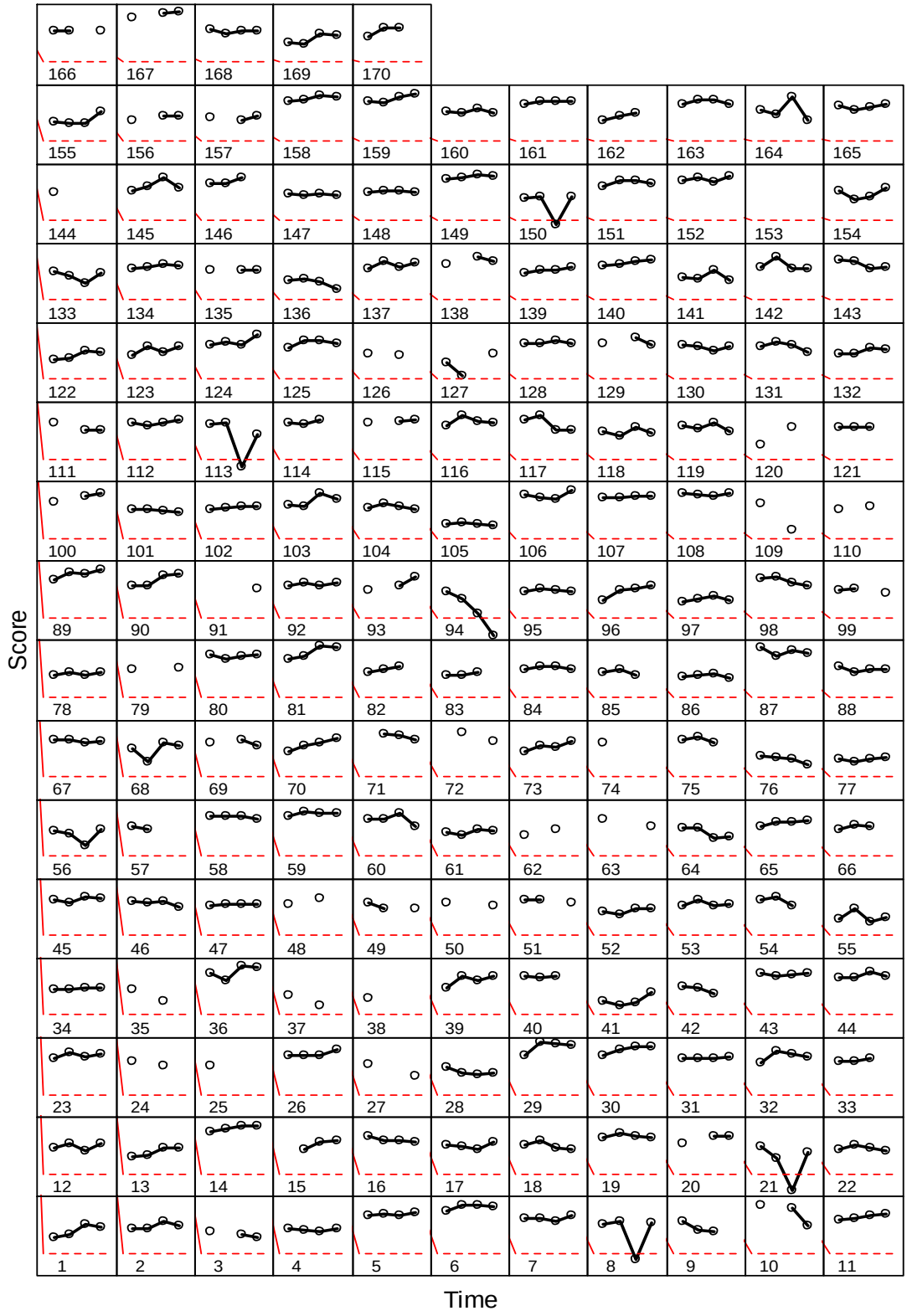


Figure 2. Individual mean GRAS scores across four time points.

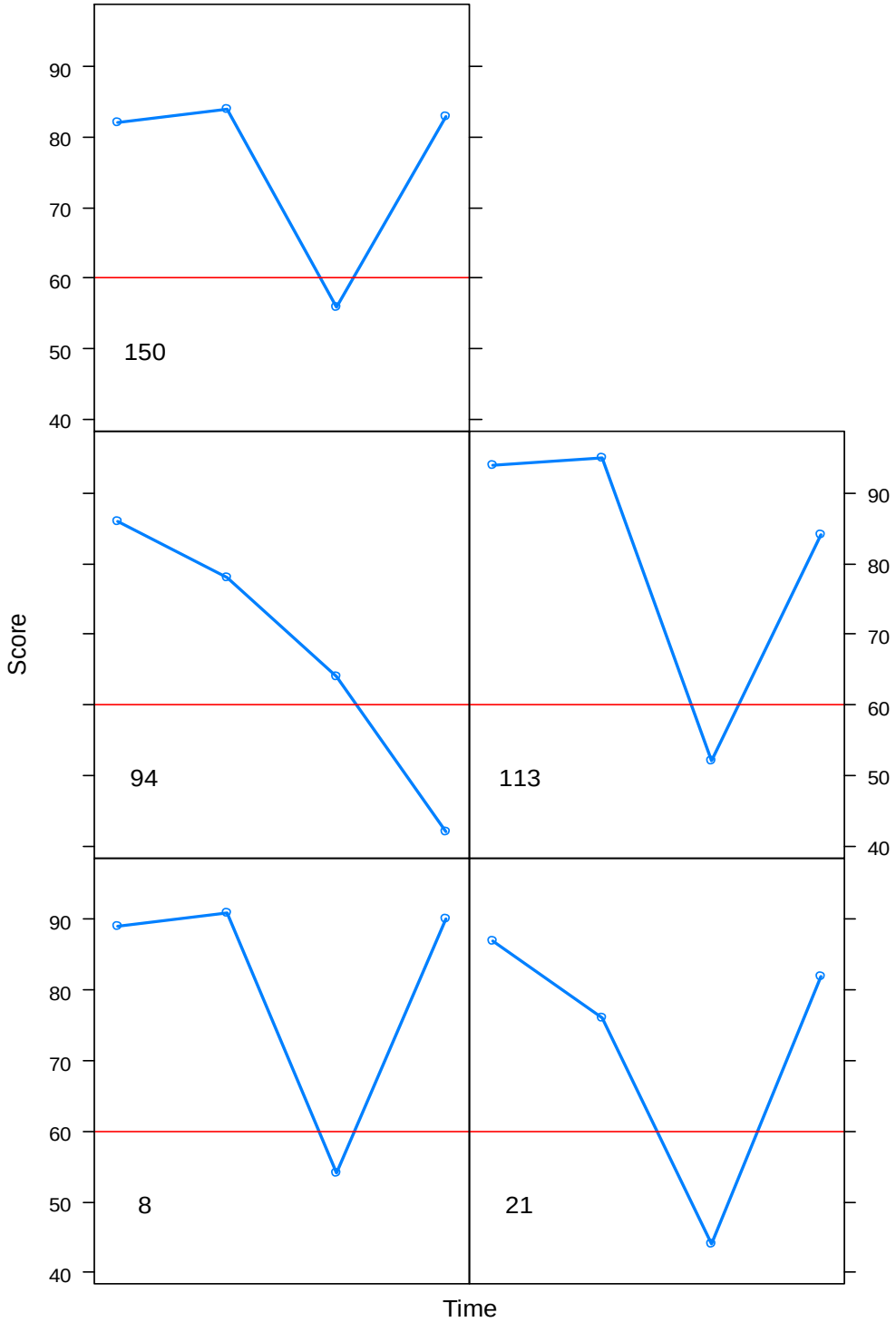


Figure 3. Five outliers noted and eliminated during data collection.

Assumptions included normality, and homogeneity of variance. The assumptions reviewed indicated no violations. The distribution of the scores was assessed through skewness and kurtosis. The range for skewness was -.360 to -.094 indicating a clustering of scores toward higher GRAS scores (Pallant, 2013). The kurtosis was calculated from -.674 to -.213 meaning that the distributions are more flat than normal distributions (Pallant, 2013). Since the sample size was large, the kurtosis and skewness tend to be sensitive so histograms of the residuals were inspected to assess the shape of the distribution (Pallant, 2013). The histograms of the Reflection Scores were fairly symmetric at each time point. Refer to figures 4 through 7. The Q-Q Plots were also assessed and represented close to a straight line. Levene's statistic was also assessed and were not significant ($F(3, 95) = .62$, $p = .605$ at the first time point; $F(3, 95) = 2.4$, $p = .073$ at the second time point; $F(3, 95) = 1.86$, $p = .141$ at the third time point; $F(3, 95) = 1.28$, $p = .285$ at the fourth time point. Based on these findings, there is no concern about non-homogeneity of variances at each time point. Lastly, the Box's $M > .05$, therefore we have not violated the assumption of homogeneity of variance (Pallant, 2013).

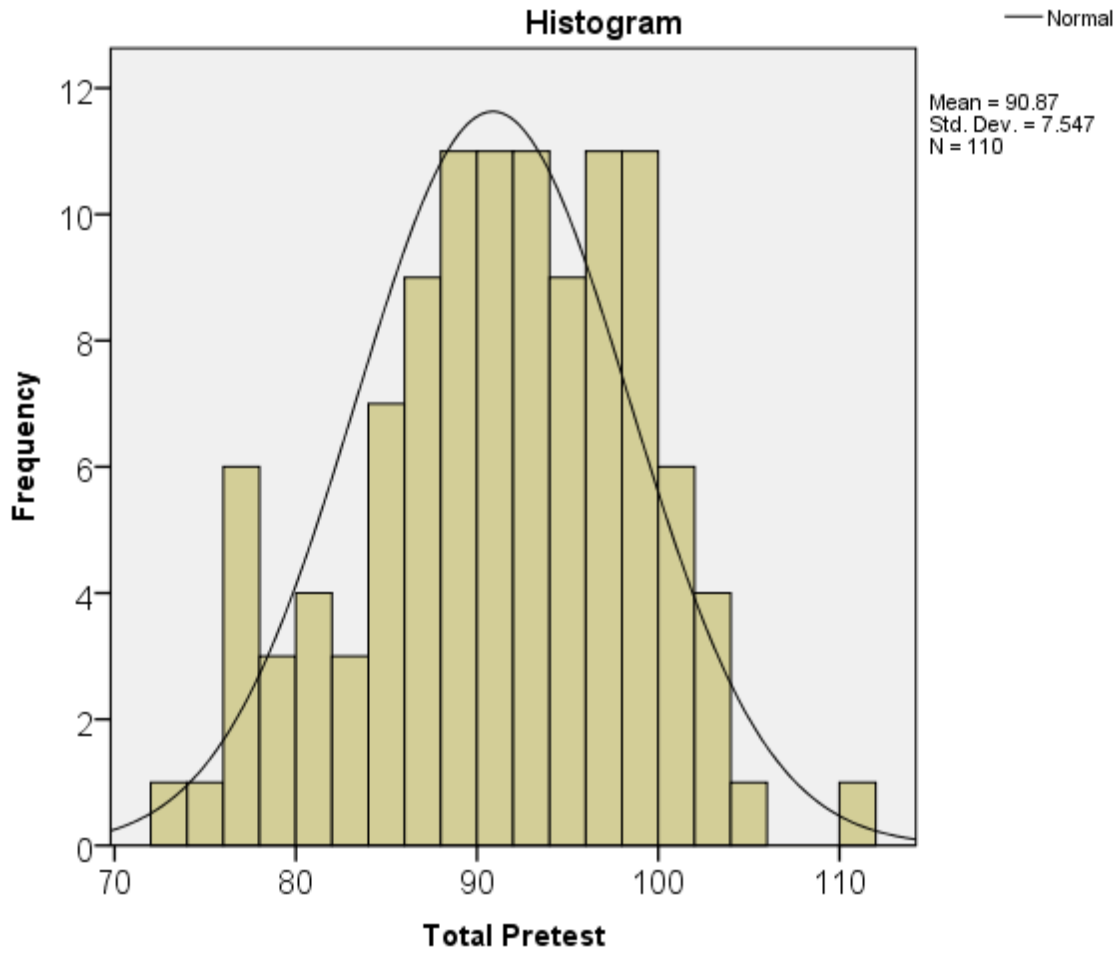


Figure 4. Histogram of total GRAS pre-test (time 1) scores.

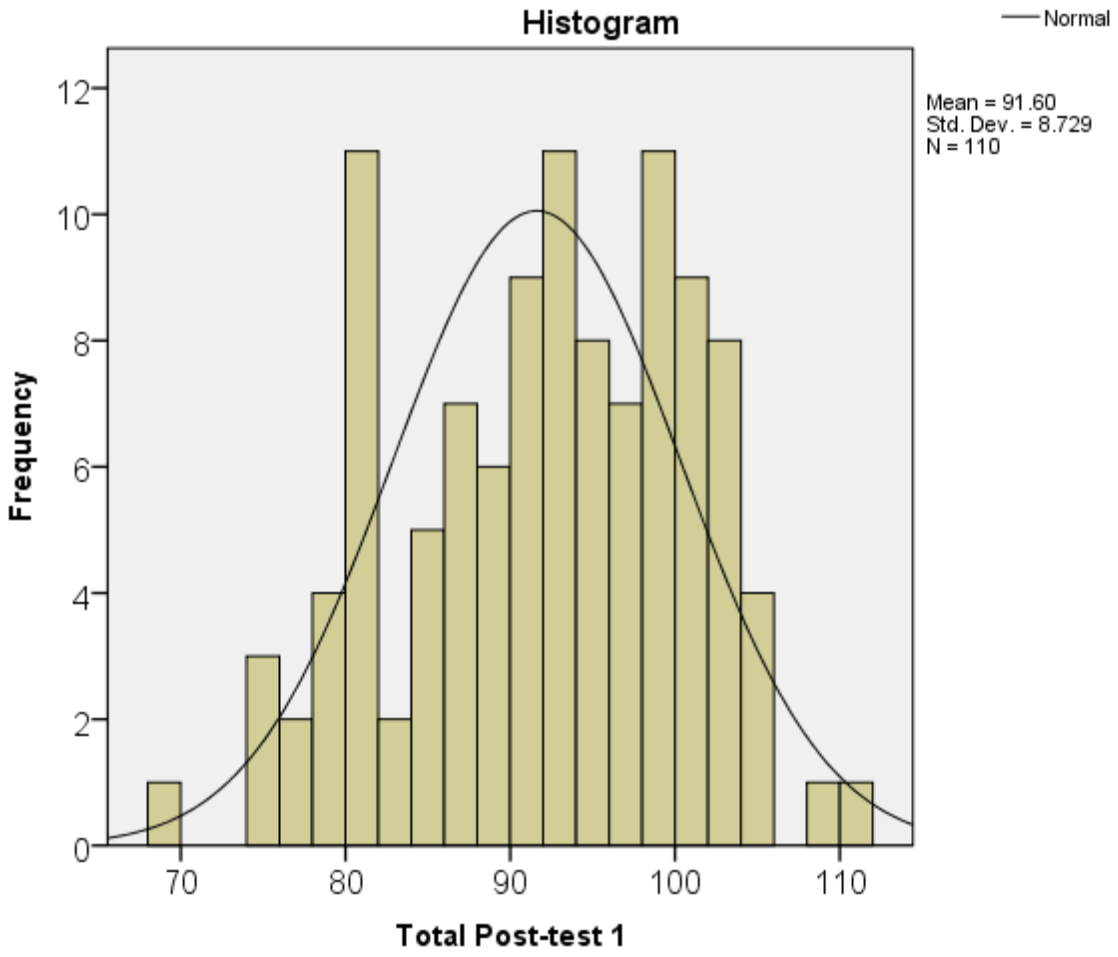


Figure 5. Histogram of total GRAS post-test 1 (time 2) scores.

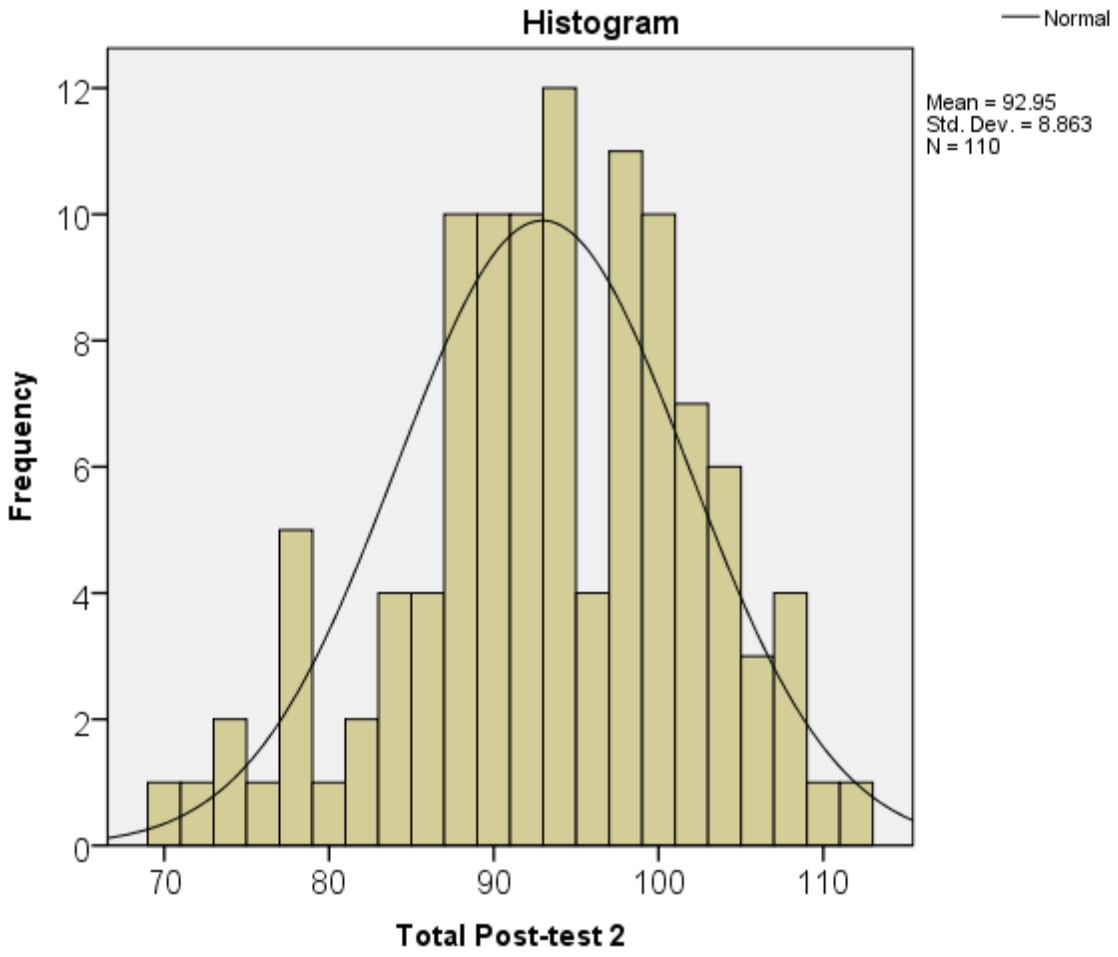


Figure 6. Histogram of total GRAS post-test 2(time 3) scores.

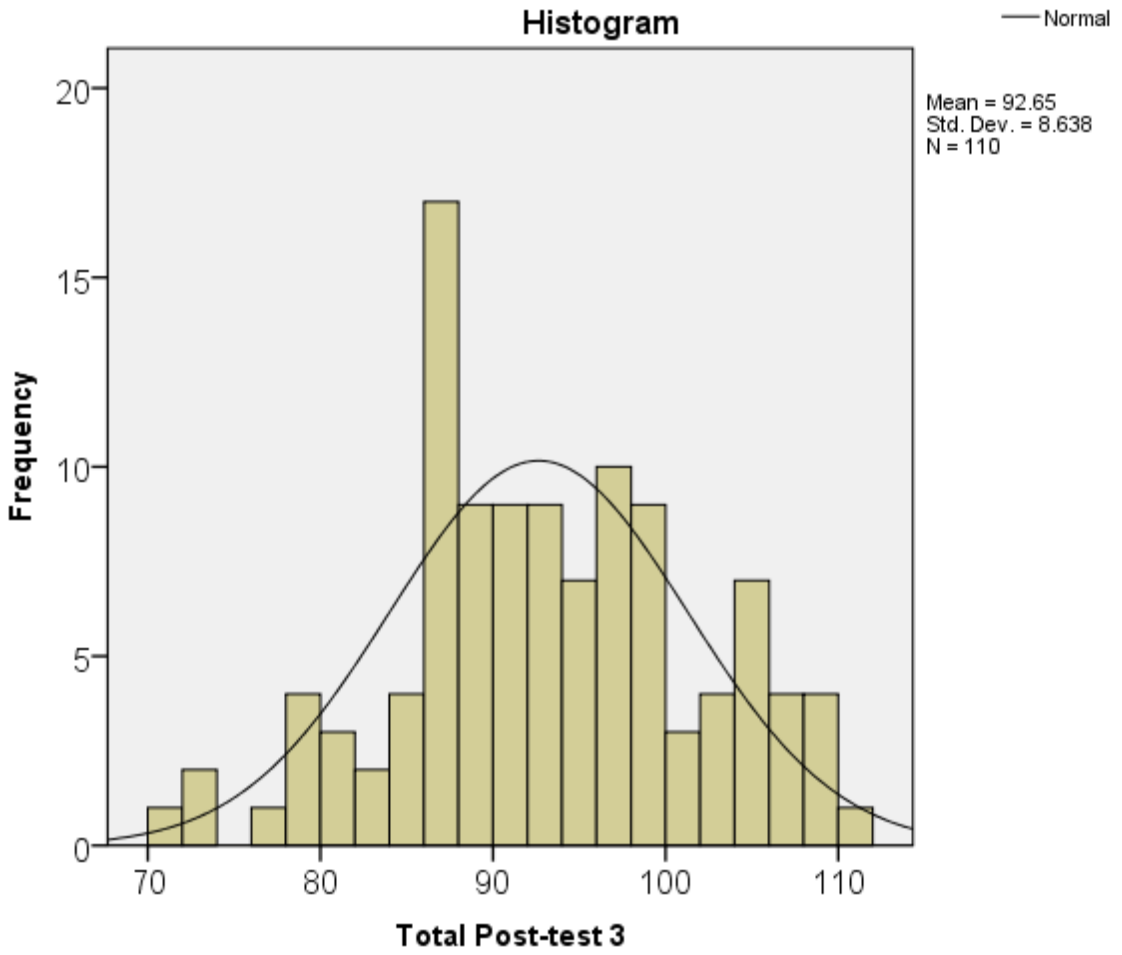


Figure 7. Histogram of total GRAS post-test 3 (time 4) scores.

Interaction Effect

All of the research questions in this study require looking at the interaction effects of factors on the dependent variables. See definitions for interaction effects and profile plots located in Chapter One. Taking a closer look at interaction before discussing the results of the analysis will provide clarity on this concept. Figures 8 and 9 provide a visual for interaction effect. To better understand interaction effects and profile plots, refer to the second profile plot (high GPA) in Figure 9. For this figure, factor A=time at four levels (pretest, and three post-tests), factor B=previous healthcare experience (no vs. yes) and the dependent variable is the

reflection ability score. The blue line represents participants with previous healthcare experience where the red line represents participants with no previous healthcare experience. When looking at the first two time periods (pre-test to post-test one), the two lines are fairly parallel, indicating similar changes in reflection ability scores across the two time points. In other words, there is a very small observed interaction effect between previous health care experience and time, when restricted to these time points. However, when observing the next two time periods (time 2 to time 3) the lines are non-parallel, indicating a very different change in reflection ability scores across these two time points for students with no previous health care experience versus students with previous health care experience. This results in a larger observed interaction effect between previous healthcare experience and time. Similarly, the last two time periods (time 3 to time 4) result in a larger observed interaction effect in comparison to the first two time points.

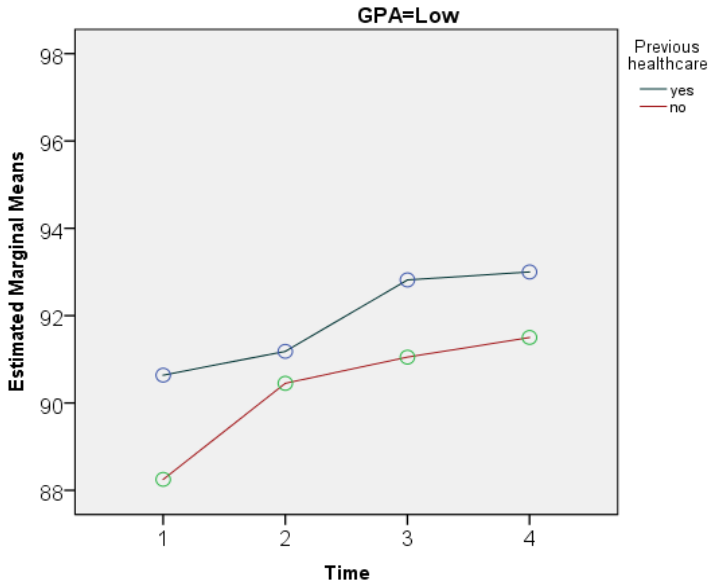


Figure 8. Profile plots showing effect of health care experience and time on GRAS scores for low GPA.

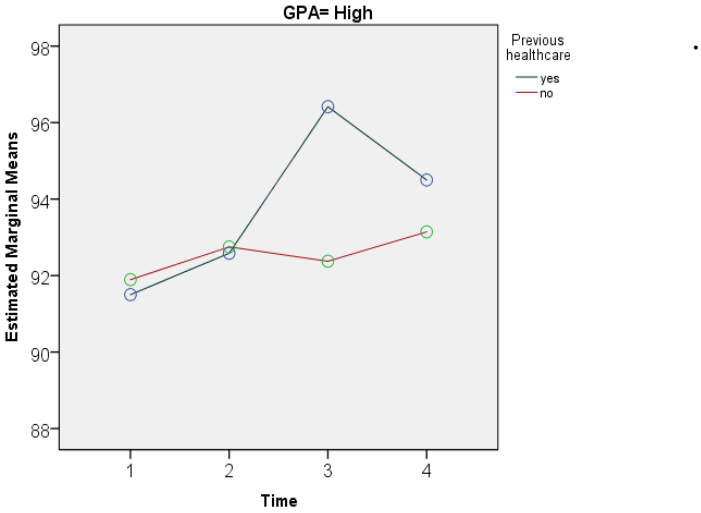


Figure 9. Profile plots showing effect of health care experience and time on GRAS scores for high GPA.

Research Question One

Research question one asks how reflection ability scores change over time when undergraduate sophomore-level nursing students' participate in three simulations with VAD. Data was collected during four different time points (pre-test, post-test 1, 2, & 3) where GRAS scores ranged from 23 to 115. A score closer to 115 indicated greater reflection ability whereas a score closer to 23 signifies a lower level of reflection.

The hypotheses follow:

- H_0: Repeated measures of simulation and VAD has no effect on improvement of reflection ability scores
- H_1: Repeated measures of simulation and VAD improves reflection ability scores.

Descriptive statistics on the reflection ability scores across four time points are provided in Table 3. The reflection ability mean scores revealed slight improvement overtime. Mean scores ranged from 91 to 93 and increased at each time point (see table 3). Mean score at time 1 was 91, time 2 92.1, time 3 92.6, time 3 93. A mixed between-within subject's analysis of variance was conducted to assess the impact of time on reflection ability scores. There was a signification interaction between reflection ability and time, Wilks' Lambda = .829, F (3, 93) = 6.384, p =.001, partial eta squared = .171. The effect size according to the partial eta squared is small. These findings suggest that reflection ability may significantly improve over time.

Table 3

Descriptive Statistics on Pretest, Posttest 1, 2, 3 Scores

	Total Group		*M* Low GPA		*M* High GPA	
Time Period	*M*	*SD*	No PHE	PHE	No PHE	PHE
Pretest	91.0	7.78	88.6	90.6	91.9	91.5
Posttest 1	92.1	8.51	90.5	91.2	92.8	92.6
Posttest 2	92.6	8.95	91.1	92.8	92.4	96.4
Posttest 3	93.0	8.77	91.5	93.0	93.1	95.5

Note. Previous healthcare experience (PHE)

Research Question Two

Research question two investigated how personal variables of previous healthcare experience and GPA influence undergraduate sophomore-level nursing student's reflection ability. The hypotheses include:

- H_0: Personal variables have no influence on undergraduate sophomore-level nursing student's reflection ability.
- H_1: Personal variables improve undergraduate sophomore-level nursing student's reflection ability.

Figure 10 represents a profile plot with the upper line representing the mean reflection scores for participants with previous healthcare experience and a low or high GPA reflection ability scores during the pre-test time point. The lower line represents no previous healthcare experience with a low or high GPA at pre-test. The lines are fairly parallel indicating a minimal observed interaction effect. Those with healthcare experience and a low GPA had lower reflection ability

scores. A higher GPA resulted in better reflection ability scores. Those with no previous healthcare experience yielded a similar pattern but resulted in lower reflection ability scores for both low and high GPA.

A mixed between-within subject's analysis of variance was conducted to assess the impact of these variables on reflection ability scores without time as a factor. Previous healthcare experience did not reveal statistical significance F (1, 95) = .511, p = .476. The GPA also revealed no statistical significance F (1, 95) = 1.07, p = .303. Nor did the interaction between previous healthcare experience and GPA reveal statistical significance F (1, 95) = .010, p =.922. The partial eta squared resulted in .005, .011, and .000 indicating a small effect size. Overall, these results indicate that previous healthcare experience and GPA have no influence on reflection ability scores prior to any simulation and VAD experience.

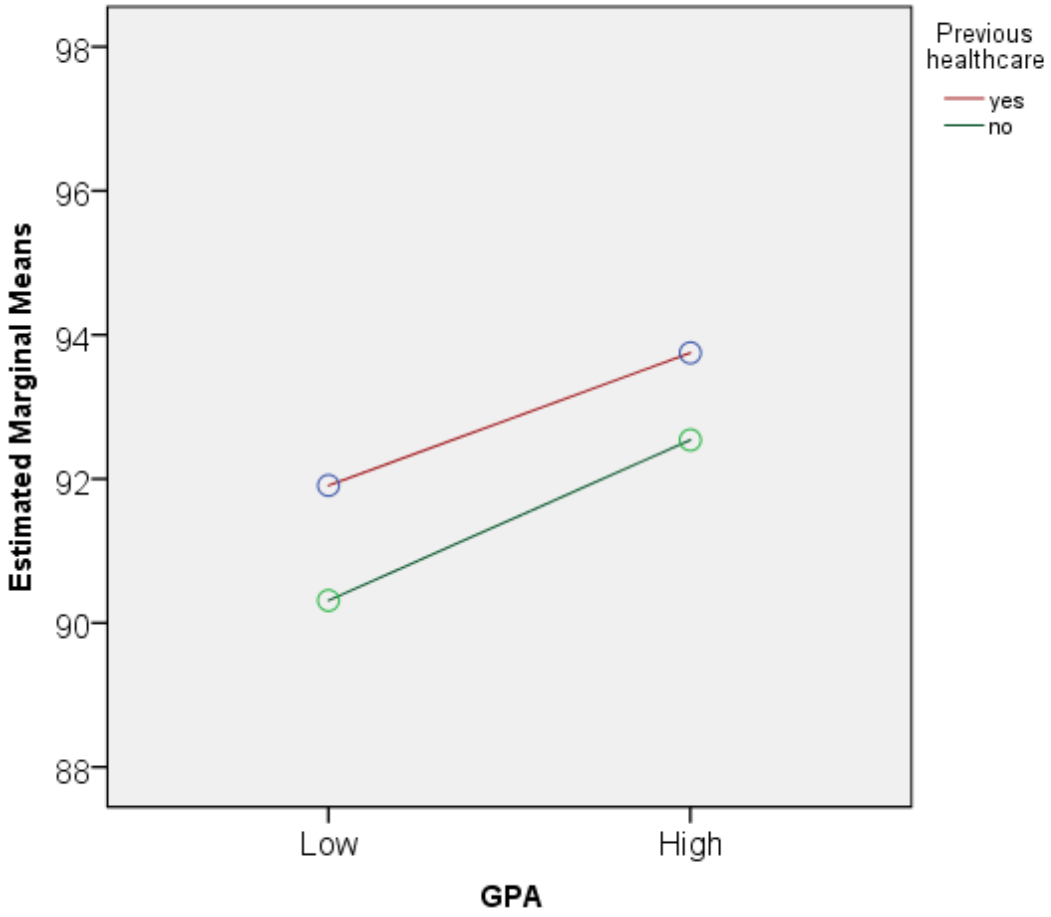


Figure 10. Profile Plots Showing Effect of Health Care Experience and low/high GPA on GRAS scores at the pre-test time point.

Research Question Three

Research question three explored how personal variables influence undergraduate sophomore-level nursing student's reflection ability following repeated simulation with VAD over time.

- H_0: Personal variables have no influence on undergraduate sophomore-level nursing student's reflection ability with VAD over time.

- H_1: Personal variables improve undergraduate sophomore-level nursing students' reflection ability with VAD over time.

Several profile plots were examined in regards to this research question. Figures 8 and 9, discussed previously, represent mean reflection ability scores over time of those with and without previous healthcare experience that had a low GPA and a high GPA. Figure 8 shows reflection ability scores of those with low GPA with and without previous healthcare experience. The pattern in in Figure 8 revealed parallel scores throughout each time point. Participants with previous healthcare started with higher reflection ability scores that stayed higher throughout each of the measurements. Participants without previous healthcare started with lower reflection scores and remained lower at each measurement. There is a minimal interaction that occurs with these variables. Figure 9 shows a differing interaction pattern. Those with a high GPA that had previous healthcare experience resulted in initial reflection ability scores that were the same as those who did not have any previous healthcare experience. However, starting after the second time point, those with previous healthcare experience increased their reflection ability more so than those who did not have any experience at all. See Table 3 for mean scores for each group.

The variable, GPA was also assessed in Figure 11. Again, those with a low GPA had lower reflection ability scores when compared to those with a high GPA. Overtime the lines were mostly parallel with the exception of a slight increase in reflection ability scores during post-test three for high GPA participants indicating more of an observed interaction effect.

Figure 12 represents the variable of previous healthcare experience on reflection ability scores overtime. Those with and without previous healthcare experience resulted in similar reflection ability scores during time 1 and time 2. Whereas, for time 3 and time 4 there was a

much higher reflection ability score than those without previous healthcare experience resulting in an interaction effect.

A mixed between-within subjects analysis of variance was conducted to assess the influence of previous healthcare experience and GPA on reflection ability scores across four time periods. There was no statistically significant interaction between previous healthcare experience and reflection ability scores over time, Wilks' Lambda = .959, F (3, 93) = 1.31, p = .276, partial eta squared = .041. Additionally, no statistical significance was revealed with GPA over time, Wilks' Lambda = .993, F (3, 93) = .205, p = .893, partial eta squared = .007. Lastly, the interaction between previous healthcare experience and GPA influence over time also revealed no statistical significance, Wilks' Lambda = .962, F (3, 93) = 1.227, p = .304, partial eta squared = .038. The partial eta squared of .041, .007 indicated a small effect size and .304 a large effect size. These statistical results suggest no difference in the reflection ability scores regardless of previous health care experience and/or GPA.

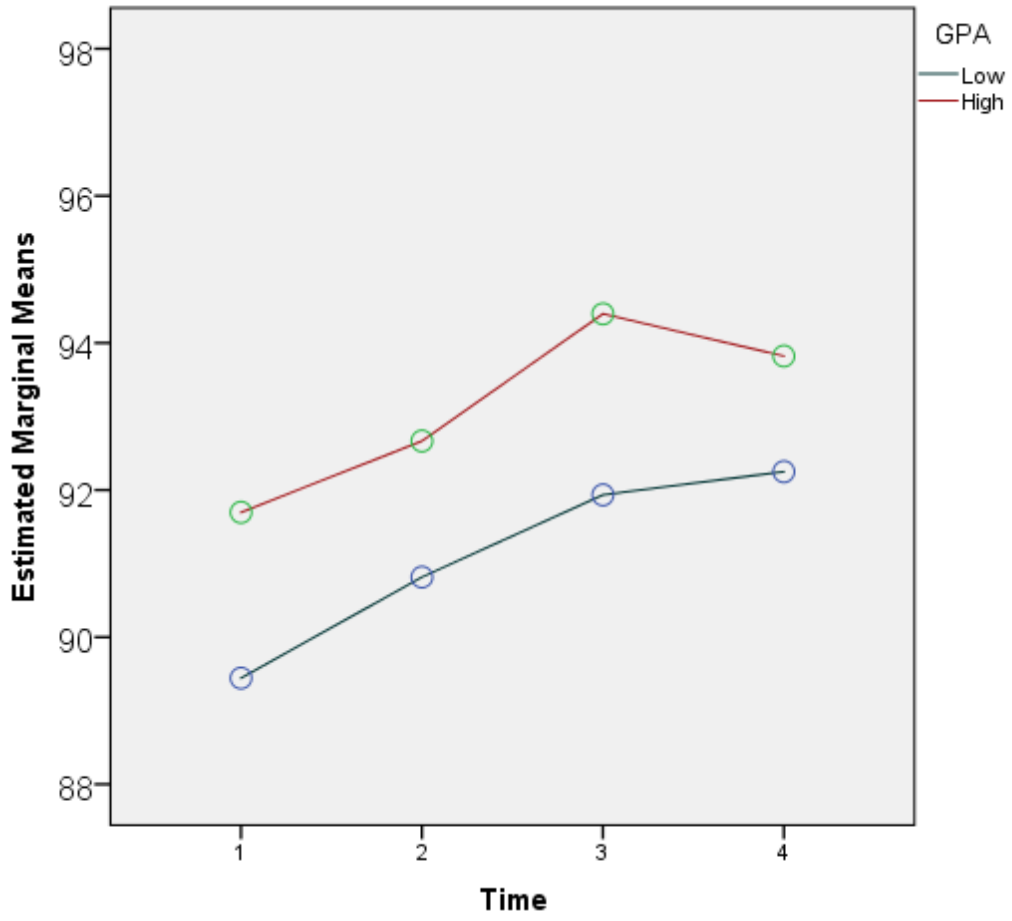


Figure 11. Profile plots showing effect of low/high GPA and time on GRAS scores.

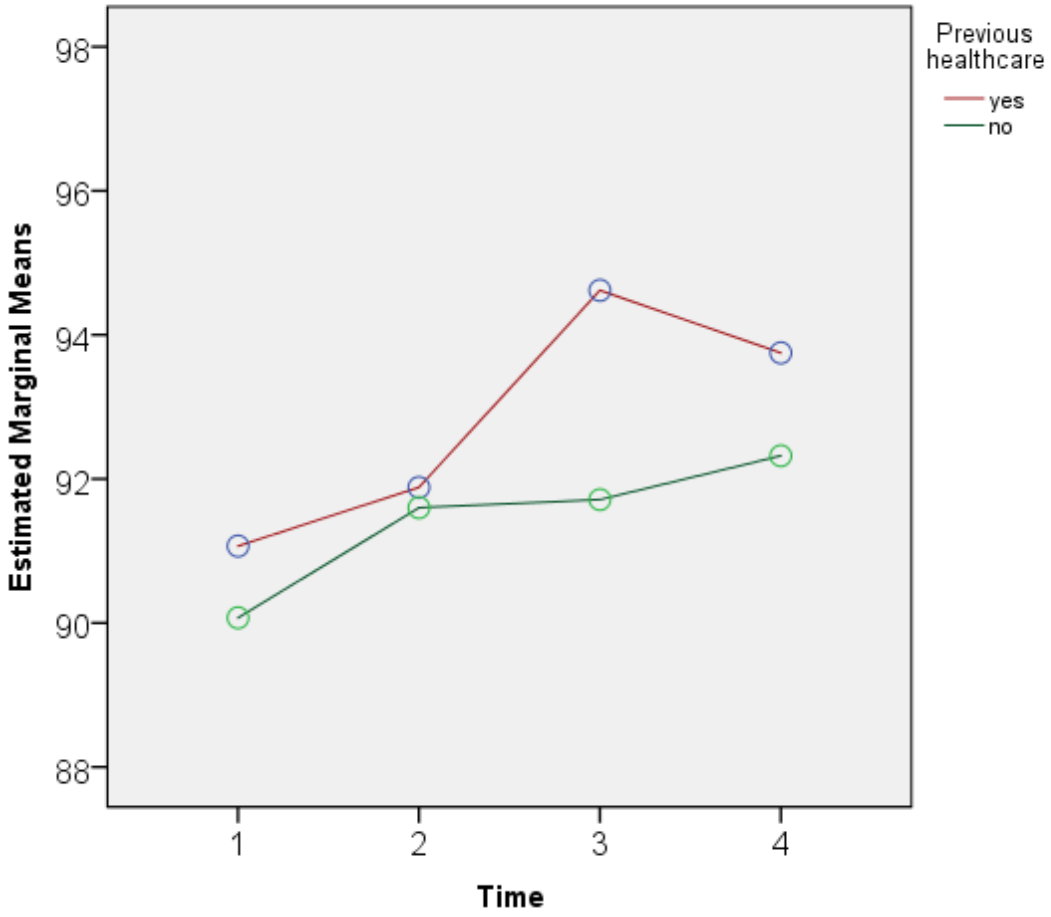


Figure 12. Profile plots showing effect of previous health care experience and time on GRAS scores.

Summary

This chapter presented a description of statistics for the demographics and research questions. Descriptive statistics were completed to describe the sample. The mix-between-within ANOVA presented findings on the differences in refection ability between and within groups. Statistical significance was only revealed with reflection ability scores over time. Previous healthcare and GPA had no influence on reflection ability regardless of time. The next chapter will include a discussion of the results, study limitations, implications for practice, and recommendations for future research.

CHAPTER FIVE

DISCUSSION AND IMPLICATIONS

This study used a descriptive one group pre-test-post-test repeated measures design to examine the influence of high-fidelity simulation and VAD on undergraduate sophomore-level nursing students' personal reflection ability. This chapter begins with a discussion of the demographics, data analysis, and research questions findings. The conceptual framework used to guide this study will also be linked to the results of this study. Limitations of the study are also presented. This chapter concludes with implications and recommendations for nurse administrators, simulation experts, and nurse educators.

Discussion

This section includes a discussion of the study's findings. A review of demographic data is presented. Additionally, a discussion on each research question is included. Lastly, the theoretical framework, Schön's work on reflection, as it relates to the findings will be presented in this section.

Demographics

A variety of demographic variables were assessed in this study. The sample was described with the following demographics: gender, age, and ethnicity. Demographic items were reported by 157 participants however, some items were missing and resulted in 155 responses. Participants were predominately female (82.2%) with the remainder male (17.8%). Ages ranged from 18-34 (M =20) with 87% of the participants between 19–20 years. Most of the participants were Caucasian (91%). The particular participant demographics of this sample were compared to the NLN (2014) Biennial Survey of Schools of Nursing for the academic year 2013-2014 to determine if the sample was representative of the national nursing population. Male

demographic findings for BSN program were similar to the NLN survey. The other demographics differed from this study in comparison to the NLN (2014) survey results. According to the NLN (2014) survey, more minorities were represented in basic RN programs (28%) than was evident in this sample (9%). Also, in BSN programs, 18% of nursing students were over the age of 30 (NLN, 2014) whereas in this sample only 13% were over 30. However, the NLN survey represented all schools of nursing.

Other demographics assessed in the study included the number of credits taken during the current semester, number of nursing course failures, GPA, and previous healthcare experience. Only two participants responded that they failed a nursing course. The credits taken during the current semester varied from 6 to 19 credits with the majority of participants enrolled in 12 to 16 credits (84.7%). Therefore, most of the participants were enrolled in the nursing program as full time students. According to the AACN 2014-2015 Enrollment and Graduations in Baccalaureate and Graduate Programs Survey 94% students were enrolled full time. GPA was categorized into two groups, low GPA, 2.60 to 3.49 and high GPA, 3.50 to 4.00. More participants reported a higher GPA (61.1%). Previous healthcare experience was also examined. Only 36 participants (22%) had previous healthcare experience ranging from three months to 13 years. Other studies that examined previous health care experience with nursing students had at least half of the participants indicating previous health care experience (Hannans, 2013; Padden, 2011). Most of the participants who responded with having previous healthcare experience only worked two years or less (75%). The experiences varied from positions such as medical assistants, activity aides, secretaries, and patient care technicians. Although demographic variables for this sample are not an exact match they have a similar distribution as national data about nursing students. Also, some demographics such as previous health care experience did not have any national data

to compare; however, it is not unexpected to anticipate that some nursing students would have these work experiences. The next section discusses each research question and the findings.

Research Question Discussion

This study investigated sophomore-level undergraduate nursing students' reflection ability following high-fidelity simulation and VAD. Using a descriptive, one group pre-test-post-test repeated measure design three research questions were answered and are discussed below. A discussion of Schön's work on reflection and how it relates to this study is also included.

Research question one. Research question one investigated undergraduate sophomore-level nursing students' reflection ability over time following a high-fidelity simulation and VAD. The hypothesis for this research question stated that repeated measures of simulation and VAD improves reflection ability scores. The null hypothesis included repeated measures of simulation and VAD had no effect on improvement of reflection ability scores. Using a mixed-between-within ANOVA, the null hypothesis was rejected. As reported in Chapter Four, the mean scores resulted in a statistically significant change over time. The GRAS scores increased at each time point from the time 1 (M = 91.0, SD = 7.78), time 2 (M = 92.1, SD =8.51), time 3 (M = 92.6, SD = 8.95) to the last measurement, time 4 (M = 93.0, SD 8.77). Additionally, the reflection scores were high initially. This may have occurred because of the admission requirements at the university. Other possibilities of a high initial score initially may be related to more of the sample having a high GPA and only two participants had a previous failure. When comparing the scores across the time points, an improvement is evident with each simulation and VAD exposure. Therefore, the results of this study may indicate that reflection ability increases over time with multiple simulation and VAD exposures. Anecdotally, this finding is consistent with

several others that suggest reflection through debriefing requires practice overtime (Aukes et al., 2008; INACSL Board of Directors, 2013; Procee, 2006).

Results of this research relate to many core concepts of nursing such as clinical judgment, clinical reasoning, and self-confidence. The ability to reflect encourages students to think at a higher-level to ultimately make better decisions related to safe patient care. Clinical judgment and clinical reasoning also require high-level thinking that is needed for nursing practice. These concepts are vital in recognizing that a situation even exists. When individuals reflect they are thinking and formulating new understandings of a situation. Students having repeated exposures to simulation and VAD develop new understanding through a guided reflection. Each experience builds upon the previous experience which helps nursing students build their thinking through reflection, which should result in better clinical reasoning and judgment. Self-confidence also helps with these concepts. Enhanced self-confidence offers an individual security in proceeding with a challenging event. Further thinking during the situation allows the individual to recognize key factors in order to respond correctly (Dusaj, 2014). Reflection, and these core concepts of nursing, work hand-in-hand and are paramount in 'thinking like a nurse'. This higher level thinking is supported by this study and several others. Increases in clinical judgment, and increases in clinical reasoning were reported in studies that also investigated debriefing (Dreifuerst, 2011; Dusaj, 2014; Weaver, 2015). The studies examined different samples, but all sampled from pre-licensure students. Different debriefing approaches were used, but all impacted the development of higher level thinking. These positive outcomes of debriefing in this study, as well as others, help to conclude that debriefing is beneficial to student learning.

Knowledge is also a vital aspect of reflection. Individuals need to be able to transfer knowledge when reflecting. According to Schön, intellectual knowledge is essential in finding a solution. In particular, when reflecting-in-action, individuals need to find a solution. Therefore, individuals can draw from what they currently know. Also, reflection helps individuals acquire knowledge to help them reflect and/or perform better during future situations. Repeated simulation and VAD offer students reflection development opportunities that support student learning. Compared to this study, Shinnick et al. (2011) measured knowledge before and after debriefing and found that learning does occur during debriefing. Although the Shinnick et al. (2011) study used one simulation experience, a two-group repeated measures design was used to collect data during multiple time points which is similar to this study. Additionally, Shinnick et al. (2011) used a different debriefing approach, but reported statistically significant differences between the knowledge accrued before and after a simulation in comparison to after the debriefing. Therefore, reflection occurs during the debriefing component of the simulation which ultimately helps nursing student's knowledge. Provided that more simulation experiences are offered, students should build upon the knowledge accrued from previous experiences. These findings of this study and Shinnick et al. (2011), suggest that learning does occur during a reflective debriefing.

Reflection through debriefing also impacts student performance. Increasing reflection ability scores through repeated measures of simulation and debriefing suggests that students may perform better. According to Schön, the way students perform is an example of how individuals can use reflection-in-action effectively. When reflecting-in-action, individuals need to think about the current situation to come up with a resolution. The resolution to the problem may not always be correct. If it is incorrect the new or remaining situation is framed again and a new

solution is formed and completed. This is repeated until a the problem is solved. When reflection-in-action occurs correctly, the situation is framed, problem identified, and solution is fulfilled. The practice of reflection through repeated measures of simulation and VAD suggests an improvement in student thinking. Similarly, other studies have found that VAD is thought to influence student performance related to response times, and behaviors (patient identification, team communication and assessment of vital signs). All studies focusing on student performance sampled from pre-licensure nursing students and used VAD (Chronister & Brown, 2012; Grant et al., 2010). Also, the tools used differed from this study; however, all of the findings are related. Although there are some differences with these studies, the findings from this literature, along with the results of this study, may indicate that VAD does indeed enhance reflection ability and ultimately change the students' performance.

In general, activities that promote reflection over time are crucial to student learning. Similarly, in other studies reflection ability scores increase over time when a reflective activity is used. A study conducted by Morse (2012) investigated the effectiveness of *Debriefing with Good Judgment* with nurse practitioner students over different time-points but did not find any statistically significant data between groups. However, there was a significant change in GRAS scores for those in the experimental group that participated in *Debriefing with Good Judgment.* This type of debriefing is structured to promote reflection which may relate to why there was a significant change of mean scores within this group. VAD produced a similar outcome overtime. This type of debriefing provides a visual reinforcement of what occurred during the debriefing to aid in the development of reflection. It appears that both types of debriefing enhance reflection. Using another activity, Aukes et al. (2008) found that reflection ability increased with experimental learning, an educational method used with medical students. Although this study

differed with a sample of medical students and techniques used, comparisons can be made. Similar to debriefing, experiential learning also promotes reflection. Both teaching-learning activities provide an experience for the students to develop reflection skills to become better health professionals. The findings from this study, as well as others, suggest that activities that encourage reflection overtime are beneficial.

Overall, most of these studies support the fact that reflection positively impacts the learner. According to the literature examined, debriefing provides an opportunity for students to develop reflection. The results of this study are comparable to other studies which helps to conclude that simulation and VAD may improve reflection ability. However, studies investigating any type of change over time are limited. This is concerning as simulation use occurs throughout the nursing program. Long term effects of simulation and debriefing are needed to guide best practices. Thus this study contributes to the empirical evidence on debriefing and reflection.

Research question two. Research question two examined the variables of previous health care experience and GPA on reflection ability. The hypothesis for this research question specifies that personal variables improve undergraduate sophomore-level nursing students' reflection ability. The null hypothesis states personal variables have no influence on reflection ability. As mentioned in Chapter Four, the null hypothesis was not rejected. In this study, the results revealed personal variables have no statistically significant influence on reflection ability. Although no statistical significance was found, the profile plots signified that regardless of previous healthcare experience, those with a low GPA had lower GRAS scores than those with a higher GPA. Also, those with previous healthcare experience and low GPA had lower GRAS scores than those with a high GPA and previous health care experience. This makes sense

theoretically. Schön (1983) recognized that previous experiences contribute to building a knowledge base which helps an individual to reflect. Reflection uses higher-order thinking that helps develop new knowledge to change future behaviors (Denton, 2011; Dewey, 1933; INACSL Board of Directors, 2013; Lowe, et al,, 2007). Individuals with a high GPA indicated that their thinking is at a higher level, as evident in the higher reflection ability scores. These students may work harder to accrue better grades and secure the knowledge needed to become a nurse. This knowledge then acts as a baseline for students to use clinical reasoning skills when confronted with problematic patient situations.

Additionally, practice helps with the development of reflection (Aukes et al., 2008; Procee, 2006). Those with previous healthcare experience may have had practice reflecting during and after situations that occurred. The individuals may have debriefed following the situations which may influence reflection. Also, those with prior health care experience and a high GPA have two factors that support the development of reflection. Those with a high GPA may think at a higher level than those with a low GPA. Therefore, a combination of the two variables, previous healthcare experience and high GPA, seem that they would be a precursor in becoming good reflectors.

This research question displayed the initial reflection ability prior to any simulation or debriefing experience. The participants were beginning nursing students just learning the nursing role with only 36 of the participants having some sort of previous health care experience. This background may impact reflection ability during the initial point of the study because most of the participants may not have had any prior knowledge or experience to build upon. Also, these individuals may not have had the opportunity to reflect on patient situations since they did not have any clinical experience at the start of this study. Therefore, participants with previous

health care experience were able to reflect better hence the higher reflection ability scores evident in the profile plots. These individuals may have had experiences in the patient-care setting that gave them the opportunity to reflect. Additionally, the first data collection occurred very early in the semester during the first semester enrolled in nursing courses. Students not having any previous experience or nursing courses may have had a hard time reflecting. The information was new to them and probably not applied in a real-life setting. This was revealed with those lower reflection ability scores that had no previous health care experience.

Previous health care experience positively impacted initial reflection scores. Similarly, in other studies reflection ability was better with those with experience (Aukes et al., 2008; Morse, 2012). As discussed previously, a study conducted by Morse (2012) revealed rather high baseline mean GRAS pre-test scores (Experimental Group: M = 94.6; Control Group: M= 97.4). Not much change was evident when comparing the baseline mean score to the final score. Since the sample was nurse practitioner students they all had several years of experience as a nurse. This finding supports the assumption that previous healthcare experience may have an impact on reflection. These advanced nurses had many opportunities to reflect during their practice as a nurse, which is evident in the high mean scores. Most of the participants in this study did not have many clinical experiences, which resulted in overall lower reflection ability scores. However, those with previous healthcare experience revealed higher mean reflection ability scores. Another comparable study conducted by Aukes et al., (2008) also discussed previously, examined reflection ability using the GRAS. Although this study used undergraduate medical students, the educational program used for the experimental group was an experiential learning program that promotes learning through reflection and experience. Interestingly, the participation in the experimental group had a positive impact on reflection ability. Those

individuals in the experiential group were given opportunities to learn through experiences. This is similar to previous health care exposure. Learning occurs through situations that took place during prior health care experiences. Again, this supports the notion that experience does indeed influence reflection. Specific activities designed to promote reflection helps to build a knowledge base and offers individuals practice in reflection development. Additionally, supporting higher GPA's and health care exposure may help with the student's ability to reflect. Overall, with Schön's idea of needing intellectual knowledge and practice for reflection and the findings from the study that are consistent with other research support that personal variables such as previous healthcare experience and GPA impact an individual's ability to reflect.

Research question three. Research question three investigated the influence of previous healthcare experience and GPA on undergraduate sophomore-level nursing students reflection ability overtime following high-fidelity simulation and VAD. The hypothesis stated personal variables improve undergraduate sophomore-level nursing student's reflection ability with VAD over time. The null hypothesis stated that personal variables have no influence. The null hypothesis was not rejected as no statistical significance was evident when these variables were examined. However, again for this research question, the profile plots revealed interesting patterns. As discussed previously in Chapter Four, when looking only at participants with a high GPA at later time points, those with prior healthcare experience showed more improvement over time then those without prior healthcare experience. Meaning that from time 2 to time 3 and from time 3 to time 4 there was more of a change in mean scores for those with previous healthcare experience and high GPA when compared to no previous healthcare experience and a high GPA. During these time points the mean scores increased more dramatically. This

suggests both high GPA and previous health care experience have more of an impact on reflection ability over time.

Also, when examining previous healthcare experience over time, similar scores were evident during time 1 and time 2, with an increase during time 3 and time 4. Although not statistically significant, this finding suggests that previous healthcare experience does indeed have more of an influence on reflection ability scores when repeated attempts of simulation and VAD occur. This is also consistent with the idea that reflection ability develops through practice. According to Schön (1987) and Aukes et al. (2008) experiences enhance the development of reflection. Patient care situations may arise during the individual's previous health care experience. During these situations, the students may have the opportunity to reflect-in or reflect-on the event. These situations provide an avenue for the individual to think at a high-level which helps to develop reflection. Exposure to situations in the health care environment provides individuals an opportunity to reflect. With reflection, an individual accrues knowledge. Therefore, health care experience may provide the individual with practice opportunities to enhance the development of reflection. As evidenced in this study, development of reflection overtime improves more given the opportunities to practice. If those with prior health care experience were exposed to similar situations as occurred in the simulation scenarios, then reflection development can be further enhanced as a reminder of what had happened in real-life. Additionally, the individuals that had previous health care experience may have been working during data collection. This could also impact why there was more of an improvement in reflection ability scores during the later measurements.

Additionally, when looking at students with a low GPA, students with previous healthcare experience had consistently higher GRAS scores than those with a low GPA without

previous healthcare experience. This finding is important for faculty to encourage nursing students to gain some type of other health care experience during the nursing program to enhance reflection and ultimately student learning. When comparing low and high GPA over time, those with high GPA again scored consistently higher throughout each measurement with a slight increase during post-test three. During the time of this study, the data was collected over different time points during the first seven weeks of the semester. The students were learning information in class as well in clinical. The students with a high GPA may have been able to process the information learned easier than those with a low GPA. This finding is supported by Schön's (1987) idea of the contribution of intellectual knowledge having a factor with reflection. Those with a higher GPA may have more intellectual knowledge which was reflected in the profile plots with the higher mean scores during each time point when compared to low GPA. Dewey (1933) also described reflection as a process of thinking. Furthermore, reflection results in clarifying and creating meaning on experiences (Aukes et al., 2007). Individuals with a high GPA may be able to process their thinking more effectively than those with a low GPA. Higher-level thinking helps individuals to process an unanticipated situation that may occur in the complex health-care environment. Additionally, those with a higher GPA may spend more time studying and attending class which helps to contribute to their intellectual knowledge. This intellectual knowledge may help to enhance the thinking needed for reflection. Therefore, faculty should encourage students to improve their GPA.

This study's findings were also compared to other literature. Very little literature has investigated the impact of personal variables impact on reflection. Hannans (2013) study reported statistically significant findings suggesting previous healthcare experience positively influenced reflection ability. One explanation for this difference involved the sample of first,

second, and third year baccalaureate nursing students. An online clinical post-conference activity was used for students to reflect following a clinical day. Similar to simulation and debriefing, this type of activity also enhances students' reflection. Both activities offer a practice environment that encourages reflection. Therefore, previous health care experience positively impacts the student's ability to reflect when using appropriate activities that encourage student learning. Again, for this study, those with previous health care experience had higher mean reflection ability scores that improved over time. The specific content covered during the simulations (vital signs, oxygenation, communication) may have occurred during the individuals previous healthcare experiences which could explain the higher mean reflection ability scores.

Additionally, another study investigated reflection activities that positively correlated with GPA (Stephens et al., 2012). Although the sample included medical students, an activity was used to enhance reflection. The activities involved writing an essay and then participating in a small group discussion. Similar to simulation and debriefing, students could write down key events that occurred during the simulation and then discuss the situation in a group during debriefing. When using VAD specifically, the students are reminded of pertinent events through a visual format. Similarly, in this study, those with higher GPA had constantly higher reflection ability scores than those with low GPA. This steady incline in scores evident with those with a high GPA suggests that activities that promote reflection are needed. Those with a higher GPA may be more committed to learning which is represented in the reflection ability scores. Both studies support the fact that personal variables impact reflection.

Although some literature supports these personal variables as having an impact on reflection, other factors may also be influential. When examining previous health care experience affect on reflection ability other factors may be influential such as the number of

years of experience or type of experiences. As described previously, only 36 of the participants had responded 'yes' to previous healthcare experience. Of those participants, the experiences may vary in regards to years of experience and type of position. For example, a dietary aid may not gain the same experiences as a patient care technician or emergency medical technician. Additionally, as previously mentioned, most of these participants had two years or less experience in these positions. This amount of experience may not be enough time to greatly influence reflection ability. Additionally, the amount of hours each participant worked per week is unknown. The participants that responded with having two years of experience could have possibly only worked during summer or winter breaks. If the participants work very few hours per week there may not be much of an impact.

Overall, personal variables impacted reflection ability scores over time as evidenced by the mean scores. This study's finding, as well as the literature discussed, suggests that personal variables have an impact on reflection ability. Additionally, Schön's concept of reflection is supported by the variables in this study as having influence on reflection and will be further discussed below.

Reflection. The conceptual framework used for this study involved Schön's work on reflection. According to this framework, reflection involves thinking back on an event to discover new understandings of the situation (reflection-on-action). Reflection also occurs during a situation (reflection-in-action) where the individual thinks through the situation while it occurs to hopefully resolve the problem.

Most of the participants of this study were beginning nursing students with very few clinical nursing experiences to think back on to aid in the discovery of new understandings. Therefore the scenarios created for this study were written to exemplify Schön's explanation that

reflection occurs by building a knowledge base from experiences. The topics chosen for the simulation related to what was taught in the theory class that students were taking at the time. In the first scenario the students had to interpret vital signs. The second simulation scenario involved oxygenation where the nurse had taken measures to assess and intervene. The third simulation scenario included an interaction between the patient and nurse with therapeutic communication approaches. Each scenario involved the same patient at different points of the hospital admission. Therefore, the scenarios were written to help the students to reflect back on knowledge accrued during the previous simulations if needed. The students had very minimal clinical contact with patients at the time of the study; however, the same skills were taught simultaneously during the scheduled clinical time in the skills lab. This skill practice time may have provided a simulated experience for the students to draw from.

One area during the simulation scenario required students to reflect-in-action when a patient had trouble breathing during the oxygenation scenario. The students had to frame the situation (patient having trouble breathing, SpO2 low) to think about the situation. During reflection-in-action, students think about possible actions and arrive at a conclusion about the best solution. During this scenario, the nurse raises the head of the bed, applies oxygen, and in turn the patient's oxygenation problems resolve. Students with previous health care experience may have cared for patients with oxygenation problems and can thus reflect-in-action by using this pre-existing knowledge. As described by Schön, individuals frame the situation and then figure out a resolution to the problem. For those with previous health care experience, this process should occur rather smoothly where the situation resolves without any problems. Novice nurses or beginning nursing students who do not possess previous knowledge or experience in similar situations may have difficulty determining actions. The reflection that occurs during the

event may be inadequate to resolve the situation. For this study, as the students observed the simulation, reflection-in-action can occur by anticipation of what the actor nurse may do next. So instead of being an active participant and actually performing, the participants were thinking through the situation. This specific problem, low SpO2, was discussed further during debriefing to help to ensure reflection-on-action. The students were reminded of the event and encouraged to reflect back on what occurred. A short clip of the video was replayed that focused on the low SpO2. The facilitator encouraged the students to reflect on the particular situation. The students thought process was discussed verbally until a group consensus formed that approached the most appropriate response to the situation. Using the VAD offered the student a reminder or visual reinforcement of the specific problem to enhance reflection. The students were provided with an opportunity to reflect during the simulation and afterwards through debriefing. Using this concept of reflection helps students to think effectively to troubleshoot situations that may occur in the hospital setting.

Schön's work on reflection also supports the personal variables of GPA and previous health care experience. As discussed previously, although prior healthcare experience and GPA did not reveal statistical significance, the profile plots did suggest more improvement with those with a higher GPA and previous healthcare experience. According to Schön, reflection requires both practice and a previous knowledge base. This idea supports the notion that previous health care experience and GPA may enhance reflection ability. Individuals that have a higher GPA may have more of a knowledge base but without practice with reflection they may not have the ability to reflect effectively. Schön suggested a theory to practice gap where memorization may not help with the development of reflection. Therefore, having a combined high GPA and

previous health care experience may provide both the knowledge base and practice needed to develop reflection.

Additionally, according to Schön, individuals need to practice reflection with a trained facilitator in a controlled environment over time. The high-fidelity simulation and VAD provided the students an opportunity to practice reflection with a trained facilitator during three time points. Therefore, Schön's idea of practicing reflection overtime was consistent with the results of this study that reflection ability may improve with repeated simulations and VAD.

Overall, Schön's work on reflection supports the findings of this study. The students were given the opportunity to reflect-in-action during the viewing of the scenario and reflect-on-action while debriefing with the video. Schön's ideas also suggest that personal variables may impact reflection. Lastly, Schön's idea that reflection also requires practice in a training environment over time is consistent with this study's finding. This study adds to the body of literature relating to debriefings; however, limitations were identified and are discussed below.

Limitations

The findings of this study are promising and provide a preliminary contribution to the literature, but some limitations were evident. The first limitation involves generalizability of the study. The sample was a convenience sample limited to one location, and one student group of undergraduate sophomore-level nursing students. These students may not represent all nursing students. Another influence on the generalizability of the findings was the demographic characteristics of the sample. When compared to the NLN Survey of Nursing Schools (2014), the demographics of this study varied. These differences may influence the results and the ability to generalize the findings. Additionally, this study design lacked a control group. Control groups provide stronger support for or against the intervention being tested. This study, with its

descriptive nature, was conducted to describe reflection ability following repeated simulations and VAD. No control group or randomization was used. Studies that use a more rigorous design can better solidify the evidence that repeated simulation and VAD does impact reflection ability.

Another limitation includes the time frame of the study. Because the study measures reflection over time, clinical experience and/or content taught in theory class could also change reflection ability. Clinical experiences vary among nursing students. The participants were assigned to different clinical instructors. During this study, most of the participant's clinical time was in the skills lab. During skills lab, students practice skills that are completed individually or in small groups. Clinical instructors may also disseminate information differently. Also, the students were placed at different clinical sites. Depending upon clinical assignments and patient conditions, students may have different clinical exposure to patient situations which may impact their knowledge and clinical skills. Furthermore, content taught during the fundamentals nursing course that occurred between data collection measurements may have influenced reflection ability scores. For example, after the first simulation experience, the faculty taught content regarding oxygenation. Since the topic was also oxygenation, this content helped to build a knowledge base to help the students to reflect during and after the next simulation. For future studies, controlling for extraneous variables can include ensuring that all students are getting the same experience. Once example includes examining reflection ability prior to clinical site placement while the students are all in the skills lab learning the same information.

Several items not consistent with a typical simulation experience occurred and may pose further limitations. The fundamentals nursing course involved a large number of students (approximately 80-90 per section). This is not typical of many simulation learning experiences that involve a clinical group with a small number of students. Students in this study may have

become inattentive or distracted during the simulation and VAD. Not all of the students were able to verbally participate during the debriefing due to the large number of participants per class. Additionally, prerecorded videos were used to demonstrate the nurses' role during the simulation rather than live performance of the participants. This is not typical of a simulation experience but was part of the study design for several reasons. First, the prerecorded video allowed scripting of incorrect and correct actions. This also helped to prevent any audio-visual malfunction during the simulation. Lastly, due to time constraints, the simulation and VAD had to be completed in a timely manner. The exact timing of the video playback during debriefing was pre-determined. Usually, when using VAD, the simulation is recorded while the students are participating 'live'. This type of debriefing may be more difficult to determine exact time points to play back. More time may be needed for faculty to encourage reflection using the recent video-recording of the live scenario. Therefore, having used the pre-recorded video may not have been completely representative of using the recording of a 'live' performance from the participants.

Another limitation involved the administration of the GRAS. Although the GRAS is a one-dimensional scale, three relevant aspects are part of this scale: Self-reflection, empathetic reflection, and reflective communication. More specifically, self-reflection is an exploration of one's own thoughts; empathic reflection is the understanding of others in the situation; and reflective communication is the behavior resulting from the self-reflection and empathetic reflection (Aukes, 2008). These specific components of the scale may not have occurred during the simulations and may have influenced the results. For example, one item on the scale 'I am able to understand people with a different culture/religious background' was not relevant to the simulation as the simulated patient was a white Caucasian female and most of the participants

were the same race and gender. Additionally, these concepts are not part of Schön's work on reflection. Reflection, according to Schön, focuses more on the present and past situations and the framing of the problem that leads to a solution. Additionally, the GRAS is a self-reported tool. Self-rating can result in skewed results based on how the participant's feel would be most suitable for the researcher. For most of the measurements, the survey was administered during the end of class time. Students may have responded quickly without much thought in order to depart the class early. Also, the students may have answered each item generally rather than analyzing their own thinking following the high-fidelity simulation and VAD. Lastly, the GRAS was administered during four different time-points. Survey fatigue could result from this type of design. Even though there are some limitations, the findings offer important considerations for nursing education.

Implications

The purpose of this study was to investigate reflection ability of undergraduate sophomore-level nursing students following a high-fidelity simulation and VAD. This study's results suggest, that overtime, reflection ability may improve with simulation and VAD. Again, personal variables did not reveal statistical significance but rather yielded interesting data that students with previous healthcare experience and high GPA had higher mean reflection ability scores overtime. Based on these findings, using simulation and VAD is important. These findings are meaningful for nurse administrators, nurse educators, simulation experts, and patients' and are discussed below.

Educators need to consider the personal variables of GPA and previous healthcare experience since they may impact reflection. Students who have lower GPA's need encouraged or assisted to increase their GPA. Activities to promote reflection through reflective questioning

during class or clinical activities may help to improve their thinking process. Also, increasing simulation experiences to encourage students to reflect during debriefing may help their thinking which may ultimately increase their GPA. Additionally, since previous healthcare experience may have an impact on reflection, educators should encourage students to work in a health-related field while in nursing school. However, the amount of hours worked should not limit the time available for studying. For those students that cannot work and attend school full-time faculty should include activities that resemble patient situations to enhance reflection and critical thinking by providing opportunities for clinical contact.

Nurse administrators need to ensure that simulation and VAD is incorporated throughout the program. Specifically, since reflection ability improves overtime, repeated opportunities of simulation and debriefing are needed to develop these skills. Therefore, simulation should be included in all clinical courses. Nurse educators need to then incorporate high-quality simulation and debriefing in specified courses by selecting appropriate simulations for the student level and topic. Simulation experts also can assist with integrating simulation across the curriculum. Select faculty interested in simulation and debriefing need trained on evidence-based debriefing practices to ensure competence (NLN Board of Governors, 2015b). They can then provide insight on best practices for simulation and debriefing for other faculty. This will help to ensure a debriefing experience that enhances reflection. As the nursing students progress through the program, simulations should increase in difficulty and build upon previous scenarios. This practice will add to their knowledge base and should help students to reflect better. Developing reflection is essential for nursing students to become better at clinical reasoning, thus they will provide better patient care.

Ultimately, better reflection ability will impact nursing care which is particularly important in this complex health care environment. Reflection involves a type of critical thinking about situations to gain a new understanding or resolution of the problem (Schön, 1987). This type of thinking is needed in nursing practice in order to provide quality patient care. Unexpected patient situations may arise that require higher-level thinking. The practice of reflection, or higher-level thinking, through repeated use of simulation and VAD throughout the nursing program should help the graduate nurse to better respond to these unexpected patient situations. Further recommendations for administrators, simulation experts, and faculty are discussed next.

Recommendations

According to the study findings, simulation and VAD use over time may increase reflection ability. Therefore, recommendations emerging from the results of the study were formulated. The recommendations are congruent with several key documents related to simulation and debriefing. These suggestions are of utmost importance since nursing programs continue to see an increasing use of simulation. According to the NCSBN study, up to 50% of clinical experiences can be replaced with high-quality simulation (Hayden et al., 2014). Therefore, nursing programs may rely upon simulation even more now than ever before for clinical learning opportunities. The following section includes recommendations for nurse administrators, faculty, and simulation experts in regards to simulation and debriefing. The need for future research is also indicated at the conclusion of this section.

Nurse Administrators

The findings from this study offer nurse administrators several recommendations. Nurse administrators are at the forefront in ensuring a means for high-quality simulation experiences.

Nurse administrators need to support long term use of simulation (Anderson et al., 2015). Appropriate simulation resources are needed to provide a good learning opportunity for students. Therefore, an adequate budget for simulation needs allocated. The budget requirements involve several items such as securing of physical space for simulations and a separate area for debriefing (Anderson et al., 2015). Also, the budget needs to supply necessary equipment such as simulators and materials to realistically mimic the health care environment to make the simulations more realistic. Additionally, audio-visual equipment is needed to provide a live-feed for those observing and allowing the option for VAD. All of this equipment needs to be maintained to provide students many simulations during their time in the nursing program. Simulation and debriefing experiences enhance reflection, which is linked to clinical reasoning. These opportunities help to adequately prepare students to care for patients in the ever-changing health care environment.

Nurse administrators need to also ensure that nursing programs have adequate simulation personnel. There needs to be adequate numbers of simulation personnel who have sufficient training to effectively implement their roles (NLN Board of Governors, 2015a). Simulation experts can facilitate the use of simulation throughout the nursing program providing appropriate experiences at various levels of the program. Also, a simulation expert can assist other faculty with debriefing techniques (NLN Board of Governors, 2015b). Simulation and debriefing can be a lot to manage individually, regardless if it is by simulation experts or faculty. Simulation experts can help to assist faculty with the simulation experience. This joint effort can contribute to student learning. The simulation expert and faculty can view the simulation simultaneously to help structure a debriefing experience to promote reflection. During debriefing, both can facilitate debriefing and ensure that key events are reflected upon.

A budget for faculty development opportunities is also necessary (Anderson et al., 2015; NLN Board of Governors, 2015a; NLN Board of Governors, 2015b). Faculty need educated on best practices for simulation and debriefing. Specifically, faculty development on good debriefing practice will help encourage a reflective student discussion. Simulation experts and faculty involved with simulation, need to be qualified through specific courses, programs, and certification (Anderson et al., 2015). This helps to ensure that these individuals have the necessary knowledge, skills, training, and expertise to provide a quality learning experience.

Simulation Experts

Simulation experts also have an important role in ensuring a quality simulation experience for the students. Recommendations for simulation experts include seeking opportunities to become qualified to conduct simulations (Anderson et al., 2015). These opportunities involve obtaining a certification in simulation (Certified Healthcare Simulation Educator, CHSE), attending simulation workshops/conferences/webinars, and reviewing current literature that supports simulation and specific debriefing methods. With current awareness of simulation practices, the simulation expert can determine the method of debriefing best suited for the nursing program to ensure consistency and promote reflection and clinical reasoning for students. Therefore, every simulation experience needs an adequately trained debriefer. An adequately trained debriefer should be able to encourage more of a thoughtful discussion, use probing questions and help to connect theory to practice during debriefing which will help to develop the students' reflection.

Simulation experts can also provide faculty development opportunities for faculty to acquire debriefing skills. Additionally, simulation experts can offer orientation to simulation and debriefing for new faculty (Anderson et al., 2015). Once faculty engage in the debriefing

facilitator role, simulation specialists can monitor or evaluate them using a debriefing evaluation tool such as Debriefing Assessment for Simulation in Healthcare (DASH). This evaluation will help to ensure that the faculty is facilitating a reflective discussion rather than just disseminating information to the students. Regardless if simulation experts and/or faculty are debriefing, they should be adequately trained to encourage a student-centered reflective discussion. Having qualified debriefers will help students to acquire the skills needed to think through situations that may arise in the health care setting. This will then ultimately impact patient care.

Lastly, simulation experts can assist faculty in integrating simulation throughout the curriculum using the INACSL *Standards of Best Practice* (NLN Board of Governors, 2015a). Simulation experts can ensure that the most up-to-date standards are being used during the simulation experiences and also include the best practice related to debriefing. The simulation expert's assistance with incorporating all of these recommendations will help to ensure high-quality simulation experiences that enhance reflection and prepare the students for practice.

Nursing Faculty

Further recommendations were formulated for nursing faculty. Faculty can assist with simulation integration throughout the curriculum to enhance student learning outcomes (NLN Board of Governors, 2015a). Faculty, specifically interested or currently using simulation and debriefing, should consider faculty development opportunities to enhance debriefing skills (NLN Board of Governors, 2015b). The faculty development can occur through course(s), continuing education, and/or by experienced simulation experts (NLN Board of Governors 2015b; INACSL Board of Directors, 2013). When faculty debrief, they need to consistently use evidence-based resources to help ensure competence in debriefing (NLN Board of Governors, 2015a; NLN Board of Governors, 2015b). Faculty need to also be cognizant of the impact of personal bias

during debriefing (NLN Board of Governors, 2015b). Encouraging a student-centered discussion without faculty perception is important for students to develop reflection using their own thoughts. Additionally, the debriefer needs to provide a safe environment to facilitate a reflective discussion with all participants.

Faculty can also help to develop student's reflection skills during other teaching-learning activities that take place during classroom and clinical teaching. In the classroom, activities other than simulation can be created to enhance student's reflection skills. An activity, such as using a case study during class and then facilitating a discussion regarding the student's responses can help with reflection. Faculty can also facilitate reflection during clinical activities. Often times, post-conference is used to discuss what occurred during the clinical day. Faculty can encourage the students to examine certain patient situations and elaborate on their thought processes and potential solutions. Faculty's facilitation of reflection activities will hopefully help the student to learn to think through patient situations. This type of thinking helps the students provide the best possible patient care.

Future Research

Research regarding VAD has varied regarding the debriefing approach examined, and subject groups. Studies examining VAD have focused on student performance, response times, and perceptions. Other research that focused on reflection and debriefing examined the impact of other debriefing methods on clinical reasoning, clinical judgment, reflection, and reflection level. The research related to this topic is sparse, therefore, suggestions for future research are provided.

Replicated studies are warranted to confirm or refute these findings. Generalizability can be enhanced by different sampling techniques such as random sampling. Furthermore, going

beyond a one-site study and using multiple sites could provide more evidence on this topic. Also examining different program type such as studying associate degree or RN to BSN students, could be devised to determine if the findings are consistent across program levels.

Additionally, further research is needed in regards to examining reflection ability of nursing students at other levels of the program (junior and senior level years). Simulations typically increase in difficulty as students' progress through the program. Also, more advanced students have more clinical experience and theory content which may lead to differing results. Another idea includes conducting a longitudinal study to see how simulation and VAD impact reflection ability over long term use (from the start of nursing courses to prior to graduation). Also, possibly conducting the study during simulation time that occurs in smaller groups may pose different results. Additionally, including a control group to compare if VAD is more effective than structured debriefing is needed.

Other essential research involves the personal variables that may influence reflection ability. Future studies should further explore the impact of previous healthcare experience on reflection. Gathering specific data such as length of time in the position, average number of hours worked per week, or type of position would be helpful. Also, personal variables, different from previous healthcare experience and GPA, may have more of an impact on reflection ability and should be explored. Examining items such as number of credits currently taking during the semester, or amount of workload may have an influence and could be included in future research.

Furthermore, not much literature exists that provides suggestions on how to best use VAD. Research is needed in this area to determine if this is the best method to debrief. Comparative studies using VAD with other commonly used debriefing approaches would help to

establish best practices. Also, different ways to use the video during debriefing need examined to provide the best evidence to guide nurse educators on how to debrief with the assistance of video. For example, it would be helpful to determine the best number of video clips to show during the debriefing or best time to show the video.

Overall, several gaps remain in this area. Conclusions on VAD and reflection ability are preliminary. Further research using rigorous study methods would help to ensure confidence in the study's findings. Using multiple data collection sites and/or comparing other methods of debriefing to VAD are recommended. Further research will help to add to the state of the science on debriefing.

Conclusions

In conclusion, this study adds to the literature regarding simulation and debriefing. Results revealed that reflection ability may improve over time with simulation and VAD. Although statistical significance was not found with GPA and previous healthcare experience as factors that improved reflection ability, the difference between those with previous healthcare experience with a higher GPA compared to those with a low GPA reflected an improvement of the GRAS scores over time. The implications and recommendations of this study may be used to aid in the development of high-quality simulation and debriefing to enhance nursing students' reflection. Many gaps in the debriefing literature remain and need studied to formulate best practices for high-quality simulation experiences.

References

Alexander, M., Durham, C. F., Hooper, J. I., Jeffries, P. R., Goldman, N. Kardong-Edgren, S., …Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation, 6*(3), 39-42.

American Association of Colleges of Nursing. (2012). Nursing shortage fact sheet. Retrieved from http://www.aacn.nche.edu/media-relations/NrsgShortageFS.pdf

American Association of Colleges of Nursing. (2015). *Enrollment and Graduations in Baccalaureate and Graduate Programs*. Washington DC: Author.

American Heart Association. (2010). Structured and supported debriefing. Retrieved from http://www.ahaonline.org

Anderson, N. B., O'Neill, L. O., Gormsen, L. K., Hvidberg, L., & Morcke, A. M. (2014). A validation study of the psychometric properties of the Groningen Reflection Ability Scale. *BMC Medical Education, 14*(214). 1-8. doi: 10.1186/1472-6920-14-214

Angelo, T. A., & Cross, P. K. (1993). *Classroom assessment techniques* (2nd Ed.). San Francisco, CA: Jossey-Bass.

Aukes, L., Geertsma, J., Cohen-Schotanus, J., Zwierstra, R., & Slaets, J. (2007). The development of a scale to measure personal reflection in medical practice and education. *Medical Teacher, 29*(2-3), 177-182.

Aukes, L., Geertsma, J., Cohen-Schotanus, J., Zwierstra, R., & Slaets, J. (2008). The effect of enhanced experiential learning on the personal reflection of undergraduate medical students. *Medical Education, 13*(15), 1-10.

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco, CA: Jossey-Bass.

Boese, T., Cato M., Gonzalez, L., Jones, A., Kennedy, K., Reese, C., …Borum, J. C. (2013). Standards of best practice: Simulation standard V: Facilitator. *Clinical Simulation in Nursing, 9*(6), S22-S25. doi: 10.1016/j.ecns.2013.04.010

Byrne, A. J., Sellen, A. J., Jones, J. G., Aitkenhead, A. R., Hussain, S., Gilder, F., ... Ribes, P. (2002). Effect of videotape feedback on anaesthetists' performance while managing simulated anaesthetic crises: A multicentre study. *Anaesthesia, 57*(2), 176-179.

Cant, R. P., & Cooper, S. J. (2011). The benefits of debriefing as formative feedback in nursing education. *Australian Journal of Advanced Nursing, 29*(1), 37-47.

Cantrell, M. A. (2008). The importance of debriefing in clinical simulations. *Clinical Simulation in Nursing, 4*(2), e19-e23. doi: 10.1016/j.ecns.2008.06.006

Chronister, C., & Brown, D. (2012). Comparison of simulation debriefing methods. *Clinical Simulation in Nursing, 8*(7), e281-e288. doi: 10.1016/j.ecns.2010.12.005

Dekker-Groen, A. M., Marieke, F. S., & Stokking, K. M. (2011). Teacher competencies required for developing reflection skills of nursing students. *Journal of Advanced Nursing, 67*(7), 1568-1579. doi: 10.1111/j.1365-2648.2010.05591

Denton, D. (2011). Reflection and learning: Characteristics, obstacles, and implications. *Educational Philosophy and Theory, 43*(8), 838-852. doi: 10.1111/ j.1469-5812.2009.00600

Dewey, J. (1933). *How we think.* Boston, MA: Dover Publishing.

Dieckmann, P., Friis, S. M., Lippert, A., & Ostergaard, D. (2009). The art and science of debriefing in simulation: Ideal and practice. *Medical Teacher, 31,* e287-e294.

Dismukes, R. K., Gaba, D. M., & Howard, S. K. (2006). So many roads: Facilitated debriefing in healthcare. *Simulation in Healthcare, 1*(1), 23-25.

Dreifuerst, K. (2009). The essentials of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives, 30*(2), 109-114.

Dreifuerst, K. T. (2010). *Debriefing for meaningful learning: Fostering development of clinical reasoning through simulation* (Doctoral dissertation). Retrieved from Proquest and Theses Global. (UMI No. 3617512)

Duffy, A. (2008). Guided reflection: A discussion of the essential components. *British Journal of Nursing, 17*(5), 334-339.

Dusaj, T. K. (2014). *A randomized control study comparing outcomes in student nurses who utilize video during simulation debriefing as compared to those who utilize traditional debriefing* (Doctoral dissertation). Retrieved from Proquest and Theses Global. (UMI No. 3585000)

Fey, M. K., Scrandis, D., Daniels, A., & Haut, C. (2014). Learning through debriefing: Students' perspectives. *Clinical Simulation in Nursing, 10*(5), e249-e256. Doi: 10.1016/j.ecns.2013.12.009

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th Ed.). Thousand Oaks, CA: Sage.

Freshwater, D., Taylor, B. J., & Sherwood, G. (2008). *International textbook of reflective practice in nursing.* Oxford, United Kingdom: Blackwood.

Gaberson, K. B., Oermann, M. H., & Shellenbarger, T. (2015). *Clinical teaching strategies in nursing* (4th Ed.). New York, NY: Springer.

Garrett, B., Macphee, M., & Jackson, C. (2010). High-fidelity patient simulation: Considerations for effective learning. *Nursing Education Perspectives, 31*(5), 309-313.

Grant, J., Dawkins, D., Molhook, L., Keltner, N., & Vance, D. (2014). Comparing the effectiveness of video-assisted oral debriefing and oral debriefing alone on behaviors by undergraduate nursing students during high-fidelity simulation. *Nurse Education in Practice*, *14*(5), 479-484. doi: 10.1016/j.nepr.2014.05.003

Grant, J. S., Moss, J., Epps, C., & Watts, P. (2010). Using video-facilitated feedback to improve student performance following high-fidelity simulation. *Clinical Simulation in Nursing*, *6*(5), e177-e184. doi: 10.1016/j.ecns.2009.09.001

Groom, J. A., Henderson, D., & Sittner, B. J. (2014). NLN/Jeffries Simulation Framework state of the science project: Simulation design characteristics. *Clinical Simulation in Nursing*, *10*(7), 337-344. doi: 10.1016/j.ecns.2013.02.004

Grossman, R. (2009). Structures for facilitating student reflection. *College Teaching*, *57*(1), 15–22. doi: 10.3200/CTCH.57.1.15-22

Ha, E. (2014). Attitudes toward video-assisted debriefing after simulation in undergraduate nursing students: An application of Q methodology. *Nurse Education Today*, *34*(6), 978-984. doi: 10.1016/j.nedt.2014.01.003

Hannans, J. (2013). *Testing a reflection education intervention on baccalaureate nursing students' level of reflection during online clinical post conference* (Doctoral dissertation) Retrieved from Proquest & Thesis Global. (UMI No. 3601589)

Harder, B. (2010). Use of simulation in teaching and learning in health sciences: A systematic review. *Journal of Nursing Education*, *49*(1), 23-28. doi: 10.3928/01484834-20090828-08

Hays, R., & Gay, S. (2011). Reflection or 'pre-reflection': What are we actually measuring in reflective practice? *Medical Education, 45*(2), 116-118. doi: 10.1111/ j.1365-2923.2010.03813

Hayden, J. (2010). Use of simulation in nursing education: National survey results. *Journal of Nursing Regulation, 1*(3), 52–57.

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S1-66.

Hober, C. L. (2012). *Student perceptions of the observer role play experiences in the implementation of a high fidelity patient simulation in bachelor's degree nursing programs* (Doctoral dissertation). Retrieved from Proquest and Thesis Global. (UMI No. 3495026)

Husebo, S. E., Dieckmann, P., Rystedt, H., Soreide, E., & Friberg, F. (2013). The relationship between facilitators' questions and the level of reflection in post simulation debriefing. *Simulation in Healthcare, 8*(3), 135-142. doi: 10.1097/SIH.0b013e31827cbb5c

INACSL Board of Directors. (2013). Standard VI: The debriefing process. *Clinical Simulation in Nursing, 9*(6S), s26-29. doi: 10.1016/j.ecns.2013.04.008

Institute of Medicine. (2011). *The future of nursing: Leading change, advancing health*. Washington, DC: National Academies Press.

Jeffries, P. R. (2012). *Simulation in nursing education: From conceptualization to evaluation* (2nd Ed.). New York, NY: National League for Nursing.

Kaplan, B. G., Abraham, C., & Gary, R. (2012). Effects of participant vs. observation of a simulation experience on testing outcomes: Implications for logistical planning for a school of nursing. *International Journal of Nursing Education Scholarship, 9*(1), 1-15. doi: 10.1515/1548-923X.2398

Kardong-Edgren, S., Willhaus, J., Bennett, D., & Hayden, J. (2012). Results of the National Council of State Boards of Nursing national simulation survey: Part II. *Clinical Simulation in Nursing, 8*(4), e117-e123.

Koole, S., Dornan, T., Aper, L., Scherpbier, A., Valcke, M., Cohen-Schotanus, J., & Derese, A. (2011). Factors confounding the assessment of reflection: A critical review. *BMC Medical Education, 11,* 104. doi: 10.1186/1472-6920-11-104

Krogh, K., Bearman, M., & Nestel, D. (2015). Expert practice of video-assisted debriefing: An Australian qualitative study. *Clinical Simulation in Nursing, 11*(3), 180-187. doi: 0.1016/j.ecns.2015.01.003

Kuiper, R., Heinrich, C., Matthias, A., Graham, M. J. & Bell-Kotwall, L. (2008). Debriefing with the OPT model of clinical reasoning during high fidelity patient simulation. *International Journal of Nursing Education Scholarship, 5*(1), 1-14. doi: 10.2202/ 1548-923X.1466

Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Students' experiences. *Journal of Nursing Education, 46*(6), 269-276.

Lavoie, P., Pepin, J., & Boyer, L. (2013). Reflective debriefing to promote novice nurses' clinical judgment after high-fidelity clinical simulation: A pilot test. *Dynamics, 24*(4), 36-41.

Lowe, M., Rappolt, S., Jagial, S., & Macdonald, G. (2007). The role of reflection in implementing learning from continuing education into practice. *Journal of Continuing Education in the Health Professions, 27*(3), 143-148.

Maier, C. (2015). *GSR 517 Lecture Notes.* Personal collection of Christoph Maier, Indiana University of Pennsylvania, Indiana PA.

Mariani, B., Cantrell, M. A., & Meakim, C. (2008). Nurse educators' perceptions about structured debriefing in clinical simulation. *Nursing Education Perspective, 35*(5), 330-331.

Mariani, B., Cantrell, M. A., Meakim, C., Prieto, P., & Dreifuerst, K. T. (2013). Structured debriefing and students' clinical judgment abilities in simulation. *Clinical Simulation in Nursing, 9*(5), e147-e155. doi: 10.1016/j.ecns.2011.11.009

Meakim, C., Boese, T., Decker, S., Franklin, A. E., Gloe, D., Lioce, L.,…& Borum, J. C. (2013). Standards of best practice: Simulation standard I: Terminology. *Clinical Simulation in Nursing, 9*(6S), S3-S11.

Mezirow, J. & Associates (1990). *Fostering critical reflection in adulthood.* San Fransisco, CA: Jossey-Bass.

Morse, C, J. (2012). *The effect of debriefing with good judgment on acute care nurse practitioner students' reflective ability and perspective transformation* (Doctoral dissertation). Retrieved from Proquest and Theses Global. (UMI No. 3352408)

National Council of State Boards of Nursing (NCSBN). (2015). NCSBN national simulation study. Retrieved from https://www.ncsbn.org/685.htm

National League for Nursing (NLN). (2014). Annual Survey of Schools of Nursing, Academic Year 2013-2014. Retrieved from https://www.nln.org/newsroom/nursing-education-survey-of-schools-of-nursing-academic-year-2013-2014

National League for Nursing NLN Board of Governors. (2015a). A Vision for Teaching with Simulation. Retrieved from http://www.nln.org/docs/default-source/about/nln-vision-series-(position-statements)/vision-statement-a-vision-for-teaching-with-simulation.pdf?sfvrsn=2

National League for Nursing Board of Governors. (2015b). Debriefing Across the Curriculum. Retrieved from http://www.nln.org/docs/default-source/about/nln-vision-series-(position-statements)/nln-vision-debriefing-across-the-curriculum.pdf?sfvrsn=0

Neill, M. A., & Wotton, K. (2011). High-fidelity simulation debriefing in nursing education: A literature review. *Clinical Simulation in Nursing, 7*(5), e161-168. doi: 10.1016/ j.ecns.2011.02.001

Nolon, A. (2008). Encouraging the reflection process in undergraduate teaching using guided reflection. *Australian Journal of Early Childhood, 33*(1), 31-36.

Padden, M. L. (2011). *The effects of guided reflective journaling on nursing students' level of reflection, self-awareness, and perceived clinical decision making skills* (Doctoral dissertation). Retrieved from Proquest and Theses Global. (UMI No. 3500773)

Pallant, J. (2013). *SPSS survival manual* (4th Ed.). New York: McGraw-Hill.

Palmer, E., Edwards, T., & Racchini, J. (2014). High-fidelity simulation meets athletic training education: An innovative collaborative teaching project. *Athletic Training Education Journal, 9*(2), 96-100. doi: 10.4085/090296

Polit, D. F., & Beck, C. T. (2012). *Nursing research: Generating and assessing evidence for nursing practice* (9th Ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Procee, H. (2006). Reflection in education: A Kantian Epistemology. *Educational Theory, 56*(3), 237-253.

Reed, S. J. (2012). Debriefing experience scale: Development of a tool to evaluate the student learning experience in debriefing. *Clinical Simulation in Nursing, 18*(6), 211-217. doi: 10.1016/j.ecns.2011.11.002

Reed, S. J., Andrews, C. M., & Ravert, P. (2013). Debriefing simulations: Comparison of debriefing with video and debriefing alone. *Clinical Simulation in Nursing, 9(*12), e585-e591. doi: 10.1016/j.ecns.2013.05.007

Rothgeb, M. K. (2008). Creating a nursing simulation laboratory: A literature review. *The Journal of Nursing Education, 47*(11), 489-494. doi: 10.3928/01484834-20081101-06

Rudolph, J. W., Simon, R., Rivard, P., Dufresne, R. L., & Raemer, D., B. (2007). Debriefing with good judgment: Combining rigorous feedback with genuine inquiry. *Anesthesiology Clinics, 25*(2), 361-376.

Savoldelli, G. L., Naik, V. N, Park, J., Joo, H. S., Chow, R., & Hamstra, S. J. (2006). Value of debriefing during simulated crisis management. *Anesthesiology, 105*(2), 279-85.

Sawyer, T., Sierocka-Castaneda, A., Chan, D., Berg, B. Lustik, M., & Thompson, M. (2012). The effectiveness of video-assisted debriefing versus oral debriefing alone at improving neonatal resuscitation performance. *Simulation in Healthcare, 7*(4), 213-221. doi: 10.1097/SIH.0b013e3182578eae

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. San Francisco, CA: Jossey-Bass Inc.

Schön, D. A., (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey Bass.

Shellenbarger, T., & Edwards, T. (2012). Nurse educator simulation: Preparing faculty for clinical nurse educator roles. *Clinical Simulation in Nursing, 7*(2), 249-255. doi: 10.1016/j.ecns.2010.12.006

Shepherd, K. C., McCunnis, M., Brown, L., & Hair, M. (2010). Investigating the use of simulation as a teaching strategy. *Nursing Standard, 24*(35), 42-48.

Shinnick, M. A., Woo, M., Horwich, T. B., & Steadman, R. (2011). Debriefing: The most important component in simulation? *Clinical Simulation in Nursing, 7*(3), e105-e111. doi: 10.1016/j.ecns.2010.11.005

Simones, J. (2008). Creating a home care simulation laboratory. *Educational Innovations, 47*(3), 131-133. doi: 10.3928/01484834-20080301-08

Stephens, M. B., Reamy, B. V., Anderson, D., Olsen, C., Hemmer, P. A., Durning, S. J., & Auster, S. (2012). Writing, self-reflection, and medical school performance: The human context of health care. *Military Medicine, 177*(9), 26-30.

Tanner, C. A. (2006). Thinking like a nurse: A research-based model of clinical judgment in nursing. *Journal of Nursing Education, 45*(6), 205-211.

Weaver, A. (2015). The effect of a model demonstration during debriefing on students' clinical judgment, self-confidence, and satisfaction during a simulated learning experience. *Clinical Simulation in Nursing, 11*(1), 20-26.

Welke T. M., LeBlank, V. R., Savoldelli, G. L., Joo, H. S., Chandra, D. B., Crabtree, N. A., & Naik, V. N. (2009) Personalized oral debriefing versus standardized multimedia instruction after patient crisis simulation. *International Anesthesia Research Society, 109*(1), 183-189. doi: 10.1213/ane.0b013e3181a324ab

Wotton, K., Davis, J., Button, D., & Kelton, M. (2010). Third-year undergraduate nursing students' perceptions of high-fidelity simulation. *Journal of Nursing Education, 49*(11), 632-639. doi: 10.3928/01484834-20100831-0

Appendix A

The Groningen Reflection Ability Scale (GRAS)

Instructions: Here are some statements about your learning and functioning in practice. Using the 1 to 5 scale below, please indicate what *really indicates* your approach rather than what you think your experience should be. Please treat each item separately from every other item. Each item response is based upon a 5-point Likert scale (A=total disagree to E= totally agree) (Morse, 2012). Place your university email and answers on the Scantron form provided.

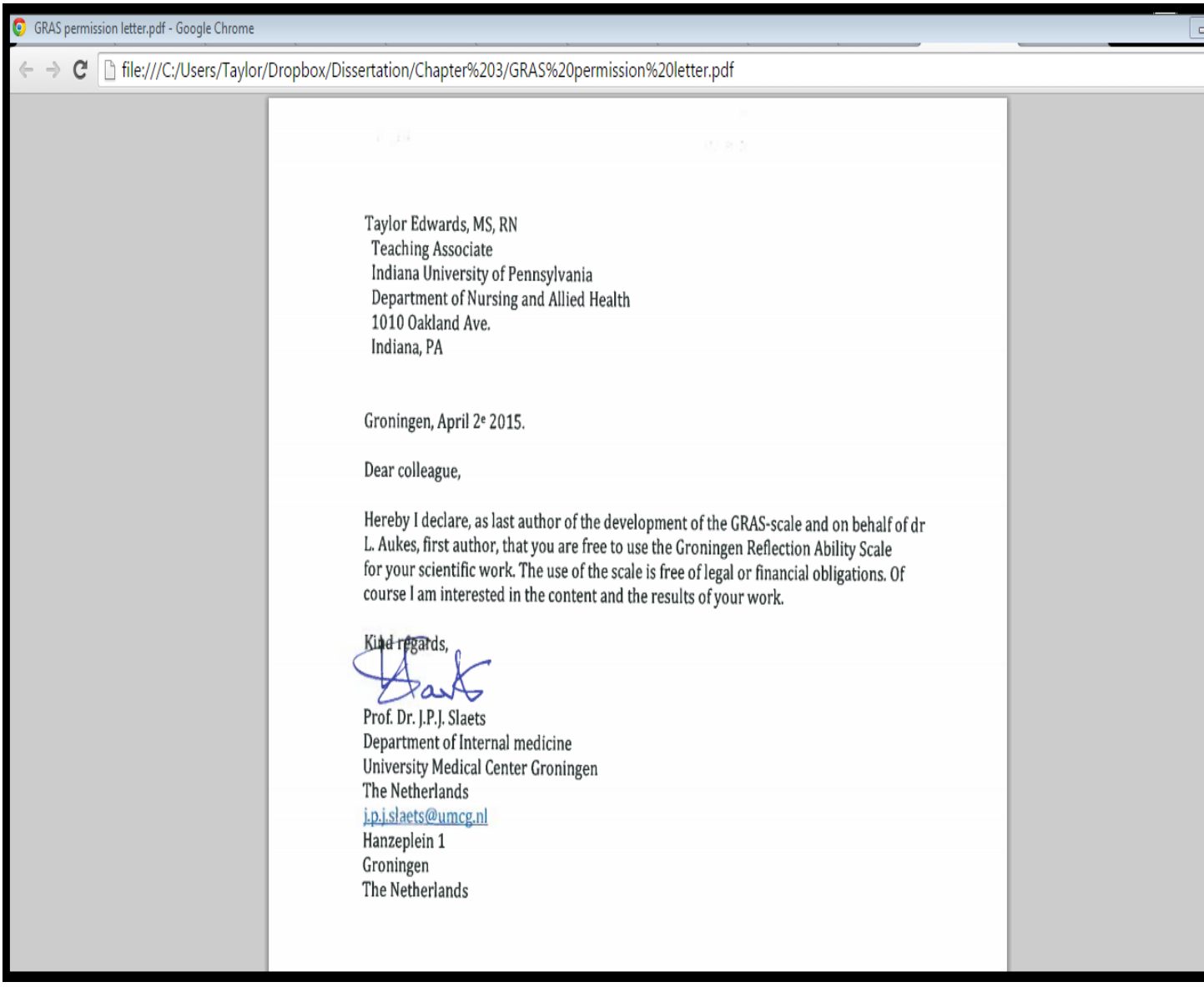
	A	B	C	D	E
1. I want to know why I do what I do	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
2. I am aware of the emotions that influence my behavior	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
3. I do not like to have my standpoints discussed	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
4. I do not welcome remarks about my personal functioning	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
5. I take a closer look at my own habits of thinking	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
6. I am able to view my own behavior from a distance	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
7. I test my own judgments against those of others	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
8. Sometimes others say that I do overestimate myself	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree

9. I find it important to know what certain rules and guidelines are based on	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
10. I am able to understand people with a different cultural / religious background	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
11. I am accountable for what I say	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
12. I reject different ways of thinking	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
13. I can see an experience from different standpoints	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
14. I take responsibility for what I say	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
15. I am open to discussion about my opinions	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
16. I am aware of my own limitations	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
17. I sometimes find myself having difficulty in illustrating an ethical standpoint	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
18. I am aware of the cultural influences on my opinions	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree

19. I want to understand myself	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
20. I am aware of the possible emotional impact of information on others	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
21. I sometimes find myself having difficulty in thinking of alternative solutions	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
22. I can empathize with someone else's situation	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree
23. I am aware of the emotions that influence my thinking	Totally disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Totally agree

Appendix B

Permission Letter


GRAS permission letter.pdf - Google Chrome

file:///C:/Users/Taylor/Dropbox/Dissertation/Chapter%203/GRAS%20permission%20letter.pdf

Taylor Edwards, MS, RN
Teaching Associate
Indiana University of Pennsylvania
Department of Nursing and Allied Health
1010 Oakland Ave.
Indiana, PA

Groningen, April 2e 2015.

Dear colleague,

Hereby I declare, as last author of the development of the GRAS-scale and on behalf of dr L. Aukes, first author, that you are free to use the Groningen Reflection Ability Scale for your scientific work. The use of the scale is free of legal or financial obligations. Of course I am interested in the content and the results of your work.

Kind regards,

Prof. Dr. J.P.J. Slaets
Department of Internal medicine
University Medical Center Groningen
The Netherlands
j.p.j.slaets@umcg.nl
Hanzeplein 1
Groningen
The Netherlands

Appendix C

Demographics

#_____

Directions: Please answer each question openly and honestly. Also place your university email at the top right corner of this handout.

What is your gender?

a) Male
b) Female

What is your current age in years?

What is your race?

a) Caucasian (non-Hispanic)
b) African American
c) Hispanic/Latino
d) Asian/Pacific
e) Native American
f) Other specify_____

Have you ever had a failure in a required nursing course?

a) Yes
b) No

What is your cumulative grade point average (GPA)?

How many credits are you enrolled in this semester?

Do you have prior work experience in the health care field?

a) Yes
b) No

If yes, please describe your prior health care field experience (how many years, your job title, etc.) Position title _____Years in the position_____

Appendix D

Cover Letter (on IUP letterhead)

Title: An Examination of Undergraduate Sophomore-level Nursing Students' Personal Reflection Ability Following High-fidelity Simulation and Video-Assisted Debriefing

Principal investigator: Taylor Edwards, MS, RN, 724-357-2557

You are invited to participate in this research study. The following information is provided in order to help you to make an informed decision whether or not to participate. If you have any questions please do not hesitate to ask. You are eligible to participate because you are a nursing student at IUP enrolled in NURS 212 Fundamentals I Theory.

The purpose of this study is to gain insight on best practices for debriefing following a high-fidelity simulation. Participation in this study will include simulation and debriefing which are integrated in part of the course. Additional time required for this study is approximately 10minutes of your time on three separate occasions during the semester of fall 2015. You will take a pre-test, prior to the first simulation, view a 5-10 minute simulation scenario, debrief, and then take a post-test on three different occasions.

There are no known risks or discomforts associated with this research.

You may find the experience enjoyable. You may enhance your learning through participating in this study. Also, the results of this study will hopefully provide evidence of how debriefing influences your thinking about nursing situations

Your participation in this study is voluntary. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigator or IUP. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you choose to participate, you may withdraw at any time by notifying the Project Director or informing the person administering the survey. Upon your request to withdraw, all information pertaining to you will be destroyed. If you choose to participate, all information will be held in strict confidence. The information obtained in the study may be published in scholarly journals or presented to nursing education professionals but your identity will be kept strictly confidential. Your course grade will not be affected in any way.

If you are willing to participate in this study, please complete the survey and consent will be implied. If you choose not to participate, please notify the project director. If you choose not to participate, an alternative assignment of writing a one-page reflection of the debriefing following each simulation experience that will be turned in.

Project Director:
Mrs. Taylor Edwards
Doctoral Candidate
Nursing & Allied Health Professions
1010 Oakland Ave.
Indiana, PA 15705
Phone: 724/357-2557

Faculty Sponsor:
Dr. Teresa Shellenbarger
Professor
Nursing & Allied Health Professions
1010 Oakland Ave.
Indiana, PA 15705
Phone: 724/357-2557

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: 724/357-7730)