Fall 10-2013

Exploring the Lived Experiences of Participants in Simulation-Based Learning Activities

Rachael Beard
Lindenwood University

Exploring the Lived Experiences of Participants in Simulation-Based Learning Activities

by

Rachael Beard

A Dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the

degree of

Doctor of Education

School of Education

Exploring the Lived Experiences of Participants in Simulation-Based Learning Activities

by

Rachael Beard

This dissertation has been approved in partial fulfillment of the requirements for the degree of

Doctor of Education

at Lindenwood University by the School of Education

Dr. Susan Isenberg, Dissertation Chair	10-18-2013 Date
Dr. John Henschke, Committee Member	10/18/13 Date
Janet Sprehe, Committee Member	10/18/13 Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

Full Legal Name: Rachael Beard

Signature: Rachael Beard Date: 10/18/2013

Acknowledgements

I would like to take this opportunity to share my sincere appreciation to those people in my life who supported me during this process. First, I want to thank my dissertation committee chair Dr. Susan Isenberg for her continued support and openness to my ideas and opinions as I engaged in my study and dissertation. I want to thank my committee members Dr. John Henschke and Janet Sprehe for their expertise and guidance throughout my research. I also want to formally thank my institution of employment, my co-workers, and the participants in the study. Without their positive outlook and interest in participating in this study, my research would have been impossible. Sincere gratitude is also given to Dr. Yvonne Gibbs for her expertise and time spent assisting with document revisions and formatting. Finally, I could not have gotten through this long and enduring process without the support of my family. My deepest appreciation goes to my husband Jared, my son Cole, and my parents Gary and Gerry for their help, support, and constant reassurance that I would succeed.

Abstract

There is currently a small body of research on the experiences of participants, both facilitators and learners, during simulated mock codes (cardiac arrest) in the healthcare setting. This study was based on a practitioner's concerns that mock codes are facilitated differently among educators, mock codes are not aligned with andragogy theory of adult learning, and there is no standardized method to evaluate participant reflection achieved during the debriefings immediately after mock codes. The study took place in a large federal government healthcare organization. The qualitative study method, interpretive inquiry, was used to explore the lived experiences of clinicians and facilitators who participate in mock codes. A validated reflection rubric was used as a method of assessing the achieved level of reflection in a group setting during the debriefing sessions that follow mock codes. Data were collected from interviews, observations, and transcribed mock code video recordings. Five themes emerged: (a) preparation, (b) consistency, (c) use of video recordings, (d) opportunity for follow-up, and (e) self-reflection. The two most significant findings were the lack of consistency in the design, facilitation, and evaluation of the mock code and debriefing processes that lead to confusion, anxiety, and stress among both learners and facilitators, and the gap between facilitator knowledge and understanding of the assumptions of adult learners and the andragogical practice model. Data analysis identified the need for additional participant support through follow-up opportunities for reflection, and the need for andragogy education for the facilitators of mock code exercises. Though the element of surprise makes the mock code realistic much like a fire drill, the study findings indicate learners perceive they would benefit from being prepared for the learning experience in

the form of a pre-briefing. Recommendations for future research include a study of the application of andragogy to the competency framework currently within the VHA system, an evaluation of an evidence-based structure and standardized method for designing and delivering high-quality simulation activities that align with the andragogy, and development of standardized and easy to use methods of assessing the levels of achieved learner reflection during and after the debriefing process.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Background of Study

The expectations and responsibilities of the healthcare workforce are constantly changing. The growth of the American population and the aging of the baby-boomer generation continue to increase demand for healthcare (Rahn & Wartman, 2007). Many Americans already suffer from chronic illnesses that require ongoing medical care. In addition, the advancement of healthcare technology, pharmaceuticals, and treatment options further expand the need for improvements in healthcare clinician education (Rahn & Wartman, 2007). There is a growing concern that education programs have not kept pace with these changes and that reforms are needed to improve the quality and relevance of education and training efforts (Hoge, 2004). Historically, the majority of education in the healthcare setting has been delivered in the classroom setting. This often involves the use of lecture presentations and skill demonstrations. However, this type of education has also been linked to a common disconnect between knowledge and practice (Johnson, Johnson, & Smith, 1998). I am a nurse educator within the Veterans Health Administration (VHA). In my experiences as a healthcare educator of clinicians, too often knowledge gained in the classroom does not translate into actions at the bedside with the patient.

I have observed within my employment setting a wide variation of educational methods used in the healthcare setting. In my opinion, there has been a recent trend to move education away from traditional passive teaching methodologies such as lecture and towards methods that support active engagement. An adult education theory called andragogy describes the unique characteristics of adult learners and how they learn best,

which is through active engagement. Nonetheless, I believe there is low acceptance and adoption of this idea at the VHA. This observation is based on my own experiences as a nursing instructor focused on moving clinical education away from teacher directed modalities and towards learning opportunities that support self-directedness and are experiential in nature. Within the VHA, educational leaders seem to support the adoption of best practices in clinician education. The word clinician refers to those healthcare workers who directly or indirectly take care of patients. These activities are often at the bedside and include job titles such as nurse, physician, and patient care technician. Although these three roles are the most common, other titles that sometimes also support patient care at the bedside include psychologists, pharmacists, therapists, dieticians, social workers, medical students, and nursing students. The VHA has recently encouraged participation by educational leaders in seminars, conferences, and online training events that focus on educational delivery methods, competency development and evaluation, and emerging best practices for clinical education with the hope of introducing educational programs with methodologies that better align with the future of healthcare provision.

Educational leaders within the VHA recommend training should be restructured to focus on clinician core competencies that will better prepare them to manage today's evolving healthcare system and patient population (Pruitt & Epping-Jordan, 2005). Within the VHA organization, clinician core competencies include knowledge, skills, and abilities (KSAs). These competencies are developed annually, must be successfully completed by all employees, and drive the ongoing development and the clinical workforce. Successful demonstration of KSAs can be associated with job promotions,

pay increases, and high-quality competent care. They are specific to job roles, expectations, and clinical expertise. For example, the KSAs of a nurse educator will be different from those of a floor/staff nurse. In addition, the KSAs for a floor/staff nurse will vary depending on the clinical setting where they are employed. Therefore, the KSAs of a medical-surgical nurse who commonly works with patients who have undergone surgery will be different from the KSAs of a nurse who works in the emergency department or intensive care unit.

The organization, a supervisor, or clinician often identifies these clinical competencies and they are evaluated on an ongoing basis. Wright (2011) identified three common sources used to identify clinical competencies for healthcare clinicians. First, competencies can be related to new equipment being introduced in clinical areas. An example might be the implementation of a new I.V. pump being introduced into clinical areas. An ideal competency would be related to the knowledge and skills required to use the new piece of equipment in the patient care setting. Another source of clinical competencies is the publication or revision of procedures or job expectations for clinicians based on changing healthcare needs. For example, this year a major area of improvement within the VHA was the reduction of skin ulcers in the in-patient care setting. Skin ulcers are more effectively managed and treated when they are identified in the earliest stages of development. Therefore, the VHA introduced national guidelines and procedures for the care of patients who are at risk for developing pressure ulcers. This year, our medical center also created a competency for all healthcare clinicians related to these new publications and job performance expectations if the clinician worked in a setting or cared for patients who were at risk for developing a pressure ulcer.

Finally, clinical emergencies such as cardiac arrest are another source of competency identification. Educators in the healthcare setting often refer to these occurrences as "high-risk, low-volume" and they require the need for on-going support and verification of competencies related to their successful management. Tasks that are considered high risk, low volume are often associated with the management of scenarios that are considered life threatening and do not occur often or on a regular basis. Specifically, there is increased focus on the implementation and wider application of simulation training opportunities to safely educate and assess such competencies. This year, the VHA has focused effort and attention towards the implementation of simulation exercises for verifying competencies related to the management of cardiac arrest, shock, and airway management. All of these emergencies are considered high risk, low volume because they do not occur often and require advanced skills, knowledge, and abilities to effectively and efficiently manage the scenario and produce positive health outcomes for the patient.

Simulation has gained increased attention in recent years due to its wide applicability in the healthcare setting. There is a large body of evidence showing the usefulness of simulation as a standard instructional method in healthcare (Issenberg, McGaghie, Petrusa, Gordon, & Sales, 2005; McGaghie, Isenberg, Petrusa, & Scalese, 2010; Raemer et al., 2011). Two of the most exciting benefits of medical simulation are the ability to standardize clinician education and reduce the probability of harming patients or co-workers. Simulation replicates a real life scenario or task in a non-threatening, low-risk environment (Patterson, Blike, & Nadkarni, 2008) and is a great instructional method for tasks that are often considered high risk, low volume. These

situations require clinicians to have knowledge, skills, and the ability to communicate with team members effectively in order to safely and efficiently treat or manage the patient situation. Standardized and repetitive practice of these competencies in a controlled and low-risk environment through the use of simulation is an ideal educational option.

Simulation training sessions for in-hospital cardiac arrests are called mock-codes. The word “code” is commonly used to refer to cardiac arrests in the in-patient setting. In the real clinical setting, when a patient is suffering from cardiac arrest, a system based on a facility-wide alert is announced over a speaker system. The facility wide, overhead alert uses a coined phrase *code K* to request the assistance of skilled clinicians to help with the patient who is suffering from cardiac arrest. This response team is often referred to as the code team and is usually comprised of nurses, physicians, and a respiratory therapist. The responding code team along with bedside staff will implement the appropriate procedures to manage the situation that includes basic life support or cardiopulmonary resuscitation (CPR), management of a patent airway, and medication administration. The term code is familiar and commonly used part of clinician language. Therefore, a mock code is the simulation of a cardiac arrest. Mock codes are conducted throughout the hospital by the nursing education department for the purpose of practice and assessing and maintaining competency. The location of mock codes is rotated to ensure that hospital clinicians throughout the medical center have adequate opportunities to participate and practice the skills required to competently manage a code K widely referred to as a code.

Annual data is regularly collected describing code Ks that took place within the facility where the study took place. During fiscal year 2011, there were a 51 code Ks called during the year. This data reflects only codes related to cardiac arrest. The data does not include overhead pages related to impending weather or fires such as a *code blue* or *code red*. These situations are very different and are not being discussed as part of this study. On-going education and staff support is integral to the continued success and positive outcomes achieved during code events. These events are considered emergent and would be included in Wright's (2011) classification of high-risk, and low-volume. Therefore, the facility supports and encourages the utilization of simulated mock codes to help clinicians improve their code responsiveness and competency during a real life event. Simulated mock codes have proven to be especially well supported and accepted in areas within the hospital where cardiac arrests do not frequently occur. These areas include units in mental health, spinal cord injury rehabilitation, outpatient/same day surgery, and procedural areas such as the gastrointestinal lab, cardiac catheterization lab, and dialysis.

Although simulation is growing in its use and adoption, there is a very small body of research that has focused on simulation as an instructional methodology. There is an even smaller body of research studying the best practices for design and implementation of simulation exercises. In addition, there is wide variation in the mock code instructor facilitation skills and their delivery of debriefings. Once a simulation such as a mock code has been completed, the participating clinicians are guided through a group debriefing. A debriefing is conducted after the mock code is complete and is often unstructured, although some facilitators do utilize pre-determined question sets to

encourage engagement and participation. The process of debriefing is aimed at encouraging both personal and group reflection as a method of assessing the learning experience. In addition, debriefing also provides an opportunity for participants and instructors to discuss skills and responses observed during the mock code while exploring their overall experiences. Finally, and of most interest to me, is the lack of research that contributes to the body of knowledge about the experiences and perceptions of clinicians and facilitators who participate in simulation learning exercises, specifically reflection achieved during the debriefing.

Statement of Problem

As a nurse educator, I am concerned that the reflective practices and methods of debriefings commonly used post mock codes by instructors who facilitate mock codes are not well understood and are designed differently among each facilitator. Therefore, debriefings are facilitated in different ways as a result of instructor differences in understanding how to do it. There is also concern that the level of clinician reflection varies and could be influenced by group make-up and characteristics. It seems logical that the more familiar groups of participants are with each other, the more trust there will be in each other, particularly in high stress life/death situations which are being simulated through the mock code exercises. Finally, education departments such as nursing education within the VHA are frequently funded by programs and projects that produce measurable results and outcomes. One of the weaknesses in simulation as a teaching method is the lack of an objective and standardized tool for assessing learning and added value to the learner and the organization. The current state of competency assessment

lacks a theoretical framework and therefore fails to meet the learner competencies that facilitate learning in the adult education setting.

Significance of Study

Although, the use of simulated mock codes as a clinical competency verification method is well established, the use of debriefing post mock codes is not. There are some significant gaps in knowledge and research related to the overall process of simulation based learning and the methods used to assess learner value and competence. First, there is a gap in literature specifically related to the application of andragogy as a theoretical framework in this field of study. Second, there is currently no objective method of assessing reflection that takes place during the debriefings. Last, the study may help bridge a gap in the literature between the process of conducting a mock code and the experiences and perceptions of participants in the mock code.

Definition of Terms

For the purpose of the study, the following terms are defined for clarity of understanding and ease of readership.

Andragogy- the art and science of helping adults learn (Knowles, 1980, p. 40).

Clinician- defines an employee who provides clinical patient care in the hospital setting. This term often refers to common clinical roles such as a nurse, physician, or patient care technician; however, may also include nursing students, medical students, psychologists, pharmacists, dieticians, therapists, and social workers. This role does not imply education or certification, but simply the provision of direct patient care at the bedside.

Competency- defined as a cluster of knowledges, understandings, skills, attitudes, values, and interests that are necessary for the performance of a function (Knowles, 1984). Within the VHA, competency is often defined by only knowledge, skills, and abilities (KSAs); however, for the purpose of this study, the inclusive definition described by Knowles will be used when discussing learner competency.

Debriefing- defined as facilitated or guided reflection in the cycle of experiential learning (Fanning & Gaba, 2007) and refers specifically to reflection following participation in a mock code. Often the learner will review the events that transpire during the mock code to guide the debriefing process. Debriefing is often used interchangeably with reflection in literature related to simulation and mock codes.

Instructor- commonly refers to a nurse educator but in some instances may also be a physician acting in an educational role. Instructors are primarily responsible for conducting the simulation and debriefing and may choose to debrief using wide variety of techniques including personal reflection, group reflection, video-assisted debriefing (implies the review of a video-recorded mock code as a method of encouraging discussion and group participation), written reflection, etc. The majority of instructors have some standardized training in leading simulation activities and conducting debriefing sessions using varying techniques.

KSAs (knowledge, skills, and abilities)- a series of narrative statements used to determine successful performance of a position ("What are KSAs", 2009). Knowledge, skills, and abilities are associated with job competency and are often also embedded within federal job descriptions, performance evaluations, and job vacancy announcements. Knowledge is defined as a body of information applied directly to the

performance of a function. Skill is defined as an observable competence to perform a learned psychomotor act. Ability is defined as competence to perform an observable behavior or behavior that produces an observable product ("What are KSAs", 2009).

Medical student- defines a student currently enrolled in a doctor of medicine training program. Medical students are often in their third or fourth year of medical school and are not licensed to practice medicine independently. Medical residents are graduates who are obtaining additional training and clinical hours at the bedside that are required to apply for their licensure. Medical fellows have graduated from medical school and are licensed medical doctors but are continuing their medical education in a specialty of their choice such as cardiology, neurology, rheumatology, surgery, etc. For the purpose of this study, all medical students who are not licensed will be referred to medical students and those who are licensed will be included in the clinician role.

Mock code- a simulated learning event that recreates a real life cardiac arrest in the health care setting. Mock code design and delivery may vary between facilitators based on previous education, training, experiences, and teaching philosophies.

Nurse educator- an identified professional role within the medical center and is responsible for the development and delivery of clinical educational programs. Nursing instructors have primary oversight of all simulation exercises. This oversight includes setting up the equipment and manikins required for the exercise, prompting clinicians with cues related to the scenario, and leading the group debriefing after the completion of the simulation exercise. All nurse educators possess a bachelor's degree in nursing and a master's degree in nursing education.

Nursing student- defined as an undergraduate student enrolled in an associate or bachelor nursing degree program. Nursing students often participate in clinical practicum hours required for degree completion. Practicum includes mentored interactions with an expert nurse or small groups of students assigned to a nursing faculty member from the nursing school. Practicum activities include all aspects of patient care at the bedside including participation in medical simulation exercises.

Reflection- the deliberate analyzing, or making sense, and assimilating learning experiences (Billings & Halstead, 2009; Schön, 1983) facilitated by a nursing instructor in the group setting as evidenced by verbal interaction with instructor and group members. Reflection is often used interchangeably with debrief in literature associated with simulation and mock codes.

Simulation – an experiential learning technique, not technology, that replicates substantial aspects of the real world in an interactive fashion (Gaba, 2004). Simulation is often used for medical training on skills or tasks that are considered high risk. Simulation has ties to emergency management in military training and aeronautics in addition to healthcare. Simulation uses varying techniques, equipment, and resources to help participants practice skills and competencies required for patient care.

Purpose of Study

The purpose of this study was to explore the overall lived experience of healthcare clinicians during a debriefing session after their participation in a simulated mock code. The current design of simulation activities is often structured by a rubric that is based on the topic or primary objective of interest. This study will focus on mock codes that simulate a cardiac arrest event that takes place in the patient care setting. The

mock code process has a distinct set of competencies that clinicians are expected to perform and these competencies are used to guide the simulation exercise and debriefing.

There is very little research that focuses on the process of developing simulation activities. There is an even smaller body of research on the debriefing phase of simulation that focuses on learner self-reflection and internalization of the experience. Current practices in debriefing widely vary and little is known about the lived reflective experiences in a simulated healthcare setting (Raemer et al., 2011; Dismukes, Gaba, & Howard, 2006; Fanning & Gaba, 2007). By exploring and understanding experiences during mock code debriefs, both clinicians and facilitators may be able to improve the debriefing process and therefore may positively impact learning through improved reflection. In addition, there is little understanding of how group characteristics and group make-up impact the debriefing and reflective experience. Educators in any field that use simulation may find this study's results helpful in their ongoing education program assessment and in the ability to help learners "recapture their experiences, think about it, mull it over, and evaluate it" (Boud, Keogh & Walker, 1985, p. 33).

Research Questions

1. What level of reflection is achieved in simulated mock code debriefing sessions?
2. Does the reflection experience differ by group characteristics (demographics, professional roles, professional experience, etc.) and debriefing design and delivery (simulation environment, debriefing environment, debriefing techniques, and debriefing design)?
3. What is the lived experience of clinicians who participate in simulations and debriefing exercises in the healthcare setting?

4. What is the lived experience of instructors who facilitate simulations and debriefing exercises in the healthcare setting?

Limitations

The study followed a qualitative design and data were obtained from one healthcare organization that is part of the VHA. The study location was chosen out of convenience and researched practice specific to my place of employment within the department of Nursing Education. I am employed by the facility and closely affiliated with the program under evaluation. The close affiliation could be a limitation to the study due to researcher bias; however; my observations and experiences add critical insight and value to the study. In addition, to potential personal bias, another limitation could be the biases of the organization. Due to the hospital's large number of clinician employees, constant influx of new medical and nursing students, and the highly diverse number of services offered, the organization is very interested in broadening the scope and implementation of medical simulation activities and has a stake in improving the methodology and design of them.

Another limitation to the study is ability to generalize study findings. The organization is classified as a 1A healthcare facility. The 1A classification references the hospital's size, budget, number of employees, and diversity of services rendered and is used within the federal government for comparison purposes. The 1A distinction is often used to compare our hospital to other VHA facilities with similar 1A distinctions. A 1A facility is considered to be the largest facility within the VHA structure. Due to the nature of a 1A facility, there is additional support and funding available for the development of new educational strategies and programs. Therefore, the allocation of

funds, instructor positions, and simulation equipment may vary between facilities of different sizes. Finally, the study only collected data from simulated mock codes. Therefore, the findings are limited to application within this type of simulation exercise.

Assumptions

There are three primary assumptions. First, methodologically, group debriefings and participant interviews were used to obtain qualitative data. It was assumed that participants in the study answered interview questions and participated in debriefings to the best of their ability. Theoretically, it was also assumed that the participants in the study perceived the mock code learning experience to be useful in helping them improve competency related to the management of a cardiac arrest. Finally and also theoretically linked to andragogy, was the assumption that study participants are self-directed and independent adult learners (Knowles, Holton, & Swanson, 2011) and therefore, prefer learning opportunities that are experiential in nature over the more traditional teaching methods that rely on passive learning methods.

Chapter 2: The Literature Review

In Chapter 1, an overview of the background and problem concerning the use of simulation as an instructional method in healthcare was introduced. In Chapter 2, I provide a review of the literature associated with simulation as a teaching method and its implications for learning assessment. Chapter 2 reviews the literature through the examination of a theoretical framework grounded in andragogy. Additional learning theories that are prevalent within this field of study are also discussed. The chapter presents research and literature related to key variables in the study and is organized by the main constructs; andragogy and underlying learning theories and concepts, teaching methods commonly utilized with adult learners with special introspection of simulation, and learning assessment techniques placing special emphasis on reflection.

Conceptual Framework

The conceptual framework guides the study by outlining possible courses of action based on previous work and other's ideas. The conceptual framework for this study connects the major aspects of inquiry and acts as a map providing coherence and methodological alignment with the overall goal of answering the research questions. For the purpose of this study, I chose andragogy as the theoretical framework. Andragogy acts as an umbrella encompassing how I think about the learners and how I think about the study design. In addition, several of the study assumptions are also embedded within the theory of andragogy.

Andragogy

One possible reason for the recent rise in simulation learning exercises may be related to its ability to address core andragogy objectives as described in the adult learning model. Principles and theories of adult learning currently drive the development and design of healthcare education activities within the VHA. Knowles (1970) described andragogy as a model of practice for adult learners. Knowles earliest published use of the term andragogy was in 1968 in a published article where he defined andragogy as "the art and science of helping adults learn" (as cited in Knowles, Holton, & Swanson, 2011).

The theory of andragogy is relevant to the creation of new learning processes to meet the needs of today's adult learners (Wang & Kang, 2003). The assumptions of andragogy support an instructional style that is well received and conducive to learning in the adult education setting (Merriam, 2001). The andragogical learning model is based on six key assumptions about adult learners and these assumptions are observed in learners participating in simulation-based learning activities. The six assumptions about adult learners and learning are foundational to the theory and its application as a study framework (Knowles et al., 2011).

1. Adults tend to be self-directed learners (self-directed)
2. Adults have a rich reservoir of experience that can serve as a resource for learning (foundation)
3. Adults are most interested in learning subjects having immediate relevance to their work or personal lives (readiness)

4. Adults are generally motivated to learn due to internal or intrinsic factors as opposed to external or extrinsic factors (motivation)
5. Adults need to know the reason for learning something (need to know)
6. Adult learning is problem centered rather than content oriented (orientation). (p. 43)

It may be helpful to define and discuss the term *adult* as it is used within the assumptions. Knowles et al. (2011) considered the term in several different ways of thinking. First, biologically, people become adults when they reach the age at which they can reproduce. Second, legally, adults are defined by the age at which the law says they can vote, marry, join the military, etc. Third, socially adults are defined by the performance of adult roles such as working full-time, caring for children and spouse/parent, etc. Finally, the psychological definition correlates adulthood with being able to arrive at a self-concept of being responsible for their own lives and being self-directed. Knowles et al. (2011) felt that the psychological definition was the most important and relevant to learning (p. 62).

The theory of andragogy describes a process in which adult learners become engaged in dynamic and interactive learning experiences (Yeager et al., 2004). Andragogy places emphasis on the process of learning rather than on the subject matter being taught. Teaching strategies that are guided by the theory of andragogy are interactive, contextual, and experiential in nature and may include activities like role-playing, gaming, and simulation (Bux, 2009).

Based on the six assumptions, Knowles (1984) developed a practice model for applying the andragogical assumptions of learning to the adult classroom. The process

model is based on eight critical elements that help prepare the learners for acquiring new knowledge or skills. According to the work of Knowles (1984), adult learners are different from adolescents and children. Teaching adults require the use of different techniques, approaches, and assumptions to facilitate valuable teaching and training opportunities. Adults, and especially professional adults, bring diverse experiences, talents, skills, and knowledge that provide invaluable resources to the educational environment. Clinicians in the healthcare setting are often highly educated, motivated to learn, and bring a wealth of professional and personal experiences to the classroom.

The practice model guides the design of instructional and assessment methods in the adult classroom and prepares the learner for learning. Knowles et al. (2011) called the andragogical model a process model meaning that the model deals with the facilitation of procedures and resources, rather than the transmission of information and skills. Knowles et al. (2011) proposed that by focusing on the process of learning, rather than content, an adult learner would be able to acquire the information and skills as a self-directed, independent learner (pp. 114-115). The process model identified eight key elements relevant to the instruction of adult learners. These elements are

> (1) preparing the learner; (2) establishing a climate conducive to learning; (3) creating a mechanism for mutual planning; (4) diagnosing the needs for learning; (5) formulating program objectives that will satisfy learner needs; (6) designing a pattern of learning experiences; (7) conducting these experiences with suitable techniques and materials; and (8) evaluating the learning outcomes and re-diagnosing learning needs. (p. 114)

Understanding the assumptions and process elements within the theory of andragogy are paramount to the successful design and implementation of new teaching methodologies such as simulation. Well-designed teaching methodologies can facilitate the verification of clinical competencies required for high-quality patient care that are often the focus of simulation activities such as mock codes.

The term *KUSAVI* is an acronym that was used to define a cluster of adult education competencies (knowledge, understanding, skill, attitude, value, and interest) required for the performance of a function (Knowles, 1984) and closely align and relate to the earlier discussion of clinical core competencies required for competent care of patients. Knowles use of learning competencies further defined the competency concept and expanded the definition beyond knowledge, skills, and abilities (KSAs), the current concept of competency within the VHA. For the purpose of this study, Knowles' (1984) general concept of competency has been adopted along with the following definition of terms associated with the concept. *Knowledge* is generalization about experience and internalization of information, *understanding* is application of information and generalizations, *skills* are incorporating new ways of performing through practices, *attitudes* are adoption of new feelings through experiencing greater success with them than with old feelings, *values* are adoption and priority arrangement of beliefs, and *interes*t in satisfying exposure to new experience (Knowles, 1970).

Additional learning theories within the field of simulation. Although andragogy is the underlying framework for this study, there are other learning theories that have been prominently applied to the field of educational research as it relates to simulation. Although this list is not inclusive of all of these theoretical applications,

some of the more prevalent theories in this field include transformational learning, constructivism, and the concept of experiential learning.

Transformational learning. Another major contribution to the research efforts surrounding reflection in learning that built upon earlier works was shared by Mezirow (1991). Mezirow (1991, 2000) has studied educational instruction and transformational learning. Clark (1993) shared in reference to the work of Mezirow's (1991) theory of transformational learning:

> Transformational learning is defined as learning that induces more far-reaching change in the learner than other kinds of learning, especially learning experiences which shape the learner and produce a significant impact, or paradigm shift, which affects the learner's subsequent experiences. (p. 48)

There are three common themes that emerged from Mezirow's (1991) work on transformational learning. Experience, critical reflection, and rational discourse all help transform learning. Mezirow (2000) shared "a defining characteristic of being human is our urgent need to understand and order the meaning of our experiences, to integrate it with what we know to avoid the threat of chaos" (p. 3).

Constructivism. Constructivism poses that learning involves a process of constructing meaning and knowledge through experience (Merriam & Caffarella, 1999). The constructivist theorists propose that learners are simple, unique, and multidimensional (Askell-Willliams & Lawson, 2006). Constructivism also suggest that educators must consider the learners' background and culture as important variables that affect how the learner perceives reality, truth, and attainment of new knowledge (Svinicki, 1999). Constructivists believe that successful completion of problem-solving

activities increases the learner's confidence, enhances the learner's motivation to learn, and prepares the learner for resolving more complex and challenging experiences in the future (Deubel, 2002; Reilly & Spratt, 2007). All of these beliefs are clearly related to the education and training of healthcare personnel and seem to fall under the umbrella of andragogy. Andragogy encompasses many of the concepts and ideas captured within the theory of constructivism and therefore, andragogy is a better conceptual framework for the study.

Twomey-Forsnot (2005) proposed a constructivist model of education as a place where educators acted as facilitators, consultants, and coaches rather than teachers. Similar constructivist theorists conclude that the responsibility of the educator is to help the learner achieve his or her own understanding based on personal perspective and belief (Dabbaha, 2003). Placing greater emphasis on the student perspective and encouraging self-directed learning creates a more meaningful learning environment and allows the learners to arrive at their own conclusions (Caws, 2006; Blondy, 2007).

Knowles et al. (2011) shared that applying elements 2, 3, and 4 from the practice model directs the instructor to use the existing knowledge, experience, and motivation of learners to shape the learning experience (p. 257). When these principles are applied there is a shift from that of a traditional teacher towards a facilitator of learning. In addition, the transmission of information is lessened and the role of process manager is emphasized promoting the relationship building, needs assessments, and involvement of the learner in planning, linking the learner to resources, and encouraging and supporting student initiative (pp. 259-260).

Constructivists and adragogues agree that educational activities that are designed to support and challenge ideas, opinions, actions, and decisions facilitate learning (Chrenka, 2001). Critical thinking is supported and learners are encouraged to analyze their thinking and decision making processes (Maudsley & Strivens, 2000). Both directly correlate to the process of debriefing that occurs after participation in a mock code. Debriefing sessions allow learners to view the learning experience and assess, evaluate, and compare their experiences to those of other learners (Lunce, 2006).

Experiential learning. Experiential learning is "learning from experience". Aristotle once said, "For the things we have to learn before we can do them, we learn by doing them" (Bynum & Porter, 2005). Kolb and Fry (1975) helped popularize the term through work that is heavily reliant on the earlier works of John Dewey. Before, discussing the work of Kolb it would be beneficial to first brief the reader on the works of Dewey.

The earliest educational works of Dewey (1902) argued that education and learning are social and interactive processes. Dewey (1902) advocated for educational structure that balances the delivery of knowledge with the interests and experiences of the learner. Through this argument, Dewey became one of the first proponents of hands-on or experiential learning. One of his foundational arguments was that "if knowledge comes from the impressions made upon us by natural objects, it is impossible to procure knowledge without the use of objects which impress the mind" (Dewey, 2009, pp. 217-218).

Dewey (1897) also created a new image of the teacher role. He advocated that the role of the teacher is to not stand at the front of the room and lecture, but to be instead a facilitator and guide (Dewey, 1897, p. 9). As Dewey explains in his earliest work:

> The teacher is not in the school to impose certain ideas or to form habits to the child, but is there as a member of the community to select the influences which shall affect the child and to assist him in properly responding to these influences. (p. 9)

Knowles et al. (2011) went further stating that the teacher becomes a partner or facilitator in the process of learning and this idea has helped guide and restructure many classrooms today, especially in the adult education setting.

Kolb and Fry's (1975) work focused on learning theory with an emphasis on experiential learning. One of Kolb and Fry's most famous publications were their Experiential Learning Model (ELM) that was predominantly developed for use in adult education setting and has strong ties to the foundational work of Dewey. The ELM is composed of four elements: concrete experience, observation and reflection on that experience, formation of abstract concepts based on the reflection, and testing the new concepts (Kolb & Fry, 1975).

Kolb and Fry (1975) went on to share that experiential learning provides students with the chance to acquire and apply knowledge, skills, and feelings in an immediate and relevant setting. Experiential learning thus involves a "direct encounter with the phenomena being studied, rather than merely thinking about the encounter" (Borzak, 1981, p. 9). Kolb and Fry (1975) furthered identified a defining characteristic of

experiential learning in that it is deliberate in nature. Therefore, experiential learning is different from learning that occurs as a direct reflection of participation in life events.

A summary of Kolb's ELM was described in *Experiential learning: Experience as the source of learning and development* (1984). Concrete experiences often translate into the "do" phase of the ELM where the learner actively experiences an activity. These activities can be varied to include laboratory sessions, field work, practicum, work studies, and simulations. The second stage, often referred to as the "observation" phase, is where the learner consciously reflects back on the experience. In the third phase "thinking" takes place. The learner attempts to conceptualize what was observed. This may be in the form of a new theory or model. Finally, in the fourth phase of the ELM the learner "plans." When planning, the learner may formulate how the new theory, model, or plan will be applied to future experiences that are similar in nature (Kolb, 1984). Kolb went on to further develop learning styles that identify with each of the four stages and is widely used in education and training today.

Teaching Methods According to Andragogy

The literature in andragogy acknowledges various teaching methods that align with the assumptions and principles of andragogy in the classroom. Widely recognized teaching methods include but are not limited to (a) case studies, (b) discussion, (c) lecture, (d) interactive and distance learning, (e) learning contracts, (f) course portfolios, (g) demonstration and simulation, (h) forums, panels, and symposiums, and finally (i) mentorship (Galbraith, 2004). Although this list is not inclusive of all teaching methods used in the adult classroom, these are the methods most commonly discussed in the literature.

Galbraith (2004) suggested that when selecting an appropriate teaching method for adult learning, a comprehensive framework should be used (p. 183). The framework should include the major elements of the teaching-learning transaction (p. 183). The elements referenced in Galbraith's framework include the teacher, the learner, the content, and the situations (Conti, 1989; Seaman & Fellenz, 1989). The goal when selecting a teaching method is to choose a method that best facilitates learning and is tailored to the needs of the participants. Therefore, each of the elements in the framework brings a different set of needs and interaction of these needs can impact the method selected (Galbraith, 2004, p. 183).

Methods guided by andragogy most often follow several common objectives. Methodologies are experiential in nature. Galbraith (2004) stated that methods should draw on the past experiences of the learners and should be participatory in nature (p. 383). The teaching method should also have an action component that helps the learner connect learning to future practice (p. 383). The clear connection of aforementioned methodologies and andragogy is evident in the through Galbraith's well-stated summary of the techniques:

> At its core is the concept of learning through experience- from the past experience on which the [method] is built; through the present interaction of the participants who bring their own life experience; and for the future, by building skills that are presumed useful to the learners. (p. 383)

Case studies are a teaching method that can used when learners must draw on individual examples of real life practice (Galbraith, 2004, p. 384). The description of the case can be either oral or written and provides learners with the opportunity to learn from

their own interpretation of the case while also building on the experiences of others. The application of case studies usually includes three major components including (a) a case study, story, or report, (b) the case analysis, and (c) the case discussion (Galbraith, 2004, p. 384). Many times the development of simulation exercises is based on interesting or unique medical cases. The cases are used to set the environment and tone for the simulation exercise.

Discussion is another teaching method described by Galbraith (2004). "Discussion seems to be both inclusive and participatory" (p. 209). Discussion places both the teacher and the learner on equal ground and imply that everyone can make useful contributions. Educators also believe that discussion actively involves learners in the educational experience and is well suited for problem solving, concept exploration, and attitude change (p. 210). Discussion plays an integral role during the process of debriefing which takes place after the simulation has been completed.

Lecture may be considered by many to be a method more aligned with pedagogy; however, Galbraith (2004) also posed that lecture is a legitimate instructional method in the adult classroom as well. Hyman (1974) well stated that lecture is to teach, it is to be used as a teaching method, not just standing before a large group to speak. "Learning can be facilitated through oral exposition and illustration without violating the basic principles of effective facilitation" (Galbraith, 2004, p. 227). A facilitator engaging the lecture method must remember "to acknowledge the learners' experiences, foster a sense of self-worth, supportively challenge ways of thinking, and encourage critical reflection and application as well as active participant involvement"(Galbraith, 2004, p. 227).

Lecture is well suited when the primary goal of learning is information transfer. Information can be presented in a well-organized fashion with a framework for additional learning activities and future study.

Distance learning is on the rise within higher education (Witte & Witte, 2004, p. 253). "Learners are educational consumers demanding both quality and accessibility" (Witte & Witte, 2004, p. 253). The key to successful education in the 21st century is the utilization of virtual networks built on multimedia platforms (White & Bridwell, 2004). Interaction, feedback, and learner assessment are imperative to the successful implementation of distance learning in the adult classroom. Distance learning is characterized by openness, equal access, flexibility, dynamism, portability, nonlinear transfer, multisensory delivery methods, and responsiveness to practical needs of learners (White & Bridwell as cited in Galbraith, 2004, p. 274). Distance education can include all technologies and the interfaces between them that are used to connect learners to a virtual learning environment (Galbraith, 2004, pp. 274-275).

Learning contracts are used to adapt educational needs to individual learners' needs and interests. The formal definition of the learning contract is a written agreement by learners that details what will be learned, when learning will occur, and what criteria will be used to evaluate the results of the learning (Knowles, 1986). Learning contracts are the result of a process of negotiation between instructors and learners to arrive at a plan that meets both the needs, objectives, and expectations of the instructor and the learner (Lemieux, 2001).

Course portfolios are selections of coursework that represent a sample of the skills, knowledge, and competency obtained. Barrett (1995) described portfolios as "a

select sample of the total population of the student's work" (Barrett, 1995). In general a portfolio is a visual example of a learners work in one course. Generally portfolios follow a framework of four elements: an introductory statement, documentation, reflective analysis, and a concluding statement (Galbraith, 2004, p. 323). The use of portfolios seems to be consistent with experiential learning and closely aligns with Knowles (1984) position that adult learners experiences can serve as a valuable resource for their learning.

Forum, and the closely related panel and symposium have a long history in education. Although all three methods are similar, they also vary in their purpose, tone, and level of audience participation (Galbraith, 2004, p. 406). All three share the common application of an organized session for groups of participants that are often guided by a moderator or chairperson. Forums, panels, and symposiums are well suited as a follow up to another technique such as lecture. These methods can provide learners the opportunity to clarify questions and seek additional information. In addition, they also promote free and open audience participation (Galbraith, 2004, p. 408).

Finally, mentoring is an informal, one-to-one relationship that aims to promote the development of the learner. Mentoring is often used interchangeably with coaching and preceptoring. These terms are sometimes used in other setting such as business and healthcare. However, for the purpose of this study, mentoring represents the exchange and relationship more often exposed and used in academics and will focus on that term. Mentors serve in a function to help students explore and understand a new world or environment, interpreting for themselves, and helping them learn what they need to know to flourish (Galbraith, 2004, p. 453). Mentors also model expected behaviors, speak the

"language", and understand the "peculiarities" of the new environment (Galbraith, 2004, p. 453). Successful mentors encourage students, offer support, and provide students with challenges for growth (Galbraith, 2004, p. 455). There are many teaching strategies that are based on the principles of andragogy and several are directly related to simulation activities. Case studies, discussion, and demonstration/simulation all are common strategies used when designing and implementing medical simulation activities with learners.

Marienau and Chickering (1982) noted that the principles of andragogy emphasize "the role of experience, freedom to makes judgments and the responsibility for the consequences of choice and action" (p. 8). One of Knowles (1970) primary assumptions for andragogy is that adult learning differs from pedagogical learning because experience plays a primary role. Teaching methodologies that help adults focus on experience and outcomes of those experiences can help adults learn in a self-directed fashion (Little, 1981). Demonstration and simulation encourage participants to see real consequences of one's actions, to feel the exhilaration of success and the frustration of failure (Gilley, 2004, p. 361). These techniques may also help adult learners improve competencies related to interpersonal interaction, group processing and intercultural communication, coping with ambiguity, and working on real-life problems with other adults (Gilley, 2004, p. 361).

Demonstration is different from simulation. Demonstration focuses on showing how something works while focusing on the procedure or process to successfully do so. Demonstrations can supplement content and help learners translate descriptive material

into actual practice. In healthcare, demonstration is often used as a method of competency verification related to tasks that are associated with procedural processes. Simulation on the other hand, is more inclusive of reality. Simulations are real life replications that take place in mock environments that are created to mimic the real world. Kolb (1984) noted that there is a renewed interest in using instructional methods that translate abstract ideas of academia into concrete realities of peoples' lives.

Overview of Simulation as a Teaching Method

Simulation is an educational method within healthcare training that has recently been growing in use. At some point in medical education, skills must be practiced on living patients. However, in an effort to improve patient safety and limit patients exposure to unnecessary risk, simulation-based education can be used prior to skill implementation on living patients (Ziv, Root, Small, & Glick, 2003). Simulation encourages deliberate practice and deliberate reflection which are both staples in any field of expertise (Ericsson, 2008). Simulation is considered an experiential learning technique that simulates a real life scenario or task in a non-threatening environment (Fanning & Gaba, 2007). Students have the opportunity to practice skills, familiarize themselves with their own reactions, and improve interdisciplinary communication using simulation equipment such as manikins, patient actors, virtual environments, and task trainers. The hands-on experiences provide students with an opportunity to see their actions and decisions play out providing them with pathways for increased critical thinking and self-evaluation.

The expectation of health care professionals is constantly changing to meet the demands of the ever-changing healthcare system. Healthcare providers are expected on a

daily basis to confront and adapt to new procedures, technology, equipment, and job expectations. Specifically, the nursing profession has begun to accept new and additional responsibilities that lead to caring for more acutely ill patients who require advanced skill sets and critical thinking. The role and function of the nurse continues to expand placing greater demands on nursing professionals to constantly re-evaluate their professional knowledge, behaviors, and skills.

Simulation has gained attention as an advantageous method of clinical training for nursing, medical, and clinically affiliated students and trainees. In addition, and of interest to the researcher, the application of simulation for current practitioners as a method of verifying competency and providing practice opportunity for skills or procedures that are considered high risk or low volume in the hospital setting. Ziv, David, and Ziv (2005) stated that one of the most advantageous outcomes of medical based simulation training is that it provides learners the opportunity to learn from mistakes and errors in a simulated environment thereby reducing the occurrence of similar error in real life. Ziv et al. (2005) also proposed that simulation activities can boost performance and enhance patient safety.

Another advantage of simulation is the ability to provide all clinicians with similar and standardized experiences (Carter, Wesley, & Larson, 2006). Often times in the clinical practicum setting it is difficult to provide standardized learning opportunities for all students as the daily patient admissions and diagnoses can vary from day-to-day, experience-to-experience. Therefore, by using simulation, all learners can participate in the same scenario or simulated task. Another advantage of simulation is the opportunity

for students to participate in immediate feedback, apply corrective actions, and see the outcomes of their behaviors and decisions (Billings & Halstead, 2009, p. 256).

A recent comparative meta-analysis study determined the effectiveness of simulation based training to non-simulation based training (Cook et al., 2012). An identified 92 eligible studies met inclusion criteria and data was abstracted on instructional design, outcomes, and study quality. The analysis concluded that simulation based training is associated with small to moderate positive effects. Specifically, knowledge, process measure of skills, process measure of behavior, and patient effects, all reported positive effects (Cook et al., 2012).

However, there are also some disadvantages to using simulation as a method of clinical instruction. First, many times it is difficult and time consuming to recreate a scenario that is realistic. "Without a feeling of reality, it is difficult for the learner to transfer the learning to a real situation" (Billings & Halstead, 2009, p. 256).

Also, the actual development of simulated learning activities can be time consuming and labor intensive for those clinicians who oversee the simulation centers and labs. Equipment is costly as well. In an article describing initial and maintenance costs for a college simulation lab in a small nursing department, costs were approximately $150,000 to start and $15,000 per year to maintain the program (Tuoriniemi & Schott-Baer, 2008). High fidelity manikins can run upwards of $85,000 at time of initial purchases.

Finally, simulation activities have been shown to increase stress and anxiety for in learners. DeMaria et al. (2010) found that increased levels of anxiety can positively or negatively impact learner outcomes. Too much anxiety can be associated with decreased

learning, while some anxiety in associated with increased performance and retention (DeMaria et al., 2010). DeMaria et al. (2010) also showed that not all clinicians experience anxiety equally. Research showed that novice clinicians volunteer for simulation activities and seem to incur less anxiety as compared to senior and expert clinicians.

In addition to the manikin, a simulated setting or environment would also require bedside equipment such as ventilators, I.V. infusion pumps and fluids, cardiac monitoring set-up, and a patient hospital bed. In order for simulations to be as real as possible, the facilitators also prefer to use real medications; procedural set-ups such as sterile drapes, catheterization kits and central line dressings; and the application of real treatments such as respiratory therapy treatments, intubation tubes, and defibrillators (Rosen, 2008). Finally, simulations required skilled clinicians to develop and oversee their implementation. Many simulation labs hire specially trained technicians who have expertise in clinical practice and also have advanced education in instructional design (Lateef, 2010).

Types of simulation often used in medical education. Simulation varies widely. Exercises can include simple tasks which are performed on equipment referred to as task trainers. An example of this would be practicing I.V. insertion on a model arm. Simulation also can be very realistic. There has been enormous improvement made to high fidelity manikins recently. These manikins are real to touch, sense, and reactions. They simulate every aspect of human life from breathing, coughing, moving, and even talking. They can respond to medications, procedures, and specific student reactions.

Although the term simulation often is used to describe medical education opportunities that are driven by high technology, in-depth training equipment such as a high fidelity manikin, there are a wide variety of types of simulation. Simulation has been used for years in medical education. One of the first forms of medical simulation was the use of oranges and orange peels to simulate the texture and sensation of a patient's skin to practice intramuscular injections in nursing school. Simulation has rapidly advanced to current trends that use haptics to reproduce the touch sensations associated with neurological and orthopedic surgeries. Haptics refers to the technology that simulates touch and pressure. There is a wide variety of simulation techniques used in practice today and several techniques are discussed in detail below.

Partial task trainer. The most basic form of medical simulation in current practice today is referred to as part or partial task trainers. A partial task trainer simulates only a portion of the body or environment (Durham & Alden, 2008). These trainers vary widely in their cost, applicability, and response. However, the main goal of a partial task trainer is to assist clinicians in learning a skill or hands on technique. They are also helpful for facilitating the learning of a procedure or introducing a new piece of equipment. For example, in nursing education, model arms are often used venipuncture practice (drawing blood). The task trainer arms often have realistic skin, veins, and some will provide blood return into the I.V. catheter when inserted successfully. The task trainers are useful as they allow students to practice the same skill repeatedly until deemed competent or comfortable. However, they also lack some aspects of reality and are difficult to use in large groups as most facilities do not own multiple task trainers.

Simulated patients. Simulated patients are a form of role play. This learning technique is most applicable in scenarios that may require communication or coaching techniques that are new or unfamiliar to the clinician. For example, simulated patient scenarios are often used with new physicians as a method of practicing patient assessments and obtaining health histories. This technique is also commonly used to help clinicians practice communication in difficult situations such as death and dying or end of life care. Many times, educators play the roles with the learners and therefore can provide immediate feedback to the student or clinician.

Computer-based simulation. Computer based simulation is a growing field within medical simulation and programs and technology are constantly improving. Early trends in computer-based simulation included question and answer like scenarios that guided clinicians through correct algorithms for appropriate patient care. However, current trends are focused on replicating medical environments and using virtual reality to train clinicians. Clinicians use critical thinking skills and knowledge to make clinical decisions, based on those decisions, they can observe the results in action (Durham & Alden, 2008). The programs often provide strategic feedback and prompts as part of the virtual interactions.

Complex task trainers. Complex task trainers are the next generation of partial task trainers. They integrate haptics into their technology making the learning environment more rich and realistic. This type of trainer is especially useful in training skills and procedures that occur blindly. For example, pelvic trainers are now available to help clinicians master the performance of a thorough pelvic exam. With haptic technology in place, sensors embedded within the pelvic model provide immediate

feedback regarding pressure applied, appropriate physical assessment, location, and areas missed (Durham & Alden, 2008).

Integrated simulators. Finally, the most commonly used equipment in medical simulation is the integrated simulators. These simulators combine partial or full-bodied manikins with computer-based technology providing a more realistic training experience. These manikins are often categorized based on fidelity. Fidelity is defined by the degree to which the appearance and capabilities of the simulator resemble the appearance and function of the human experience (Maran & Glavin, 2003). Integrated patient simulators are therefore often categorized as low, medium, or high fidelity.

Integrated patient simulators are among the most current teaching advances in medicine and nursing. These high tech manikins are interactive, responsive, and realistic. They often are capable of many common physiologic responses such as respiration, heart sounds, breath sounds, urinary output, pupil reaction, and blood/fluid exchange. Some of the more high fidelity manikins will respond to the student as well with verbal cues, moaning, crying, etc. As the research and popularity has increased, many companies now provide manikins specifically for special populations and age groups. For example, one of the most common companies producing integrated patient simulators currently offers infant, child, adult, and pregnant versions of the manikins.

Another key component of the integrated simulators is the multilayered response systems. They provide clinical reality by imitating external and internal responses to clinician behaviors and decisions. In addition, the manikins internally record all input, output, and interactions that provides the educator and the participants with feedback and opportunities for learning.

All of the integrated simulators are operated by stand-alone PC software. Some of the simulators are hard wired to a desk top or lap top. Other more recent models are wireless making them even more realistic as they lack the extensive wires that were common with earlier models. Many of the simulator software also include integrated debriefing system. This system is comprised of audio and video recording capabilities. The video and audio is also synced with the internal manikin event log providing a reliable tool for debriefing and discussing the training events (Durham & Alden, 2008).

All of the types of simulation have a place in clinical education. The study focused on the use of the integrated or high-fidelity simulator. This type of simulator was recently purchased by the medical center and adopted for the delivery of all mock codes within the healthcare facility where the study took place.

Although the discussion of simulation technology, equipment, and manikins was extensive, I feel that it adds value to the understanding of how simulation learning activities can be developed and implemented and how medical simulation has evolved. Based on the skill or task that the educator desires to focus, a simulation can be created and used to address learners' specific needs. Varying types of equipment and the application of the equipment and enrich or lesson the overall learning in simulation based teaching methodologies. As a researcher, it is important to me to adequately understand the implications and uses of each type of simulation equipment so that I can best prepare and deliver a quality learning activity for the learners.

Application of simulation in healthcare. Although educators and trainers are motivated to redirect education and training activities to more closely align with adult educational theories and principles, a greater impact on education has been made by

movement and trends in healthcare. These trends seem to lead our education and training aims and efforts and have impacted the growth and recent adoption of experiential learning and simulation in healthcare.

An important and guiding movement in current education and training trends in healthcare was greatly impacted by the 2010 Institute of Medicine (IOM) report on the future of nursing. This report illustrates that nursing constitutes the largest sector of the nation's healthcare workforce (IOM, 2010) and nursing accounts for nearly 85% of the care administered in the hospital setting. Therefore, it is easy to understand the emphasis the IOM report placed on the education of nursing staff. Among a variety of findings, the report noted that nurses should achieve higher levels of education and training through improved education systems (IOM, 2010, p. 2).

> To ensure the delivery of safe, patient-centered care across [healthcare] settings, the nursing education system must be improved. Patient needs have become more complicated, and nurses need to attain requisite competencies to deliver high-quality care. (IOM, 2010, p. 3)

In response to this staggering report, higher education and clinical education efforts began investigating the use and adoption of new trends and ideas in how education and training needs can be addressed. Specifically, an emphasis was placed on skill validation, competencies, and on-going education in the work setting.

Simulation has been identified as a key training strategy to address the current needs. In part, simulation offers clinicians the opportunity to train skills required to respond to emergent or high-risk scenarios in a non-threatening environment. As patient needs continue to become more and more complicated, it is necessary for clinicians to

have access to training opportunities that directly simulate and standardize these scenarios without placing the patient in danger.

Another trend that is guiding the future of healthcare education is patient safety. "Nurses and other health care professionals are under increased scrutiny to provide safe, competent, and effective care" (Durham & Alden, 2008, p. 1). The IOM report, *To Err is Human: Building a Safer Health Care System* (Kohn, Corrigan, & Donaldson, 2000), recommended as a key strategy to prevent medical errors in the clinical setting, the adoption of medical simulation activities (p. 179). The report states that simulation should be used for training new or novice practitioners, crisis management, and when new or potentially dangerous procedures and equipment are introduced into the health care system (p. 179).

Patient safety is a constant concern in the medical profession. Clinicians can cause patient harm or even death when managing a disease process poorly, choosing to not use best standards of care, or lack of training. According to Eder-Van Hook (2004), a health care provider's ability to react prudently in an unexpected situation is one of the most critical factors in creating a positive outcome in medical emergency. Eder-Van Hook also noted that medical errors kill upwards of 98,000 persons annually with an estimated cost of between $37 million to $17 billion in preventable adverse events dollars per year. With these identified concerns it is evident that improving patient safety and care is a concern for the industry. Use of patient simulators enables clinical instructors to provide clinicians with structured, well developed patient scenarios rather than having to identify or find appropriate and/or rare patient care opportunities in the health care setting (Fanning & Gaba, 2007).

Design, implementation, and evaluation of medical simulations. Simulation-based learning has been growing in use throughout healthcare education programs recently; though, very little research has been done providing evidence of best practices for scenario development and implementation. There is a wide variety of methods and delivery models used in simulation and there seems to be a large gap in research regarding the best way to deliver quality simulated learning experiences. Benner (2001) stated that skilled nursing requires well-planned education programs. When planning an educational activity, it is helpful to consider what type of tool will be most appropriate to teach the task at hand (Benner, 2001). In addition, Beaubien and Baker (2004) stated that it is not the level or capabilities of the simulation equipment that determines effectiveness, but rather the faculty who designs the educational experience. "Simulation is a multi-dimensional concept requiring the educator to examine not only the equipment, but also the environment, and the psychological perceptions of the learner and educator" (Beaubien & Baker, 2004, p. i52).

Many questions have recently been brought to the attention of researchers working in simulation focusing on the process of simulation-based learning. For example, questions about the best length, delivery method, group size, and debriefing approaches, have all been identified as gaps in research related to simulation. These questions along with others have begun to be addressed in current research studies.

In an article by Salas, Wilson, Burke, and Priest (2005), a general framework for simulation-based activities is described. The major components of simulation include performance history/skill inventory, task/ competencies, training objectives, simulation exercises, measures/metrics, performance diagnosis, and feedback/debriefing. The article

went on to describe what each component should include. A major failure of current literature is the provision of simulation content without any guidance or in-depth information about how to get there (Salas et al., 2005). There appears to be a gap in the body of research that focuses on the design and implementation of simulation activities. Specifically, future research could focus on the different components of the simulated experience and the analysis of how each element contributes to learning (Ziv et al., 2005).

Cook et al. (2012) recently studied the effectiveness of instructional design. Using a meta-analysis, several instructional design features of simulation-based training were studied. There were 289 eligible studies enrolling a total of 18,971 trainees included in the analysis. Inconsistency between instructional designs was usually large. However, skill outcomes, repetitive practice, interactivity, multiple learning strategies, and individualized learning outcomes all confirm effectiveness in simulation-based training (Cook et al., 2012).

Waxman (2010) published evidence-based guidelines for clinical simulation scenario development. It identified six critical elements of scenario design that included

1. Ensure that the learning objectives are defined. Develop clear, concise learning objectives.
2. Identify the level of fidelity (the level to which the simulation mimic reality); high, medium, or low.
3. Define the level of complexity (problem solving).
4. Use evidence-based references.
5. Incorporate instructor prompts and cues.

6. Allow adequate time for debriefing or guided reflection.

These six critical elements provide guidelines for educators as they begin to design and develop simulation scenarios. Incorporating these guidelines helps to ensure well-designed scenarios that meet the needs of the learners and facilitates quality outcomes for learning.

Debriefing. Debriefing is often the final step of the simulation learning process and is a critical part of simulation-based education as it directly relates to reflection. After a participant or group completes a simulation activity, they will discuss the experience. This process lacks guidance or framework. Some debriefings are very quick and guided by the facilitator. Some debriefings are longer than the simulation activity itself and are led by group members. Simulations are often video and audio recorded so that participants can review their actions and conversations post-activity. In other cases, debriefing takes place individually through journaling or writing activities. Little is known about which type of debriefing process best suits the learners' needs and the simulation activity.

Fanning and Gaba (2007) defined debriefing as a "facilitated or guided reflection in the cycle of experiential learning" (p. 115). They identified a critical need for current research to illustrate how to debrief, how to teach others to debrief, what methods of debriefing exist and how effective are they? Not all learners are naturally capable of analyzing, or making sense, and assimilating learning experiences on their own (Fanning & Gaba, 2007). It is the role of debriefing and reflection to "help learners bridge the gap between experiencing an event and making sense of an event" (p. 116).

Raemer et al. (2011) concluded in a critical review of current literature on debriefing in simulation-based education, that "many characteristics of the debriefing process might affect its efficacy" and "given the current state of the science, important aspects of the process may still be poorly understood or even discovered" (p. s53). The review highlighted five questions that must be answered to characterize the debriefing process:

1. Who- who is debriefing?
2. What- what is the content/methods of debriefing?
3. When- timing of the debriefing?
4. Where- environment of the debriefing?
5. Why- theoretical framework supporting debriefing?

Although all of these recommendations are important to the advancement of the science, this study will focus on "what" question describing the content/ method of debriefing. Further research is needed to determine if one type of debriefing method has advantages or disadvantages over another.

Known experts in the field of debriefing also share different approaches to conduct this part of the process. For example, in a recent workshop held during the Annual Meeting of the Society in Europe for Simulation Applied to Medicine (SESAM) held in Granada, Spain in June 2011, three experts conducted a debriefing session as an experiential learning opportunity. Nearly 80 participants observed each expert as they led debriefs. The first expert described his style as facilitated discussion. His debriefing was broken down into three phases (description, analysis, and application). During the description phase the participants in the simulation described what happened and what

they found to be positive or negative. The expert also explored views and opinions with probing questions. After the analysis, the expert asked for solutions to identified problems and how those solutions might be put into practice (Dieckmann, 2012).

The second debriefing expert focused on key issues that arose during the simulation scenario. Specifically, he chose to use "debriefing with good judgment" by balancing advocacy and inquiry (Chanchayanon, Suraseranivongse, & Chau-in, 2005). The expert debriefer chose to describe observations from the scenario, share his own judgment, and invites the participants to share what drove their actions and decisions during the scenario. The expert then helps the participants reframe their actions for improved future performance in similar settings or scenarios (Dieckmann, 2012).

The third and final expert begins the debriefing by asking the participants as a team to review their alternatives (as appropriate for medical decision-making) at different points in the scenario. The expert also invites the participants to discuss both advantages and disadvantages of each. The team is then asked to relate the discussion to the principles of Crisis Resource Management, which is a model commonly referenced in patient safety literature (Dieckmann, 2012). It is evident, based on this workshop, that experts in the field have a wide variety of approaches they choose to use to facilitate debriefing. The evidence and research is lacking empirical evidence to support one approach or methodology.

A recent methodology for debriefing has been studied and presented called Debriefing Assessment for Simulation in Healthcare (DASH). The DASH assessment instrument has been developed and currently undergoing psychometric testing to validate the quality of healthcare simulation debriefings. The DASH instrument evaluates six

dimensions and elements of debriefings that have been identified through rigorous research. Many of the DASH dimensions also closely align with the basic principles of adult learning demonstrating the close relationship between effective debriefings and the facilitation of adult learning. Dimensions of DASH include (a) establish an engaging learning environment, (b) maintain an engaging learning environment, (c) structure the debriefing in an organized way, (d) provoke engaging discussions, (e) identify and explore performance gaps, and (f) help trainees achieve or sustain good future performance (Fleeger et al., 2012).

The DASH instrument is being widely applied to the development and design of future simulation activities. Application of such instruments may improve the standardization and rigor of simulation debriefings (Fleeger et al., 2012). Because of the complexity of effective debriefing, training and tools are needed to help facilitators deliver high quality, rich learning opportunities in these settings. Additional research and training is needed, but the initial findings of studies using the DASH instrument show promise.

Many times, video recordings of the simulation exercise are used to guide the debriefing. There is consensus in research of the usefulness and impact of debriefs that are guided by video (Owen & Follows, 2006; Rutledge et al., 2008; Zulkosky, 2010; Mikasa & Cicero, 2012). Mikasa and Cicero (2012) found that the use of video recordings during debriefs enhanced students ability to identify strengths and also areas for growth and improvement. They also identified that as compared to non-video assisted debriefs, critical thinking and communication showed significant improvement when video recordings were used (Mikasa & Cicero, 2012).

Learning Assessment Techniques in Adult Education

Learning assessment can be described as the assessment of the learner, the instructor, and the environment. The goal of assessment is most often aimed at measuring and evaluating learners' progress; however, learning assessment can also facilitate inspection of program effectiveness, instructor effectiveness, and potential opportunities for improvement (Angelo & Cross, 1993). There is a wide variety of assessment techniques applied in the adult education setting. Often these techniques can be categorized by the goal of the assessment. For example, Angelo and Cross (1993) used five primary categories of learning assessment.

The first category offers assessment techniques associated with the assessment of knowledge and skill. A few techniques that may be used include knowledge probes, focus lists, empty outlines, memory matrix, minute papers, muddiest point, and a handful of others. These assessments measure how well a student is learning content related to a specific subject.

The second category of assessment is assessing skill in analyzing and critical thinking (Angelo & Cross, 1983). Examples of techniques often implemented in this category include categorizing grids, defining features matrix, pro and con grids, and analytic memos. These assessments are designed to evaluate procedural learning, learning the *how* instead of the *what* (Angelo & Cross, 1983, p. 159).

Assessing skill in synthesis and creative thinking is the third category identified by Angelo and Cross (1983). Techniques in this category may include the one-sentence summary, work journals, approximate analogies, concept maps, invented dialogues, and annotated portfolios. Assessments designed to evaluate creative thinking in the

classroom measure information synthesis. Synthesis is demonstrated through the weaving of previous knowledge with new course content.

The fourth category of learning assessment is defined as the assessment of skill in problem solving. Some examples of techniques that could be applied in this category are problem recognition tasks, documented problem solutions, and audio/video recorded protocols. These assessments target the measurement of metacognition. A student who demonstrates metacognition is able to identify commonalities amongst problems, explore and work through problems, and reflect and alter problem-solving plans (Angelo & Cross, 1983, p. 213).

Lastly, the fifth category of assessment described by Angelo and Cross (1983) is skill assessment in application and performance. Techniques often implemented in this category include directed paraphrasing, application cards, student-generated test questions, human tableau or class modeling, and paper or project prospectus. These assessments measure the students' ability to apply learned knowledge and skill in the appropriate setting. Some would refer to this as "conditional" learning (Angelo & Cross, 1983, p. 231).

The five categories of learning assessment techniques could all be applied to simulation based activities. All five techniques have applicability, however, few have been researched as an assessment tools in medical simulation activities such as mock codes. Increased knowledge and skill adoption are most commonly identified by facilitators as the focus of learning objectives and desired outcomes.

The ability to assess learning is often a challenge for the educator who chooses simulation as an instructional method. When designing a medical simulation, the

educator must also consider the process of learner assessment. Self-evaluation, analysis of the experience, and personal and group reflection are primary components of the learning assessment process as it relates to simulation activities. These assessment tools provide a methodology for knowledge discovery, refinement, and enhancement of critical thinking skills (Bux, 2009) and other forms of learning that the learner may achieve. In addition, they also provide a method of assessing adult learning competencies.

Learning that takes place during participation in a medical simulation, such as a mock code, cannot be categorized into one category of assessment. Therefore, many different learning assessment techniques are often implemented. Three of the most common techniques used to evaluate and assess learning in simulation activities are evaluation of learning outcomes (by the learner and the instructor), observation of performance based on pre-determined objectives, and reflection both by the individual and the group. However, the process of evaluation during and after simulation has been limited with most research focusing on self-reports and participant satisfaction (Bux, 2009). A significant gap in simulation research has been attributed to the lack of valid and reliable instruments to assess learning outcomes (Boulet, Jeffries, Hatala, et al., 2011).

Self-evaluation. Within healthcare education, self-assessment has long been accepted as a required part of the learning process. Wright (2011) conceded that clinical competency assessment cannot take place without the input and self-assessment of the learner. Medical and nursing educators often refer to self- assessment as self-examination. Self-assessment can take place pre or post learning activity and in many cases will do both. For example, when validating competency, the learner is asked to

assess or rate their level of competency. Upon completion of demonstration of the knowledge of skill, the learner is often asked to reassess their level of competency using the same rating scale.

Another example of self-evaluation often implemented in regards to simulation exercises is completed post-participation in the activity. Learners are asked to evaluate their performance during the simulation and comment on things that they believe to be positive or negative. Beyond simulation, continuing education accrediting bodies such as the American Nurses Credentialing Center and the American Credentialing Center for Medical Associates require a self-assessment of learning and a written description of how the learning activity or content will be put into future practice before they will grant continuing education credit.

Although self-evaluation is a common technique used in medical education, it is a lacking research to support its justification for use. Issenberg et al. (2001) found in a meta-analysis of the accuracy of self-assessments in health professionals, that not uncommonly, self-assessments were not valid and could not be compared to the assessments of experts of objective tests. One of the identified weaknesses of self-assessments appears to be the lack of comparison of one's own performance to valid and accurate established criteria. In many cases, validated measures of performance are unknown to the self-evaluator (Issenberg et al., 2001).

Observation of performance. On the other hand, observation of performance is often performed by experts who are using a valid, objective-driven, assessment tool or checklist. For example, during the simulated mock codes, a nurse educator will observe the group performance and evaluate skills and knowledge based on a checklist of

required steps in the process of responding to a patient in cardiac arrest. In most cases, observation of performance is completed by an identified expert or clinical leader; however, observations can also be made by peers as well.

Overview of reflection as an assessment technique. Reflection is a concept embedded within the process of debriefing. Reflective practices, which often guide the process of debriefing, are integral to a learner's ability to internalize their experiences. Scholars suggest that reflection can enhance critical thinking (Cirocco, 2007), increase self-awareness and communication skills (Paget, 2001), and change how clinicians approach patient care (Paget, 2001). Reflection also increases the chance of information retention and skill adoption (Boud et al, 1985; Schön, 1987; Jarvis, 1987, 1992; Powell, 1989; Mezirow, 1991; McCaugherty, 1992; Murphy & Atkins, 1994). There seems to be wide variety in the process of debriefing and often times are conducted based on the expert opinion of the educator who is facilitating it. Although most professionals involved in the development and use of medical simulation agree that debriefing is an integral component to the learning process, there is little agreement on the process, underlying framework, grounding theories, and actual delivery (Mikasa & Cicero, 2012).

Moving towards the concept of reflection as a part of the process of debriefing, literature is less abundant. Reflection is considered to be an integral component of the process and is often observed during debriefing. Facilitating effective participant reflection and evaluating and assessing reflection has proven to be difficult in my opinion. The concept and application of reflection, while widely accepted in healthcare education, is threatened by the lack of reliable methods of assessing learners' reflective practices. Current literature demonstrates that there is more discussion surrounding the

concept of reflection or the extent of its use, rather than empirical evidence on the assessment and evaluation of reflection in practice. If reflection is to continue to be supported in education and training practices, educators must establish a means to evaluate its effectiveness.

When considering reflection and its application to clinical education and training, a challenge in this setting is helping learners handle clinical challenges competently. The concern around competency is particularly relevant to the education of clinical providers such as nurses and physicians. Clinicians must make decisions with autonomy and expert judgment often in high stress, critical situations. An identified learning strategy to help deal with these learners is reflection (Boud et al., 1985; Schön, 1987; Jarvis, 1992; Powell, 1989; Mezirow, 1991; Murphy & Atkins, 1994).

Of importance to this study is the reflection stage of Kolb and Fry's (1975) learning cycle. Many experts in the field of simulation state that reflection is a critical phase in learning for simulation exercises. Many of these ideas and support can be linked to the early works of Schön (1983). Schön can be credited with a large contribution to the development and research associated with reflection. Schön's (1983) work, which was heavily influenced by the theoretical work of Dewey (1902), focused on the role of reflection in learning. He coined the term "reflection-in-action" and brought reflective practices to the forefront of professional education and training. Schön (1983) described reflection-in-action as "thinking on our feet." "Reflection-in-action involves looking to our experiences, connecting with our feelings, and attending to our theories in us. It entails building new understandings to inform our actions in the situation that is unfolding" (Schön, 1983, p. 21).

Schön (1983) goes on to further describe reflection-in-action stating:

> The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understanding which have been implicit to his behavior. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation. (p. 68)

Schön (1983) also clearly delineated between the reflection that takes place "on your feet" and the reflection which takes place after an encounter. Schön (1983) referred to this type of reflection as "reflection-on-action." The act of reflecting-on-action enables learners to spend time exploring why they behaved the way they did, what was happening, and why they made the decisions they did. By participating in reflection-on-action, learners develop sets of questions and ideas about activities and practice (Schön, 1983, p. 123).

Schön's (1983) early work on reflection has guided new and current research in reflective practices and application to teaching and learning. Three scholars whose work should be discussed include the work of Jarvis (1987), Mezirow (1991), and Boud (1985). Jarvis (1987) developed a theory about the process of learning through social experiences. Although medical simulation and clinical education often do not occur in a social setting, his contributions relate to the advancement of the subject matter. Jarvis (2007) created a learning process model that considers an experience as a learning process adults need along with a reflective action.

Jarvis (2007) went on to further develop levels of learning based on his model. The first level is non-learning and is described as no learning taking place. Three routes of non-learning are presumption, non-consideration, and rejection of learning. The second level, non-reflective learning includes a small amount of learning. Three routes for non-reflective learning include pre-conscious, practice, and memorization. The third level of learning, reflective learning, leads to critical reflection. Three routes to reflective learning include contemplation, reflective practice, and experiential learning.

Jarvis (1987) described each of these routes for better understanding. Contemplation is achieved when a person thinks about what is being learned. Reflective practice occurs when there is reflection prior to an action and during the action. Finally, experiential learning is when actual experimentation occurs in one's own environment.

Jarvis (1992) stated that reflection can facilitate the integration of theory into practice. Turning experience into learning is found to be valuable in clinical practicum settings often associated with pre and post licensure nursing education and physician education (Saylor, 1990; McCaugherty 1992; Murphy & Atkins, 1994). In addition, reflection enhances the development of clinical competence (Jarvis, 1992).

Reflection has been studied in many different clinical settings. The use of reflective journals is becoming popular in pre-licensure programs for nursing, dentistry, therapy, and medicine. In addition, it has also been widely adopted for the education of future teachers (Fellows & Zimpher, 1988; Ross, 1989; Smyth, 1989). In a study by Wong et al. (1995), reflection of nursing students was assessed using reflective journals. The study used a grading rubric based on the reflective theoretical works of Boud et al. (1985) and Mezirow (1991). Through content analysis and the identification of a coding

scheme, the researchers were able to identify levels and categories of reflection 50-75% of the time accurately. The authors concluded that reflective writing can be used as evidence for the presence or absence of reflective thinking (Wong et al., 1995).

In another study (Jenson & Joy, 2005) researchers explored a model to evaluate levels of reflection in baccalaureate nursing students' journals. The authors used a similar grading rubric model to study reflection (Getliffe, 1996; Powell, 1989; Richardson & Maltby, 1995; Wong et al., 1995). Journals were analyzed on seven categories of reflectivity based on the work of Mezirow (1991) and found that 63% of journal entries demonstrated higher-level reflectivity. The authors concluded that reflective journaling can be used to help students place their experiences into a learning format for growth which will ultimately improve healthcare education.

Similar studies evaluating written reflection have also been conducted with pharmacy students (Wallman, Lindblad, Hall, Lundmark, & Ring, 2008), occupational therapy (Dunn & Musolino, 2011), and undergraduate and graduate students in a broad range of majors (King, 2011; Morrison, 1996; Brown & McCartney, 1998) and similar findings have been disseminated. Although the body of research is growing among the implementation and evaluation of written reflection, there is a smaller body of research studying reflective practices beyond journaling. When discussing reflection as related to simulation exercises, often times, reflection is considered to be the main function or goal of the debriefing process.

Due to the recent rise and adoption of simulation exercises as a method of healthcare training and education, there is a new and emerging body of research focused on the utilization and effectiveness of debriefing and reflection. Koole et al. (2012)

studied using video-cases to assess student reflection. The researchers studied the application of an instrument called Student Assessment of Reflection Scoring rubric (StARS) to assess the quality of student reflection after reviewing two interactive video-cases. Reflection scores, based on the instrument, varied widely. However, inter-rater reliability (Krippendorff's alpha= 0.88) was acceptable. Conclusions from the study suggest that a standardized tool such as the StARS is a practical method for assessing reflection and providing effective student feedback (Koole et al., 2012).

A concept analysis found that there are several key essentials that positively affect the debriefing and reflective process. Dreifuerst (2009) identified five standard case studies highlighting concepts embedded within debriefing exercises. The study reviews the concept of debriefing as it relates to medical simulation (Dreifuerest, 2009). Concept analysis was used to survey the literature and define key attributes. Conclusions from the study found that debriefing strategies and environments vary widely and can impact student learning. Faculty might consider specific strategies and the emphasis they place on reflective learning. Students could be encouraged to think-in-action, think-on-action, and think-beyond-action using activities that ground simulation experiences within nursing processes (Dreifuerest, 2009).

A critical review of the debriefing process helped identify the importance of reflection and the approach used by debriefing facilitators (Raemer et al., 2011). A review of literature, analysis of the process, and interview data from participants was used to conduct a synthesis of the process of learning by debriefing. The review concluded that research in this area is sparse and limited. Characteristics of debriefing were graphically represented in a design focused on "who, when, where, what, and why"

format. This format could be an appropriate method to help guide facilitators in debriefing and reporting of outcomes associated with learning (Raemer et al., 2011).

Finally, reflection as the primary method of learning during the debriefing process was highlighted in a study by Lasater (2007). The study qualitatively looked at student experiences during simulation and debriefing and how experiences related to the development of clinical judgment. Debriefing was critical to allowing students to reflect on their experiences and integrate learning obtained through the simulation exercise (p. 274). The quality of reflection was recognized by the participants and corroborated with the work of Mezirow (1991) identifying that critical reflection engages learners in reassessing posed problems (p. 74). Debriefing also supported the participants need to solve problems with discussion about actions and feelings. One identified problem with the debriefing and reflective process was the lack of systematic evaluation and an evaluative model that is derived from the feature and criteria associated with adult learning (Lasater, 2007, p. 275).

Another newer idea stemming from research in debriefing and reflection proposes the use of both oral and written techniques to better facilitate learner reflection. Petranek (2000) suggested that based on his observations and experiences in medical simulation, that written reflection when used along with oral reflection far out performs oral reflection by itself (p. 113). Writing, as a method of post simulation reflection provides learners with the opportunity to reflect on the activity and their emotions. In addition, writing “helps put everything into perspective” (p. 113). The major downfall of writing is the time needed to both write and evaluate. However, the author suggested that the benefits far outweigh the costs (p. 114). Written debriefing allows learners to reflect

about behaviors, individual learning, and skills and promotes individual and private communication with their facilitator (p. 117). This methodology is worthy of additional research as it relates to reflection during the debriefing process.

Summary

In summary, I chose the theoretical framework for the study based on the theory of andragogy. The assumptions and practice model of andragogy closely align with how I approach adult learning and is a framework for new teaching methodologies within adult learning such as simulation and reflection. According to the theoretical framework, adult learning can be optimized through the use of simulation learning activities. The educator must, however, understand the design process of medical simulation and integrate this teaching methodology with the underpinnings of andragogy.

Chapter 3 introduces the study design and methodology and discusses in detail data collection, analysis, and data safety and protection of human subjects. Chapter 4 presents the study findings as they relate to each of the research questions. Chapter 5 summarizes the study, provides a thorough discussion of the findings and implications, makes recommendations related to medical simulation within the VA, suggests ways to improve this study, and recommends future research in the field of medical simulation as it relates to adult education and reflection.

Chapter 3: Methodology

Overview

The majority of current research on simulation-based learning and reflection practices focuses on equipment implementation and program evaluation. There are few researchers that study educational design and assessment techniques for simulation-based learning. The purpose of the study was to explore the lived experiences of participants in a simulated mock code. Specifically, this study focused on experiences, beliefs, and perceptions related to participation in a mock code, the overall level of achieved reflection during group debriefs based on a standardized reflection rubric, and the impact that group make-up and activity design had on the overall delivery and participation in the mock code. The studied used qualitative data to abstract themes that emerged and applied meaning to those themes in an effort to answer the research questions. Data were gathered using transcribed video recordings, participant interviews, and a validated reflection rubric.

Medical simulation for mock codes was fairly new to the facility and the organization at the time of the study. Nurse educators were very interested in identifying best practices for implementing simulation-based learning activities. To answer the research question, I explored perceptions and lived experiences of clinicians who participated in reflection as part of the debriefing process. In addition, I wanted to explore the adoption of a reflection grading rubric to standardize the assessment and evaluation of group reflection. Finally, I was interested in learning and exploring different styles and delivery models used by instructors during debriefing activities. The exploration of debriefing styles may help educators understand and development

simulation activities that can better meet the needs of the learners. Overall, the study aimed to provide a better understanding of current debriefing experiences and practices in an effort to improve future delivery of simulation exercises in the healthcare setting.

Methodological Design

A qualitative design was chosen for the study because the current body of research in this topic area is minimal and in an effort to generate rich data that is detailed within the context of the study location and field, I felt that a qualitative design was most fitting. Qualitative designs support the need to study the phenomena holistically, in the natural setting, while capturing the participant perceptions as a measure of reality (Wiersma & Jurs, 2005).

Maxwell (2005) suggested that the strengths of qualitative research derive primarily from its inductive approach (p. 22). Specifically, qualitative research focuses on specific situations or people and its emphasis on words rather than numbers (p. 22). Maxwell (2005) went on to describe five goals for which qualitative studies are especially well suited. These goals include

1. understanding the meaning, for participants in the study, of the events, situations, experiences, and actions they are involved or engage in. "Meaning" is used to describe cognition, affect, intentions, and perspective. (p. 22);
2. understanding the particular context within the participants act, and the influence that this context has on their actions (p. 22);
3. identifying unanticipated phenomena and influences, and generating new "grounded" theories about the latter through an inherent openness and

flexibility that allows qualitative research designs to be modified during research to understand new discoveries and relationships (p. 22);

4. understanding the process by which events and actions take place, rather than the outcomes (p. 23);
5. and developing casual explanations based on what roles research variables play and what processes connect the variables to each other. (p. 23)

To summarize, a qualitative research methodology seemed to be the best fit.

Interpretive inquiry. To best answer the research questions posited, interpretive inquiry was chosen for the qualitative framework that guided the study design. Interpretive inquiry is a comprehensive research methodology that explores, explains, and describes a phenomenon through a researcher's observations, interpretations of data, and the real world context from which it the study environment resides. Interpretive inquiry is "not just concerned with describing the way things are, but also with gaining insights into how things got to be the way they are, how people feel about the way things are, what they believe, [and] what meanings they attach to various activities" (Gay, 1996, p. 151). Interpretive inquiry is used to explore, understand, and reveal the meaning of lived experiences (Hultgren, 1989). The interpretive inquiry research method facilitated adequate holistic study of the lived experiences of not only the clinicians, but also the instructors, along with my own observations throughout the research study process. The design created new insights, revealed new ideas about mock code delivery and the process of debriefing, and led to additional research questions and future considerations within the field of simulation and reflection.

The utilization of previous video recorded mock codes combined with clinician and instructor interviews provided a wide and well-represented body of data for analyzing. Lietz, Langer, and Furman (2006) suggested that trustworthiness "is established when findings as closely as possible reflect the meaning described by the [study] participants" (p. 44). In order to ensure trustworthiness and provide validity for the study, several considerations were discussed during study design. First, triangulation of observation, interview, and the rubric data was used to verify the research findings. Secondly, researcher bias was minimized through thorough transcription of interviewee data keeping it as close to original form as possible. Third, expert opinions were obtained to identify weaknesses or bias related to study design, interview questions, and data analysis. Lastly, the reflection rubric was used in its original form, which was previously validated for use in similar settings and study designs.

Ethical considerations. When studying human subjects, Merriam (1998) suggested that participant rights be addressed and maintained. A summary of procedural interventions were used to address participant rights as follows: research goals and research questions were clearly articulated to study participants; verbal and/or written consent was obtained from each participant; participants were informed of all data collection tools and study design; written reports and collected data were made available to participants upon request; participants were not identified by personal characteristics or identifiers, rather by an assigned anonymous code; confidentiality was maintained and all documents were stored in a locked file accessible only to the researcher; and to protect the health of participants, qualified personnel were available to assist with any distress experienced while reflecting on their experiences.

The study included data collection from human subjects and therefore, subject safety and ethical considerations were formally addressed. The institutional review board (IRB) at the academic institution approved the study protocol prior to implementation. In addition, the study site IRB waived approval because the study was deemed to be educational in purpose. I will seek review by the study site Research and Development Committee prior to public dissemination of any data, recordings, or publications associated with the study. In addition, the privacy and confidentiality of all study participants was ensured through safe and secure storage of all data, recordings, and documents associated with the study. The study was implemented as designed and approved and this ensured that the integrity of the study was maintained.

Research Questions

The research questions guided the study design and also framed the discussion of study data collection, analysis, and interpretation. The research questions were as follows:

1. What level of reflection is achieved in simulated mock code debriefing sessions?
2. What is the lived experience of clinicians who participate in simulations and debriefing exercises in the healthcare setting?
3. What is the lived experience of instructors who facilitate simulations and debriefing exercises in the healthcare setting?
4. Does the reflection experience differ by group characteristics (demographics, professional roles, professional experience, etc.) and debriefing design and delivery (simulation environment, debriefing environment, debriefing techniques, and debriefing design)?

Research Setting

The study took place within the department of organizational development in a large healthcare organization in metro Midwestern state. The facility is considered an acute care, in-patient hospital that services general medicine and surgical patients. All of the patients at the hospital are Veterans and the hospital is one of a larger network of hospitals within the VHA healthcare system. The hospital has approximately 150 in-patient beds and offers a wide variety of specialty services including general surgery, general medicine, emergency, cardiac, mental health, telemetry, gastroenterology, nephrology, ophthalmology, neurology, primary care, and hematology/oncology treatment options. The organization employs approximately 1,000+ nursing staff with experience ranging from novice with less than one year experience to expert nursing staff with 35+ years of experience in the profession. In addition, the organization is a teaching hospital and therefore also employs and trains a wide variety of medical personnel including medical students, residents, fellows, internists, physicians, and physician assistants. Clinical education plays an integral role in facilitating skill and knowledge adoption and competent patient care.

The current simulation activities implemented within the medical center are focused on the reviewing previously learned knowledge and skills as they relate to clinician response to patient codes. Mock codes are not intended to be the first presentation or delivery of information, but rather an opportunity for clinicians to practice and review the roles and responsibilities of code response. Mock codes also provide an avenue for verifying clinician competence.

Simulated mock codes are delivered using a standardized script/scenario focused on the clinical response and decision making using skills, knowledge, and abilities based on basic and advanced life support. The mock code is delivered with the assistance of several nursing instructors. The instructors take on several roles during the simulated codes including simulation facilitator, videography, note taking, and participation in the actual code based on who responds and what gaps need to be filled. The instructors often are active participants in the mock codes assisting with chest compressions, respirations, or simply giving cues if critical steps or responses are being skipped or overlooked.

The lead instructor oversees the delivery of the mock code and also is in charge of running the complex and computerized high fidelity manikin that plays the role of the patient. This facilitator role includes prompting the appropriate responses from the manikin including changes in respirations, heart rates and rhythms, dilation of pupils, etc. All of these manikin responses are controlled by the lead facilitator through a wireless laptop. The computerized responses are the result of reactions and decisions made by the mock code participants. Once the mock code is complete, the lead instructor also leads the debriefing.

The nursing education department maintains video recordings of past mock code activities for six months. I analyzed the most recent video recordings of mock code activities for the study using both visual observation of the video recorded content and transcription of audio content during the debriefings. Each month, one mock code is performed at a randomly selected location in the hospital. Each mock code usually has between 5-10 participants in varied roles including physicians, nurses, patient care technicians, respiratory therapists, and nurse instructors. Additional staff may respond to

the mock codes as secondary support staff. These include police, chaplain, and health administration staff. Often both will assist with the management of the scene and offering support to family or caregivers in a real code situation. However they do not participate in any care related to the patient and therefore will not be included in data gathering and analysis. The mock code participants are random and include those clinical team members who respond to an overhead page for cardiac arrest assistance referred to as Dr. Red. Therefore, the group characteristics and make-up may differ with the change in location for each mock code. For example, if the mock code was called on an in-patient medical-surgical ward, it would be likely that the participants would be familiar with each other and commonly work together. However, if the mock code was conducted in the parking lot of the hospital, it would be likely that a diverse team of staff would respond. They may not be as likely to know each other or their professional roles.

Convenience sampling was the method used in the study due to the availability and accessibility to mock code participants. Because I have a working relationship with many of the participants I felt comfortable asking previous mock code participants to be subjects in the study. My target population was participants in a mock code within the last six months who was identified via the video recordings.

Instrumentation

The reflection rubric was developed by Wetmore, Boyd, Bowen, & Pattillo (2010) and is based on the previous work by Mezirow (1991) and Boud et al. (1985). The reflection grading rubric has been validated for use in similar research settings. Content validity was established by the original author through evaluation of the rubric by a panel of experts who have studied reflection and are familiar with models of reflection. In

addition, the rubric has an established intra-rater reliability of .086 based on Chronbach's alpha statistic (Wetmore et al., 2010).

Analysis of achieved group reflection was completed using the standardized reflection rubric. Similar rubrics have been used in research studying reflection in medicine, nursing, dental hygiene, and pharmacy (Wetmore et al., 2010). The rubric measured achieved reflection based on six identified elements of reflection and four levels within each element. Each transcribed audio recording was analyzed for the presence of any of the six following elements of reflection: engagement, association, integration, validation, appropriation, and reflection outcome. Mezirow (1991) also identified four levels of reflection: non-reflector, beginning reflector, (intermediate) reflector, and critical reflector. These elements and levels of reflection are outlined in the reflection rubric.

When the original tool was developed, content analysis of written reflections from journal entries were used to identify descriptive words and phrases that exemplify each of these elements and levels of reflection. "Content analysis is a technique that enables researchers to study human behavior in an indirect way through an analysis of their communications" (Fraenkel & Wallen, 1999, p. 405). These descriptive words and phrases were then aligned with the correct element and level of reflection within the rubric. See Appendix A for the reproduced version of the rubric. I obtained permission from the Wetmore et al. (2010) to use the rubric; however, it is also widely available on the Internet for free use.

Based on the debriefing rubric, there are four levels of reflection. These are the non-reflector (1) , the beginner reflector, (2), the [intermediate] reflector (3), and the

critical reflector (4). A beginner will often skip or overlook the category of reflection. As an example based on the element of engagement, the non-reflector would make no reference to personal experiences, blame others for mistakes, and focus on manikin not being life-like. This occurrence would be assessed and recorded as a 1. A beginner reflector would convey one or two aspects of simulation exercise, but would not relate experiences back to self and would be recorded as a 2. The intermediate reflector would convey some personal feelings about the simulation experience but does not relate them to personal learning. This would be recorded as a 3. The critical reflector would always convey personal feelings as he or she reflected on simulation and related feelings to future personal learning, which would be recorded as a 4. Based on the video recording transcripts and researcher observations, each mock code debriefing session was evaluated for overall reflective effectiveness.

Procedure

The study procedure is visually depicted in Figure 1. I also describe narratively each of the major steps in the procedure for ease of understanding the process and design of the study.

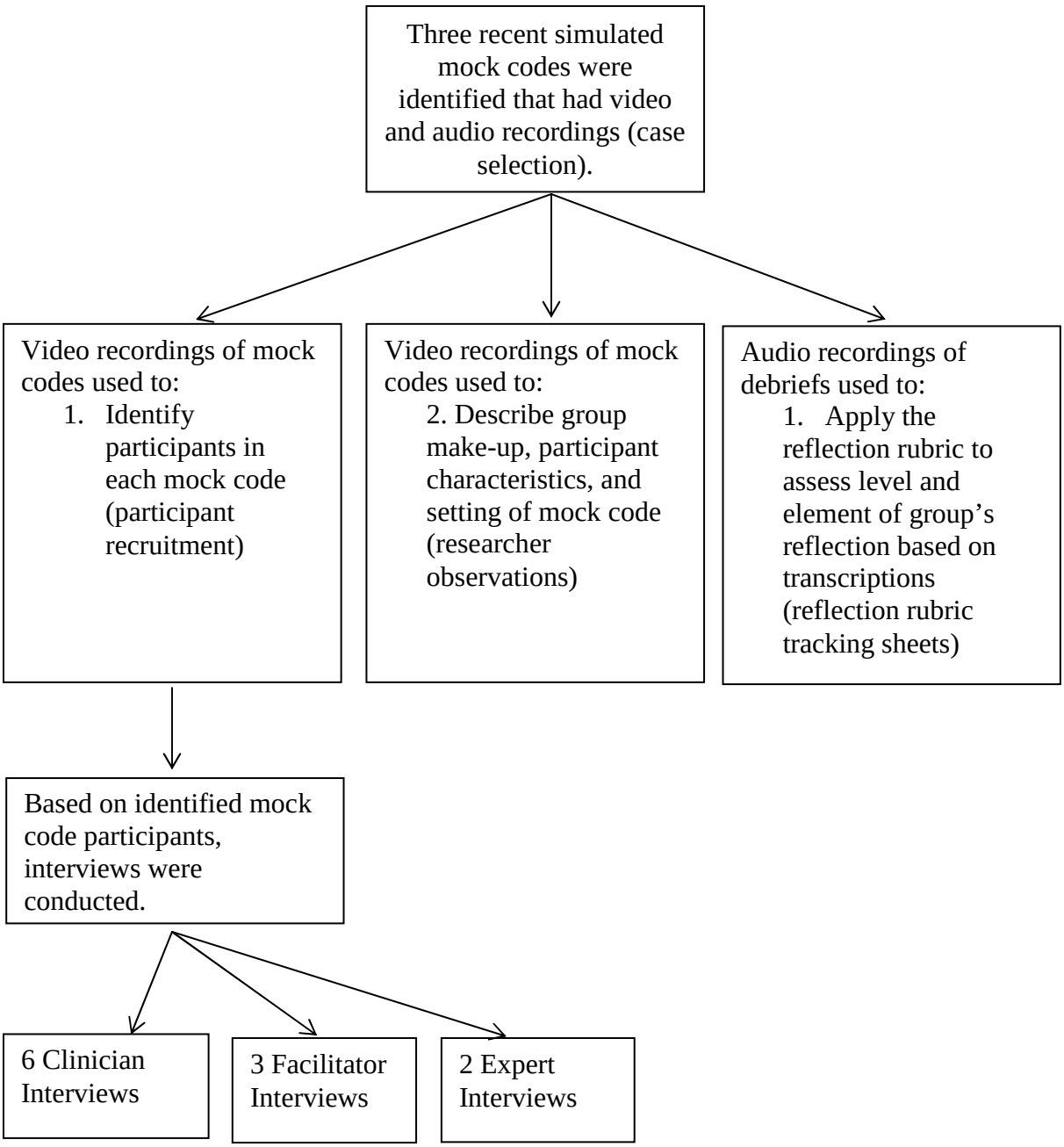

Figure 1. Visual depiction of the three phases of data collection for the study procedure. Phase 1 identified potential cases that included video and audio recordings. Phase 2 described group characteristics, identified potential interview participants, and applied the reflection rubric to transcribed audio recordings. Phase 3 included interview with clinicians, facilitators, and experts.

Mock code case selection. Retrospective video and audio recordings of recent simulations were analyzed for group demographics and group characteristics. The video recordings were also used to identify participants in the mock codes and the instructors who lead each code. All data were de-identified and contained no personal or location identifiers. All participants consented to video recording prior to their participation in the mock code exercises. The signed written consent acknowledges that the recordings may be used for future quality improvement, educational projects, and research studies. Three varied scenarios were chosen for analysis based on availability, most recent recordings, and variations in mock code locations.

Researcher observations. I currently work as a nursing instructor employed within the department of nursing education at the medical center. Clinicians frequently attend trainings and educational opportunities offered by the nursing education department in which the researcher is employed. Therefore, I am familiar with most of the participants who respond and participant in the mock code activities.

My observations of the mock codes described group characteristics, make-up, and background for each simulation exercise. Data were recorded using a basic hand written checklist. For each mock code, I tallied how many participants responded to the code. I also used my experience and familiarity with each participant to identify each participant's professional background (nurse, physician, student, patient care tech, etc.) and their role/s that they performed during the mock code. Finally, I wrote a brief description of the location, setting, time of day, and other details to describe to the reader the background and environment that the mock code was delivered.

Assessment of group reflection. After the video recordings of each mock code were used to describe group demographics and characteristics, the debriefings for each mock code were transcribed using audio recordings. Each debriefing usually lasted between 15 and 30 minutes. The reflection rubric was then used to assess the level of group reflection achieved during each debriefing.

I created a tracking sheet (Appendix B) based on the reflection rubric that provided me a standardized method for tracking occurrences of reflection during each debrief. Using audio recordings, I transcribed each debrief. The occurrences of reflection were then hand noted on the tracking sheet. Each occurrence was placed in the correct category and level. Once the initial analysis was completed, I reviewed the identified reflection occurrences and assigned an overall reflection score based on a scale of 1-4; 1 being non-reflector and 4 being expert reflector. The overall score considered the number of total occurrences of reflection in each category and the average level of reflection that was achieved overall. An example of a completed reflection tracking sheet can be reviewed in Appendix C.

Once all data had been gathered from the video and audio recordings, the recordings were returned to the nursing education department for long-term storage. All transcribed data was de-identified and stored on a secure computer in my private office that is also behind a locked door. Transcribed data will be maintained for three years post dissertation defense to allow adequate time for follow-up studies and publication opportunities.

Participant recruitment. Participants in the mock codes were identified from the video recordings. All identified participants were contacted and asked to voluntarily

participant in follow-up interviews. Initial contact was made using the VHA email distribution list. A formal email invitation was created and used as the first attempt for interview recruitment. Additional emails with more detail about the purpose of the interview, examples of questions, expected amount of required time, and possible interview locations were sent after initial interest was shown by a participant.

A total of six clinicians (two participants from each identified mock code) were interviewed to discuss individual experiences related to their participation in the debriefing process and their beliefs about reflective practices. Three interviews were conducted with instructors. All interview participants verbally consented to both the interview process and audio recording prior to the interview being conducted. All interviews followed a pre-determined set of open-ended questions and each interview was recorded using a voice recording device. The data were stored in an electronic file and transcribed.

Clinician interviews. The clinician interviews were conducted in a private office. After clinicians were identified as participants in one of the three chosen mock codes through the video recordings, I then individually contacted each and asked for voluntary participation in a face-to-face interview. Of the more than 20 clinicians contacted, I had seven agree to an interview. One clinician did not respond to follow-up email requests to schedule an interview; therefore, six interviews were conducted. I used the organization's email account to contact each of the seven identified clinicians to set up interview dates and times. To accommodate clinician schedules, some of the interviews were completed in their offices and some were completed in my personal office. I began each interview by explaining the purpose of the study and the interview.

Then verbal consent was obtained to participate. Each interview was guided by a pre-determined set of open-ended questions (Appendix D). In addition, the interviews were audio recorded with a voice recorder and hand written notes were taken as well. Each interview was scheduled for one hour. The average interview lasted around 30 minutes.

Facilitator interviews. Facilitator interviews were set up in a similar manner as the clinician interviews. Because I work closely with the other nursing instructors, I felt comfortable asking each instructor who had recently led a mock code to participate in a voluntary interview. Of the six recently recorded mock codes I was able to obtain three nursing instructor interviews. I explained the purpose of the study and the interview and obtained verbal consent to participate. Each interview was conducted in my private office and was guided by a pre-determined and approved set of open-ended questions specific to the roles and experiences of the instructor (Appendix E). All interviews were audio recorded using a voice recorder and hand written notes were taken as well. Each interview was scheduled for one hour and the average interview lasted about 30 minutes.

Expert interviews. I also interviewed two current experts in the field of medical simulation, debriefing, and reflection. Each expert was identified and recruited by email contact. Interviews were conducted over the phone and consent was obtained verbally over the phone prior to the start of the interview process. The first expert was an education specialist for a leading simulation company who produces simulation manikins and simulation equipment and travels throughout the country delivering training on effective development and delivery of simulation activities in healthcare. The second expert was a current researcher who was developing a model for future debriefing methodologies. Both interviews were open and were guided by questions that had arisen

from the previous interview with clinicians and instructors. In addition, the experts were questioned about some of the current gaps in research. The questions for these interviews were not structured. The interviews were recorded and hand written notes were taken throughout.

Data Analysis

The data analysis was completed in three phases. The first phase of data analysis focused on qualitative data gathered from retrospective video and audio recordings of the identified mock codes and debriefs. The video recordings were used to obtain three significant types of data for the study. First, the video recordings of the mock codes were used to identify participants and instructors names. Because of my close affiliation with many of the participants and instructors, I was able to identify the names of both by viewing the video recordings. Additionally, group demographics, group make-up and characteristics, and a description of each setting of the mock codes were extracted based on my knowledge of the environment and people and my experience. Secondly, the audio-recorded debriefs were transcribed using a computer and word document. Third, the transcriptions were analyzed using the reflective rubric-tracking sheet for level and type of achieved group reflection. The data analysis in Phase 1 helped me achieve a clear understanding of occurring reflection and identify potential interview participants.

The second phase of data analysis focused on the interview data. The clinician and instructor interview data were coded separately. Each interview transcript was printed and highlighter pens were used to identify common abstracts of data. These abstracts of data were then categorized to identify emerging themes.

Next, expert interviews were conducted. The intent of the expert interviews was to share my study findings with field experts and to fill in any gaps or holes in the findings. Expert interviews were conducted ad hoc, over the telephone and were guided by questions that had arisen out of the initial data collection and analysis. The interviews, researcher observations, and transcribed recordings ensured triangulation of data to verify findings (see Figure 2).

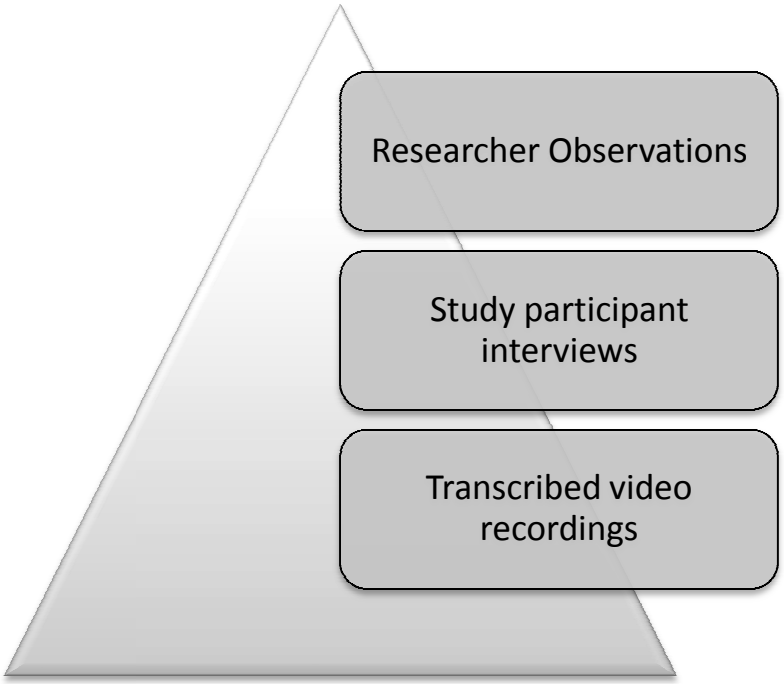

Figure 2. Triangulation of the qualitative data sources. Visual presentation of the triangulation of data including three sources of data collection: (a) researcher observations during mock codes and debriefs, (b) participant (clinician, instructor, and expert) interviews, and the (c) application of the reflection rubric to transcribed video recordings to assess levels of achieved group reflection.

Summary

The utilization of previous video recorded simulation activities combined with participant and facilitator interviews and researcher observations ensured triangulation of data. Chapter 3 provided an overview of the methods that were used for data collection

and analysis. Data were collected from a reflective rubric tracking sheet results, researcher observations of group characteristics, and in-depth interviews. Qualitative data were coded to identity emerging themes..

Chapter 4 presents the study findings as they relate to each of the research questions. Chapter 5 summarizes the study and provides a thorough discussion about the implications of the study and future recommendations related to medical simulation within the VA and makes suggestions for improving this study and recommends additional future research in the field of medical simulation as it relates to adult education and reflection.

Chapter 4: Results

Chapter 4 presents the data and findings from the study. Data were collected during three separate rounds of interviews including interviews with participants, instructors, and experts. In addition to interview data, video recorded mock codes were analyzed for overall observations related to group make-up, participant demographics, group interactions, and mock code setting and design. The video recordings were also used to assess the overall level of group reflection measured by the reflection rubric. Last, the rubric data were analyzed using descriptive statistics.

Participant Interview Questions

The following data were obtained during interviews with participants from the identified mock codes. The results are presented in the order of interview question. All participant responses are presented.

Participant interview question #1: Give me a brief description of your recent experiences during the simulated mock code you recently took part in. (For example, what was your role, was this your first time participating in a mock code, how did you think it went overall?) Participant #1 described the mock code from the point of her arrival at the mock code location:

> When I arrived I assessed the situation, stepped in to cardio-pulmonary resuscitation (CPR) relief, started compressions, and then moved to the defibrillator. I gave some directions from that point, but mostly started observing towards the end. It was a great experience. I don't think you can practice a code enough. Every code is always different.

Participant #2 shared that this was not her first mock code exercise:

> This wasn't my first code or mock code. But it was a little different. I got to the code late so I felt like I was always a little behind, like a time lapse. The group was small; I work with everyone so I knew everyone in the room. I was in charge of the crash cart.

Overall, Participant #2 felt positive about the experiences and thought it went well. "I think it went well overall; the facilitators were good and gave good cues when we were missing or forgetting something. It was a good review for our unit."

Participant #3 also felt positive about the mock code experience. This was however, the first time the participant has been involved in a mock code exercise. "This was my first mock code/ ACLS [advanced cardiac life support] in many years. [The code was called on] 6N at the elevator. I found it to be beneficial in many ways. [Mock codes] take what you think you know and puts it into practice." Overall, Participant #3 stated, "I felt the sense of being rushed, not a lot of feedback during the simulation, no opportunity to go back and do again. [I] would have appreciated more guidance before starting." Another suggestion offered by Participant #3 was to offer consistency in mock code design and delivery. "Some instructors do this, some do not. Different style of teaching can be distracting sometimes, a little confusing."

Participant #4 was also a participant in the 6N mock code along with Participant #3. Participant #4 added that a video recording was used for the debriefing. Specifically related to the facilitator, she stated "the facilitator interjected during the video debrief to assist with questions and answers." She did not provide feedback about her role during the code nor did she discuss how she felt the code went overall.

Participant #5 was a student nurse. This was her first time participating in a mock code. Her role in the mock code was performance of chest compressions. She participated in the mock code in the SCI (spinal cord injury) unit. She initially shared "I felt pretty comfortable doing this role. I think it went well overall. No real problems that I saw." One thing she pointed out was the large number of people either participating or watching the mock code exercise. "There were a lot of people there though, lots of people watching."

Participant interview question #2: Can you describe the group of responders who participated in the mock code? (For example, what was group communication like? How did the group interact? Why do you think these interactions occurred? How did these interactions impact the delivery of effective code response?)

Participant #1 described the group make-up as "normal team members, RNs [registered nurse], LPNs [licensed practical nurse], techs [patient care technicians]." She stated she was comfortable around the team. When discussing the interaction and impact of the group on the response to the code, she shared "If I didn't know who was there I may not know people's strengths and weaknesses."

Participant #2 shared that most of the people responding to the mock code were from the SCI [spinal cord injury] unit. Overall, he felt that the environment felt like "testing. . . . I was a little hesitant at first. [I] had to understand it was for learning." He also shared that everyone who responded got involved in the mock code. In relation to group make-up and interaction, he knew everyone at the mock code and felt that there was no real difference since he was familiar with everyone in attendance.

Participant #3 described her group of responders as “random.” She knew everyone because she has been a long time employee of the organization, however, the team was not a group of people who normally work together is the same setting. Overall, she felt that “Communication was very good; [we are] here to learn, be part of a team. [The] group supported each other, gave clear directions to each other, nobody was negative, everyone was focused on the task, group did well.”

Participant #4 also described the group as “random. . . . There were lots of people, med[ical] students, maybe a few nursing students, lots of people around. Not for sure who they were.” However, even with the diverse group make-up, Participant #4 felt positive about the overall mock code. “[The] group worked well together.” When discussing the interaction of the group and facilitator, Participant #4 shared that “The teacher prompted us sometimes, kept us on track, which was nice.” In addition, she also stated that because this was her first mock code, she did not have another experience to make comparisons.

Participant #5 described the group as diverse. “There were lots of people, med students, nursing students, etc., but no-one in charge.” Also, Participant #5 described the physician facilitator actions as “gave cues a lot” and “had to help with communication.”

Participant interview question #3: Can you discuss the educator who facilitated the code exercise? (For example, what role did the educator play in the scenario? How much interaction did the educator have with the group? How did the educator facilitate group discussion when the simulation was over?)

Participant #1 shared that the facilitator "gave input and directions, cued participants, too" and used video recordings during the debriefing. Participant #1 recalled that the facilitator chose to hit on areas that need "major improvement."

Participant #2 described the mock code group makeup—there were multiple educators and one main facilitator. "She did a good job cueing us, kept the code moving." Also, "she reminded us about what to expect during the debriefing." The educators "had great involvement, gave time to think, and didn't jump right in." [They] let us "realize our own mistakes."

Participant #3 felt the educators had the "expectation that you knew the information already." There was minimal information provided about the scenario. "If we varied from protocol, we stopped and went through rationale and correction." Participant #3 shared that she felt fairly comfortable during the debriefing. "The educator started with a question, something like How do you think it went?'" "The educator provided positive and negative feedback." The intent was not to threaten, but I thought overall the event was stressful."

Participant #4 shared that during the mock code there were several instructors helping. "One ran the video camera, one took notes, one was offering to help and give cues, one was working on a computer." She also stated that her teacher was present as well. "They all seemed very good, supportive. They helped out a lot and when it was over, we just talked about what happened."

Participant #5 shared, "I would suggest that the pre-brief needs to be longer and stronger. This wasn't well thought out. It seemed like they waited to the last minute."

Also, she noted that the environment didn't seem to be well controlled. The educators "struggled with how much prompting and who is responsible for prompts."

Participant interview question #4: When the mock code ended, what happened next? What was the process like? Did you like the way the exercise ended? What suggestions or changes would you make to the process?

Participant #1 liked using the video for the debriefing. "I would suggest being more detailed. And [it] could be a little longer. More time would have been nice." She also made the suggestion to follow-up after the debriefing with an evaluation or a separate review session at a different time. "However, that may be challenging to get the same group together."

Participant #2 noted that the debriefing also used a video recording to review the mock code events. "A video was used, very good application. The facilitator stopped often to reflect on different parts of the video." Also, "he picked out details, things were obvious when we watched ourselves on the video."

Participant #3 also likes the video because "it allowed the whole process to be reviewed; especially for people who may have arrived late to the mock code. They got to see it from the beginning."

Participant #4 described the events and also made a few suggestions. The educator "gave a wrap-up and stated expectations for the debriefing." Suggestions included "move the location. It isn't formal enough, too close to the scenario location. [Participants] get distracted. They want to get back to patient care." Also, "I am not for sure that participants consider the debriefing to be part of the learning. Facilitators need to accept this."

Participant #5 shared that the facilitator started with a pre-briefing. "The pre-brief was about 20 minutes long. We watched the video. . . . Personally, I think the physician should lead us through the discussion." Suggestions included "discussing different roles within the mock code and different perceptions of each of the participants."

Finally, Participant #6 shared that her debriefing was led by the teacher. "We didn't say much . . . I don't really know what she could have done differently. This was our first time so maybe we will talk more next time."

Participant interview question #5: Overall, did you learn from your participation in the mock code exercise? Can you share with me what you learned? Can you share with me how much you learned?

Participant #1 clearly felt learning was achieved. "I learned how to use the defibrillator. It was a good review of BLS, very hands on. We don't get that very often." He also shared that he "remembered little things that we don't do often." An example was shared about remembering to place the patient on the backboard. "I love the hands on practice."

Participant #2 shared, "I definitely learned. I love mock codes." He also shared that in his 11 years of practice, he has only participated in two real codes. Mock codes are "a great refresher . . . I got to get my hands in the crash cart and drawers, got to see what and where the contents are." He also shared that mock codes provide a great reminder about all the roles of responders during the code scenario. "Mock codes review the overall whole process. They are great."

Participant #3 also found the mock codes to be beneficial. "I got to put knowledge into action . . . Sometimes we just go through the motions. The group got to work together, environment felt very safe."

Participant #4 elaborated on how he learned during the mock code. "I started thinking about right and wrong." Additionally, "I learn from reflection." Participant #4 also suggested that it may be beneficial for the facilitators to debrief as well.

Participant #5 shared that learning definitely occurred. "I am definitely more comfortable now. I kind of know what to expect now. I know that I do not want to do the crash cart in real life." She also shared that she feels most comfortable performing chest compressions.

Finally, Participant #6 shared, "I learned a lot." She described the mock code as "controlled chaos . . . There was a lot going on. I just tried to stay out of the way." Also, she shared that the mock code was very hands on and "that was good."

Participant interview question #6: Critical reflection, a term used to describe the "mulling over" of information and experiences, has been shown to improve learning after simulation exercises like mock codes. What does reflection mean to you? Do you consider yourself a person who reflects? Did you reflect after your participation in the mock code? Did the educator impact group reflection? Did the educator impact your individual reflection?

Participant #1 feels he is a natural reflector. "I tend to mull things over quite a bit afterwards. I reflect on personal mistakes. I seem to learn best when I focus on my weaknesses." Overall, he did not have any additional suggestions for future mock codes.

Participant #2 stated, “I am a reflector for sure.” She tends to ask herself, “What could I have done differently?” She also likes to reflect on different roles and tries to remember the different responsibilities for each role. “The video review helped me remember and reflect on other roles during the code.” Some tips that she shared for future mock codes included “allow others to participate in their own reflection,” suggesting that the group setting may not be the best option for everyone. Additionally, “keep doing mock codes; they are great.” Finally, she shared that she believes “there are always folks who are hesitant to participate, but continue to support and encourage them.”

Participant #3 felt strongly that she is a reflector. “I am definitely a reflector. I might even be a little obsessive. I build on the feedback from the educator and focus on my weaknesses.” She feels that refection reinforces learning. There was mention of some possible negativity during the debriefing and she felt “one person was unpleasant and the feedback was negative . . . I didn’t really accept the critique because of it.” She continued, “I could feel myself coming un-done because of it.” Some suggestions that were shared include the addition of a forum or blog. “I think a forum would help the learner accept the feedback.”

Participant #4 feels like he consciously thinks about things; however, he said, “I don’t take notes or journal or anything like that . . . I just think about it in my head. Sometimes I talk to myself too.” He also suggested the need to add a pre-briefing and present the learning objectives more clearly. “This would help learners know what to expect and how to prepare for the mock code.” Questions used during the debriefing

should guide the learner, but "not answer the question for them." Also he added, "the facilitators need to keep the group from derailing."

Participant #5 called herself a conscience reflector. "At least 24 hours or so afterwards I think about my performance." Lastly, Participant #6 summarized herself as a reflector also. "I definitely think about things later. I thought about my participation in the code, about what I did wrong and right, and I even went home and studied my medications that were used during the mock code!" Because this was the first time participating in a mock code, she did not have additional suggestions or ideas for improvement.

Facilitator Interview Questions

There were five interview questions used to guide the mock code facilitator interviews. These questions posed inquiry into the lived experiences of the facilitators and attempted to explain their debriefing methodology. Three facilitators were interviewed.

Facilitator interview question #1: What is your preferred style to debrief (group, individual, written, verbal, video assisted, audio assisted, etc.) and why do you choose this style? Facilitator #1 prefers to use a mix approach when leading debriefs. "I like both video and verbal. I like this approach because it gives the participants immediate feedback and the video validates my feedback." For example, "They hear my feedback and then they see it first hand while watching the video recording."

Facilitator #2 also prefers a mixed approach. "I like to debrief the group verbally and use the video too. . . . I have found that sometimes the group is scared to ask

questions and the video helps initiate questions and discussion." Facilitator #2 dislikes debriefing in a individual setting and prefers to debrief with a whole group. "Just my preference, no real reason." When discussing his preference to use the video recording during debrief, he shared some concerns about future new policy within the VHA. Specifically, "the new policy will limit our use of video . . . I like to use video because it captures things that may be missed or overlooked or not remembered. This is an asset to both the participants and instructors." One thing the Facilitator #2 emphasized was his consistency is creating a positive learning environment. "Before I start any debrief, I always discuss group rules and emphasize that we discuss all questions as a group. All questions are valid." Adding more to these thoughts, he shared "My goal is to get the group to think critically. I want them to reflect on the questions . . . brainstorming, group thinking, discussion." Facilitator #2 prefers "lots of open discussion . . . I only use the video recording to highlight time sensitive events." For example, "the video can show an event like how long they were off the chest or how long it took to apply the pads."

Facilitator #3 also prefers to use video-assisted debriefings. Although she points out, "Sometimes I can't get the equipment to work and that is really frustrating." She prefers using the video because "I think it captures things that may be missed." She continued "video reinforces what the instructor identifies as problematic. It is objective. It is an honest critique of performance."

Facilitator interview question #2: How do you think it facilitates learners/ reflection? What are the strengths of this style? Facilitator #1 felt that video is most useful because "it is non-threatening and non-judgmental . . . I also think that the video is

easier for the instructor as well. It offers an objective way rather than appearing to be subjective."

Participant #2 feels video recording is a positive approach for debriefing because "it works well with diverse groups with diverse personalities . . . There are always leaders and followers. The video approach seems to facilitate assurance and confidence [during the discussions]." He also feels the video "limits anxiousness . . . I also really try to ask all of my questions in a non-judgmental way" in an effort to create a safe learning environment. Additionally, "I also ask questions in a way that will lead the learner towards the right answer." For example, "What do you check before administering nitro?"

Facilitator #3 commented in regards to video assisted debriefings, "I prefer to use the video because it provides visual learning as well and verbal." She further explained, "I think that people learn best when we discuss it and then it is reinforced by the video." The video also helps the instructor lead the debriefing. "Sometimes it is difficult to remember everything . . . The video provides prompts and cues and helps the instructor lead the discussion."

Facilitator interview question #3: What are the weaknesses you perceive to this style? How could you improve its use during debriefing exercises? Facilitator #1 said that a weakness to using the video recording is that "participants may feel singled out, intimidated." However, she also shared that she "dislikes written debriefs because they are one-directional." With written debriefings "you lose the interaction and immediate instructor feedback." Facilitator #1 also mentioned that she has considered pre-scheduling a post scenario debriefing to allow for personal reflection, however, "I

have not yet tried this approach. . . . I prefer to just debrief the group immediately with the video."

Facilitator #2 believed a weakness of video assisted debriefing is distraction. "Sometimes I see participants getting distracted by not-so-important stuff like what their voice sounds like or how they look on camera." The video also seems to "create side conversations and the group can lose sight of the real objective." Another weakness is that "learners sometimes don't want to participate because they don't want to be recorded." Facilitator #2 also discussed group debriefing. "There are weaknesses to debriefing in a large group too . . . Sometimes, I'll have 15 or more people. Then not everyone participates. I try to use a simple question like 'How did you feel?' and ask everyone person in the group to answer it." Facilitator #2 emphasized that when working with large groups she makes it very clear that questions and comments cannot "be directed at an individual; instead you can only comment about the group or yourself."

Facilitator #3 felt that although she prefers to use the video for debriefing, "It may cause some anxiousness also. Because the participant knows they are being taped, they don't want to make any mistakes. It may be challenging to create a safe learning environment when using the video recordings." She went on to share that sometimes "it is difficult to bounce between instructors as well." For example, "Many times we have a lot of instructors helping with the mock codes. Everyone wants to comment or point something out and it [debrief] appears to be non-cohesive." Also, "sometimes I think we miss the big-tickets items because we are worried about [participant] feelings . . . I don't want to hurt anyone's feeling or make them feel incompetent." She continued, "I think that weakness is attributed to my own personality though . . . I don't like to make people

feel bad and I am sometimes overly concerned with feelings." In addition, " I literally cringe when I have to point out someone's specific weakness or mistake."

Facilitator interview question #4: Thinking of your most recent simulation activity that you facilitated, walk me through the debriefing. Were the learners interactive? Did they actively participate? How did you feel the debriefing went overall? What would you have done differently? How did you evaluate learning? Facilitator #1 first described the mock code setting.

> Mock code was held in building 51, Spinal Cord unit. Learners were very interactive. Participants were mostly from the SCI team and were RNs or LPNs. I think there was also a house supervisor and maybe someone from security. I definitely remember that the MD on call did not show up until about 15 minutes into the code. Everyone who was there was very familiar with each other. We all work together. There were also multiple instructors there so I felt like our responses got off track sometimes [during the mock code].

Facilitator #1 went on to share, "I definitely think we need to have pre-determined debriefing questions." She highlighted some things she believed need to be discussed such as "clear roles, identification of responsibilities" and she continued to suggest using a checklist. "A written checklist with each mock code learning objective would be helpful, too . . . It should have space to write notes and comments also. It is very difficult to take notes and also observe what it happening during the code."

Facilitator #2's last mock code took place in the cardiology and included a large group of students.

> The scenario was a 59-year-old mad coming from the EP [electrophysiology] lab. There were students, anesthesiology, cardio techs, RNs, and one physician present. Most of these folks work together and are very familiar with each other. The team worked great together. I was really impressed with communication. All roles were clearly identified at the beginning of the code.

He continued to share that one concern was space. "There wasn't enough space and it wasn't big enough for the team, students, instructors, and simulation equipment . . . I don't think it went as smoothly because of that." Facilitator #2 discussed mock code planning and preparation. "I had all of the objectives written beforehand . . . I used the objectives to lead the debriefing. I asked lots of open ended questions. We didn't use the video due to technical difficulties." He added, "The group asked me to come back and do another mock code soon."

Facilitator #2 shared several suggestions for improvement as well. "I would like to try a pre-brief. I think it would depend on the population and setting though." For example, "I think new nurses or nursing students could really benefit but maybe the expert nurses wouldn't." Also, "The pre-brief would allow me time to explain the objectives and give an overview of the scenario. I could explain what they are being evaluated on."

Facilitator #3 described her most recent mock code:

> My last debrief was on 6N. The group was very large and diverse. A lot of residents responded. There were also floor RNs, med techs, house supervisor, and several instructors. The house supervisor was at least 10 minutes late.

She continued, “I started the debriefing with open ended questions. Something like ‘How do you think it went today?’” She encouraged the participants to give open and honest feedback. She said, “I usually get pretty basic answers. I have to really dig to get much more.” For example, she might suggest a more specific question such as “What elements of the code do you think went especially well today?” Or another suggestion was “What elements do you think need a little more work or attention?” She “always validates the good things that happened during the code” and then “I move on to the areas that need improvement.”

Facilitator #3 discussed the need for additional “drilling down” during debriefings. “The groups don’t usually want to hear the feedback . . . I often will start the debriefing by saying ‘there is always room for improvement. Let’s identify some specific examples from today’s code’.” Also, she reaffirmed that she “always wraps up a debrief with the positives.” Facilitator #3 suggested the instructors clearly know their roles. “We need to clearly define our instructor responsibilities. I want to create a more standardized list of who is doing what.” Also, “I would love to try following up with the participants after the initial debrief . . . I was thinking maybe an email or something.” In addition, she shared “I don’t think we capture everything at the debriefing and an additional follow-up opportunity may increase learning and provide another opportunity to reflect.” Facilitator #3 agreed that a pre-briefing could be beneficial. “We could present the objectives, prepare the learners for what to expect, and familiarize them with the equipment.” She added, “There always seems to be a lot of questions about the equipment. A pre-brief might help the learners become more familiar and comfortable with the manikins.”

Facilitator interview question #5: Is there anything additional you would like to share? This interview question prompted some additional suggestions and areas for improvement from each facilitator. Facilitator #1 suggested the need for "additional opportunities for reflection." She explained, "it would be nice if participants could somehow follow-up or communicate with the instructors. Then this could be shared with the group." Also, when thinking about the evaluation process, "objectives need to be set ahead of time and there needs to be pre-set criteria. The evaluation needs to be focused on skills."

Facilitator #2 shared the he would like to see the "opportunity for reflection both pre and post simulation . . . I think this would increase confidence, satisfaction, and outcomes." Additionally, "It would be great if we could somehow re-evaluated after participation in a mock code. Maybe the same group would do another code together and improvement could be measured."

Facilitator #3 stated, "My only suggestions would be clearer lesson plans and checklists. This would help us keep track of skills and tasks during the mock code." She elaborated, , "I think there are pros and cons to using checklists, but it is really hard to watch and write. A checklist might be easier. This is when the video is really helpful. You see things you forgot to write down." Facilitator #3 added a final suggestion, creating a safe learning environment. "I like to state up front, 'do your best, we are not here to stump you.' I think this is really important and all of the instructors need to make sure this [preparing a safe learning environment] happens."

Expert Interviews

Two expert interviews were conducted for this study. Both interviews were conducted without pre-determined question sets. I chose to start each interview with a description of my study and then allow the expert to share information about his or her research or experiences that would bring clarity and additional knowledge to my research questions.

The first expert interview shared recent research findings within the field of debriefing. The second expert interview shared experiences and approaches to the design and implementation of successful medical simulations. Both experts have extensive experience delivering simulations and conducting debriefs in the healthcare setting.

Expert Interview #1: Kourtney Schroeder and Andrew Grimes. The California VA Healthcare System Skills and Simulation Center is one of the country's leading medical simulation centers. Kourtney Schroeder, MA, is the standardized patient trainer/coordinator and Andrew Grimes, BA, is the medical simulation manager. Both have participated in research studies as leaders in simulation practice. Their most recent work focused on the debriefing portion of medical simulation. They commonly use simulation to train registered nurses, physicians, soldiers nearing deployment, and undergraduate nursing students preparing for careers in mental health.

Shroeder and Grimes shared some findings from their research on debriefing during a conference call on June 4, 2012. Comments were shared along with a PowerPoint slide deck highlighting important ideas and concepts from their research and work. Initially, the discussion focused on important aspects of successful debriefings. Then, we discussed the need for debriefings to be debriefed allowing facilitators of

debriefing to reflect and improve on their performance as well. These ideas and techniques closely relate to my study as I investigated the facilitators' experiences and perceptions of participating in simulation exercises.

Expert interview question #1: I am very excited to learn more about your research. Can you begin by telling me about your research findings? Shroeder started the interview by discussing some basic findings from their research.

> First, there are some common barriers that have been identified as limiting facilitators from performing debriefs. The most common barrier identified through research was time (58% of respondents), followed by lack of knowledge, facilitator limitations, and facilitator request to not perform debriefing.

Shroeder further discussed a common misunderstanding as it relates to facilitators of debriefing.

> Another question that commonly occurs from facilitators who are new to debriefing is understanding the difference between debriefing and feedback. During debriefing learners actively participate in discussion and have interactive engagement amongst peers and facilitators. Debriefs are facilitator led, value learners' frames of reference, and impose a reflective process. During feedback, learners passively listen, value the evaluator's frame of reference, and are often checklist based.

Grimes added, "The purpose of debriefing is to close gaps in knowledge and skills. It also enhances patient safety and care."

Expert interview question #2: Can you share with me more detail about these gaps in knowledge as it relates to debriefing? Shroeder continued to discuss and added additional details.

> There are specific elements of the debriefing process. First, the pre-brief is used to set the tone, rules, expectations, and objectives. The pre-brief also assists with the debriefing later. Facilitators can observe team behavior and also create learner buy-in. Second, the debriefer acts as the guide. He or she focuses discussion and explains learning. Third, the learner is the engaged participant. The learner tells us what happened. Fourth, experiences are pre-planned and should meet learning objectives. Fifth is the impact. This sheds light on simulation. Recollection allows learners to reflect on frames of thought. Many times video recording is used as tool. Reporting is another element and is often done verbally. Reporting provides feedback to course faculty and helps link the objectives to the course. Finally, timeframe is the element of a planning process. Debriefing should be done immediately after simulation; the length often varies, but leaves lasting influence on practice.

I added at this point in the discussion, that often our facilitators do not all debrief the same way. As part of my study, I am interested in learning about how and why facilitators choose different methods for leading debriefings. Shroeder elaborated on this inquiry.

> Common objectives of debriefing include comparing and contrasting experiences and ideas and obtaining feedback. There are also several methods of debriefing. We categorize these into four types. First, judgmental, places harsh criticism,

> error in the hands of the learner, and presumes essential failure. "Here's how you messed up." Second, non-judgmental, gently points out learner errors, presumes essential failure, but in a nicer way . . . such as "What do you think you could have done better?" Third, advocacy plus inquiry, which includes direct observation and subjective judgment and genuine curiosity. It may sound something like "I noticed you didn't shake the patients hand when you entered the room. Why did you not shake the patient's hand?" Finally, good judgment, which widens the focus to include the learner and debriefer, offers genuine report of puzzlement and inquiry into how the learner's actions can make sense. "I noticed you did not make an empathetic statement. I was concerned about that because the patient seemed upset. How did you see the situation?" This technique identifies performance gaps between observed action and desired action.

At this point in the interview, I brought up the issue of debriefing evaluation. Shroeder described some of common tools that she and Grimes use at their simulation center.

> Video produces sustained behavioral change as described in research by Scherer et al. (2003) and enhances debriefing experience. Instructor-directed evaluation can be verbal or written, formative versus summative, and can use checklists or collaboration scripts for observers. Self-assessment is the reflection on one's own frame of reference. Self-assessment is free from ridicule and you can use tools such as journals, letters, blogs, etc. Learners have a tendency to be too hard on themselves, and in other cases do not take themselves seriously. Another

> evaluation is the 360 degree assessment. This tool uses multiple evaluators to measure identical parameters using the same rating scale. This helps to identify differences between self-assessment and ratings by other evaluators. Often in the medical setting there are six core competencies: patient care, medical knowledge, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice. Doherty and Brodsky (2011) first published these competencies as part of their research.

Grimes then added "Debriefing the debriefing, as originally researched by Rudoloph et al. (2008) is reflection on ones' own frames of learning." Adding, "In the army, this is called After Action Review. The purpose is to assess the debriefing styles or quality control of debriefers. Debriefing debriefs can identify and bridge any gaps between lessons learned and the learning objectives."

Shroeder continued,

> It is essential to encourage debriefer reflection, teaching debriefers to be better debriefers. When debriefing the debriefing, the instructor/ preceptor/facilitator is the target of the intended behavioral change. We recommend using the Good Judgment method when debriefing the debriefing. The focus is internal and places sole possession in the hands of the learner/debriefer. Be sure to provide specific examples. We use the debriefing with good judgment method based on the work of Rudolph et al. (2008). Based on simulation literature, this technique appears to elicit the most positive behavior change as compared to other techniques used to debrief.

I asked, "Why is debriefing the debriefing so rarely done?"

Shroeder replied,

> Based on our study results, time restraints, fear of something new, and self-reflection is challenging for some debriefers. One suggestion to work around the time issue is to use journals or blogs to catch immediate feedback and reflection. Then later, whether it be monthly or quarterly, you have notes and comments to use to guide the debriefings. Fear of something new can also be related to faculty buy-in. First we back our need to debrief the debriefings with literature and research. In addition, we also emphasize the need to become better educators, better clinicians, etc. Try to reiterate that even instructors can improve. It is okay to make mistakes and the debriefing the debriefing allows us to identify mistakes and improve upon them before working with new learners.

Expert Interview #2: Thomas (Tom) Ritchie, MA, Education Specialist, Laerdal. The second expert interview was conducted in person after a training seminar that was presented by Laredal. Laredal is currently the leading provider of medical simulation scenarios and producer of medical simulation equipment. The company also has participated in extensive research as it relates to best practices within the field of medical simulation design and simulation equipment development.

Expert interview question #1: **Can you tell me about how Laerdal has created a sound training method for new simulation facilitators?** Initially, Ritchie briefed me on why simulation is a great learning technique. "The IOM (Institute of Medicine) shared that preventable adverse events are the leading cause of death in the United States . . . Laeradel strongly supports medical centers who want to invest in using medical simulation to reduce that risk." More specifically, Ritchie shared " Simulation

increases the learner's skill development, allows for practice in a controlled environment, and provides on-demand access to practice patients." Ritchie's passion for the use and adoption of simulation was obvious throughout the interview. We next discussed the design process that Laerdal provides as a framework when creating new simulations. I asked, "Is there a standard design or methodology that Laerdal feels promotes the best outcomes for simulation?" Ritchie began, "First, it is important to provide an overview of the simulation to your learners. Make sure that your objectives are clearly defined and they align with the goal of the simulation." I agreed with Ritchie's comments and we then began discussing equipment requirements.

Ritchie provided a training manual from Laerdal that is used to help new facilitators. It was interesting to learn that Laerdal emphasizes the need to prepare a written document that looks similar to a lesson plan. The document highlights the whole process of the medical simulation. We looked at a lesson plan together from the manual. Ritchie began, "For example, you'll see here [pointing to a lesson plan on rescue breathing] that we have listed all of the required equipment. You'll see simulation equipment, medical and clinical equipment, and even the medications that will be used during the simulation." He emphasized the need to be prepared. Next, we looked at the description of the scenario and linked the scenario to the equipment needs and even to the set-up of the room. Ritchie added, "We also use decision making trees for all of our scenarios."

> The decision making tree is a visual depiction of the varying different routes a scenario may take. The tree provides a facilitator quick reference to which responses and cues need to be made during the scenario based on the decisions

made by the participating clinicians. After the decision tree, you'll notice the plan includes a checklist. This checklist is the proposed correct actions in order. The checklist is more familiar to me as we currently use something similar with our mock codes. The final piece of the planning document included a debriefing summary. The debriefing summary provides the facilitator with a summary of the scenario, the correct actions that should have been made, and it highlights really important things that you want the clinician to remember. The summary would be very useful to help standardize the debriefing for mock codes.

Expert interview question #2: I am very interested in learning about why facilitators choose certain methods for debriefing. As an expert, what is your preferred method? Ritchie stated, "I prefer instructor-led, small group settings. This is typically one or more instructional staff and a group of 10 or less learners." I added, "This sounds very similar to our current mock code set-up." Ritchie said that he prefers this set-up because "it promotes group communication and teamwork. Anything larger than that and I think you lose out." He also suggested that in situations when you may have more than 10 learners, "allow others to be observers . . . Give them a checklist and have them watch for the objectives or skills on the checklist. Then, encourage peer-to-peer learning. Allow the observers to discuss the checklist and highlight the skills that were met and un-met." He went on to reference a study by that showed "learners actually prefer peer teaching over instructor teaching" and suggested that I refer to this work for more information on the topic. I added, "I think this is a really great idea and could definitely be added to our current mock code debriefs."

Finally, we closed our discussion talking specifically about the high-fidelity SimMan 3G. This new piece of equipment is being utilized during our mock codes. We discussed some of the new features of the SimMan and highlighted some special considerations when using the equipment in the simulated setting. Ritchie stated, "The environment has to feel real. Create a believable story and scenario. Dress the SimMan to match the scenario. Use real medical devices and equipment, and even moulage if you can . . . These suggestions support the need for the simulation to replicate real life in as many ways as possible, and additionally support the need for well-planned and documented simulations. I agreed with Ritchie's comments and added, "It would be very easy to skip over or miss an important detail when delivering a simulation." We concluded the interview.

Debriefing Observations and Reflection Rubric Results

For each mock code I first described the setting, group make-up and characteristics, and provided a general overview of simulation activity and delivery. This data provides an understanding of each mock code and highlights similarities and differences between them. In addition to describing the mock code scenario and the activity, I also used a reflection rubric to assess the levels of reflection achieved during each debriefing. For each mock code, a reflection rubric is presented that summarizes the findings of the evaluation of group reflection.

Mock Code #1. The setting for the first video mock code took place in the spinal cord injury unit. This unit is an acute care setting with care focused on the needs of patients who have suffered a debilitating spinal cord injury or have been diagnosed with multiple sclerosis. Spinal cord injuries and disease cause wide variations in loss of

function ranging from physical disability to organ and tissue dysfunction. Common concerns within the population of spinal cord injury patients includes respiratory distress and failure, pressure wounds and ulcers, genitourinary and gastrointestinal dysfunction and infection, sexual dysfunction, and mental and emotional distress.

The unit is staffed with registered nurses, licensed practical nurses, patient care technicians, advanced practice nurses, and a physician. In addition, often times there are many types of therapists on the floor ranging from occupational, recreational, and physical therapy. The unit provides 24-hour care and is considered an in-patient setting.

Mock code #1 participants. The mock code was held at 2:10 pm in the afternoon. Initial response to the mock code included a staff nurse and a patient care technician. Upon initial response the RN and care technician immediately started cardio-pulmonary resuscitation and called for the overhead page. Within 2 minutes of calling the code overhead, the nurse supervisor on call responded along with additional nursing staff. Nearing the 12-minute mark of the mock code, the physician on call responded. In total, there were three RNs, one nursing supervisor, one patient care technician, and one physician caring for the simulated patient (see Figure 3).

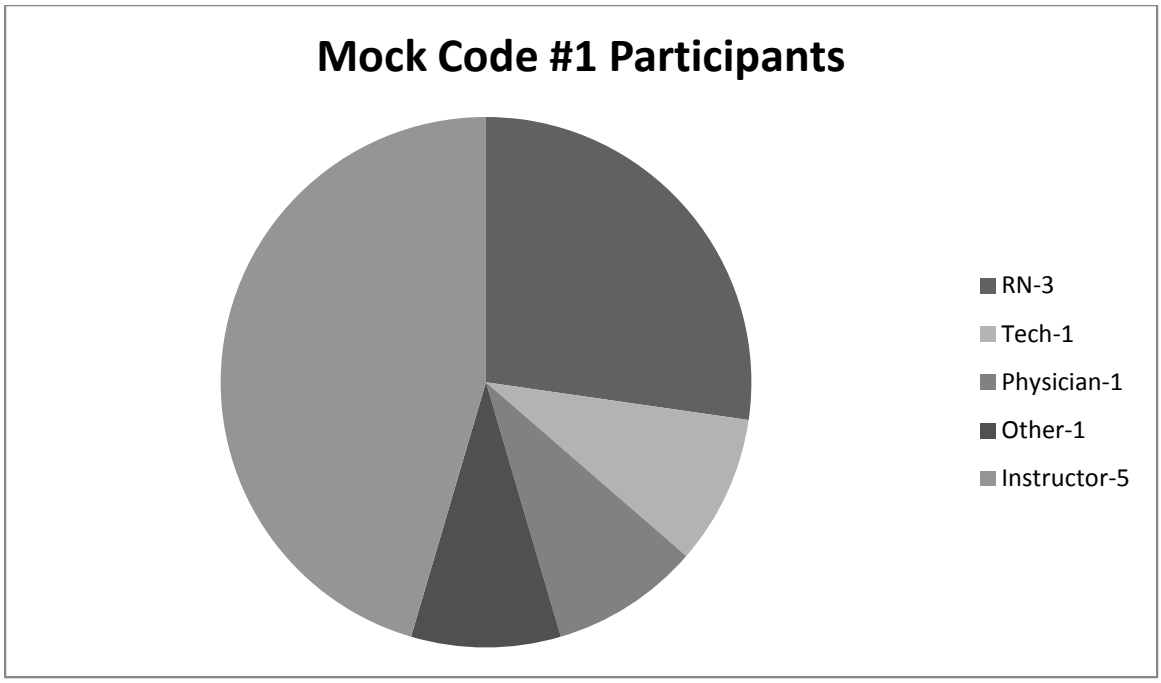

Figure 3. Demographic breakdown of mock code #1 participants based on the video recording.

Mock code #1 reflection rubric results. The results of the evaluation of achieved group reflection are summarized in Table 1. Mock code #1 was assessed for each element of reflection. Once the element was identified as being present, it was then categorized for level of achieved reflection.

Table 1

Mock Code #1 Reflection Rubric Results

Elements of reflective process	**Non Reflector**	**Beginning Reflector**	**(Intermediate) Reflector**	**Critical Reflector**
	1	**2**	**3**	**4**
Engages in reflection/debriefing process		Relates difficulty in scenario to "couldn't see the manikin breathing"		
Association: Reflection on what went right and what could improve in simulation experience.				Felt the scenario "went well overall" and identified "not to forget to put pt. on backboard". "Compressions were stopped for a long time"
Integration of team			"Team forgot to put pt. on backboard"	
Validation: Self-assessing new and old knowledge		"I felt it went really well". "I felt really comfortable" "I thought overall it went well"		
Appropriation: Inference of learning				Demonstrates ability to make inferences; group used a wide variety of examples, group discussed things that were overlooked and applied it to future practice
Outcome of reflection		Very few personal examples given, most were descriptive in nature and summarized the overall experience. "I felt" or "I thought"		

Note. Adopted from Wetmore et al. (2010) Reflection Rubric.

The nurse educator leading the mock code began debriefing after the code was completed. Initially, the nurse educator began the debriefing with a brief discussion of events that unfolded during the mock code. There was very little discussion and this conversation appeared to be more about clarification and review of the events. The educator then asked participants about how they felt about the mock code

This question prompted several responses from the mock code participants. The RN who first responded commented that she did not know if she was supposed to really call the overhead page or not due to the scenario being a "mock." Therefore, she felt her response was a little unnatural.

Another nurse who entered the mock code several minutes after initiation commented that she felt like the "code went well overall." This comment led the group to a short discussion about what was good. Some of the comments included that "communication was good," "lots of people responded," and "I felt like I had lots of help."

After this brief discussion about what the participants felt went well, the nurse educator began to show the video recording of the mock code to the participants. Occasionally during the playback the nurse educator would pause the video to show areas of weaknesses or actions that were missed during the code response. For example, at one point during the mock code, the nurse educator prompted a participant to start an intravenous (I.V.) catheter. However, this step did not happen. Placing an I.V. is an integral step during the response to codes and the nurse educator felt that is was important to highlight this failure.

At another point in the video the educator paused the video to display the length of time compressions had been stopped due to one of the participants trying to place the defibrillation pads on the patient. One of the basic foundations of CPR is to continue compressions minimizing "off the chest" time to less than 10 seconds. The nurse educator used the video replay as a way to display the importance of working together and maintaining compressions during the code response.

After reviewing the video of the teams code response, the nurse educator asked the group for final thoughts or feedback. No one shared any final thoughts, ideas, or concerns. One participant did share that they felt the mock codes are beneficial and should be offered more often. The debriefing concluded and the group returned to the spinal cord unit for the remainder of their shift. In all, the mock code lasted 36 minutes from the start of the code to the conclusion of the debriefing.

Mock code #1 debriefing observations. Overall, I felt that this mock code was conducted well. There was significant participation by clinicians in both the code and the debriefing. The facilitator used a mixed approach to conducting the debriefing. This approach blended the video led debriefing with extensive opportunities for self and group reflection blended throughout. As an example, the facilitator began the debriefing with an open question to the group regarding how they felt the mock code went overall. This question allowed for the participants to engage in conversation with each other and also led to initial reflection and review of the clinical activities undertaken during the code. From there, the facilitator then asked the group if they would like to watch the video of the mock code.

During the video, the facilitator stopped the video after pertinent events or missed cues but allowed the group to identify the mistake or offer a resolution to the problematic action. The facilitator did not take the role of telling the participants what they did wrong. This technique allowed the participants to cue into problems based on when the facilitator would pause the video, but also supported reflection and critical thinking. The facilitator did not give the participants the answers. They came up with the answers and solutions on their own.

Another observation made during the first mock code was the lack of participants. In other mock codes there was always a physician and a trained "code team" that responded, in this case, due to some challenges with the overhead paging system no physician or "code team" responded. Therefore, the code was fully led by staff nurses trained in basic life support only. Upon conclusion of the mock code video review, the facilitator took the opportunity to discuss with the participants how they should respond if a similar situation were to occur in a real life setting. The facilitator concluded the debriefing with the opportunity for the team to discuss any outstanding questions and share final comments about the simulation activity.

Mock Code #2. The second mock code took place on a medical-surgical inpatient floor on the North end of the sixth floor referred to as 6N. The simulator was set up outside the elevator doors leading to the 6N unit. This unit most often cares for patients who have undergone surgery or are preparing for a surgical procedure. The floor is staffed by RNs, LPNs, patient care technicians, and a health administrator staff member who works at the desk. In addition, this floor frequently has physicians, residents, and fellows who see patients. It is very much a "teaching" unit.

The scenario for the mock code was developed in response to a real code that was experienced earlier in the year. A patient was taken off the floor for a procedure. Upon returning to the floor, the patient "coded" just outside the elevators as he was being brought back to the unit.

Mock code #2 participants. Upon calling the mock code via the overhead paging system, there was a mass response. Initially three medical students and one fellow responded. In addition, the health administration staff member from the desk, a floor nurse, and the nursing supervisor responded. Within 1-2 minutes, additional staff responded from our intensive care unit, which is located directly below the 6N unit. In all, there were 12-13 participants in the mock code. The demographics of the group are presented in Figure 4.

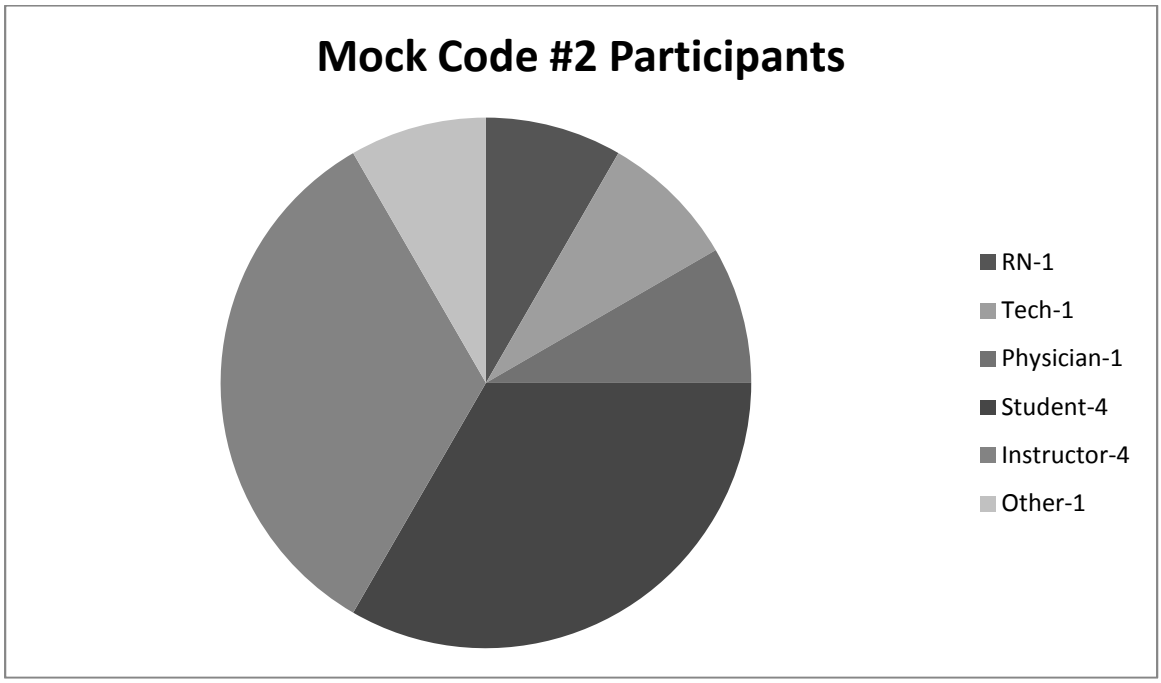

Figure 4. Demographic breakdown of mock code #2 participants based on the video recording.

Mock Code #2 reflection rubric results. The results of the evaluation of achieved group reflection are summarized in Table 2.

Table 2

Mock Code #2 Reflection Rubric Results

Elements of reflective process	**Non Reflector**	**Beginning Reflector**	**{Intermediate} Reflector**	**Critical Reflector**
	1	**2**	**3**	**4**
Engages in reflection/debriefing process				Makes reference to personal feelings and relates to future learning, "I forgot . . . but I won't forget next time"
Association: Reflection on what went right and what could improve in simulation experience.		Provides descriptions but does not reflect on improvements, "no one is taking notes," normally this would be the RN supervisor"		
Integration of team			Demonstrates awareness of team performance, does not reflect on their role, "who is in charge," "I can't really tell"	
Validation: Self-assessing new and old knowledge				Relates experience to prior knowledge and beliefs, lots of discussion about correct procedure, policy, appropriate response, etc.
Appropriation: Inference of learning			Demonstrates and comprehends simulation, inferences made to prior knowledge, "I	

		forgot," "I wasn't for sure who was supposed to lead," "I'll be more clear next time"
Outcome of reflection		Demonstrates ability to reflect on own work and apply, lots of examples used from scenario, made reference and application to future practice

Note. Adopted from Wetmore et al. (2010) Reflection Rubric.

The debriefing of the mock code #2 response was led by the physician champion who oversees many of the simulation activities within the medical center. He began the debriefing immediately with a review of the video content. There was very little discussion about the video replay. The physician did stop the video periodically to identify both good and bad response behaviors of the participants.

One of the first skills that were skipped during the code was the communication and identification of a "recorder." The recorder is the person taking notes throughout the code. They are responsible for noting times of medications delivered, times of defibrillation, and other code responses such as the initiation of the I.V. or central catheter for medication administration. During this mock code, that role was not clearly identified or communicated and there was no recording taking place until 6-7 minutes into the code response.

When the physician stopped the video to discuss this mishap, several participants immediately chimed in to discuss and share their thoughts. The fellow (term used to

identify a physician in training), who had taken the lead during the code response, shared, "I forgot. I was focused on getting CPR started and getting a line in that I didn't even think about telling someone to record. I'll remember next time though!" Another medical resident standing very close to the fellow said that he remembered the recorder role "only after one of the nurse educators prompted them to identify a recorder."

The debriefing continued with video review of the response. The physician facilitator again stopped the video a few minutes later to address a good behavior of one of the participants. He noted the correct procedure for initiating an I.V. and a central line for medication administration. He congratulated the fellow on knowing to start and maintain CPR rather than focusing on lines and medications. "You never stopped compressions. That is great. Compressions are most important. Good job." Several people within the group smiled and acknowledged the fellow's correct decision-making.

Upon completion of video review, the physician facilitator asked the code participants if they had any other questions. A few questions arose about correct procedure and policy. One specific question came up regarding the response of the intensive care unit staff. Another question arose about when and how to decide when a central line is necessary. All of the questions were objective in nature and related to clinical response and actions.

Mock code #2 debriefing observations. One of the first observations made by the researcher was the delivery method of the facilitator during the debriefing. The facilitator chose to utilize the video recording of the mock code as a method of reflection for the participants. However, notably, the facilitator appeared to depend on the video rather than allowing the participants to recall the events as they unfolded. There were long

periods of time during the debriefing where the participants were simply watching the code unfold. The researcher felt that the video clips could have been shorter allowing more opportunities for the participants to comment and reflect. It felt like the group was timid to speak up when the video was being reviewed and therefore there may have been aspects of the code that could have been further discussed but were overlooked due to the video.

Another observation made during the debriefing was that the facilitator took the primary lead role of the debriefing. This included stopping the video when he felt there was something to be discussed and commenting when things were done right or wrong. This left the participants to be more of an observer and listener during the debriefing rather than an active participant in the reflective process. The impact of this debriefing method is unknown, but it is expected that this pedagogical approach to debriefing will decrease the level of reflection achieved by the group.

Mock Code #3. The third mock code was held in a cardiology unit referred to a 7S. This unit is similar to the previous unit discussed above. The unit cares for patients who have undergone or are preparing to undergo surgical procedures related to cardiac diagnoses. The unit is staffed 24 hours by RNs, LPNs, patient care technicians, and one administrative staff. In addition, physicians, therapists, and other support staff frequently round on the unit. On the day of the mock code, a nursing school was also present for clinical practicum.

The mock code was set up in an empty room on the cardiology unit. A nurse educator played the role of a floor nurse and found the patient unresponsive in his bed. She immediately called the overhead page for code response.

Mock code #3 participants. When the mock code was called overhead, the charge RN on the floor responded along with the patient's care technician. Within 30-40 seconds there was a rush of nursing students who also responded. At the 3:30 minute mark, the intensive care team also responded along with a couple of medical residents. The nursing supervisor also entered the room close to the same time. The demographics of the group are presented in Figure 5.

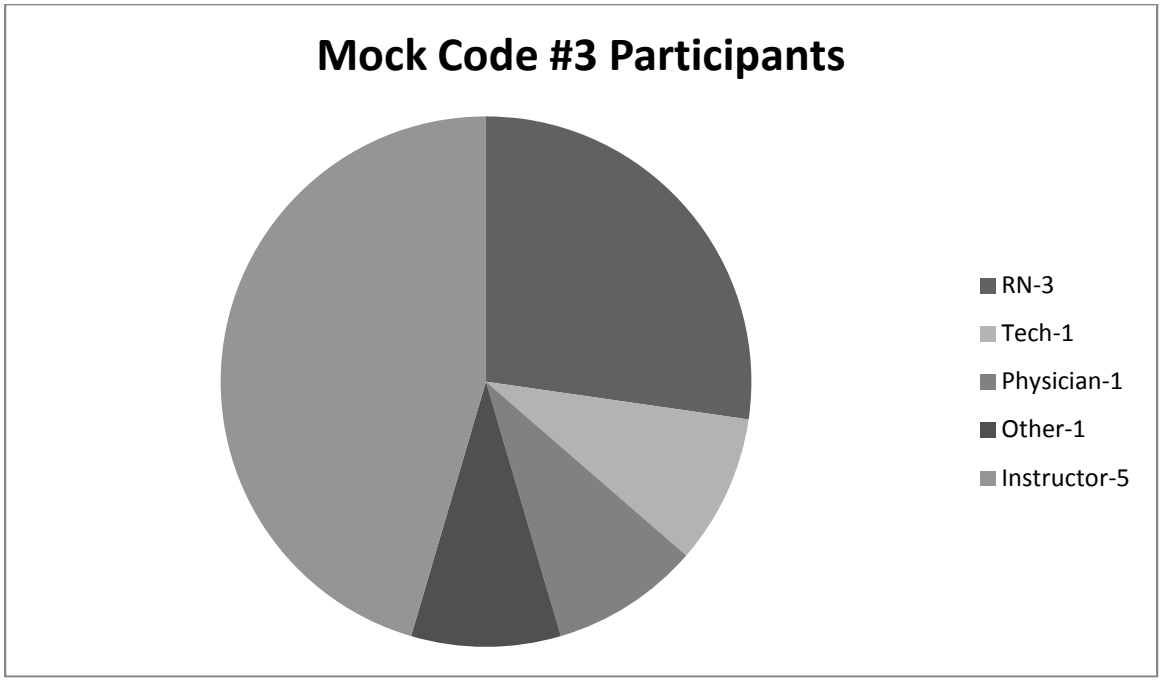

Figure 5. Demographic breakdown of mock code #3 participants based on the video recording.

Mock code #3 reflection rubric results. The results of the evaluation of achieved group reflection are summarized in the rubric (see Table 3).

Table 3

Mock Code #3 Reflection Rubric Results

Elements of reflective process	**Non Reflector**	**Beginning Reflector**	**{Intermediate} Reflector**	**Critical Reflector**
	1	**2**	**3**	**4**
Engages in reflection/debriefing process			Many occurrences of personal feelings, did not relate to future learning though, "I felt . . . ," "I liked . . .," "I was scared at first"	
Association: Reflection on what went right and what could improve in simulation experience				Provides examples of what went well and what need improvement, "place pt. on hard surface," "stay on the chest," "I need to study my medications, rhythms, etc."
Integration of team				Discussed key aspects of team and roles, "I am more comfortable now responding," "what should we do if . . .," "I noticed several RNs doing specific things"
Validation: Self-assessing new and old knowledge			Demonstrates self-assessment and relates occasionally to prior knowledge, "I wasn't for sure what was going on," "I was really afraid," "I thought we did really well"	

Appropriation: Inference of learning		Demonstrates understanding and synthesizes experiences, "I need to look over medications," "review rhythms," "What should we do if . . .," "wish we could do more simulations"
Outcome of reflection	Reflects on own work, but does not provide a lot of personal examples, "I was afraid," "I felt . . .," "I was impressed . . . ," "I wish . . . "	

Note. Adopted from Wetmore et al. (2010) Reflection Rubric.

Interestingly, due to the small space limitations of the room where the mock code was held, the debriefing was moved to a nearby classroom. The large group of participants followed the nurse educator to the classroom for the facilitation of debriefing. In an effort to keep the debriefing short, the educator chose to not use video playback.

The educator first asked the group for their initial thoughts. Several nursing students immediately responded. "I wasn't for sure what to do. I knew to start compressions and CPR, but after that I was really afraid." Another nursing student agreed, "Yea, me too. I have never done anything else in a code besides watch or do compressions. It was really good to see what will actually happen." One of the medical residents also commented that he felt like there were too many people in the room. "It was really crowded, difficult to hear." Others agreed and nodded.

Next the nurse educator asked the group about what they felt they did well. One nursing student responded that she felt like the group worked well together. "We all tried

to help each other out." The resident stated that he felt like "overall the code went pretty well." The charge RN also commented that she was "impressed by how serious the group took the code."

At this point in the debriefing, the educator chose to take the conversation in a clinical direction. She began to highlight tasks and skills that she observed during the response. She discussed with the group responses that were on track and appropriate, and also mentioned some things to look out for during future codes scenarios.

Upon conclusion of the debriefing, the educator asked the group if they liked participating in the mock code and what they may take away from it. Several participants commented. A nursing student said that she wished they could do more simulations. "I really like practicing things in real life. This was really good." The charge RN mentioned that she felt like things were a little hectic. "But, I also think that by getting to 'play' today, I'll be better when a real code happens next time." Another student said, "I agree, I think that I would be really scared to go to a real life code, but now I think I would probably respond." Several students and participants agreed with her comment.

Mock code #3 debriefing observations. Initially, the researcher felt that the mock code went smoothly and was delivered in a similar manner to the previous two mock codes evaluated for the study. However, the researcher did note some differences during the debriefing. The first observation that was significantly different during this mock code debriefing was the location. The facilitator made the decision to take the group off the floor and to a more quiet and secluded location within the facility to conduct the debriefing. The impact of this is unknown, but it should be noted that this technique and approach was different from the previous two debriefings.

Another difference was how the debriefing was conducted. In the previous two debriefings, the facilitators chose to utilize the video recording as a method of reviewing and reflecting on participant roles and responses during the mock code. However, during the third mock code, the facilitator did not use the video recording due to difficulty with equipment. The facilitator had difficulty getting the recording to play and in response decided to debrief without the video in an effort to save time and get the staff back to the floors for work. Although initially, she appeared to be frustrated, the researcher did not notice any significant impact on the quality of the debriefing. In fact, there was a large amount of conversation and reflection during the debriefing as the participants attempted to recall the events as they unfolded during the mock code

Emerging Themes

Interview data and transcribed video recordings were used for theme analysis. Data reduction began with multiple repeated readings of the interviews and transcripts. Themes began to emerge during initial readings. Next, open coding was utilized to identify themes. Five themes emerged as follows: (a) prepare learners, (b) provide consistency, (c) use video recordings, (d) provide opportunities for follow-up, and (e) self-reflection. These themes are presented along with experiences and major findings associated with each theme.

Emerging theme #1: Prepare learners. The first theme that emerged from data analysis was the need to prepare learners. This theme was actualized through interview data with both participants and facilitators. Participants commonly suggested the need to have explanation of the scenario and well-defined directions for the simulation. Three of the six participants specifically made reference to the need for a pre-brief. Common

statements included, “[facilitators] came with the assumption you knew the information” and “the pre-brief needs to be stronger.” Also, one participant shared that “minimal information was provided.” This theme was also supported by data from the facilitator interviews. All three facilitators shared input and suggestions about the need for a well-developed pre-briefing. Comments included, “I think an initial brief would be beneficial” and more specific to the method of pre-brief one facilitator suggested to add “pre-determined objectives” and time for “participants to become familiar with the equipment.” Along with the data collected from the interviews, my observations and transcripts from the mock codes and debriefings also aligned with this theme. There were three different occurrences of comments made during the debriefing that would support the need for a pre-briefing. First, one participant spoke about “feeling anxious” and “I didn’t really know what to expect.” Another participant shared that she was not familiar with the equipment and therefore she felt her response was a little unnatural and suggested “a little more guidance before starting would have been appreciated.”

Emerging theme #2: Provide consistency. The second theme to emerge from the data was the need to provide consistency. Four of the six participants shared ideas related to the inconsistency between facilitators, delivery of mock codes, and the debriefings. For example, one participant said, “Different styles of teaching can be distracting sometimes and a little confusing.” Another participant shared, “the facilitator gave a lot of cues” while a different participant shared that “more cues could be helpful.”

The facilitator data was equally as inconsistent. All three facilitators agreed that consistency is needed; however, the type of suggestions varied. For example, two facilitators suggested the need to use checklists while another thought that clearer

objectives would be helpful. When reviewing the video recordings, all three mock codes were delivered differently. The settings varied, the scenarios varied, and the responders varied. Some debriefings were managed by one person and used the video recording while other debriefings were led by multiple instructors and had a feeling of chaos and disorganization.

Emerging theme #3: Use video recordings. Overall, the third theme was apparent and repetitive in all three sources of data. The participants clearly feel that the use of video recordings during the debriefing is beneficial. All six participants shared positive comments associated with the use of the video recordings. One participate said the video " let us realize our own mistakes" and "things were obvious when we watched it ourselves." All three facilitators also support the use of the video recordings. One facilitator believed the video "reinforces learning" and "provides objective feedback." Another facilitator shared that the video "helps keep us on track" and "you see things you forgot to write down." In two of the three recorded mock codes, the video recording was used to debrief. The third group attempted to use the video but had difficulty with the equipment and utilized a group discussion and verbal debriefing instead. Although one facilitator shared that she believes the video recording "can be intimidating," there were no participants who spoke negatively about the use of the video recordings for debriefing purposes.

Emerging theme #4: Provide opportunities for follow-up. Additional opportunities for follow-up or reflection were another common theme. Participants shared on several occasions the need to more time to reflect and participate in discussion. Four out of the six participants made reference to follow-up and evaluation. Examples

from the participant data include statement such as “I would suggest follow-up to the initial debriefing. Maybe a email or phone call.” Another participant shared, “allow participants to reflect on their own, not in the group setting.” All three facilitators shared ideas for adding opportunities for additional follow-up. Some examples include, “I would suggest a email with the summary of the event” and “I would like to follow-up with individuals by phone maybe.” Supporting this idea, one facilitator also shared, “I don’t think a one-time debrief captures everything.”

Emerging theme #5: Self-reflection. The final theme that emerged was the concept of self-reflection. Nearly 100% of the interview participants consider themselves to be self-reflectors. Evidence from the interviews supports the theme. One participant shared, “I went home and reviewed the different roles.” Another commented that she “thinks about things for at least 24 hours after.” Another shared, “I reflect on things, I don’t take notes or journal, just think about it in my head.” All three facilitators felt strongly that they too were self-reflectors. One gave an example of returning to his office after the code and “mulling over the experience.” Another suggested that she might be “a little obsessive” and that she “builds on the feedback from the instructor.” Additionally, the results of the reflection rubric support that the groups achieved beginner to critical levels of reflection consistently during the debriefings.

Summary

I presented the results of the study drawn from the data analysis previously discussed. Interview data from participants, facilitators, and experts were analyzed along with the researcher observations and reflection rubric assessments. Five themes emerged

from coding of data and were presented. Chapter 5 discusses the findings of the study and aligns the results of the study with the literature review.

Chapter 5: Discussion, Implications, Recommendations

Discussion

The discussion will align each of the interview question responses and the results of the reflection rubric and the themes with the literature review. At the conclusion of the discussion, the reader will have a sound understanding of how the literature relates and grounds the findings of the study.

Aligning participant interviews with literature review.

Participant interview question #1: Give me a brief description of your recent experiences during the simulated mock code you recently took part in? (For example, what was your role, was this your first time participating in a mock code, how did you think it went overall?) After reviewing all of the data associated with participant interview question #1, I found some commonalities. First, most of the participants felt positive about their participation in the mock codes. Many shared feelings of anxiety and fear, but after participating in the exercise, they felt like it was beneficial. Many participants also shared that they hoped they had the opportunity to participate in additional mock codes in the future. The majority of the respondents described their roles in the mock codes as the role related to a skill. For example, "I performed chest compressions," or "I was the recorder." They continued by sharing that in most cases, they felt the mock codes were successful and "went well overall." These feelings are closely aligned with literature describing participants' experiences in simulation exercises. DeMaria et al. (2010) found that simulation engages learners in a realistic environment, and certain amounts of anxiety are believed to enhance the learning process. Research by Mullen (2012) showed that clinicians sometimes show nervousness

about being videotaped, while others say they do not like to be watched. Additionally, the anxiety appears to vary with less anxiety associated with novice nurses and clinicians and greater anxiety associated with more experienced nurses and clinicians.

Participant interview question #2: Can you describe the group of responders who participated in the mock code? What was group communication like? How did the group interact? Why do you think these interactions occurred? How did these interactions impact the delivery of effective code response? Two of the three groups were described as random, while one group was described as "normal team members who frequently work together." All three groups were interdisciplinary in nature with team members from nursing and medicine disciplines the majority of the time. Interdisciplinary education is common and is even encouraged in the simulation setting. Baker et al. (2005) noted that effective team work is required for accomplishing complex medical tasks. Evidence has shown that simulation exercises that use interdisciplinary team approaches report more effective team performance as compared to classroom-based instruction (Baker et al., 2005). Most often the participants shared that the groups worked well together and communicated effectively. Some common feelings shared were "we worked well together," "we supported each other," and "everyone was focused on the task." Even with smooth communication and positive interactions, most groups needed cues from the instructors and the participants shared that occasionally they would veer off track and the instructor would need to redirect the group.

Participant interview question #3: Can you discuss the educator who facilitated the code exercise? What role did the educator play in the scenario? How much interaction did the educator have with the group? How did the educator

facilitate group discussion when the simulation was over? Many of the educators who facilitated the mock codes were also involved in the mock code process. The participants shared that there were normally multiple educators and each was helping in different roles. The educators took notes, participated in the mock codes, ran the equipment, and facilitated the debriefings. On occasion, due to multiple educators assisting, the mock codes appeared to be disorganized. Many of the educators cued the participants throughout the mock codes, prompting them when a skill or step was overlooked or missed. Participants also shared that sometimes there seemed to be miscommunication about when and how often to prompt. "Some helped out a lot" while others "would let us realize our own mistakes." Prompts and cues are common facilitator skills used during simulation exercises. Waxman (2010) suggested that cues can be drawn from contextual details, desired outcomes, and well written scenarios. It is important that the educator clearly understand the desired outcomes and prepare the learner for the activity (Waxman, 2010).

Participant interview question #4: When the mock code ended, what happened next? What was the process like? Did you like the way the exercise ended? What suggestions or changes would you make to the process? Two of the three mock codes used video recordings to debrief and the majority of participants felt strongly that they like the use of the video. The video recordings "allowed the whole process to be reviewed" and provided participants the opportunity to "review other roles besides the one that we performed during the mock code." Research supports the use of video recordings for debriefing purposes. Rutledge et al. (2008) found that when videos are shown during debriefs, the discussion is stimulated. Additionally, when the video is

periodically stopped and time is allowed to ask questions, it appears that participants develop strategies to overcome the identified weaknesses (Rutledge et al., 2008).

There were several suggestions that the participants offered related to ending or wrapping up a mock code. Commonly, the environment for the debriefing was not conducive to learning in the opinion of the participants. Suggestions included moving the debriefing to a more formal location and creating a more learner friendly environment. Knowles et al. (2011) discussed the learning environment as part of the andragogical framework for learning. Knowles et al. (2011) stated that facilitators of learning must establish a climate conducive to learning. This environment would be supportive and cooperative in nature and the facilitator needs to be aware of both environmental and emotional barriers to learning.

Participant interview question #5: Overall, did you learn from your participation in the mock code exercise? Can you share with me what you learned? Can you share with me how much you learned? Learning was clearly achieved from participation in the mock codes. Participants shared that they felt more confident and gave specific examples of learning that included "using the defibrillator," "practicing chest compressions," and "getting my hands in the crash cart." Many of the identified learning outcomes were skill based. Experiential learning is a well evidenced teaching method for skill based learning objectives such as those required for cardiac arrest response. Galbraith (2004) argued that teaching methods should have an action component that helps the learner connect learning to future practice. Therefore, activities such as simulations and mock codes are excellent teaching methodologies due to the opportunity for learners to practice skills in a hands-on setting. The participants also felt

that mock codes are positive and have a strong desire to participate in future mock code exercises.

Participant interview question #6: Critical reflection, a term used to describe the "mulling over" of information and experiences, has been shown to improve learning after simulation exercises like mock codes. What does reflection mean to you? Do you consider yourself a person who reflects? Did you reflect after your participation in the mock code? Did the educator impact group reflection? Did the educator impact your individual reflection? Participants strongly considered themselves to be self-reflectors. Many participants continued to reflect after the debriefing had ended. Some reflect "in their heads" while others write down ideas or even talk to themselves. Self-reflection took different directions for each participant. Some reflected on their weaknesses. Others reflected on roles or skills that they did not perform during the mock code and some reflected on things that they forgot or overlooked. Self-reflection is an integral component to the process of learning. Boud et al. (1985) emphasized the importance of providing learners the opportunity to draw from their experiences and actively engage in what they are learning. Reflection is a method used to turn experience into learning (Boud et al., 1985).

Aligning facilitator interviews with research literature.

Facilitator interview question #1: What is your preferred style to debrief (group, individual, written, verbal, video assisted, audio assisted, etc.) and why do you choose this style? The preferred style or method used to debrief groups after participation in a mock code is the mixed approach. The mixed approach uses both verbal guidance and video recordings to produce adequate discussion, critical thinking,

and interaction. The facilitators commonly started debriefings with open-ended questions. This step was believed to help get the participants involved in the discussion and set the stage for the debriefing. Then the facilitators often moved into using the video recording to review skills, strengths, weaknesses, etc. The video was often stopped periodically to highlight something critical or to allow time for discussion. In many instances, the facilitators chose to conclude the debriefing with a final open ended question seeking final thoughts, feelings, additional questions, etc.

Although this was a common process for this study, it is not standardized or based on current evidence and best practices. The research literature does not clearly present a well-defined process for debriefing, but guidelines and recommendations have been published. Raemer et al. (2011) stated that important aspects of the [debriefing] process may still be poorly understood or even discovered based on the current state of science, yet Mikasa and Cicero (2012) found that the use of video recordings during debriefs enhanced students ability to identify strengths and also areas for growth and improvement. According to my experience, the use of video recordings results in positive outcomes and should continue to be researched as a method of effective debriefing.

Facilitator interview question #2: How do you think it facilitates learners reflection? What are the strengths of this style? In the previous interview question the facilitators shared that most often video recording is used to guide the debriefing. During interview question #2 the facilitators shared their opinions of the strengths associated with the use of the video for debriefing. Strengths of the video include objectivity, reinforcement, and cueing. Facilitators feel that by using the video, participants do not

feel threatened or judged and this is supported through research (Mikasa & Cicero, 2012; DeMaria et al., 2010). In addition, the video also provides reinforcement. The facilitators felt that the critique of mistakes and weaknesses is easier to accept when it is accompanied by the visual evidence from a video recording. Finally, the video recordings allow facilitators to recall or remember things that may have been missed during the mock code. One facilitator stated that "it is easy to miss something or forget to take notes" and the video provides a quick reference during the debriefing.

Facilitator interview question #3: What are the weaknesses you perceive to this style? How could you improve its use during debriefing exercises? Weaknesses of video recording were associated with distraction and psychological discomfort. The facilitators felt that some participants do not like to be recorded due to worry about making mistakes or feeling uncomfortable with being on camera. The video also can cause distraction and loss of focus from the participants. On occasion, participants become focused on the way they appear or sound on camera and lose sight of the objectives. Mullen (2012) demonstrated that clinicians sometimes show nervousness about being videotaped and this is a realistic concern and weakness when using video recordings.

Another weakness of the video recording is the occasional equipment failure. In one scenario, the facilitator had planned to use the video during the debriefing but was unable to get the equipment operating correctly. Therefore, she was forced to use a different debriefing approach and had to adapt quickly without time to prepare. As technology and equipment becomes more and more advanced, facilitators will need to

accept the chance of equipment failure and be prepared to facilitate debriefs using other methods and approaches.

Facilitator interview question #4: Thinking of your most recent simulation activity that you facilitated, walk me through the debriefing. Were the learners interactive? Did they actively participate? How did you feel the debriefing went overall? What would you have done differently? How did you evaluate learning? Overall, the facilitators felt a sense of learner engagement and participation from the learners. The facilitators focused much of their responses on suggestions for change and improvement. One major area of improvement included the standardization of a checklist or template that could be used to help focus on missed skills and errors. This checklist could also help guide the debriefing as well.

Another identified need was to use prewritten questions during the debriefing to improve critical thinking and participation. For example, one facilitator shared that she asked the question "How do you think it went today?" which she felt was too vague. She suggested using a more deliberate question instead such as, "What elements from today's mock code do you think need additional practice or attention?" Questions written beforehand can be better developed to cue and prompt critical thinking related to the learning objectives.

Dieckmann (2012) described the debriefing process used by an expert in the field. The debriefing was broken down into three phases (description, analysis, and application). During the description phase the participants in the simulation described what happened and what they found to be positive or negative. The expert also explored views and opinions with probing questions. After the analysis, the expert asked for

solutions to identified problems and how those solutions might be put into practice (Dieckmann, 2012). A similar framework that is pre-planned and defined prior to the debriefing could enhance the learning experience and improve the overall delivery of the debriefing process.

Aligning reflection rubric results with research literature. The results of the reflection rubric found that all three of the group achieved intermediate to critical levels of reflection during the group debrief. However, when assessing the overall levels of achieved reflection, two of the three groups achieved intermediate reflection while one group achieved beginner reflection. Mock code #1 had three occurrences of beginner reflection, one occurrence of intermediate reflection and two occurrences of critical reflection. Their average level of achieved reflection was a score of 2.83, slightly below intermediate reflection. Mock code #2 experienced one occurrence of beginner reflection, two occurrences of intermediate reflection, and three occurrences of critical reflection. The average group score was 3.3 slightly above the intermediate level of reflection. Mock code #3 demonstrated one occurrence of beginner level reflection, two occurrences of intermediate reflection, and three occurrences of critical reflection. The average group level of achieved reflection was 3.3 overall which is slightly above the intermediate level.

Overall, all three groups averaged a reflective score of 3.0 which is representative of an intermediate level of reflection (2.8 + 3.3 + 3.3/ 3). These results are closely aligned with the current literature in the field of learner reflection. The research literature describes that commonly new reflectors such as novice clinicians and students achieve lower levels of reflection while clinicians and learners with more experience often

achieve higher levels (Sommerville & Keeling, 2004). The groups were blended in demographic make-up and it was expected that beginner to intermediate levels of reflection would be achieved due to the varying levels of participant experience. Reflection is a learned skill and requires deliberate practice much the same as clinical skills require practice to become competent (Schön, 1983). Therefore, the levels of reflection achieved during the mock codes reflect the blended group make-up of both new and experienced learners and reflectors.

Aligning emerging themes with research literature. The first theme that emerged during the study was the need to provide the learners with an opportunity to prepare for the simulation exercise. The participants shared that they experienced anxiety and frustration due to the lack of knowing what to expect during the mock code and debrief. Knowles et al. (2011) emphasized the importance of learner preparation as defined in the andragogy practice model. It is important to understand how learner preparation directly impacts learner motivation and barriers to learning. A basic assumption of andragogy is that adults are motivated to learn when they feel that the learning is relevant to their work. They also need to know why the learning is important (Knowles et al., 2011).

In addition, these assumptions can be barriers to learning if they are not accepted and addressed by the facilitator. Skipping over the preparation of learners can directly impact the learning outcome. For example, mock codes are often held impromptu, which means that the learners are taken by surprise when the mock code takes place. Although the element of surprise for mock codes has previously been deemed a requirement for

these learning activities, the lack of learner preparation may cause a greater negative impact than once expected.

Preparing the learner prior to the mock code exercise may produce improved learning outcomes. Learning preparation could include a review of the expected skills and objectives for successful response to cardiac arrest, the opportunity to become familiar with the simulation equipment, and a brief explanation of what happens after the mock code exercise is over (debriefing). The learning outcomes associated with the addition of learner preparation might outweigh the need to continue to maintain the element of surprise. I feel that this question needs to be furthered researched. The current model of mock code delivery does not match the andragogy practice model. I would be interested to learn about how the deviation from the andragogical framework has impacted the delivery and acceptance of mock code exercises by the learners.

The second theme that emerged was the need to provide consistency between mock codes and debriefings. Currently, the facilitators of mock codes use the process and method that is most comfortable. These choices do not appear to be based on literature or theory, but rather based on what they have experienced in the past and what comes naturally to them as a facilitator. There is a growing body of research focused on standardizing the process of mock code design and the process of debriefing. Several studies have attempted to validate frameworks and also provide evidence-based guidelines to assist facilitators in the design of simulation activities (Beaubian & Baker, 2004; Salas et al., 2005; Cook et al., 2012; Waxman, 2010). However, there is currently no consensus on this topic. As with the design of simulation exercises, there is also significant research in field of debriefing. Several studies have published models for

debriefing and made suggestions about how to deliver high quality, evidence-based debriefs (Dieckmann, 2012; Fleegler et al., 2012).

There appears to be less research in the field of debriefing and reflection as compared to the design and implementation of simulation-based activities. Raemer et al. (2011) posed that there still remains many unanswered questions related to the debriefing process. Raemer et al. (2011) suggested that additional research needs to address important questions if the process of debriefing is going to continue to grow and be relevant.

The third theme that emerged was the consensus and agreement that the use of video recordings to debrief is well liked by both participants and facilitators and is the desired method for the debriefing process. Participants generally agreed that the video recordings positively impacted the debriefing. Increased discussion was generated from the recordings and offered the participants opportunities to review roles and skills that they may have missed during the exercise. The participants also shared that the video provided visual cues during the debriefing and prompted questions and engagement during the debriefing discussions.

The facilitators equally felt positive about the use of video recordings during the debriefing process. The facilitators shared that the videos provided an objective assessment and critique and lessened the negativity towards the facilitator feedback received during the debriefing. The facilitators felt that by using the video recordings, participants were able to see the errors or mistakes and the visual representation reinforced learning and acceptance of criticism. The facilitators did share concerns over

participant anxiety to being video recorded, however, it seemed that the positive outcomes outweighed the potential negative impact.

Video recording is common practice as a method of debriefing participants post-mock code. There is consensus in research of the usefulness and impact of debriefs that are guided by video (Owen & Follows, 2006; Rutledge et al., 2008; Zulkosky, 2010; Mikasa & Cicero, 2012). Mikasa and Cicero (2012) found that the use of video recordings during debriefs enhanced students ability to identify strengths and also areas for growth and improvement. They also identified that as compared to non-video assisted debriefings, critical thinking, and communication showed significant improvement when video recordings were used (Mikasa & Cicero, 2012).

The fourth theme that emerged from the data was the desire for additional opportunities for follow-up and reflection. Both the participants and the facilitators felt that it important to offer additional opportunities for participants to engage in discussion, ask remaining or new questions, and facilitate ongoing reflective practices beyond the post-simulation debrief. The facilitators shared that sometimes the debriefing feels rushed due to time constraints or the staff needing to get back to their clinical assignments. Occasionally, the environment of the debriefing may not be conducive to learning due to distractions and space or equipment limitations. The facilitators felt that offering opportunity to provide feedback and continued discussion post-debriefing was very important.

The participants also shared similar thoughts. The participants expressed that many times they continue to reflect post-debrief on their own time and in their own way. This reflection is not being captured or shared with other group members. Participants

suggested opportunities for follow-up post-debriefing could be via email messages, electronic blogs, and electronic journals. Petranek (2000) found that the use of both oral and written techniques facilitates improved learner reflection. Petranek (2000) suggested that based on his observations and experiences in medical simulation, written reflection when used along with oral reflection, far out performs oral reflection by itself. Based on Petranek's work, positive impact could be added to the mock code exercise by pairing the current verbal debriefs with written opportunities to reflect post-debrief. Writing, as a method of reflection provides learners with the opportunity to reflect on the activity and their emotions. In addition, writing "helps put everything into perspective" (Petranek, 2000, p. 113). The major downfall of writing is the time needed to both write and evaluate. However, the author suggested that the "benefits far outweigh the costs" (Petranek, 2000, p. 114). "Written debriefing allows learners to reflect about behaviors, individual learning, and skills and promotes individual and private communication with their facilitator" (Petranek, 2000, p. 117) and the written reflection could take place on individual time following the mock code debrief. A variety of methods could be used to support written reflection as suggested by the study participants.

The final theme that emerged from the study was the observation of self-reflection by both the participants and the facilitators. It was evident from researcher observations, the assessment of reflection during the debriefings, and the interview data that majority of the participants in mock codes consider themselves to be critical reflectors. Individual, self-directed reflection occurred most commonly after their initial participation in the debriefings. Many participants reflected on their performance, identified weaknesses, and even roles that they felt needed additional review or attention.

Self-reflection by participants is directly aligned with theory and research in adult learning and andragogy. Schön (1983) clearly delineated between the reflection that takes place "on your feet" and the reflection which takes place after an encounter. Schön (1983) referred to this type of reflection as "reflection-on-action." The act of reflecting-on-action enables learners to spend time exploring why they behaved the way they did, what was happening, and why they made the decisions they did. By participating in reflection-on-action, learners develop sets of questions and ideas about activities and practice (Schön, 1983, p. 123). It is important to offer participants the opportunity to further discuss and share these questions and ideas that are developed during the post-debriefing reflective practices.

The facilitators also spent time self-reflecting. Their efforts were focused on how to improve the experience for the learner and often the facilitators critiqued their role and how they impacted the overall delivery of the mock code and the debriefing. Interestingly, the findings of the study discussed during the expert interview with Shroeder and Gross align closely with facilitator feedback and offers a researched intervention that may assist facilitators with their own self-assessment and reflection. Shroeder and Gross studied the impact of debriefing and the debriefing as a way to allow facilitators the opportunity to assess and reflect on their own performance. Video recordings can be used to provide examples and feedback. Debriefing the debriefing supports the facilitators need to continually improve their own skills and make changes to the way they deliver the debriefing prior to encountering a new group of learners.

Answering the Research Questions

Research question #1: What is the lived experience of clinicians who participate in simulated mock codes in the healthcare setting? Overall, the participants experience during the mock codes was positive. The participants shared feelings and emotions associated with excitement and positivity. Comments such as "I thought we did well," "I love mock codes," and "I hope we can do more in the future" represent participants' interest in the exercise and describe eagerness to continue to participate in future offerings.

The participants experienced feelings of fear and anxiousness. Comments such as "I was scared" and "I felt a little overwhelmed" describe some feelings of stress and anxiety. Research shows however, that a certain amount of anxiety can actually improve learning outcomes. DeMaria et al. (2010) found that increased levels of anxiety can positively or negatively impact learner outcomes. Too much anxiety can be associated with decreased learning, while some anxiety in associated with increased performance and retention (DeMaria et al., 2010). Although the participants shared feelings of fear and anxiety, they still felt positive about the experience and desired to participate in future mock codes.

The participants experienced moderate to critical levels of reflection during their participation in the mock codes. Interestingly, although reflection was the primary goal during the debriefing activity, in most cases, the participants experienced additional and most likely higher levels of reflection while reflecting on their own. The participants regularly shared that they reflect after the mock codes on their own. Reflection was varied and included both mental self-reflection through self-guided activities and written

reflection through note taking and journals. This study was the first of its kind to study and assess group reflection in this setting. Therefore, I am unable to compare these experiences to other studies of this kind. However, I do think there could be value in future research that compares the levels of reflection achieved in both group and individual settings. This study showed that it is possible that higher levels of reflection are achieved after the debriefing during individual, self-guided reflection.

Finally, the participants were critical of their performances during the mock codes. Several participants shared that they had skills they needed to work on. Some participants shared during the debriefings and interviews that they had forgotten a step in the process. They also shared that they reflected on their performance and often focused on their weaknesses and mistakes. It is interesting that although they felt positive about the overall experience, many participants also identified objectives that they felt needed additional practice or review.

Research question #2: What is the lived experience of instructors who facilitate simulated mock codes in the healthcare setting? The facilitators of the mock codes had different experiences than that of the participants. The facilitators were much more critical of the overall delivery of the mock codes and their own performance. Although they felt the mock codes were positive overall, they also shared many more suggestions and critical appraisals of the experience. It was evident that all of the facilitators desire a high quality learning activity that is well designed and delivered. I think their participation in this study allowed them to share some ideas and concerns that may have otherwise not been evaluated and discussed.

All of the facilitators were extremely positive about the group participation, interactions, and communication. They also all felt that the mock codes went well overall. However, when delving into the details of the mock codes, the facilitators opened up about concerns and frustrations. One of the first identified areas of improvement is in the design and planning of the mock codes. Only one of the three facilitators interviewed had ever received any formal training or education related to the design, delivery, and assessment of mock codes. I felt like all three facilitators would welcome the opportunity to advance their knowledge and understanding of the mock code process, especially as it relates to the leading of pre and post debriefs. Additionally, many of the facilitators had not been exposed to the principles and concepts of andragogy. If future simulations are going to meet the adult learning competencies, the facilitators must be engaged in the concepts of andragogy as the framework for simulation design, delivery, and evaluation.

The facilitators also felt strongly that the process of facilitating a mock code needed to be standardized. The literature supports this finding (Beaubian & Baker, 2004; Salas et al., 2005; Cook et al., 2012; Waxman, 2010). It was conveyed by both the participants and the facilitators that sometimes the mock codes appeared to be a little disorganized and random. One facilitator suggested that sometimes there are too many instructors and they do not always know or understand their roles. This sometimes leads to random cueing, questions, and prompts. The participants shared similar frustrations. The facilitators felt that the roles and responsibilities of each of the instructors assisting with the mock codes needs to be clearly defined and understood.

The facilitators also shared that another area of concern was related to the delivery of the debriefing. The process of debriefing appears to not be well defined or understood. Although all of the facilitators felt that the debriefing was important and was directly related to improved learning and participant engagement, they all delivered the debriefings differently. Two of the three facilitators chose to use a mix-method design that was described as both group discussion prompted by instructor questions, and also review and discussion based on the video recorded mock code. Although the mixed approach is commonly used in the debriefing process, the facilitators strongly felt that the debriefing needed to be more clearly defined and standardized. Suggestions included a checklist to assist with the evaluation of the mock code objectives, pre-written debriefing questions that are structured to increase critical thinking, and an objective and validated assessment tool to evaluate learner outcomes.

Another common experience for the facilitators was an expressed concern for post-debriefing follow-up opportunities. Currently, participants do not have any opportunities for discussion, questions, or reflection once the debriefing ends. The facilitators shared concerns and a desire for the opportunity to try some additional post-debriefing follow-up opportunities. Suggestions included post-debriefing journals or blogs that could be managed electronically, follow-up e-mails that could summarize the group debriefing and offer opportunity for additional interaction and discussion among the group, and even an additional debriefing a week or so after the mock code takes place.

Another interesting experience that was different from the participant experience was the level of critique and criticism. The facilitators were very critical of their own

performance and also shared feelings of concern for the learners. They shared that they do not like to point out errors or mistakes. One facilitator even shared that she "hates the thought of pointing out an individual's mistakes." They also showed empathy for the learners' anxiety and fear. They understood that the learners may feel intimidated or stressed in the mock code setting. They spoke strongly of their attention to ensuring the learning environment was comfortable and conducive to learning providing evidence of the adoption of the principles of andragogy as they relate to the learning environment.

Research question #3: What level of reflection is achieved in simulated mock code debriefing sessions? The overall level of reflection achieved was 3.0 on a scale of 1-4. A non-reflector received a 1.0 assessment, a beginner reflector received a 2.0 assessment, an intermediate reflector received a 3.0, and a critical reflection was awarded a 4.0. After all of the debriefings were assessed for overall reflection, the totals were summed and averaged and the overall reflection achieved was at the intermediate level (3.0). Research has shown that reflection is a learned skill and process and requires deliberate practice to improve (Schön, 1983). Therefore, because the group make-up was mixed and had varying levels of novice and experienced clinicians, it was also expected that the levels of reflection would also be varied. This was clearly seen by the varied occurrences of reflection during each debrief. All three groups encountered occurrences of beginning, intermediate, and critical levels of reflection (see Table 4).

Table 4

Summary and Average of Overall Reflection Rubric Results

Mock Code	Non-reflector 1	Beginner reflector 2	Intermediate reflector 3	Critical reflector 4	Overall assessment score
Mock Code #1	0	3	1	2	2.83
Mock Code #2	0	1	2	3	3.3
Mock Code #3	0	1	2	3	3.3
Average =					3.0

Note. Summary and average of all three mock code reflection rubric assessments based on the original rubric by Wetmore et al. (2010).

Research question #4: Does the reflection experience differ by group characteristics (demographics, professional roles, professional experience, etc.) and debriefing design and delivery (simulation environment, debriefing environment, instructor debriefing techniques, debriefing design)? Based on the level of reflection achieved by the groups and the interview data obtained from both the participants and facilitators, the debriefing experience did not differ by group characteristics and/or debriefing design and delivery. All three groups achieved similar levels of reflection. In addition, although two of the three groups were considered random make-up, their reflection and group interactions were not impacted. All of the groups felt that the mock code experience was positive. All three groups interacted with each other, established lines of communication, and worked together to perform the skills required for a cardiac arrest response.

During the participant interviews, it was evident that the participants were aware of group make-up. When asked to describe their groups, participants were able to easily recall the people involved in their mock codes. However, they did not feel that when the group was random that it impacted their response to the mock code. One participant shared that "we knew it was for learning" and "we worked well together." When applying the above statement to andragogy, it can be assumed that because adult learners are motivated to learn by their readiness and experiences, they are not negatively impacted by working with new or different groups of people (Knowles et al., 2011). Adult learners tend to prefer learning that is problem centered rather than content oriented and are generally motivated to learn due to internal or intrinsic factors as opposed to external or extrinsic factors (Knowles et al., 2011). Therefore, when considering that the group make-up did not impact the outcome of group reflection, it could be proposed that adult learners' motivation to learn is greater than the impact of external or environmental factors such as group make-up and demographics.

Implications of Study

There were several implications that came from the work of the study. First, there were significant occurrences during the mock code and debriefing that highlighted inconsistencies. The implication of this result is that, the lack of consistency does not allow predictability, and predictability leads to quality. An advantage of simulation is the ability to provide all clinicians with similar and standardized experiences (Carter et al., 2006). However, the design, delivery, and assessment processes are not currently standardized and vary between facilitators. As patient needs continue to become more and more complicated, it is necessary for clinicians to have access to training

opportunities that directly simulate and standardize these scenarios without placing the patient or clinician in danger. Use of patient simulators enables clinical instructors to provide clinicians with structured, well developed patient scenarios rather than having to identify or find appropriate and/or rare patient care opportunities in the health care setting (Fanning & Gaba, 2007).

The department of nursing education at the study site and at the time of this writing is undergoing several new processes related to the delivery of mock code simulation exercises. Based on the results of this study, the department has begun the development of a standardized tool to use during the implementation of mock codes. The standardized tool is in checklist format and highlights the major skills and objectives to successfully respond to a patient in cardiac arrest. These objectives are clearly defined by the American Heart Association as the appropriate steps in basic life support. There was a previous version of a checklist that had been used on occasion within the department. The new tool has been revised and additional areas have been added for note taking. Currently, the tool is being piloted and evaluated for effectiveness by the mock code facilitators (Appendix F).

At the time of this writing and closely related to the mock code implementation checklist, the nursing education department is discussing the implementation of a standardized debriefing tool. This tool would be based on the already developed implementation checklist but with additional questions that the facilitator can use to lead and guide debriefings. The overall goal of both the checklist and the debriefing tool is to help standardize (decrease the variability of) the process for facilitators of mock codes, while also standardizing the experience for learners. The department feels strongly that if

the learners experienced the same structure each time they participated in a mock code, they may feel more positive about the experience and could ease some of the learner anxiety related to participating in a mock code.

Another implication of the study was the identification of the need for learner preparation. The implication of this result is that the learners are not having the best possible learning experience, for preparing the learner is the first element of the adult learning process (Knowles et al., 2011). Preparing the learner through presentation of learning objectives, overview of activity expectation, and methods of evaluation are foundational to the andragogical practice model (Knowles et al., 2011). The nursing education department would like to implement a pre-briefing that is based on the principles of andragogy. Although this is currently not being done, the study findings clearly support the need for a pre-briefing. One of the major challenges with implementing pre-briefings is the removal of the element of surprise. Mock codes are conducted without prior orientation or alerts to the staff in an effort to best replicate a real life code situation.

Currently, the mock codes are still conducted without prior orientation or alerts.. However, due to the results of the study, nursing education is developing a plan that would pilot the feasibility of delivering a pre-briefing for those mock code participants who respond prior to their engagement in the actual mock code exercise. Two different methods of pre-briefings have been suggested. The first method would follow the current process. The mock code alert would be called overhead and the participants would gather at the scene of the mock code. Once all or nearly all of the participants have arrived, the facilitator would briefly highlight the expectations of the mock code, the

order of events, and the debriefing. Then the participants would re-engage in the mock code from the beginning of the response procedures. The second option that was suggested was an electronic pre-briefing. An e-mail would be created highlighting the expectations of the mock code, the objectives, a brief description of the equipment, etc. The e-mail would be sent out approximately one week prior to the scheduled mock code. The e-mail would serve as an opportunity to review basic life support procedures and allow the potential learners to prepare for participation in a mock code. The mock code would then be delivered as previously described. Both options for pre-briefings are continuing to be discussed and will be piloted in the near future.

Finally, although the VHA has placed emphasis on increasing the awareness of successful teaching strategies designed under the theoretical framework of andragogy, many instructors still lack the acceptance and adoption of the principles of andragogy as a practice model. This finding is evidence in the current state of competency development and assessment within the VHA. Although Knowles (1980) presented a clear and concise model of learner competency, the VHA still practices under a model that lacks the concepts of competency embedded within the framework of andragogy. The current VHA competency program suggests that competencies are based on knowledge, skill, and ability (KSAs). This concept fails to address additional competencies identified by Knowles as being conducive to adult learning. Knowles defined competency as a cluster of knowledge, understanding, skills, attitudes, values, and interests that are necessary for the performance of a function (Knowles, 1984). The current process of identifying competencies based on KSAs instead of KUSAVI limits the adult learner from achieving a successful and adequate performance of both function and job.

Limitations of Study

The study identified two limitations that future researchers participating in similar research should address. First, the application of the reflection rubric in a group simulation setting proved to be difficult. The rubric was originally developed for single person assessment and was validated on written documents such as journals and blog entries. I chose to transcribe the group debriefings and use the transcribed data to assess reflection. Although the study procedure rendered rich data, it was very time consuming to transcribe the video recordings. This study procedure was feasible in a research setting, however; I do not think that a similar method would be appropriate or feasible in a classroom or instructional setting. It would be very difficult for facilitators and instructors to implement a similar design as a method of reflective assessment for simulation exercises.

One possible solution to this limitation would be the addition of a group blog or group message board. Such a tool could be implemented as a way of gathering input and collective reflection from the group in a written format. This would reduce the amount of time invested in transcribing data and would provide a written document to which the reflection rubric could be applied. In my opinion the reflection rubric is an excellent assessment tool and rather than finding a new or different tool, it would be more feasible to change the way we gather feedback on level of reflection to better facilitate the application of the rubric.

Another limitation to the study was the design of the interview questions. Initially the interview questions were designed to pose ideas and stimulate study participant thoughts and responses. In most cases, the questions prompted excellent responses and

provided me with rich, high quality data. However, many of the questions posed several questions within one question. For example, during the participant interviews, question number 5 asked the participants about their reflective practices. The question goes on to also inquire about the educator's role in encouraging reflection. Therefore, I actually asked two questions in one.

For future study design, I would recommend shortening all of the questions and placing special attention to questions within questions. The example given above actually inquires about two different questions and in reality, most of the participants only responded to the first question. Therefore, I felt like the research question design limited the response to that question.

Recommendations for Organizational Policy

One of the aims of the study was to evaluate the overall program effectiveness specific to my employment location. Because the study was very specific to my place of employment within the department of nursing education, there are two recommendations for policy change within the organization that are directly related to the findings of the study. First, as I was undertaking the study, the VHA released a new policy highlighting the requirement that a consent form be signed prior to participation in any type of video or audio recording. Our previous processes allowed facilitators of mock codes to video record the exercise and debriefing and obtain signed consent afterwards. The new policy, VA Form 10-3203, now strictly prohibits any recording without a pre-signed consent. This new policy directly impacts the current delivery process of mock codes. As of now, our department no longer video records the mock code exercises. This new policy eliminates the ability of participants and facilitators to use the video recordings for the

debriefing. Based on the results of the study, video assisted debriefings are well received and associated with positive feedback and outcomes. I would recommend the new policy be revised to include an exception of its application as it relates to mock code exercises. In my opinion, the positive outcomes associated with the use of the video recordings during the debriefing far outweigh the risks of not obtaining consent prior to participation.

The second organizational recommendation based on the finding of the study is the need to develop and implement a standardized educational offering for all facilitators of mock code simulation exercises. Currently, within my healthcare organization, there are 10-12 facilitators who commonly lead mock codes. Of these, only two have undergone any type of formal training on how to design and deliver simulations or debriefings. These trainings were pedagogical in nature and therefore pose two concerns related to the future of simulation based learning at our facility. First, before the design and delivery can be standardized, all facilitators need to undergo similar foundational exposure related to simulation as a teaching method. Secondly, if the VHA and our medical center desire future learning activities that are based on andragogy, the facilitators must learn and apply the theory and principles of practice.

Recommendations for Future Research

Finally, based on the study, my recommendations for future research are based on my experiences, study design, and study findings. First, I chose to use an andragogy as my conceptual framework. At the time of this study, there were no other simulation studies that utilized a framework based on andragogy. However, the process of designing, implementing, and evaluating simulation exercises is clearly rooted in

principles of andragogy. I would find it beneficial to further the body of research in both simulation and andragogy and create new studies using a simulation model that has andragogical foundations.

Secondly, the current practice model for mock codes deviates slightly from the standard model of adult learning. Because most facilitators seek the element of surprise during mock codes, they are often implemented without an opportunity to prepare the learner. If mock codes continue to skip the andragogy process element of learner preparation, I feel strongly that future research needs to study the impact of delivering educational exercises that deviate from the evidenced-based model of adult learning.

Another recommendation for future research within the field of simulation learning is the need for a standardized tool for assessing learning as it relates to post-simulation reflection. Although this study used the reflection rubric, it may not be the best instrument. Additional research in the field of education and simulation could study other assessment tools and techniques that may produce broader and easier application. Without additional instruments that are grounded in theory and practical for use in the healthcare setting, simulation activities will continue to lack the element of objective assessment and evaluation that is critical to elevating the validity of debriefing.

Lastly, the findings of the study suggested the need for other opportunities for feedback and follow-up post-simulation and debriefing. Suggestions include e-mail messages, blogs, telephone calls, online message boards, and follow-up group meetings. However, at the time of this study, none of these ideas had been well studied or compared. The fields of simulation and medical education could benefit from additional research that may provide clarity and idea development as it relates to post-debriefing

follow-up. Specifically, research could investigate methods that produce positive experiences and improved outcomes along with the feasibility of implementing each.

Also closely related to methods of follow-up, future research could also study the implications of group versus individualized reflection. This study found that most individuals consider themselves to be critical reflectors; however, much of their reflection occurred after the simulation and debriefing were over. Therefore, additional research may be beneficial in studying the overall impact on levels of reflection achieved in comparison to group and individual settings.

Conclusion

The purpose of the study was to explore the lived experiences of participants in medical simulation exercises. Data were gathered through participant interviews, researcher observations, and transcribed video recordings. Five themes emerged from coding of the data. I aligned my research findings with the research literature in the fields of adult education, medical simulation, and reflection.

The most significant finding that evolved from my research was the lack of consistency in the design, facilitation, and evaluation of simulation, specifically mock codes, which were the focus of my study. The lack of consistency was highlighted during both clinician and facilitator interviews and was observed by me. The experts interviewed for the study also highlighted the need for standardized processes and consistent design and delivery.

The inconsistency brings confusion to both the learner and the facilitator. This causes anxiety and undue stress as the learner and facilitator do not know what to expect and are unable to prepare for the learning activity. In addition, it is difficult to

standardize the learning outcomes and ensure competency of clinicians if the learning activity is not consistent with learning objectives and expectations. Clinician response to cardiac arrest is a critical skill required for competent provision of patient care in the hospital setting. The study findings support the need for additional work and research within the field of medical simulation to establish standards and guidelines that will assist facilitators of mock codes in the future design, delivery, and evaluation of these activities.

Finally, through the critical evaluation of the current educational state within the VHA, I also found that although the VHA supports and desires learning activities that align with principles of adult learning, the current state of our education system does not correlate with andragogy theory. In many instances I found that the concepts of andragogy are not guiding the educational offerings within my organization. This became apparent as I sifted through the evidence and literature within my practice setting. For example, our competency model fails to address all the learner competencies presented by Knowles (1984) based on the theory of andragogy. In addition, our current design and delivery of mock codes fail to meet the principles of adult learning that are foundational to andragogy and the practice model. This study brought these issues to the forefront as they relate to the future delivery of simulation activities and mock codes within our facility.

References

Angelo, T., & Cross, P. (1993). *Classroom Assessment Techniques: A Handbook for College Teachers* (2nd ed.). San Francisco, CA: Jossey-Bass, Inc.

Askell-Williams, H., & Lawson, M. (2006). Multi-dimensional profiling of medical students' cognitive models about learning. *Medical Education, 40*(2), 138-145.

Baker, D., Bustafson, S., Beaubien, J., Salas, E., & Barach, P. (2005). Medical team training programs in health care. *Advances in Patient Safety*, 4, 253-267.

Barrett, B. (1995). Portfolio use in educational leadership programs: from theory to practice. *Innovative Higher Education, 19*(3), 197-206.

Benner, P. (2001). *From Novice to Expert: Excellence and Power in Clinical Nursing Practice*. Upper Saddle River, NJ: Prentice Hall.

Beaubien, J., & Baker, D. (2004). The use of simulation for training teamwork skills in health care: How low can you go? *Journal of Quality and Safety in Health Care, 13*(1), 51-56. doi: 10.1136/qshc.2004.009845

Billings, D., & Halstead, J. (2009). *Teaching in nursing: A guide for faculty* (3rd ed.). St. Louis, MO: Saunders-Elsevier.

Blondy, L. (2007). Evaluation and application of andragogical assumptions to the adult online learning environment. *Journal of Interactive Online Learning, 6*(2), 116-129.

Borzak, L. (Ed.). (1981). *Field study. A source book for experiential learning*. Beverly Hills, CA: Sage Publications.

Boud, D., Keogh, R., & Walker, D. (1985). *Reflection:Turning Experience into Learning*. London, UK: Kogan Press.

Boulet, J., Jeffries, P., Hatala, R., Korndorffer, J., Feinstein, D., & Roche, J. (2011). Research regarding methods of assessing learning outcomes. *Simulation in Healthcare*, 6(7), s48-51.

Brown, R., & McCartney, S. (1998). Using reflections in postgraduate accounting. *Accounting Education*, *7*(2), 123-137.

Bux, A. (2009). Nurses' perceptions of the usefulness of high fidelity simulation technology in a clinical education program. ProQuest: UMI 3357439.

Bynum, W., & Porter, R. (Eds). (2005). *Oxford Dictionary of Scientific Quotations*. London, UK: Oxford University Press.

Carter, M., Wesley, G., & Larson, G. (2006). Lecture versus standardized patient interaction in the surgical clerkship: A randomized prospective cross-over study. *American Journal of Surgery*, *191*(2), 262-267. doi:10.1016/j.amjsurg.2005.06.045

Caws, C. (2006). Assessing group interactions online: student perspectives. *Journal of Learning Design*, *1*(3), 19-28.

Chanchayanon, T., Suraseranivongse, S., & Chau-in, W. (2005). The Thai anesthesia incidents study (THAI Study) of difficult intubation: a qualitative analysis. *Journal of the Medical Association of Thailand*, *88*(7), S62-S68.

Chrenka, L. (2001). Misconstructing constructivism. *Phi Delta Kappan*, *82*(9), 694-695.

Christensen, U. (2006). Microsimulation (PC Simulation) in emergency health care learning and assessment. *International Trauma Care*, *16*(1), 12-18.

Cirocco, M. (2007). How reflective practice improves nurses' critical thinking ability. *Gastroenterology Nursing*, 30(6), 405-413.

Clark, M. (1993). Transformational learning. In S.B. Merriam (Ed.), *An update on learning theory. New directions for adult and continuing education. 57.* San Francisco, CA: Jossey-Bass.

Conti, G. (1989). Assessing teaching style in continuing education. *New directions for adult and continuing education*, 1989(43), 3-16.

Cook, D., Brydges, R., Hamstra, S., Zendejas, B., Szostek, J., Wang, A., Erwin, J., & Hatala, R. (2012). Comparative effectiveness of technology-enhanced simulation versus other instructional methods: a systematic review and meta-analysis. *Journal of Simulation in Healthcare, 7*(5), 308-320.

Cook, D., Hamstra, S., Brydges, R., Zendejas, B., Szostek, J., Wang, A., Erwin, J., & Hatala, R. (2012, September 3). Comparative effectiveness of instructional design features in simulation-based education: systematic review and meta-analysis. *Medical Teacher*, PMID: 22938677

Dabbaha, N. (2003). Scaffolding: an important teacher competency in online learning. *Tech Trends*, *47*(2), 39-44.

DeMaria, S., Bryson, E., Mooney, T., Silverstein, J., Reich, D., Bodian, C., Levine, A. (2010). Adding emotional stressors to training in simulated cardiopulmonary arrest enhances participant performance. *Medical Education*, *44*, 1006-1015.

Deubel, P. (2002). Selecting curriculum-based software. *Learning and Leading with Technology*, *29*(5), 10-16.

Dewey, J. (1897). *My pedagogic creed*. Retrieved from http://books.google.com/books

Dewey, J. (1902). *The child and the curriculum*. Retrieved from http://books.google.com/books

Dewey, J. (2009). *Democracy and Education: An introduction to the philosophy of education*. New York, NY: WLC Books. (Original work published 1916)

Dieckmann, P. (2012). Debriefing Olympics: A workshop concept to stimulate the adoption of debriefings to learning contexts. *Simulation in Healthcare, 7*(3), 176-182.

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

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

Dunn, L., & Musolino, G. (2011). Assessing reflective thinking and approaches to learning. *Journal of Allied Health, 40*(3), 128-136.

Durham, C., & Alden, K. (2008). *Enhancing patient safety in nursing education through patient simulation. Patient Safety and Quality: An evidenced-based handbook for Nurses*. AHRQ Publication No. 08-0043; Rockville, MD.

Eder-Van Hook, J. (2004). *Building a national agenda for simulation-based medical education. Advanced Initiatives in Medical Simulation (AIMS*). Retrieved from http://www.asahq.org/AIMS_2004_Report_Simulationbased_Medical_Training[1].pdf

Ericcson, K. (2008). Deliberate practice and acquisition of expert performance: A general overview. *Academy of Emergency Medicine*, *15*(11), 988-994.

Fanning, R., & Gaba, D. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare, 2*(2), 115-125.

Fellows, K., & Zimpher, N. (1988). Reflectivity and the instructional process: A definitional comparison between theory and practice. In Waxman, H., Freiburg, J., Vaughn, C. & Weil, M (Eds). *Images of Reflection in Teachers Education.* Reston, VA: Association of Teachers Educators, 1-19.

Fleegler, M., Rudolph, J., Eppich, W., Monuteaux, M., Fleegler, E., Cheng, A., Simon, R. (2012). Debriefing assessment for simulation in healthcare: Development and psychometric properties. *Society for Simulation in Healthcare*, *7*(5), 288-294.

Fraenkel, J., & Wallen, N. (1999). *How to design and evaluate research in education*. New York, NY: McGraw-Hill.

Gaba, D. (2004). The future vision of simulation in health care. *Quality and Safety in Health Care*, *13*(1), 2-10.

Galbraith, M. (2004). *Adult Learning Methods: A Guide for Effective Instruction* (3rd ed.). Malabar, FL: Krieger Publishing Company.

Getliffe, K. (1996). An examination of the use of reflection in the assessment of practice for undergraduate nursing students. *International Journal of Nursing Studies*, 33(4), 361-374.

Gilley, J. (2004). Demonstration and simulation. In Galbraith, M (Ed.), *Adult learning methods:a guide for effective instruction* (3rd ed.) (pp. 361-382). Malabar, FL: Krieger Publishing Company.

Hoge, M. (2004). Best practices in behavioral health workforce education and training. *Administration and Policy in Mental Health*, *32*(2), 91-106. doi: 10-1023/B:APIH.0000042742.45076.66

Hultgren, F. (1989). Introduction to interpretive inquiry. *Alternative modes of inquiry in home economics research*, 37-59. Peoria, IL: Glencoe.

Hyman, R. (1974). *Ways of Teaching* (2nd ed). Philadephia, PA: Lippincott.

Institute of Medicine. (2010). *The future of nursing: leading change, advancing health*. Washington, DC: The National Academies Press.

Issenberg, S., Gordon, M., Gordon, D., Safford, R., & Hart, I. (2001). Simulation and new learning technologies. *Medical Teacher*, 23(1), 16-23.

Issenberg, S., McGaghie, W., Petrusa, E., Gordon, D., & Sales, R. (2005). Features and uses of high-fidelity medial simulation that lead to effective learning: A BEME systematic review. *Medical Teacher*, *27*(1), 10-28.

Jarvis, P. (1987). *Adult learning in the social context*. London, UK: Croom Helm.

Jarvis, P. (1992). Reflective practice and nursing. *Nurse Education Today, 12*(3), 174-181.

Jarvis, P. (2007). Towards a comprehensive theory of human learning. *British Journal of Educational Technology*, *38*(2), 374-375.

Jenson, S. & Joy, C. (2005). Exploring a model to evaluate levels of reflection in baccalaureate nursing students' journals. *Journal of Nursing Education*, 44(3), 139-142.

Johnson, D., Johnson, R., & Smith, K. (1998). *Active Learning: Cooperation in the Classroom*. Edina, MN: Interaction Book Company.

King, T. (2011). *Development of student skills in reflective writing***.** Retrieved from http://www.tcd.ie/Nursing_Midwifery/assets/director-staff-edu-

dev/pdf/Development-of-Student-Skills-in-Reflective-Writing-TerryKing.pdf on September 19, 2012.

Kohn, L.T., Corrigan, J.M., Donaldson, M.S. (Eds.). (2000).. To err is human: Building a safer health system. A report of the Committee on Quality of Health Care in America, Institute of Medicine. Washington, DC: National Academy Press.

Kolb, D. (1984). *Experiential Learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D., & Fry, R. (1975). Toward an applied theory of experiential learning. *Theories of Group Process*. London, UK: John Wiley Publishers.

Koole, S., Dornan, T., Aper, L., De Wever, B., Scherpbier, M., Cohen-Schotanus, J. & Derese, A. (2012). Using video-cases to assess student reflection: development and validation of an instrument. *BMC Medical Education*, *12*(22), 1-8.

Knowles, M. (1970). *The modern practice of adult education*. NY, NY: Association Press.

Knowles, M. (1973). *The adult learner: A neglected species.* Houston, TX: Gulf.

Knowles, M. (1984). *Andragogy in action*. San Francisco, CA: Jossey-Bass.

Knowles, M. (1986). *Using learning contracts*. San Francisco, CA: Jossey-Bass.

Knowles, M., Holton, E., & Swanson, R. (2011). *The adult learner: The definitive classic in adult education and human resource development* (7th ed.). Oxford, UK: Elsevier.

Lasater, K. (2007). Clinical judgement development: using simulation to create an assessment rubric. *Journal of Nursing Education*, 46(11), 496-503.

Lateef, F. (2010). Simulation-based learning: just like the real thing. *Journal of Emergency, Trauma, and Shock, 3*(4), 348-352. doi: 10.4103/0974-2700.70743

Lemieux, C. (2001). Learning contracts in the classroom: tools for empowerment and accountability [electronic version]. *Social Work Education, 20*(2), 263-276.

Lewis, L., & Williams, C. (1994). Experiential learning: past and present. *New Directions for Adult and Continuing Education, 62,* 1-7. Retrieved from http://www.sunyjcc.edu/files/Experiential%20Learning%20-%20Past%20and%20Present.pdf

Lietz, C., Langer, C., & Furman, R. (2006). Establishing trustworthiness in qualitative research in social work: implications from a study regarding spirituality. *Qualitative Social Work*, 5(4), 441-458.

Little, T. (1981). History and rationale for experiential learning. Unpublished manuscript.

Lunce, L. (2006). Simulations: bridging the benefits of situated learning to the traditional classroom. *Journal of Applied Educational Technology*, *3*(1), 37-45.

Maran, N., & Glavin, R. (2003). Low-to-high-fidelity simulation: A continuum of medical education? *Medical Education, 37*(1), 22-28.

Marienau, C., & Chickering, A. (1982). Adult development and learning. In B. Menson (Ed.), *Building on experiences in adult development* (pp. 66-84). *New Directions for Experiential Learning,16*. San Francisco, CA: Jossey-Bass.

Maudsley, G., & Strivens, J. (2000). Promoting professional knowledge, experiential learning, and critical thinking for medical students. *Medical Education*, *34*(7), 535-544.

Maxwell, J. (2005). *Qualitative research design: an interpretive approach*. London, UK: Sage.

McGaghie, W., Issenberg, S., Petrusa, E., & Scalese, R. (2010). A critical review of simulation-based medical education research: 2003-2009. *Medical Education*, *44*, 50-63.

McCaugherty, D. (1992). Integrating theory and practice. *Senior Nurse, 12*(2), 36-39.

Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.

Merriam, S. (2001). Andragogy and self-directed learning: pillars of adult learning theory. *New Directions for Adult and Continuing Education*, 2001(89); 3-14.

Merriam, S. & Caffarella, R. (1999). *Learning in Adulthood*. San Francisco, CA: Jossey-Bass.

Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. San Francisco, CA: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation:Critical perspectives on a theory in progress*. San Francisco, CA: Jossey-Bass.

Mikasa, A., & Cicero, T. (2012) Play in again, Stan. Unpublished PowerPoint presentation, Seattle University, Seattle, WA.

Morrison, K. (1996). Developing reflective practice in higher degree students through a learning journal. *Studies in Higher Education*, *21*(3), 317-332.

Mullen, A. (2012, June 12). Does anxiety of seasoned clinicians in the simulation environment differ from that of novices? Live presentation, Center for Medical Simulation, Boston; MA.

Murphy, K., & Atkins, S. (1994). Reflection with a practice-led curriculum. *Reflecting Practice in Nursing: The Growth of the Professional Practitioner*. Oxford, UK: Blackwell Scientific Publications, 10-19.

Murphy, J., Torsher, L., & Dunn, W. (2007). Simulation medicine in intensive care and coronary care education. *Journal of Critical Care*, *22*(1), 51-55.

Nursing and Midwifery Council. (2008). Mentorship. Retrieved on May 22, 2013 from http://www.nmc-uk.org/Educators/Standards-for-education/Standards-to-support-learning-and-assessment-in-practice/Standards-to-support-learning-and-assessment-in-practice-settings-SLAiP/Mentorship/

Owen, H., & Follows, V. (2006). GREAT simulation debriefing. *Medical Education*, *40*, 459-489.

Paget, T. (2008). Reflective practice and clinical outcomes: practitioners' views on how reflective practice has influenced their clinical practice. *Journal of Clinical Nursing*, 10(2), 204-214.

Patterson, M., Blike, G., & Nadkarni, V. (2008). In situ simulation: Challenges and results. *Advances in Patient Safety: New Directions and Alternative Approaches.* Retrieved on February 10, 2012 from http://www.ahrq.gov/qual/_advances2

Petranek, C. (2000). Written debriefing: the next vital step in learning with simulations. *Simulation & Gaming*, *31*(1);,108-118.

Powell, J. (1989). The reflective practitioner in nursing. *Journal of Advanced Nursing*, *14*(10), 824-832.

Pruitt, S., & Epping-Jordan, J. (2005). Preparing the 21st century global healthcare workforce. *British Medical Journal*, *330*, 637-639.

Raemer, D., Anderson, M., Cheng, A., Fanning, R., Nadkarni, V., & Savoldelli, G. (2011). Research regarding debriefing as part of the learning process. *Simulation in Healthcare, 6*(7), S52-S57.

Rahn, D., & Wartman, S. (2007, November 2). For the health-care work force: a critical prognosis. *Chronicle of Higher Education*. Retrieved on February 22, 2013 from http://www.aahcdc.org/policy/For_the_Health-Care_Work_Force_a_Critical_Prognosis.pdf

Reilly A., & Spratt, C. (2007). The perceptions of undergraduate student nurses of high-fidelity simulation-based learning: A case report from the University of Tasmania. *Nurse Education Today, 27*(6), 542-550.

Richardson, G. & Maltby, H. (2008). Reflection-on-practice: enhancing student learning. *Journal of Advanced Nursing*, 22(2), 235-242.

Rosen, K. (2008). The history of medical simulation. *Journal of Critical Care, 23*, 157-166.

Ross, D. (1989). First steps in developing a reflective approach. *Journal of Teacher Education*, *40*(2), 8-11.

Rutledge, C., Barham, P., Wiles, L., Benjamin, R., Eaton, P. & Palmer, K. (2008). Integrative simulation: A novel approach to educating culturally competent nurses. *Contemporary Nurse*, *28*, 119-128.

Salas, E., Wilson, K., Burke, S., & Priest, H. (2005). Using simulation-based training to improve patient safety: What does it take? *Joint Commission Journal on Quality and Patient Safety*, *31*(7), 363-371.

Savery, J., & Duffy, T. (1995). Problem-based learning: An instructional model and its constructivist framework. *Educational Technology*, *35*, 31-38.

Saylor, C. (1990). Reflection and professional education, art, science, and competency. Nurse Educator, 15(2), 8-11.

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York, NY: Basic Books Publishing.

Schön, D. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco, CA: Jossey-Bass.

Seaman, D. & Fellenz, R. (1989). *Effective strategies for teaching adults*. Columbus, OH: Merrill.

Smyth, J. (1989). Developing and sustaining critical reflection in teacher education. *Journal of Teacher Education*, *40*(2), 2-9.

Sommerville, D., & Keeling, J. (2004). A practical approach to promote reflective practice within nursing. *Nursing Times*, *100* (12), 42-45.

Svinicki, M. (1999). New directions in learning and motivation. *New Directions for Teaching and Learning*, *80*, 5-27.

Tough, A. (1979). *The adult's learning projects: A fresh approach to theory and practice in adult learning*. Toronto, ON: The Ontario Institute for Studies in Education.

Touriniemi, P., & Schott-Baer, D. (2008). Implementing a high-fidelity simulation program in a community college setting. *Nursing education perspectives*, *29*(2), 105-109.

Twomey-Forsnot, C. (2005). Constructivism revisited: implications and reflections. *The Constructivist, 16*(1). Retrieved from http://www.odu.edu/educ/act/journal/vol16nol/fosnot.pdf

Veteran Health Administration. (2012). Directive 2012-015: Core Mentor and/or Coach Certification Program. Retrieved from http://vaww.succession.va.gov/Employee_Development/MC/default.aspx (***NOTE:*** *this is an internal Website and is not available to the public).*

What are KSAs? (2009). Retrieved August 22, 2013, from http://www.va.gov/jobs/hiring/apply/ksa.asp

Walkington, J., Christensen, H., & Kock, H. (2001). Developing a critical reflection as part of teaching training and teaching practice. *European Journal of Engineering Education*, *26*(4), 343-350.

Wallman, A., Lindblad, A, Hall, S., Lundmark, A., & Ring, L. (2008). A categorization scheme for assessing pharmacy students' levels of reflection during internships. *American Journal of Pharmaceutical Education, 72*(1), 1-1-10.

Wang, M. & Kang, M. (2003). Cybergogy for engaged learning: a framework for creating learner engagement through information and communication technology. In Hung, D. & Khine, M (Eds) *Engaged Learning with Emerging Technologies*. Dordrecht, NL: Springer.

Waxman, K. (2010). The development of evidence-based clinical simulation scenarios: Guidelines for nurse educators. *The Journal of Nursing Education, 49*(1), 29-35.

Wetmore, A., Boyd, L., Bowen, D., & Pattillo, R. (2010). Reflective blogs in clinical education to promote critical thinking in dental hygiene students. College of

Nursing at Iowa Research Online. Retrieved on September 17, 2012, from http://ir.uiowa.edu/nursing- pubs/1615

Wiersma, W., & Jurs, S. (2005). *Research Methods in Education:An Introduction* (8th ed.). Pearson Education: Boston, MA.

Witte, J., & Witte, M. (2004). Interactive television. In Galbraith, M. (Ed.), *Adult learning methods: A guide for effective instruction* (pp. 253- 272). Malabar, FL: Krieger Publishing Company.

White, B., & Bridwell, C. (2004). Distance learning techniques. In Galbraith, M. (Ed.), *Adult learning methods: A guide for effective instruction* (pp. 273-288). Malabar, FL: Krieger Publishing Company.

Wong, F., Kember, D., Chung, L., & Yan, L. (1995). Assessing the level of student reflection from reflective journals. Journal of Advanced Nursing, 22(1), 48-57.

Wright, D. (2011). *The Ultimate Guide to Competency Assessment in Healthcare (3rd Ed.).* Creative Health Care Management: Minneapolis, MN.

Yeager, K., Halamek, L., Coyle, M., Murhpy, A., Anderson, J., Boyle, K., Braccia, K., McAuley, J., Sandre, G., & Smith, B. (2004). High-fidelity simulation-based training in neonatal nursing. *Advances in Neonatal Care,* 4(6), 326-331.

Ziv, A., David, S., & Ziv, M. (2005). Simulation-based medical education. *Medical Teacher*, *27*(3), 193-199.

Ziv, A., Root, P., Small, S., & Glick, S. (2003). Simulation-based medical education: An ethical imperative. *Academic Medicine, 78*(8), 783-788.

Zulkosky, K. (2010). The impact of debriefing sessions following acquisition, self-confidence, and satisfaction: A quasi-experimental study. Doctoral dissertation,

University of Northern Colorado. Retrieved from Pro Quest LLC, http://www.proquest.com.nova.edu/en - US/products/dissertations/individuals/html

Appendix A

Reflection Rubric for Simulation Debriefing

Elements of reflective process	Non Reflector 1	Beginning Reflector 2	[Intermediate] Reflector 3	Critical Reflector 4
Engages in reflection/ debriefing process	Makes no reference to personal experiences, blames others for mistakes, and focuses on manikin not life like.	Conveys one or two aspects of simulation exercise, does not relate experiences back to self.	Conveys some personal feelings about simulation experience but does not relate them to personal learning.	Always conveys personal feelings as they reflect on simulation and relates to future personal learning.
Association: Reflection on what went right and what could improve in simulation experience.	Thoughts do not reflect on improvements that can be made or what aspects went well in simulation.	Provides descriptions of process but does not reflect on improvements or what went well in the simulation.	Provides evidence of reflection on either improvements or what went well in the simulation.	Provides evidence of reflection on both improvements and what went well.
Integration of team	Makes no reference to how the team performed, focuses on self.	Makes a brief reference to how team performed, mostly focuses on self.	Demonstrates awareness of key aspects of how team performed, does not reflect upon their role in the team.	Demonstrates comprehension of key aspects of how team performed in simulation, relates themselves as part of the team.
Validation: Self-assessing new and old knowledge	Thoughts are superficial and do not provide evidence of self-assessment.	Demonstrates self-assessment of the simulation.	Demonstrates self-assessment of experience and occasionally relates knowledge gained in experience to prior knowledge and beliefs.	Demonstrates self-assessment of the simulation and consistently relates knowledge gained in experience to prior knowledge and beliefs.
Appropriation: Inference of learning	Does not demonstrate comprehension of simulation or making inferences on experiences.	Demonstrates some basic comprehension of simulation but does not infer experiences to prior knowledge or experiences.	Demonstrates and comprehends simulation and makes inferences to prior knowledge and experiences.	Demonstrates and is able to make inferences and synthesize experiences, prior knowledge, and experiences.
Outcome of reflection	Does not reflect on own work, does not provide examples.	Reflection on own work and improvements in knowledge, skills, and attitudes on occasion but does no consistently provide examples.	Demonstrates an ability to reflect on own work and change knowledge, skills, and attitudes by providing examples of new	Demonstrates an ability to reflect on own work; apply new knowledge, skills, attitude by always providing examples of

Note. Reflection Rubric **from Wetmore et al. (2010)**.

Appendix B

Reflection Rubric Tracking Sheet

Reflection Rubric Tracking Sheet

Elements of reflective process	Non Reflector 1	Beginning Reflector 2	[Intermediate] Reflector 3	Critical Reflector 4
Engages in reflection/ debriefing process				
Association: Reflection on what went right and what could improve in simulation experience.				
Integration of team				
Validation: Self-assessing new and old knowledge				
Appropriation: Inference of learning				
Outcome of reflection				

Note. Reflection Rubric Tracking Sheet adapted from Wetmore et al. (2010).

Appendix C

Clinician Interview Questions

1. Can you give me a brief description or overview of your recent experiences during the simulated mock code which you took part in? For example, what was your role, was this your first time participating in the mock code, how did you think it went overall?

2. Can you describe the group of responders who participated in the mock code? For example, what was the group communication like? How did the group interact? Why do you think these interactions occurred? How did these interactions impact the delivery of effective code response?

3. Can you discuss the educator who facilitated the code exercise? For example, what role did the educator play in the scenario? How much interaction did the educator have with the group? How did the educator facilitate group discussion when the simulation was over?

4. When the mock code ended, what happened next? What was this process like? Did you like the way the exercise ended? What suggestions or changes would you make to the process?

5. Overall, did you learn from your participation in the mock code exercise? Can you share with me what you learned? Can you share with me how you learned?

6. Critical reflection, a term used to describe the "mulling over" of information and experiences, has been shown to improve learning after simulation exercises like mock codes. What does reflection mean to you? Do you consider yourself a person who reflects? Did you reflect after your participation in the mock code? Did the educator impact group reflection? Did the educator impact your individual reflection?

Appendix D

Simulation Instructor Interview Questions

1. What is your preferred style to debrief (group, individual, written, verbal, video assisted, audio assisted, etc.) and why do you choose this style?

2. How do you think it facilitates learners/ reflection? What are the strengths of this style?

3. What are the weaknesses you perceive to this style? How could you improve its use during debriefing exercises?

4. Thinking of your most recent simulation activity that you facilitated, walk me through the debriefing. Were the learners interactive? Did they actively participate? How did you feel the debriefing went overall? What would you have done differently? How did you evaluate learning?

Appendix E

Memorandum of Support

Department of Veterans Affairs | **Memorandum**

Date: April 20, 2012

From: Associate Chief Nurse, Organizational Development/ Informatics

Subj: Review of Study Protocol, Rachael Beard, RN, M.Ed

To: Lindenwood University- St. Charles, Institutional Review Board

1. I have reviewed the study protocol of Rachael Beard, RN, M.Ed, entitled "Exploring learning practices in healthcare: An observation and participant perception analysis of facilitated group reflection as a method of debriefing post simulated cardiac arrest."

2. The study described in the protocol supports the research mission and goals of the Education and Nursing Services at the St. Louis VA Health Care System.

3. Performance of the work described will not negatively impact Ms. Beard's current responsibilities.

4. The study will require no financial support from the medical center.

5. Ms. Beard will function as the Principal Investigator for the study.

6. I fully support Ms. Beard's participation in the study. Please contact me at extension 56358 if you have further questions.

Julie King, MHA, RN, NEA-BC

Appendix F

Mock Code Tracking Sheet

Mock Code Team Response

DEBRIEFING SCORE CARD

Based on your observations, score the mock code participants as a group. If action is done completely correctly, then give the maximum credit. If action is done partially, then give partial credit. If action is not done, then give no credit. Use your discretion. The purpose of scoring is to demonstrate learning only.

Intervention	Point allotment	Score	Notes
Checked for responsiveness (may vary with level of sedation) and breathing simultaneously	5		
Alerted emergency response and call for crash cart	5		
Checked for pulse (< 10seconds) at carotid artery closest to provider	10		
Ensure hard surface present and begin compressions ▪ At least 100 per minute (30 compressions in 18 s or less) ▪ Hard & fast ▪ Allowed chest recoil ▪ Proper hand position and appropriate technique ▪ Maintained hand position between cycles *Ratio to breaths 30:2 once bag valve mask present	10		
Ventilation appropriate ▪ 2 breaths to every 30 compressions ▪ No over-inflation (delivered over 1 second until chest rise)	10		
Crash cart retrieved quickly	10		
Proper pad selection and placement (without disruption of compressions)	10		
Rhythm analysis initiated and patient "clear" shouted	10		
Shock delivery ▪ Appropriate energy level ▪ Patient "clear" shouted before shock delivered ▪ Correct use of defibrillation push button	10		
Resume CPR immediately after shock delivery	5		
Switched off compressions regularly	5		
Roles identified clearly	5		
Crash cart Supplies/medications readily available and accessible	5		
Total Score	100		

Vitae

Rachael Beard earned her Bachelor of Science in Nursing from Southeast Missouri State University. She earned her first Masters of Education from the University of Missouri- Columbia and her second Masters of Science in Nursing from McKendree University. Her anticipated date of graduation from Lindenwood University is December 2013 with her doctorate degree in Educational Leadership with an emphasis in Andragogy.

Upon graduation with her BSN, Rachael worked in clinical nursing in medical-surgical and cardiac specialty areas. Following clinical work experience, Rachael worked as an associate professor for William Penn University serving within the Department of Health and Life Sciences. Currently, Rachael serves as the Veteran Health Education coordinator for a local VHA hospital. She serves as the organizational expert for continuing education and accreditation, patient education, health literacy, and evidence-based practice.