Mary K. Fey, MS, RN, CHSE
University of Maryland School of Nursing
655 W Lombard St, Rm W204D
Baltimore, MD 21201
fey@son.umaryland.edu

Education:

University of Maryland Baltimore Baltimore, MD	PhD	Admitted to candidacy December 2012
University of Maryland Baltimore Baltimore, MD	Post-Master's Certificate in Education	December, 2006
University of Maryland Baltimore Baltimore, MD	Master's Degree concentration in Nursing Administration	May, 2001
Bowie State University Bowie, MD	Bachelor of Science in Nursing	May 1996
Geisinger Medical Center School of Nursing Danville, Pa	Diploma in Nursing	August 1981

Professional Development:

Simulation Instructor Training Course.	Harvard Center for Medical Simulation	May 2010
Graduate Simulation Instructor Training Course.	Harvard Center for Medical Simulation	May 2012

Certification:

Certified Healthcare Simulation Educator.	Society for Simulation in Healthcare	September, 2013-present

Licensure:

Registered Nurse, Maryland

Academic Experience:

Assistant Professor and Director, Clinical Simulation Laboratories	University of Maryland School of Nursing	June, 2011-present
Associate Professor of Nursing and Coordinator of Clinical Simulation	College of Southern Maryland, LaPlata, MD	June 2009-June 2011
Assistant Professor of Nursing (promoted to Associate Professor)	College of Southern Maryland, LaPlata, MD	August, 2006-June 2009
Adjunct Clinical Faculty	Georgetown University School of Nursing Washington, DC	September 2005-May 2006

Clinical Experience:

Department Head, Nursing Education	Washington Hospital Center Washington DC	January 1998-May 2001 and July 2003-July 2006
Staff Nurse, Neonatal Intensive Care Unit	Washington Hospital Center Washington DC	March, 2002-January, 2004
Clinical Specialist, Critical Care Units	Washington Hospital Center Washington DC	May 2001- April 2002
Clinical Manager, Cardiology	Washington Hospital Center Washington DC	October 1996-Jan 1998
Staff Nurse, Coronary Intensive Care Unit	Washington Hospital Center Washington, DC	April, 1987-October, 1996
Head Nurse, Intensive Care Unit	Physicians Memorial Hospital LaPlata, MD	November 1985-April 1987

Clinical resume prior to this date available upon request

Research Experience

Debriefing Practices in Prelicensure Nursing Education: A National Survey, PhD Dissertation	2013-present
Learning Through Debriefing: Students' Perspectives	2013

High Fidelity Simulation as an Objective Learning Experience for Acute Care Pediatric Nurse Practitioner Students	2013
Guided Imagery in Percutaneous Transluminal Coronary Angioplasty Patients	1998

<u>Memberships in Professional Organizations</u>:

National League for Nursing	#432486	2006-present
International Nursing Association for Clinical Simulation and Learning	#365	2005-present
Society for Simulation in Healthcare		2007-present
Sigma Theta Tau, Pi Chapter	#0375534	2001-present
Phi Kappa Phi National Honor Society	#11216241	2001-present

<u>Professional Service:</u>

Member, Simulation Design Standard of Practice development committee	International Nursing Association for Clinical Simulation and Learning	2014-present
Appointed to Standards Oversight Advisory Board	International Nursing Association for Clinical Simulation and Learning	2012-present
Member, Debriefing Guidelines Development Committee	International Nursing Association for Clinical simulation and Learning	2012-present
Member, Certification Committee	Society for Simulation in Healthcare	2012-present
Reviewer, Certified Healthcare Simulation Educator, Advanced	Society for Simulation in Healthcare, pilot program	December, 2013
Member, Research Committee Chair, mini-grant subcommittee	International Nursing Association for Clinical Simulation and Learning	2010-present
Manuscript Reviewer	Journal of Professional Nursing	2013-present

Manuscript Reviewer	Clinical Simulation in Nursing	2011-present
Member, Research Committee	Society for Simulation in Healthcare	2011-2013
Member, Website Redesign Committee	International Nursing Association for Clinical Simulation and Learning	2007-2010
Vice President	Maryland Nurses Association District 9	2007-2009
Member, Board of Directors	Maryland Nurses Association	2007-2008
Item Writer	National Council Licensure Examination for Registered Nurses	2007
Member, District of Columbia Consortium for Nursing Education and Practice	Developed the District of Columbia Nursing Education Articulation Model	1999
Board of Directors	Greater Washington Area Chapter of the American Association of Critical Care Nurses	2000
Co-director of Education	Greater Washington Area Chapter of the American Association of Critical Care Nurses	2000
Member, Advisory Panel on Novice Nurses in Critical Care	American Association of Critical Care Nurses	1998-2000

Funded research:

Interprofessional Education: A Faculty Development Initiative	Maryland Higher Education Commission	2013 Award:$297,000
High Fidelity Simulation as an Objective Learning	University of Maryland School of Nursing, Dean's Teaching Scholarship	2013 Award: $5,000

Experience for Acute Care Pediatric Nurse Practitioner Students	Award Program	
Learning Through Debriefing: Students' Perspectives	International Nursing Association for Clinical Simulation and Nursing	2012 Award: $500

Extramural Funding:

Who Will Care grant	Co-authored grant to develop simulation program at the College of Southern Maryland	2005 Award: $400,000.
Congressionally directed grant	Co-authored grant to develop the Southern Maryland Simulation Alliance	2006 Award: $500,000

Honors and Awards:

Dr. Mary Anne Rizzolo/NLN Doctoral Dissertation Award – National League for Nursing. August, 2013

Grace E Brown Nurse Educator of the Year Award. Maryland Nurses Association, District 9. May, 2010

Publications:

Fey, M., Scrandis, D., Daniels, A., & Haut, C. *forthcoming.* Learning through debriefing: A phenomenological study. *Clinical Simulation in Nursing.**

Decker, S., **Fey**, M., Sideras, S., Caballero, S., Rockstraw, L., Boese, T., Franklin, A.E., Gloe, D., Lioce, L., Sando, C.R., Meakim, C., & Borum, J.C. (June, 2013). Standards of Best Practice: Simulation Standard VI: The debriefing process. *Clinical Simulation in Nursing, 9*(6S), S27-S29. *

Fey, M. & Bruce, N. (2001). Choosing your first job. *Advance for Nurses*, 3(5), 21-22.

Fey, M. & Miltner, R. (2000). A competency based orientation program for new graduate nurses. *Journal of Nursing Administration*, 30(3), 126-132.*

Presentations:

From Objectives Through Evaluation and Debriefing: Using the SMARTER Methodology to Develop Simulations for Nurse Practitioner and Undergraduate Nursing Students. Podium presentation, International Nursing Association for

Clinical Simulation and Learning meeting, Las Vegas, NV, June, 2013. **Fey**, M. & Akintade, B. *

Developing Diagnostic Reasoning Skills in Nurse Practitioner Students Through Simulation. Podium presentation, National Organization of Nurse Practitioner Faculty annual meeting, Pittsburgh, PA, April, 2013. Akintade, B., **Fey**, M., & Cohen, C. *

Nursing Students' Attitude and Behaviors Related to Individuals with Schizophrenia. Poster presentation, Western Institute of Nursing Research. Authors: McKenzie, G., Sideras, S., Noone, J., & **Fey**, M.. April 2013 *

Theoretical Foundations of Debriefing. Invited speaker, Children's National Medical Center, Washington, DC, March 2013

Debriefing: Existing Evidence and Best Practices. Invited speaker, Laerdal Simulation Users Network meeting. Washington, DC. October, 2013

Developing Diagnostic Reasoning Skills in Nurse Practitioner Students Through Simulation. Podium presentation, Maryland Nurses Association annual meeting. Annapolis, MD. Akintade, B., & **Fey**, M. October, 2012 *

Debriefing: Existing Evidence and Best Practices. Podium presentation, Maryland Nurses Association annual meeting. Annapolis, MD. October, 2012

Nurse Practitioner Education for Clinical Competence. Podium presentation. Quality Improvement of Nursing Education for Clinical Competency. 60th Anniversary International Conference: Chungnam National University, Daejeon, South Korea. May, 2012.

Undergraduate Nursing Education for Clinical Competency. Podium presentation. Quality Improvement of Nursing Education for Clinical Competency. 60th Anniversary International Conference: Chungnam National University, Daejeon, South Korea. May, 2012.

Introduction of the Clinical Simulation Laboratories at the University of Maryland. Podium presentation. Quality Improvement of Nursing Education for Clinical Competency. 60th Anniversary International Conference: Chungnam National University, Daejeon, South Korea. May, 2012.

An Innovative Partnership to Integrate a Simulated Clinical Experience into Critical Care Education: a Pilot Study. Poster Presentation. Teaching Better, Working Smarter: Practical Strategies. University of Maryland School of Nursing, Institute for Educators. Miller, D. & **Fey**, M. June, 2012. *

End of Life Simulations for Undergraduate Nursing Students. Podium presentation. The International Nursing Association for Clinical Simulation and Learning. **Fey**, M., & Goodman, L. St Louis, MO. 2011. *

Test Item Writing and Test Construction. Workshop. Nursing Education Department, Washington Hospital Center. Washington, DC. December, 2007.

Managing the Performance of New Graduate Nurses. Podium presentation. Competence and Innovation: Intersections in Professional Nursing Education. The Professional Nurse Educator Group. Atlanta, Georgia, October, 2004. *

A Competency Based Orientation Program for New Graduate Nurses. Poster Presentation. Toward Promoting Clinical Excellence. Dartmouth-Hitchcock Medical Center. Miltner, S. & **Fey**, M. Ogunquit, ME. May, 1999. *

*indicates peer reviewed

<u>Workshops Coordinated:</u>

Debriefing in Simulation Based Education	Children's National Medical Center. Washington, DC	October, 2013 & November, 2013
Debriefing in Simulation Based Education	College of Southern Maryland Department of Nursing	January, 2013
Debriefing in Simulation Based Education	University of Maryland	October, 2012, April 2013.
Using Simulation to Develop and Evaluate Clinical Judgment	College of Southern Maryland. Gubrud-Howe, P., Sideras, S., & **Fey**, M	2009
Simulation: Teaching Methodology and Curriculum Integration	College of Southern Maryland Decker, S. and **Fey**, M.	2008
Preceptor Workshop	Chester River Hospital Center	June 2004 and December 2004

Abstract

Title of Dissertation: Debriefing Practices in Nursing Education Programs in the United States

Mary Fey, Doctor of Philosophy, 2014

Dissertation Directed by: Louise S. Jenkins, PhD, RN
Professor, Organizational Systems and Adult Health
University of Maryland School of Nursing

Debriefing is essential to learning in simulation based education. However, little is known about current debriefing practices. While there is no single theory of debriefing, consistent themes about the characteristics of debriefing emerge from the simulation literature. The purpose of this study was to describe debriefing practices in prelicensure nursing programs. Logistic regression analysis identified the characteristics of the nursing program and the simulation administrator that are associated with the use of theory based debriefing.

A descriptive cross-sectional design was used. Data were collected via the internet. The study questionnaire consisted of three parts: demographic questions about the nursing program, questions about the simulation administrator, and questions about debriefing practices. The study sample comprised prelicensure nursing programs from across the United States representing all entry level degree programs (n = 502).

Descriptive analyses showed that most programs have integrated simulation into their curriculum. Most schools designate a faculty member to have responsibility for simulation activities. The majority of debriefing facilitators have no training in debriefing. Less than 20% of all debriefers have their competence assessed. Debriefing is not usually guided by a theory or model. The majority of respondents (82%) reported debriefing practices that incorporated the concepts of Kolb's experiential learning theory.

Further data analysis explored the relationships that significantly affected the use of theory based debriefing practices. The presence of a designated simulation administrator was significantly associated with the use of theory based debriefing. Simulation administrators who had formal training in simulation and who were in the 46-55 year old age group were significantly more likely to practice theory based debriefing. Training and competency assessment, along with structuring debriefing discussions were significantly associated with the use of theory based debriefing.

Findings suggest that nursing programs should allocate resources to several aspects of the simulation program. Programs should have a designated simulation administrator. This person should have training in simulation based education. All faculty who facilitate debriefings should have training and should have their competence assessed regularly. This study provides information about debriefing practices; the study should be repeated with other types of learners (e.g. medical students, licensed practitioners).

Debriefing Practices in Nursing Education Programs in the United States

By

Mary K. Fey

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2014

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Introduction

Use of human patient simulation as a teaching methodology is gaining widespread acceptance, spanning prelicensure to professional education of health care professionals. Simulation is a technique to replace or amplify real experiences with guided experience, often immersive in nature that evokes or replicates substantial aspects of the real world in a fully interactive fashion (Gaba, 2004). In the education of healthcare professionals, simulation experiences seek to replicate the environments in which health care is delivered. Simulation encompasses several technologies including computer-based simulations, virtual environments, and partial- or full-body mannequins. Simulation experiences can also be conducted using trained actors, or standardized patients, who can portray patients, family members, or other roles in simulation cases. For this study, simulation is defined as an experiential activity conducted for learning purposes and formative assessment during which learners provide care to a simulated patient in a realistic environment, followed by a dedicated debriefing period. It excludes simulation that is done for teaching isolated psychomotor skills and simulation done for summative assessment.

Fidelity is the term used to describe the degree to which a simulation environment, including the mannequin, accurately represents reality (Meakim et al., 2013). Mannequins generally represent one of three levels of fidelity. A low fidelity mannequin does not have realistic physical findings such as heart sounds or lung sounds. A mid fidelity mannequin has more realistic features such as heart and lung sounds, and can produce sounds to replicate blood pressure, but does not portray more realistic physical findings such as the ability to breathe or blink. A high fidelity mannequin is extremely realistic with regard to physical findings, and may have advanced features such as the ability to bleed, recognize the composition of inhaled gasses, and the ability to respond physiologically to drugs that are administered. Using the voice of the simulation operator, these mannequins can have real-time conversations with participants.

There are several advantages to using clinical simulation as a teaching methodology. Advantages include the ability to educate individuals and teams in an environment that poses no risk to actual patients, to standardize clinical experiences to which learners are exposed, and the possibility of augmenting existing clinical placements that can be difficult to obtain. Simulation also provides the ability to assess clinical skills during learning experiences that focus on specific patient presentations (Gates, Parr, & Hughen, 2012; Hravnak, Tuite, & Baldisseri, 2005; Jeffries, 2012). Simulation also provides a realistic learning environment for active learning and may provide a methodology for improving students' confidence, critical thinking, and clinical judgment. (Nehring & Lashley, 2009)

Simulation does have disadvantages. The primary disadvantage is the amount of resources required to implement a program of clinical simulation. Using high fidelity simulation to augment clinical education of health care professions students can carry significant costs (Gaba, 2004). The cost includes both the equipment itself and competent instructors to conduct simulation experiences. Despite advances in simulator fidelity, another disadvantage is the fact that simulation experiences are limited in their ability to completely replicate human interaction (Gaba, 2004; Li, 2007).

The National Council of State Boards of Nursing recently completed a survey of simulation use in prelicensure nursing programs in the United States (Kardong-Edgren, Willhaus, Bennett, & Hayden, 2012). Eighty-seven percent of the prelicensure nursing programs who responded to the survey reported using mid- and high-fidelity simulation. Additionally, 58% of Baccalaureate programs and 77% of prelicensure Master's programs had required simulation experiences built into the curriculum. Eighty-one percent of respondents felt that more simulation should be used in their programs (Hayden, 2010; Kardong-Edgren et al., 2012). Despite a paucity of evidence demonstrating the superiority of simulation over other teaching methodologies with regard to learning outcomes in prelicensure nursing students, both learners and instructors value simulation's contribution as an active learning strategy. Simulation is recognized as an important development in the patient safety movement. Allowing inexperienced health professions students to develop clinical skills in simulated environments protects patients from the errors inherent in the apprenticeship model of health care education (Levine, DeMaria, Schwartz, & Sim, 2013).

Healthcare simulation educators have adopted a general format for simulated clinical experiences. Included are an orientation to the experience (i.e. prebriefing), an episode of providing care (i.e. the simulation case), and a period of post-experience analysis referred to as debriefing. Debriefing is described as a guided reflective discussion that attempts to bridge the gap between experiencing an event and making sense of it (Fanning & Gaba, 2007). During this reflective period, the debriefing facilitator assists the learners in examining events, thought processes, and emotions that occurred during the simulation. This retrospective examination of performance assists the learners in examining how they perceived and interpreted the situation when making decisions, encouraging the metacognitive skills that can lead to the development of expertise (Dismukes, Gaba, & Howard, 2006; J. Rudolph, Simon, Raemer, & Eppich, 2008). (Raemer et al., 2011) describe debriefing as a process involving active participation of learners guided by a facilitator whose primary goal is to help learners identify and close gaps in knowledge and skills. The examination and self-reflection that occurs during the debriefing discussion and the feedback given during this time are critical to learning, and may be the most important part of the overall simulation experience (Dismukes et al., 2006; Fanning & Gaba, 2007; Issenberg, McGaghie, Petrusa, Lee Gordon, & Scalese, 2005; McGaghie, Issenberg, Petrusa, & Scalese, 2010; Savoldelli et al., 2006; Shinnick & Woo, 2010).

The body of work on reflective learning by Argyris (1977) and Schon (1983, 1987), provides a means of understanding the goal of debriefing. They describe the process through which individuals perceive and interpret events using existing cognitive frameworks or mental models. The primary goal of debriefing is to encourage self-reflection as a way for learners to examine their mental models. By understanding their mental models, learners are better able to understand how they perceived and interpreted the events of the experiential learning activity. Mental models are formed through previous life experiences, educational experiences, culture and other social and personal influences. This examination of mental models is a metacognitive strategy that allows learners evaluate their thought processes for the purpose of improving future judgments and decisions.

Dreifuerst (2009) provides a further description of the process in a concept analysis of debriefing. She identifies the attributes of debriefing as: reflection, emotional release, reception to feedback, and integration of simulation and feedback into a conceptual framework. Several influential reviews of simulation literature (Issenberg et al., 2005; McGaghie et al., 2010) have identified the feedback given during debriefing as being essential to learning. Empirical studies (Mahmood & Darzi, 2004; Savoldelli et al., 2006; Shinnick & Woo, 2010) have demonstrated that learning does not occur in simulation based education in the absence of debriefing. Additionally, poorly conducted debriefing has the potential to result in persistent poor clinical judgment (Jeffries, 2012). Lederman (1984) described a conceptual framework of "cognitive assimilation" for debriefing. In Lederman's conceptualization, the analysis conducted was not a simple recollection of events. Lederman's conceptualization views the post experience analysis as a structured, guided method for bringing meaning to the experience and learning from that meaning (p. 417). In later work, Lederman (1992) described seven elements of debriefing and a methodology for conducting debriefing. The seven elements identified as being common to all debriefing are: the debriefer, the participants, the experience through which the participants have come, the impact of that experience, the recollection of the experience, the reporting of the experience, and the time to process it. The structure of debriefing was described as being three-phased. The first phase focuses on systematic reflection and analysis; the second phase reflects on individual meanings associated with the experience; the third phase focuses on generalization and application of lessons learned (Lederman, 1992).

In a recent meta-analysis of debriefing studies that measured changes in team or individual performance, debriefing was shown to significantly improve performance (Tannenbaum & Cerasoli, 2012). In this meta-analysis, the authors report an average effect size of *d*= .67 for the intervention. The authors also report that improvements were positively correlated with higher quality facilitation and the level of structure provided by the facilitator. Debriefings in which the facilitator guided the participants through reflection and goal setting in a structured way resulted in larger effect sizes than did debriefings with lower levels of structure. Facilitated debriefings were three times as effective as non-facilitated debriefings. This suggests that the competence of the debriefer has a significant influence on the learning outcome of the simulation and debriefing. Similarly, one study demonstrated a relationship between the facilitators' questions and the level of learner reflection (Husebo, Dieckmann, Rystedt, Soreide, & Friberg, 2013). Husebo, et al (2013) concluded that the facilitators' questions only encouraged a superficial form of reflection, which possibly resulted in superficial learning. They concluded by recommending that faculty using simulation receive training in reflective questioning and use of specific questioning techniques, such as advocacy-inquiry as described by (J. W. Rudolph, Simon, Rivard, Dufresne, & Raemer, 2007). The recognition of the importance of training in techniques to promote deep reflection during debriefing is echoed in the Standards of Best Practice for Simulation, Standard VI: Debriefing published by the International Nursing Association for Clinical Simulation and Learning (Decker et al., 2013). Facilitators of simulation and debriefing are key to participant learning, and so must be knowledgeable about the theory underlying facilitation, be skilled in creating a psychologically safe learning environment, and be skilled in both diagnosing learning needs and managing optimal group processes (Boese et al., 2013; Decker et al., 2013; Franklin et al., 2013). Due to the complexity of facilitating debriefings and the fact that these skills are not normally taught as a part of nursing faculty preparation, the Standards of Best Practice for Simulation clearly state that debriefing facilitators should have specific simulation education provided by formal coursework, continuing education offerings, and targeted work with an experienced mentor (Boese et al., 2013). While training for debriefers is becoming more readily available, a recent study of debriefing practices related to the role concepts of the debriefer in Europe, the United States, and Australia suggest that there is considerable variability in the role and the practices of debriefers (Dieckmann, Friss, Lippert, & Ostergaard, 2009). This same study demonstrated wide variability in patterns of interaction between debriefing facilitators and learners.

Statement of the Problem

Debriefing is critical to learning, and research suggests that it is the most important component of the simulation based learning experience (Decker et al., 2013). During debriefing, the link between facilitators' actions and the reflective ability of learners has been demonstrated, and it is acknowledged that specific training in debriefing techniques is a requirement for debriefing facilitators. In high hazard, high reliability industries such as aviation, the belief is held that how much crews learn in flight simulation and take back to actual flights hinges on the effectiveness of the debriefing (McDonnell, Jobe, & Dismukes, 1997). The necessity of reflection to consolidate learning following an experience is integrated into the theories of educational pioneers such as Dewey, Lewin, Piaget, and Kolb (D. A. Kolb, 1984).

As prelicensure nursing programs use more simulation based education, debriefing must be integrated correctly into the experiential learning process if educators and learners are to realize the full potential of simulation. It is a generally accepted view that learning will not occur in simulation based education without debriefing. Poorly executed debriefing can also result in persistently poor clinical decision making, unresolved negative emotions related to performance, and lost learning opportunities (Dreifuerst & Decker, 2012).

The International Nursing Association for Clinical Simulation and Learning recently published evidence based guidelines for debriefing (Decker et al., 2013). This is an important contribution to the practice of simulation based education, as it provides practitioners of simulation based education guidelines by which debriefing should be conducted. The standard includes guidelines related to the competence of the debriefer, elements of the debriefing environment, the structure of the debriefing discussion, and the use of objectives to guide the discussion. With the publication of this guideline, there is now a critical need to examine current practice for congruence with the guideline and with experiential learning theory in general.

There is a lack of information about current debriefing practices in prelicensure nursing education programs. The research monograph released following an international research consensus meeting of healthcare simulation educators acknowledged this lack of empirical evidence (Raemer et al., 2011). This monograph called for more studies focused on debriefing, and recognized that many published debriefing studies did not report on important characteristics of debriefing. Because of this, a framework was recommended to be used for designing and reporting debriefing studies which outlines those important characteristics, which is termed the Sim-PICO framework (Raemer et al., 2011). The Sim-PICO framework, an adaptation of the PICO framework used to formulate research questions, includes the elements of: the simulation, population studied, intervention applied, comparisons tested, and outcomes determined.

Because of the lack of information regarding debriefing practices, there is a need to establish a baseline measurement of current practice in order to describe the current state of debriefing practices. The purpose of this study is to describe debriefing practices in simulation based education in accredited prelicensure nursing programs in the United States and to determine if selected concepts of Kolb's Experiential Learning Theory are evident in debriefing practices. This theory was chosen for its applicability to the clinical education of nurses, including simulation based education. An additional purpose of the study is to determine if certain characteristics of either the nursing program or the designated simulation expert at each school are related to debriefing practices. The designated simulation expert is defined as a person who is primarily responsible for simulation related activities in a nursing school. This person may hold a clearly defined position, such as simulation director, simulation coordinator, chair of simulation workgroup, or may be a faculty or staff member who is recognized as the simulation champion within the program ***and*** has a percentage of workload devoted to simulation activities. It is not assumed that every prelicensure nursing program has a designated simulation expert.

Significance of the Study

This is the first known study of debriefing practices in prelicensure nursing programs in the United States. This study will contribute important new knowledge to the field of simulation based education. It will establish a baseline from which to understand current practice. This study will also provide preliminary data regarding characteristics of the designated simulation expert at each nursing program. From these data, inferences can be made about the relationship between the simulation experts' characteristics and the debriefing practices. Characteristics of each program were described, and relationships examined between program characteristics and debriefing practices. This knowledge has the potential to guide recommendations about the administration of simulation programs within prelicensure nursing programs in order to reinforce those characteristics that predict the use of theory based debriefing practices. For example, if data analyses suggest that a full time designated simulation expert is associated with the use of theory based debriefing, a recommendation can be made that prelicensure nursing programs appoint a faculty member to this position.

This research study has the potential to affect practice at the micro- and macro-level. Improving practices related to debriefing at the individual level has the potential to impact learning outcomes for individuals, resulting in more meaningful learning experiences for each student. At the academic institution level, the study may provide information related to variables in the simulation expert that are more likely to result in debriefing practices that adhere to the current standards of practice. For example, the study may show that nursing programs that employ a full time simulation director are more likely to have a consistent structure that guides debriefing, may use a theory based model of debriefing, and/or may consistently assess the competence of the debriefers using an established instrument. This knowledge may influence the administration of simulation programs, as it may lead to the development of administrative guidelines for nursing programs seeking to improve their simulation programs or establish new simulation programs. At the national level, the results of the study may provide the impetus for nursing leadership bodies to advocate for a more consistent, evidence based approach to simulation and debriefing.

Theoretical Framework

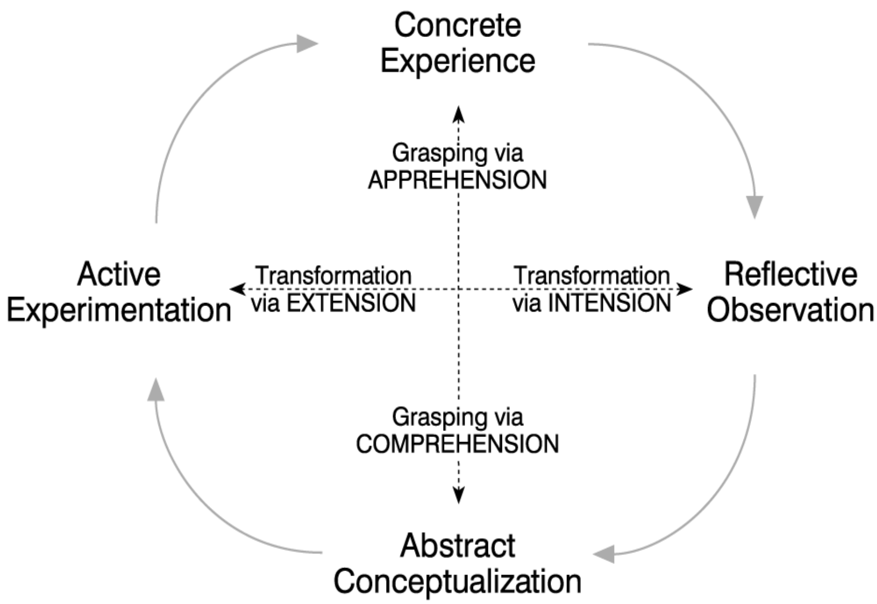
Simulation and debriefing have their roots in experiential learning theory and reflective learning theory. Experiential learning falls within the constructivist paradigm, which posits that the learner constructs a personal understanding of meaning through reflection on his or her actions (Fenwick, 2001). Several learning theories were evaluated for application as the framework for this study.

Because debriefing is primarily a reflective learning activity, the reflective learning theory of Donald Schon was evaluated. Initially developed in 1983, this theory grew out of a recognition that Positivist philosophy was not adequate to explain the knowledge embedded in expert professional practice. Positivist philosophy emerged in the nineteenth century with the rise of science and technology. This social movement aimed at applying the achievements of science to better humankind, and sought to eliminate the influence of religion, mysticism and metaphysics (Schon, 1983). Schon's theory recognized that there is a core artistry embedded in expert professional practice that cannot be explained by a purely scientific theory. From this, Schon described moving from the perspective of technical rationality to one of "reflection in action" in which problems were seen as being uniquely framed by the individual before the process of solving problems could be undertaken. This framing is based on the unique perspective of the individual. These perspectives form mental models through which individuals interpret new information and experiences for the purpose of decision making. In order to discover the mental models driving decision making, reflection on the decision making process is required. Examining the unique perspective that each practitioner brings to problem solving and then reinforcing or modifying these mental models as needed is at the heart of the reflection that takes place during debriefing. Given this, Schon's theory can be seen as contributing strongly to the understanding of the goals of debriefing. Schon collaborated with Argyris to further develop theory related to reflective learning. Argyris' (1977, 1996) body of work primarily focused on organizational behavior. He described the process of examining the fundamental policies and goals of an organization for the purpose of detecting and correcting errors as "double loop learning". This organizational view of decision making can be applied at the individual level if the examination of personal mental models is substituted for organizational policies and goals. His method for uncovering the driving forces behind organizational behavior (especially related to values and communication) provides a framework for guiding debriefing discussions in that his method embraces transparency, truthfulness, and an openness to the perspectives of others. Double loop learning, when applied to individual decision making, is actually a metacognitive strategy that seeks to examine the mental models driving actions.

The drawback of Schon's and Argyris' theories, as applied to simulation based education, is that the theory isolates the period of reflection from the other components of simulation that have a significant impact on the learner's ability to engage in and learn from simulation experiences. It does not address the quality of the experience, or the context in which the experience takes place. Once the reflection takes place, Schon's theory does not elaborate on the application of the new or modified mental models to solve similar problems in future situations.

The advantage of using Kolb's experiential learning theory is that it describes both the sequential process of an experiential learning activity and the cognitive processes that the learner engages in during the experience. It can help to structure the experience – construction of an appropriate simulation scenario, followed by a reflective discussion which leads to the learner identifying patterns or creating new mental models, followed by actively planning strategies to incorporate new learning into future experiences. Understanding the cognitive processes at work as learners move through the experiential learning cycle is useful in guiding the content of the facilitator's questions and discussions during the debriefing conversation that follows the experience (Figure 1.1).

Figure 1.1: *Kolb's Experiential Learning Model*



The outer circle shows the recursive cycle of experiential learning activities; the inner arrows show the grasping and transforming cognitive processes. Downloaded from: http://learningmatters.typepad.com/learning_matters/2008/12/learning-stylesthe-work-of-david-kolb.html

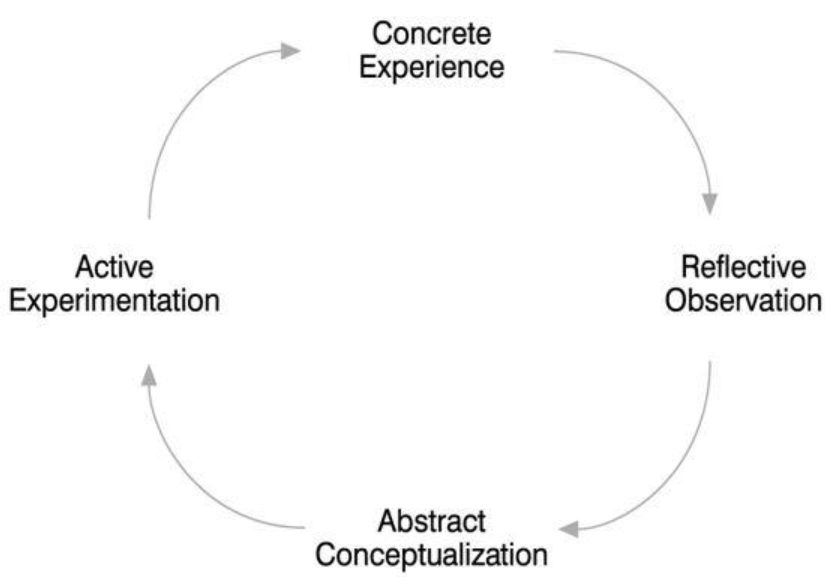
In the model above, the sequential steps of concrete experience, reflective observation, abstract conceptualization, and active experimentation are represented as a recursive cycle on the outer circle of the model. The grasping and transforming processes depicted on the vertical and horizontal axes inside the cycle represent the internal cognitive processes of the learner while moving through the steps of the cycle. Kolb's Experiential Learning Theory was built primarily upon the work of Kurt Lewin, John Dewey, and Jean Piaget and describes the process by which learners perceive and then transform their experiences in order to create knowledge (D. A. Kolb, 1984). The outer circle of Kolb's model retains the essence of Lewin's experiential learning cycle. Lewin's other important contribution to Experiential Learning Theory was the recognition of the importance of incorporating feedback into experiential learning activities, and the ability of this feedback to result in new mental models that could guide future actions (D. A. Kolb, 1984). Dewey's primary contribution to Experiential Learning Theory was the acknowledgment that prior learning from both experience and the input of more experienced others is integrated with the current experience to form a judgment. This judgment translates into an action plan based on expected outcomes. Key to Dewey's model is the concept that an immediate impulse to act is tempered by the judgment that is formed by integrating past knowledge with current observations (Dewey, 1938). One major contribution to the understanding of learning was Piaget's incorporation of the learner's mental models into the learning process. He described two processes through which these mental models influenced learning: accommodation and assimilation. In accommodation, the learner alters his or her mental models as a result of new experience. In assimilation, new experiences are integrated into existing mental models. A balanced tension between these two processes resulted in positive adaptation (D. A. Kolb, 1984).

In developing Experiential Learning Theory (1984), Kolb identified that in the three previous models discussed above, there is inherent tension and conflict between opposing but complimentary concepts. In Lewin's theory, there was tension between concrete and abstract thinking. In Dewey's theory, tension existed between the desire to act quickly and the judgment that tempers immediate action. In Piaget's model, tension existed between the desire to incorporate new concepts into exiting mental models (assimilation) versus modifying existing mental models based on new information or experience (accommodation).

According to Kolb (1984), the experiential learning cycle contains four elements: *concrete experience, reflective observation, abstract conceptualization,* and *active* *experimentation*. The *reflective observation, abstract conceptualization,* and *active experimentation* elements in Kolb's experiential learning model are most directly connected to debriefing as the time to reflect on events and examine their meaning through the participant's mental models. Following reflection, new understandings are applied to future situations. The concrete experience element of Experiential Learning Theory precedes the reflective period and influences it to the extent that the learners were adequately prepared for the experience and that the experience was meaningful to them.

The elements of *concrete experience*, *reflective observation, abstract conceptualization,* and *active experimentation* are among the main constructs in Kolb's Experiential Learning Theory and represent the recursive cycle of experiential learning (Figure 1.2).

Figure 1.2: *Recursive Cycle of Experiential Learning*

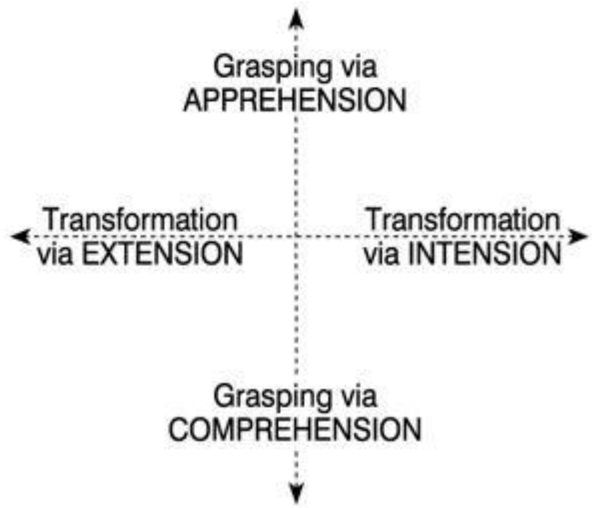


The Recursive Learning Cycle of Kolb's Experiential Learning Model. *Adapted from: http://learningmatters.typepad.com/learning_matters/2008/12/learning-stylesthe-work-of-david-kolb.html*

Concrete experience is described as the perception, through the senses, of the learning experience; it is dependent on the ability of learners to involve themselves fully and without bias in new experiences. *Reflective observation* is the ability to reflect on the experience from many perspectives. *Abstract conceptualization* is the ability to create concepts that integrate current observations into logically sound theories. *Active experimentation* is the ability to use these theories to make decisions and solve problems in future similar situations. He conceptualized the process of experiential learning as a recursive cycle wherein the learner moves through the steps of *concrete experience* followed by r*eflective observation*, which leads to a*bstract conceptualization* that allows for *active experimentation* in new situations (A. Y. Kolb & Kolb, 2009).

Within the recursive cycle of experiential learning, these four elements are the steps of experiential learning through which the learner moves. These steps and their associated cognitive processes form opposing, but complimentary processes that allow the learner to first grasp and then to transform the experience, which results in learning. The "grasping" and "transforming" processes are the other main constructs of Kolb's theory. Learning is defined by Kolb (1984) as "the process whereby knowledge is created through the transformation of experience" (p. 38). While the steps of the Experiential Learning Cycle are familiar to many educators, the constructs of the theory are not these steps alone, but the combining of these steps into the processes of grasping and transforming the experience that are depicted in the center of the model. The outside circle of the model describes the sequential steps the learner moves through during experiential learning; the inner part of the circle describes the cognitive processes the learner engages in while moving through the steps of the cycle. See Figure 1.3.

Figure 1.3: *Grasping and Transforming processes of Kolb's Experiential Learning Model*



Adapted from: *http://learningmatters.typepad.com/learning_matters/2008/12/learning-stylesthe-work-of-david-kolb.html*

The cognitive process depicted on the vertical axis involves the perception or grasping of the experience. The opposing, but complimentary, modes of *concrete experience* and *abstract conceptualization* form this process. Anchoring one end of the grasping process is *apprehension*; at the opposing end is *comprehension*. *Apprehension*, a more concrete way of knowing, relies on the senses to perceive an objective reality and is closely aligned with *concrete experience*. For example, a nurse in a clinical environment will apprehend the number depicting a patient's heart rate on a monitor screen, the sound of the irregular "beeping" associated with an abnormal heart rhythm, the feeling of coolness and dampness on the skin of a diaphoretic patient. It is information processing without assigning value to the information. It is *comprehension*, the opposing force, which allows that information to be shaped into a more meaningful whole. Importantly, it is *comprehension* that allows the nurse to create a model of that experience that can be carried forward into future similar situations. *Comprehension* allows the nurse who has apprehended the above mentioned clinical findings to recognize that they are deviations from the normal, and to integrate them into a model of a patient with compromised perfusion resulting from a cardiac dysrhythmia. This model of dysrhythmias compromising perfusion represent a mental model that can be recalled for application in future similar circumstances. This process is closely aligned with a*bstract conceptualization*. Kolb & Kolb (2009) state that it is the simultaneous engagement in these two complementary modes of knowing (apprehension and comprehension) that results in integrated learning.

The opposing, but complimentary, modes of r*eflective observation* and a*ctive experimentation* form the process depicted on the horizontal axis through which learners transform the experience. Anchoring one end of the transformation process is *intension*; anchoring the opposing end is *extension*. *Intension* refers to the process of reflecting inwardly on the recent experience to examine it from multiple perspectives, including the learner's and others' existing mental models to understand its meaning. During this process of examining the experience through existing mental models, the need to develop new mental models may be identified and subsequent new theories constructed to describe the experience. This ability to examine thought processes underlying decisions for the purpose of evaluation and revision that is described by Kolb equates to Argyris' "double loop learning" and is closely aligned with r*eflective observation*. The new understanding arrived at through *intension* allows learners to transform the experiences by *extension* as they apply new learning to make decisions and solve problems in future experiences based on new mental models. This process of applying new models is closely aligned with a*ctive experimentation*. Dewey (1938) described the outcome of the experiential learning cycle as an improvement in future experiences. In contrast, Kolb (1984) emphasizes the dynamic, ongoing nature of the process of adaptation and learning, rather than a specific outcome.

In order to optimize an experiential learning activity, the experience must be conducted in an environment that allows learners to fully engage in the experience, reflect deeply on their thought processes, and consider alternatives to their current practices for the purpose of improvement. This environment can be created by taking steps to ensure the psychological safety of learners. The importance of a psychologically safe learning environment as a context for experiential learning is acknowledged in the INACSL Standards of Best Practice for Simulation, as well as in studies of team-based learning (Edmondson, 2002). The importance of psychological safety as a context for experiential learning was also identified as contributing to the ability of all parts of the cycle of experiential learning to flourish (Rudolph, personal communication, 2013). Kolb discusses "learning spaces" as contexts for learning in which the elements of psychological safety are apparent, including providing a safe environment in which learners' ideas, beliefs and values can be examined and challenged without the fear of personal shame (A. Y. Kolb & Kolb, 2005). The creation of this safe space may make the difference between merely having the experience and learning from it (Baker, Jensen, & Kolb, 2005). Kolb describes the importance of the facilitator in protecting this space by describing the way in which facilitators manage the conversation, define boundaries, and establish norms (Baker et al., 2005).

The application of Kolb's theory to simulation based education provides a means of understanding the critical role of the educator in the experience. In order to optimize experiential learning in simulation based education, the educator has the responsibility to provide a safe environment in which to learn, structure an appropriate simulation, and guide the learners through self-reflection as they embed the learning from the experience and prepare to apply the new learning in the future.

Aims and Hypotheses

The purpose of this study is to:

- describe debriefing practices in simulation based education in prelicensure nursing programs in the United States,
- determine if the concepts of Kolb's Experiential Learning Theory are evident in debriefing practices,
- determine if selected characteristics of the designated simulation expert at each school are related to debriefing practices, and determine if selected characteristics of the nursing program are related to debriefing practices.

The characteristics of the nursing program were examined to determine if any of the variables had a significant association with the use of theory based debriefing practices. Several predictor variables are demographic in nature, and were also evaluated to determine if the final sample is representative of nursing programs throughout the United States. These variables include geographic location, types of degrees offered, enrollment number and if a nursing program is within a public or private institution. See table 1.1 for nursing program characteristics.

Table 1.1: *Characteristics of Nursing Schools*

Prelicensure Nursing Program Characteristics	Rationale for inclusion in survey or hypothesized relationship to debriefing items
Geographic Location	This will allow assessment of the representativeness of the final data. This will allow assessment of systematic nonresponse
Degrees offered	This will allow assessment of the representativeness of the final data It is hypothesized that schools of nursing offering baccalaureate and graduate degrees will be more likely to practice theory-based debriefing
Public or private status	This will allow assessment of the representativeness of the final data. It is hypothesized that private schools are better able to fund simulation programs, and that they are more likely to practice theory-based debriefing
High fidelity simulation for formative assessment	This question is to establish the criteria for participation in the study
Simulation as required part of curriculum	It is hypothesized that schools requiring simulation as part of the curriculum are more likely to practice theory-based debriefing.

Characteristics of the designated simulation expert were also examined to determine if any of the variables had a significant association with the use of theory based debriefing practices. These characteristics reflect the education and training of individuals conducting debriefing as well as the level of resources a program commits to the simulation program. See table 1.2 for characteristics of the designated simulation expert. Variables with a significant association to the use of theory based debriefing were subsequently used as predictor variables in regression models to determine if the characteristics predict the use of theory-based debriefing practices.

Table 1.2: *Designated Simulation Expert characteristics*

Designated Simulation Expert Characteristics	Rationale for inclusion in survey or hypothesized relationship to debriefing items
Registered nurse	It is hypothesized that simulation experts licensed as registered nurses are more likely to practice theory-based debriefing than those who are not.
Faculty or staff position	It is hypothesized that those in a faculty position will be more likely to practice theory-based debriefing, as the requirements to hold a faculty appointment are generally more stringent (e.g. graduate degree)
Percentage of workload in simulation	It is hypothesized that the likelihood of use of theory-based debriefing practices will be positively correlated with the percentage of workload dedicated to simulation.
Number of years teaching in nursing	It is hypothesized years of teaching in nursing will be positively correlated with the likelihood of using theory-based debriefing
Number of years teaching using simulation	It is hypothesized years of teaching using simulation will be positively correlated with the likelihood of using theory-based debriefing
Age group	It is unclear what the relationship between age and the likelihood of theory-based debriefing practices will be. While older age may be correlated with more experience teaching, it may be that younger simulation experts are more likely to practice simulation based on newer theory.
Highest academic degree	It is hypothesized that the higher the academic degree held by the DSE, the more likely a program is to practice theory-based debriefing.
Formal training in simulation-based education	It is hypothesized that having had formal training in simulation-based education will result in the use of theory-based debriefing practices.
Membership in simulation related professional organizations	It is hypothesized that those holding membership in a simulation related professional group are more likely to be aware of scholarship in the specialty, and therefore more likely to practice theory-based debriefing.
Education-related credentials	It is hypothesized that those holding education- related credentials above what is normally required to hold the position will be more likely to be actively involved in the profession and therefore more likely to apply current knowledge and evidence to debriefing practices, resulting in practicing theory-based debriefing.

The regression analyses focused primarily on variables related to the designated simulation expert, as the person holding this designation should have significant influence over practices related to simulation and debriefing. Several variables related to the simulation expert are hypothesized to be predictive of the use of theory based debriefing practices. These variables include: having a graduate degree, having more years of experience teaching in nursing and teaching using simulation, having formal training in simulation based education, holding specialty certification in education and membership in simulation related professional organizations. Several variables are indicative of the amount of resources a program invests in the simulation program, and these are hypothesized to predict the use of theory based debriefing. These variables include: the percentage of workload that the simulation expert devotes to simulation, and if the position is a faculty appointment or staff position.

Research Question 1: What debriefing practices are being used in accredited prelicensure registered nursing programs in the United States?

Research Question 2: Do characteristics of the designated simulation expert predict the use of theory-based debriefing practices? Characteristics include: highest academic degree held, number of years of experience in nursing education, number of years of experience teaching with simulation, full- or part-time status in simulation position, age range, certification in general education, simulation education or professional development, formal training in simulation-based education, and membership in simulation related professional organizations.

Research Question 3**:** Do nursing program characteristics predict the use of theory-based debriefing practices? Characteristics include: degree(s) offered, size of enrollment in nursing program, public or private institutional status, geographic region, and requirements related to simulation in the curriculum.

Summary

Debriefing in simulation based education is critical to learning. Specific techniques related to facilitation are required in order to foster the deep reflection that is part of the experiential learning process, and these techniques are not usually taught as a part of the preparation of health care professions educators. With the increasing adoption of simulation as a pedagogical technique in undergraduate nursing programs, there is a need to describe the current state of debriefing practices. There is also a need to examine debriefing practices for their congruence with published standards of practice and learning theories. This study was designed to provide that description as well as to explore what characteristics of the nursing program and/or designated simulation expert may predict the use of theory based debriefing practices. From this knowledge, recommendations may be formulated to guide prelicensure nursing programs in administering simulation programs or to guide the development of faculty involved in simulation and debriefing.

CHAPATER 2:
Literature review

Overview

The purpose of this research study is to add to the evidence describing the current state in debriefing following simulation based educational experiences. Empirical studies and expert opinion papers provide data defining important characteristics of the debriefing process. This chapter provides context for the current understanding of debriefing and demonstrates current knowledge related to the essential characteristics of debriefing. Published quantitative and qualitative studies and their contribution to knowledge of current debriefing practices are reviewed. This literature review also provides a historical context for the development of debriefing practices, and their evaluation.

For this study, simulation is defined as an experiential activity conducted for learning purposes and formative assessment during which learners provide care to a simulated patient in a realistic environment, followed by a dedicated debriefing period. It excludes simulation that is done for teaching isolated psychomotor skills and simulation done for summative assessment. These two applications of simulation were excluded because in both cases, the simulation is not followed by a period of debriefing; in both cases, students are given feedback without guided self-reflection. For this study, debriefing is defined as **a**n activity that follows a simulation experience that is led by a facilitator. Participant reflective thinking is encouraged, and feedback is provided regarding the participants' performance while various aspects of the completed simulation are discussed. Participants are encouraged to explore emotions, question, reflect, and provide feedback to each other. The purpose of debriefing is to move toward assimilation and accommodation in order to transfer learning to future situations (Meakim et al., 2013).

Historical background

Debriefing is practiced in various settings, with varying purposes. In addition to simulation based education, debriefing is practiced in the fields of psychology, aviation, and the military. In psychology, debriefing is used following research studies in which the research subjects have been deceived. In 1973, the Committee on Ethical Standards in Psychological Research recommended that all research subjects be provided the opportunity to resolve any negative aftereffects of the study and to be provided with an understanding of any facts of the study that had previously been withheld from them (Tesch, 1977). This ethical standard is interpreted as advocating for debriefing following psychological research studies. Researchers were specifically directed to remove misconceptions and undesirable consequences (such as negative feelings about the subjects' behavior) resulting from the experiment (Holmes, 1976). Clarifying misconceptions came to be referred to as "dehoaxing"; resolution of negative feelings came to be referred to as "desensitizing" (Holmes, 1976).

Debriefing in psychology can also have therapeutic goals, as is the case in Critical Incident Stress Debriefing (CISD). First used following the 1982 Air Florida crash in Washington, DC, CISD is part of an overall Critical Incidence Stress Management strategy that seeks to mitigate the effects of exposure to traumatic events by first responders, crisis response teams, military personnel and victims of violence (Pender & Prichard, 2009). CISD is a structured psychoeducational experience that seeks to prevent the development of a post-traumatic syndrome and serves as an early identification mechanism for those who may require professional mental health follow up services (Pender & Prichard, 2009). Process Debriefing is a method that is similar to CISD, but focuses more on group process variables such as leadership implications and group characteristics (MacDonald, 2003).

Debriefing in the military began during World War II. One technique, Historical Group Debriefing, was conducted in order to reconstruct important historical data about soldiers' encounters by having them recount events from engagements along with thoughts, feelings, assumptions, and decisions. Though unintended, these sessions were found to provide a feeling of relief, which was termed a "spiritual purge" (MacDonald, 2003). More recently, with the development of simulation training in the military, debriefing following simulated training battles is known as an "after action review". After action reviews are the time when participants come together to discuss the events of the training exercise, account for their actions, and explicitly link lessons learned to future actions (Darling, Parry, & Moore, 2005; Lederman, 1992). Key to military after action reviews is the belief that correcting *thinking* is more critical than correcting *actions*, hence after action reviews seek to uncover thought processes underlying decisions that were made during the simulated battle. Debriefing in the military focuses on learning and transferring experiences to the theater of battle. However, common to both historical group debriefing and after action reviews in military debriefings is the important practice of disregard for military rank during the debriefing discussions, allowing all participants to honestly discuss the events of the experience without fear of being penalized (Darling et al., 2005; MacDonald, 2003). Debriefing in psychology mainly differs from debriefing in the military in that psychological debriefing primarily aims to minimize the negative psychological impacts of experiences, while military debriefing seeks to correct faulty thinking and transfer learning to the field of battle to improve chances of future success.

In aviation, the objective of debriefing following simulated flight training more closely resembles that of the military. Following flight simulations, crew members participate in facilitated debriefing sessions that are led by a trained facilitator who is also a licensed pilot. The primary objectives of debriefing following flight simulations are to:

- have crewmembers discuss events with each other in order to discover as much on their own as possible,
- guide crew members in evaluating what went well, what could be improved, and how to improve it,
- allow crew members to recognize how Crew Resource Management techniques can help in the management of situations in flight to improve safety and efficiency, and
- have the crew develop the skill of self-debriefing for use following actual flights in the future (Dismukes & Smith, 2000; McDonnell et al., 1997).

In aviation, the belief is held that the amount crews learn in flight simulation and take back to actual flight hinges on the effectiveness of the debriefing (McDonnell et al., 1997). Techniques used by the facilitator to optimize debriefing include introducing the expectations and learning objectives during debriefing, active listening, Socratic questioning, the strategic use of silence, and use of videos (Dismukes, Jobe, & McDonnell, 1997). Similar to debriefing in the military is the practice of disregard for hierarchy with regard to rank or status; all members speak openly and provide feedback to each other without fear of penalty.

Debriefing in simulation based healthcare education incorporates several of the principles and objectives from debriefing in these other fields. Similar to psychology, debriefing in simulation based healthcare education attends to the emotional reactions of participants and seeks to negate negative outcomes related to participants' perceptions about their performance during the simulation case. The military belief that correcting wrong thought processes is more important than correcting wrong actions is shared by facilitators in simulation based healthcare education (Darling et al., 2005). Finally, practitioners of healthcare simulation share the aviation industry's practices of encouraging team-based self-discovery with the goal of transferring learning to the workplace in order to improve safety and efficiency.

The importance of debriefing in simulation based healthcare education has been recognized in literature reviews, expert opinion manuscripts, and empirical studies. It is a generally accepted view that learning will not occur in simulation based education without debriefing. Several influential reviews of simulation literature (Issenberg et al., 2005; McGaghie et al., 2010) have identified the feedback given during debriefing as being essential to learning. Empirical studies (Mahmood & Darzi, 2004; Savoldelli et al., 2006; Shinnick & Woo, 2010) have demonstrated that learning does not occur in simulation based education in the absence of debriefing.

There are certain characteristics of debriefing that have been identified in early theoretical work, concept analysis manuscripts, and research-based frameworks. Lederman (1984) described a conceptual framework of "cognitive assimilation" for post-experience analysis that she viewed as quite different from the early historical group debriefing conducted in the military. In Lederman's conceptualization, the analysis conducted was not a simple recollection of events for the purpose of historical reconstruction or so that those who were not present could learn from those who were present. Lederman's conceptualization views the post experience analysis as a structured, guided method for bringing meaning to the experience and learning from that meaning (p. 417). The more modern military practice of "after action reviews" has evolved to mirror this conceptualization (Darling et al., 2005). Lederman also discussed the need for debriefing to occur in order to address the expected ambiguity that the learner would feel at the conclusion of the experiential learning activity. In later work, Lederman (1992) described seven elements of debriefing and a methodology for conducting debriefing. The seven elements identified as being common to all debriefing are: the debriefer, the participants, the experience through which the participants have come, the impact of that experience, the recollection of the experience, the reporting of the experience, and the time to process it. The structure of debriefing was described as being three-phased. The first phase focuses on systematic reflection and analysis; the second phase reflects on individual meanings associated with the experience; the third phase focuses on generalization and application of lessons learned (Lederman, 1992).

Reflection, a defining characteristic of debriefing, has been addressed in the nursing literature related to simulation based education. Reflection on experiences is a key concept in Kolb's Experiential Learning Theory, and the reflective discussion that takes place during debriefing has been referred to as the "heart and soul" of simulation training (Rall, M., Manser, T., & Howard, S.K., 2009). Schon (1987) describes the process of reflecting on thought processes as a primary process in the development of expert practice. Ruth-Sahd (2003) suggests that in order to encourage deep reflection in students, nurse educators must maintain trust, create a collaborative relationship with learners, engage learners both cognitively and affectively, and provide adequate time for reflection. Decker (2007) described reflection as an active process of self-monitoring initiated by a state of puzzlement occurring during or after an experience that can lead to the discovery of new knowledge (p.45). For several reasons, reflection requires the guidance of a skilled facilitator. Reflection can have negative consequences if the reflection does not lead to conclusions about the learning experience, as can happen without expert guidance. To avoid possible negative feelings of personal distress, self-doubt, and insecurity, it is essential that the facilitator establish a safe environment that is based on trust and confidentiality and guide the discussion to ensure that learning objectives are met (Decker & Dreifuerst, 2012).

Debriefing Research Studies

A number of debriefing studies have been published in the last decade seeking to answer several research questions about debriefing techniques. Quantitative research studies have evaluated the effect of the use of video to augment verbal debriefing, simulation without debriefing versus simulation with debriefing, instructor-led versus student-led debriefing, structured versus unstructured debriefing, and the timing of debriefing. Several qualitative studies have sought to understand debriefing processes and students' perceptions of debriefing.

Studies examining the use of video playback during debriefing

The effect of augmenting traditional debriefing discussions with playback of audio/visual recordings of the simulation has been explored in several studies. Byrne et al. (2002) measured 32 anesthesiology residents' time to solve a clinical problem and charting error rates when using video-assisted verbal debriefing across a series of five simulations in one day. Residents were randomly assigned to one of two groups. One group received a "short explanation" of events after each simulation and one group received the same short explanation. In addition, they viewed a video recording of their performance.

Charting error evaluated the ability of the residents to document vital signs at 2.5-minute intervals. The chart error rate from each participants' final simulation was divided by the chart error rate of the same subject during the first simulation to provide a ratio. Time to solve the problem was taken as the time from the onset of the clinical problem to the time when the last intervention was made. The significance of changes were analyzed using Wilcoxon's Rank Sum test. The video group had a shorter mean time in minutes to solve ratio (0.68) compared to the verbal only group (1.18), but the difference was not statistically significant. The verbal group showed a greater decrease in chart error (median ratio 0.63) than the video group (median ratio 0.83), but the difference was not statistically significant.

Differences between the groups on demographic factors were not reported. This could have been significant, as participants had various levels of experience. The study did not report on training or blinding of assessors. There was no discussion of intervention fidelity. It is of note that the instructors' feedback was described as "a short explanation", and therefore, may not have been a reflective debriefing discussion. Given these limitations, it is difficult to interpret the results of this study.

Savoldelli et al. (2006) also compared verbal only debriefing to video-assisted verbal debriefing in anesthesiology residents. In this study, a convenience sample of 42 anesthesiology residents was randomized to one of three equivalent groups. An a priori power analysis estimated that 39 total subjects were needed. Group 1 received no debriefing. Group 2 received verbal feedback. Group 3 received verbal feedback that was augmented with video playback of the simulation events. This study evaluated non-technical skills using the Anesthetist Non-Technical Skills (ANTS) scoring system in two simulation experiences pre- and post- intervention (Fletcher, McGeorge, Glavin, Maran, & Patey, 2004). The ANTS instrument evaluates the skills of task management, situational awareness, team working, and decision making. Outcome assessors underwent training in the use of the ANTS instrument prior to the study and were blinded to group assignment. Inter-rater reliability for the total ANTS score was acceptable: intra-class correlation coefficient = .64 ($p < .0001$). At the category level, across the four categories, interrater reliability was acceptable: intra-class correlation coefficient = .58 ($p < .0001$). Change scores were calculated as total ANTS score at posttest minus total ANTS score at pretest. Analysis of variance determined that there was a significant difference between the three groups ($F= 6.10$, $p < 0.005$). Post hoc testing revealed that compared to controls (- 1%), improvement in ANTS scores were greater in the groups who received debriefing, either verbal (+15%) or video-assisted (+11%). No significant difference was found between the verbal only versus the video-assisted verbal debriefing groups. The study did demonstrate that improvements in ANTS scores tended to be lower in the video-assisted group, although this difference was not statistically significant. It was discussed that reasons for this may have included that using video may have limited the time for discussion, may have distracted the learners, or may have resulted in “information overload”. Most importantly, this study demonstrated that ANTS scores decreased from pretest to posttest in the group who did not receive debriefing.

Grant, Moss, Epps & Watts (2010) evaluated the effect of video-assisted verbal debriefing in nursing students. In this study, a convenience sample of 34 undergraduate and 6 graduate nursing students were randomly assigned to the group receiving verbal debriefing (control group) or video-assisted verbal debriefing (intervention group). There was no a priori power analysis. All students participated in two practice simulations over the course of the semester, and two final simulations at the end of the semester. Participants were scored by raters who were blinded to group assignment during the last two simulations on patient safety, communication, assessment, prioritization, interventions, and delegation using a modified version of the Clinical Simulation Tool (Radhakrishnan, Roche, & Cunningham, 2007). Each behavior was assigned a point value, and points were totaled to reach a total performance score for each student and for each of five teams. Inter-rater reliability was assessed using Fliess’s kappa coefficients, which ranged from .71 to .94, indicating substantial to nearly perfect agreement.

Analysis of variance and t tests were used to compare control and intervention groups on behaviors, roles, scenarios, and student simulation teams. The video-assisted group had a higher mean score (9.09) than the control group (8.44), but the difference was not statistically significant. The only significant difference was that students in the intervention group were more likely to perform two behaviors: patient identification (t test, $p < .01$) and team communication (t test, $p = .01$).

Chronister & Brown (2011) also evaluated the use of video playback during debriefing compared to verbal only debriefing using a comparative crossover design. A convenience sample of 37 undergraduate nursing students were randomly assigned to one of two equivalent groups. Both groups participated in two cardiopulmonary arrest simulations that lasted 15 minutes, followed by a 30-minute debriefing. Simulations were spaced one week apart. Outcome variables evaluated included quality of skills (guided by American Heart Association guidelines), time to complete skills, and knowledge retention using a 10 item written examination. Interrater reliability was assessed following a three hour instrument training session. After watching videotaped cardiopulmonary arrest simulations, interrater reliability was determined to be 90% rater agreement with four raters.

Outcomes were measured by comparing change in mean skill quality scores and exam scores. Other outcomes measured included time to complete skills. To compensate for the small sample size, the significance level was set at $p < .10$. There was no significant difference between the groups on skill quality scores ($p = .71$). Analysis of time to complete skills indicated that the video playback group had faster times on three skills: pulse assessment with initiation of CPR ($p = .09$), initial defibrillation ($p = .04$), and total time to resuscitation ($p = .03$). Knowledge gains were significantly better in the verbal only debriefing group from pretest to posttest ($p = .01$). These findings suggest that speed of skills may be positively affected by viewing a video of the skills during debriefing, while knowledge retention is positively affected by verbal only debriefing.

Similar to the study by Savoldelli et al. (2006), the authors raise the possibility that time spent watching the video may have detracted from the reflective discussion, which in turn may have influenced knowledge acquisition and retention.

Sawyer et al. (2012) also evaluated verbal only compared to video assisted verbal debriefing. A convenience sample of 30 pediatric and family medicine resident was randomly paired into 15 teams of two members each. Each team was then randomly assigned to one of the debriefing types for three simulations. An a priori power analysis estimated that eight teams in each study group were required. There were only seven teams in the verbal debriefing group. The video group had the required eight teams. Outcomes were measured by reviewers who were blinded to group assignment using the previously validated Neonatal Resuscitation Performance Evaluation (NRPE) tool (Sawyer et al., 2011). The video-assisted verbal debriefing group had a greater improvement in neonatal resuscitation scores than the verbal only debriefing group, but the difference was not statistically significant (video, 12%; verbal, 8%; $p = 0.59$). Time to complete tasks was also measured; there were no statistically significant differences between groups in the seven tasks measured.

This study is notable for the amount of detail provided related to factors that can affect the quality of debriefing. Significant details explained in the manuscript included that all elements of the simulation and debriefing were facilitated by the same investigator, the model of debriefing used, and details about the content and timing of the debriefing. This complete description enhances the reader's ability to interpret the findings.

In reviewing studies evaluating the impact of using video playback of simulations to augment verbal debriefing, no strong benefit to the use of video-assisted verbal debriefing has been demonstrated. In several of the studies, the video-assisted verbal debriefing groups demonstrated greater improvement in measures related to skill performance (e.g. time to skill), but the differences were not statistically significant. Given the expense associated with audio/visual recording systems in simulation laboratories, the currently published studies do not justify the expense. One potential explanation may be that time spent reviewing the recordings takes time away from the reflective discussion that is critical to debriefing. To provide for better comparison of augmenting verbal only debriefing with video review, the amount of time for discussion should be held constant, with video review time added to discussion time.

Studies evaluating facilitation techniques

Several studies have evaluated various facilitation approaches to debriefing. These studies evaluated facilitator led versus self-debriefing by learners or no debriefing at all. Morgan et al. (2009) compared facilitator led debriefing to no debriefing at all. A group of 58 volunteer anesthesiologists was randomly assigned to one of three equivalent groups. Group 1 received 1:1 debriefing following the first simulation. Group 2 received a home study program consisting of peer-reviewed articles about the causes of human error in medicine. Group 3 was dismissed after completion of the pretest simulation with no educational intervention. Subjects participated in two simulation scenarios spaced from six to nine months apart. Outcome measures were a scenario-specific dichotomous checklist of skills and a global rating scale, which was performed by raters who were blinded to group assignment. Interim analysis of variance after the posttest simulation revealed no difference between Groups 2 and 3, and so they were combined into a single group to compare with the intervention Group 1. This allowed for the final analysis to essentially compare those who received debriefing to those who did not receive debriefing.

Analysis of variance showed a significant time by group interaction ($F = 4.18$, $p = .046$). The group who did not receive debriefing showed no significant improvement between pretest and posttest times on the dichotomous skills checklist ($p = .52$), but there was significant improvement in the debriefed group ($p = .03$). There was no significant difference between the groups on the global rating scale ($F = .268$, $p = .61$).

The greatest threat to the validity of this study is the amount of time between pretest and posttest (six to nine months). This introduces the possibility of history and maturation as confounders. While retention of learning is an important outcome to measure, this study would have been strengthened by measuring outcomes more immediately in addition to the long term follow-up at the six to nine month point.

Shinnick, Woo, Horwich, and Steadman (2011) evaluated the impact of the separate components of simulation on learning by measuring heart failure knowledge immediately after the "hands on" component of simulation and then again after the "hands on" component plus debriefing. Heart failure knowledge was measured using parallel forms of a 12-item multiple-choice questionnaire. This two group repeated measures experimental design evaluated the outcome in 162 prelicensure nursing students. An a priori power analysis estimated a desired sample size of 128 for a power of 0.80.

Both groups completed the heart failure test prior to the simulation (knowledge pretest). The experimental group then completed the hands on portion of the simulation, followed by posttest 1. Following group debriefing, the experimental group then took posttest 2. The control group completed the same pretest as the experimental group, and then took posttest 1 within one hour (prior to the simulation). This group then participated in the simulation and debriefing before taking posttest 2.

Heart failure knowledge scores on a 12 item multiple choice exam decreased in both groups on pretest 1 ($M = -5.63$, $SD = 3.89$, $p < .001$) and then improved after debriefing ($M = + 6.75$, SD 4.32, $p = < .001$). This validates what is generally believed about debriefing, and echoes the findings of the Morgan et al. (2009) and Savoldelli et al. (2006) studies that there is no learning in the absence of debriefing.

Study evaluating the timing of debriefing

One research study was located that evaluated in-simulation debriefing versus post-simulation debriefing (Van Heukelom, Begaz, & Treat, 2010). The study evaluated students' perceptions of the effectiveness of the debriefing and their self-reported confidence. The convenience sample of 161 third year medical students was randomized to receive either in-simulation or post-simulation debriefing. Two days after the simulations, participants completed a 12 item survey. Respondents were asked to rate their confidence pre- and post- simulation and to rate the teaching effectiveness of the simulation, with four items specifically targeting the debriefing they received. The internal consistency for the survey data related to the effectiveness of debriefing was acceptable, with $a = .69$ for the in-simulation debriefing group and poor, with $a = .60$ for the post-simulation debriefing group. Wilcoxon signed-rank tests showed significant differences between the groups on three survey items: "the debriefing helped me learn effectively" ($p = .001$), "the debriefing help me understand the correct and incorrect actions" ($p = .001$), and "the debriefing style was effective" ($p = .010$). All were rated higher by the post-simulation debriefing group. Survey items related to self-reported confidence demonstrated a high level of reliability as measured by an $a = .91$. Scores in both groups related to confidence increased from pretest to posttest (all $p = < .001$); there was no difference between the groups in confidence levels.

This study has several limitations. The primary limitation is the fact that the measures are all self-report. In addition, the "pretest" measures were actually done retrospectively after the entire experience, and therefore, not a true pretest. Additionally, no comparison between the groups on demographic measures was reported. The survey items demonstrated poor to acceptable internal consistency. Finally, the amount of time allotted for simulation, plus debriefing, was only 20 minutes. Not only is this a very limited amount of time, the division of that time between the simulations and the debriefing was not standardized or recorded. Given these factors, it is difficult to interpret the results of this study.

Studies evaluating instructor-led versus self debriefing

Welke et al. (2009) evaluated the effectiveness of a standardized, computer-based program for debriefing. A secondary aim was to compare this method of debriefing to video-assisted verbal debriefing in a convenience sample of 30 anesthesiology residents who were randomized to one of two groups. An a priori power analysis estimated a sample size of 12 participants. This sample size was calculated using an effect size of 1.0, and a power of 0.80. Participants were evaluated by assessors who were blinded to group assignment using the ANTS instrument during a series of three simulations. Results demonstrated that the computer based program was effective for learning. The total ANTS scores significantly improved in this group from pretest to posttest and posttest to retention at five weeks ($F = 9.4$, $p = < .001$). The total ANTS score for the video-assisted verbal debriefing group also improved significantly from pretest to posttest and posttest to retention at five weeks ($F = 9.1$, $p = <.001$). The different debriefing techniques were compared by measuring an effect size, which was very small (0.02 standard deviations). This suggests that there was no strong advantage of one method of debriefing over the other.

This study raises the interesting possibility that allowing participants to debrief using a carefully constructed multimedia instructional program is sufficient to ensure learning following simulation. It may also suggest that learners being debriefed by a more senior clinical supervisor may not be as open during debriefing discussions, which may interfere with learning. Instead of openly self reflecting on the thought processes driving their actions, learners may instead feel the need to defend their actions to those whose judgment has the potential to affect their grade or performance evaluation. Allowing learners to pace their own debriefing using a computer based system may allow learners to more openly self reflect and more specifically target their individual learning needs.

Similarly, Boet et al. (2011) evaluated instructor led debriefing versus self-debriefing by learners in a convenience sample of 50 anesthesiology residents. In this prospective, repeated measures design, participants were randomized to one of two equivalent groups. Each group participated in one pretest simulation scenario. The self-debriefing group was then told to “reflect on their nontechnical skills performance using the ANTS scale” as a guide. Subjects were then left alone to self debrief for 20 minutes. The second group participated in an instructor-led debriefing using the ANTS framework for 20 minutes. Both groups then participated in a second simulation during which raters who were blinded to group assignment scored their performance using the ANTS scale. Analysis of variance demonstrated that both groups improved their performance from time one to time two ($F = 13.3$, $p = < .01$). There was no difference between the groups based on type of debriefing ($F = .031$, $p = .58$). Analysis of variance at the category level for all four ANTS categories demonstrated no significant difference between the groups in any category: task management ($F = .56$, $p = .46$), team working ($F = 1.25$, $p = .27$), situation awareness ($F = 1.15$, $p = .29$), and decision making ($F = .33$, $p = .57$).

These findings are similar to the study done by Welke et al. (2009), and suggest that, for formative evaluation, learners may be able to conduct their own debriefing effectively if given a framework within which to work. This study again raises the concern that debriefings led by senior practitioners who can influence the learners' clinical performance rating may in some way limit the ability of learners to reflect openly. Self debriefing may allow learners to reflect more openly since they are not in the position of having to defend their actions to senior clinicians or supervisors.

Studies comparing specific models of debriefing

Two studies evaluated a specific model of debriefing compared to unstructured debriefing. The model evaluated in both studies was the Debriefing for Meaningful Learning (DML) model Dreifuerst, (2010). Mariani, Cantrell, Meakim, Prieto, and Dreifuerst (2012) evaluated the effects of DML on a convenience sample of 86 juniorlevel baccalaureate nursing students using the Lasater Clinical Judgment Rubric. Participants who had been randomly assigned to clinical groups earlier in the semester were assigned to the control or intervention arm of the study based on whether the faculty members attended the faculty development session on the use of DML. Students participated in two simulations spaced four to five weeks apart. An a priori power analysis determined that 27 participants were needed in each group; there were 42 students in the intervention group and 44 students in the control group.

During the first simulation, students were scored by clinical faculty. Members of the research team also completed the Lasater Clinical Judgment Rubric in order to address interrater reliability of the clinical faculty. Using the Pearson product-moment correlation, inter-rater reliability was determined to be high ($r = .92$; $p < .01$). During the second simulation, only members of the research team scored the students.

Mean total scores were analyzed with repeated measure analysis of variance to assess differences within groups and between groups as well as across time for both groups. No statistically significant differences were found in overall scale scores between groups ($F = .0009$, $p = .64$), time main effect ($F = .33$, $p = .56$), or group x time interaction effect ($F = .213$, $p = .64$). A computed power analysis at the completion of the study suggested low observed power; the a priori power analysis was calculated assuming a moderate effect size. The authors suggest that a more conservative effect size would have resulted in a larger sample size, which may have resulted in statistically significant differences between groups. A particular weakness of the study was the fact that two different groups of faculty scored the students after the first and second simulation, which may have resulted in inconsistent scoring. History and maturation may have influenced scores. Students also participated in theory classes and clinical experiences between the simulations, which may well have influenced their clinical judgment, making it difficult to isolate the effect of the simulation on clinical judgment scores.

Dreifuerst (2012) compared the Debriefing for Meaningful Learning model to unstructured debriefing to measure its effect on students' reasoning skills as measured by the Health Sciences Reasoning Test (Facione & Facione, 2006). Debriefing was rated by the students using the Debriefing Assessment for Simulation in Healthcare – Student Version instrument (DASH-SV) (Simon, Raemer, & Rudolph, 2010). The study also measured students' perception of the quality of debriefing. The sample consisted of 238 baccalaureate nursing students in the seventh semester of an eight semester program of study.

Three weeks before the simulation, participants completed the Health Sciences Reasoning Test and a demographic questionnaire. Following a four hour long simulation experience, students in the experimental group participated in a debriefing discussion using the Debriefing for Meaningful Learning model, which was facilitated by the researcher who created the model. The control group received "usual and customary" debriefing led by clinical instructors. Immediately following the experience, students completed the DASH-SV (Simon et al., 2010) and the Debriefing for Meaningful Learning Student Questionnaire.

Analysis of covariance showed that the between-participants test effect of Debriefing for Meaningful Learning on the total Health Sciences Reasoning Test was significant ($F = 28.55$, $p = \leq .05$), and the covariance was significantly related to debriefing method (F = 623.91, p = $\leq$ .05), with a large effect size of .84. To evaluate DASH-SV ratings of the different methods of debriefing, ratings on the six elements of the DASH-SV were converted to Z scores. The mean aggregate DASH-SV scores were significant (Z = -11.99, p = < .001), indicating that participants in the different groups perceived a difference in the debriefing styles, with the Debriefing for Meaningful Learning group rating five of the six elements higher than the control group.

In the final analysis of findings, eleven regression models were constructed to examine the relationship between Debriefing for Meaningful Learning, the Health Sciences Reasoning Test, the DASH-SV, and the Debriefing for Meaningful Learning Student Questionnaire. Results indicated that there was a significant relationship between these elements, and indicated that as students' reasoning skills improved, they perceived a higher quality of debriefing.

The two studies evaluating Debriefing for Meaningful Learning versus unstructured debriefing do not provide strong direction for debriefing practitioners. The Debriefing for Meaningful Learning model has been recently developed, and requires further testing.

Observational and qualitative studies

In a manuscript reporting two studies, the elements of debriefing applied to two types of simulations were examined (Dieckmann et al., 2009). The types of simulations were focused on medical issues versus crisis resource management issues. Researchers evaluated the roles of the debriefers and patterns of communication following simulations. In the study examining roles, 70 simulation center directors were asked to complete an electronic survey. The survey asked respondents to rate how relevant each one of six roles was to ideal debriefing. The six roles were those identified by Harden and Crosby (2000) as roles of the medical teacher. These roles included the simulation instructor as information provider, role model, facilitator, assessor, planner, and resource developer. Twenty-two responses were received from Europe, Australia and the United States. Wilcoxon's test for dependent samples was used to investigate significant differences between central tendencies between the different types of simulations (medical versus crisis resource management). There was not a significant difference in the perceived importance of the various roles between the two types of simulations, with the exception of information provider, with higher perceived relevance for medical simulations ($p = < .01$).

The second study reported in this manuscript was an observational study examining the interaction of debriefing facilitators with their students. Specifically, observations were recorded about talking balance, topics addressed (i.e. medical versus crisis resource management topics), and types of interaction (questions versus utterances). This study used a paper-based observation protocol to code interactions between debriefing facilitators and participants during eight debriefings in one simulation course. Observations revealed several patterns of interaction.

- Line interactions (3 debriefings). These interactions are primarily between the facilitator and one participant.
- Triangle interactions (2 debriefings). These interactions involve the facilitator and two of the most active participants.

- Fan interactions (1 debriefing). These interactions take place between the facilitator and all participants in a dyadic way. There is little interaction between participants. Participants are all active.
- Star interactions (2 debriefings). The participants interact with each other and with the instructor. Interactions are more evenly distributed in this pattern than in the others.

The value of this study is that it explores the phenomenon of debriefing processes according to the learning objectives of the simulation experience, which can vary greatly (e.g. medical crisis, crisis resource management, communication). The survey gathered expert opinion related to the various roles of the facilitator when conducting simulations for various reasons. The experts surveyed saw the roles as fairly consistent across the two types of simulations, with the exception of giving information, which is logical when facilitating medical crisis simulations, as there is often concrete information that must be clarified (e.g. pharmacology, pathophysiology). The second study documented the wide variation in patterns of communication in debriefing. This analysis supports the need for training for debriefing facilitators to ensure that each participant actively reflects and shares their perspective during debriefing.

Qualitative studies and expert opinion papers have identified the following as characteristics of successful debriefing: having a structure, positive faculty demeanor, cuing questions, debriefing immediately following the simulation, honest and forthright feedback on performance, a safe learning environment, and enough time to adequately debrief learners (Brackenreg, 2004; Dismukes et al., 2006; Kuiper, Heinrich, Matthias, Graham, & Bell-Kotwall, 2008; Lasater K, 2007; J. W. Rudolph et al., 2007).

Cantrell (2008) reported the results of qualitative focus groups that investigated students' perceptions of structured debriefing following simulation exercises. Eleven senior-level prelicensure nursing students participated in a simulation experience followed by an unstructured verbal debriefing. They then received a structured debriefing session involving a review of video playback of the events of the simulation two weeks after the simulation; this was considered part of the focus group. Two one-hour qualitative focus groups were conducted by the investigator and were recorded and transcribed verbatim. It was not reported if saturation of themes was a goal of the data collection, and it was not reported.

Content analysis of the focus groups revealed three components that students identified as influencing their learning. Students preferred to be well prepared for clinical simulations through didactic coursework prior to the experience. Faculty demeanor was also identified as a critical component. Students felt that faculty who exhibited a coaching and supportive demeanor and who provided cues during the simulation lessened their anxiety and supported their learning. With regard to debriefing, students strongly preferred that debriefing take place immediately after the simulation, when events were still fresh in their minds. The medium used (verbal versus video-assisted verbal debriefing) was not as important as the timing. Students saw debriefing as an important teaching strategy.

Student perceptions of debriefing were also reported by Lasater (2007). The qualitative portion of this study was embedded in a larger study that focused on developing a rubric for the assessment of clinical judgment. For the qualitative portion, eight of the original 39 study participants attended a 90 minute focus group, which was videotaped. The students were all female, ranged in age from 24 to 50, and five of the eight had previous bachelor's degrees. Analysis of the findings revealed several themes, although it was not reported if saturation of themes was assessed or achieved. There was acknowledgement that high fidelity simulation has both strengths and weaknesses. Students also identified the value of working in teams, as it enabled them to learn with and from each other, which was seen as a strength. Students also identified the paradox of "anxious and stupid feelings yet increased awareness" (p. 273). There was a connection observed between the seemingly uncomfortable feelings of inadequacy and the openness to learning; it was this discomfort that motivated students to reflect during debriefing in an effort to understand their thoughts and correct their errors. This description by students echoes Decker's description of reflection as an active process of self-monitoring that is initiated by a state of puzzlement (Decker, 2007). Students saw the quality of reflection during the debriefing as being key to effective learning. Students also articulated a strong desire for more direct feedback from the simulation facilitator about their errors. They did not only want to hear what was done correctly.

A qualitative study used semi-structured interviews with a purposive sample of surgical team members from the United States, United Kingdom, and Australia sought to identify the core components of debriefing (Ahmed et al., 2012). Subjects included both debriefing facilitators and learners receiving debriefing. The sample consisted of 18 surgeons, of which 8 were trainers and 10 were trainees; 8 surgeons, of which 4 were trainers and 4 were trainees; and 7 operating room nurses, of which 4 were trainers and 3 were trainees. An interview protocol that was piloted before being finalized explored the views of participants on the following topics: the purpose of debriefing; components of an ideal debriefing; examples of effective and ineffective debriefing; and strategies to improve the quality of debriefing. Interviews lasted 30-45 minutes and were audiotaped. Members of the different professional groups were interviewed until saturation of themes was achieved. Audiotapes were transcribed, analyzed, and cross-checked by three research team members in order to ensure reliability of the emergent themes. The following themes emerged.

- Purpose of debriefing. The most common purpose of debriefing was to identify what went well or not so well. The key goal of debriefing was to enhance future practice. Interestingly, 50% of trainers identified “providing positive reinforcement” as a goal of debriefing, while only 18% of trainees identified this as a goal. This may reinforce student perceptions from the Lasater (2007) study in which students strongly voiced the desire for more direct feedback on performance, including their errors.
- Current practice of debriefing. There was a discrepancy in beliefs about the frequency with which debriefing was conducted. Most trainers believed that they routinely provided debriefing, while most trainees did not believe that they routinely received debriefing. This raises the question of what trainers are actually doing when they believe that they are debriefing, or what trainees expect from debriefing. The exception was in anesthesia, where all trainers and trainees stated that debriefing was routinely done. Most agreed that debriefing was most likely done when something went wrong.

- Components of effective debriefing.
    - Approach and timing. Debriefing done immediately following simulation was preferred. Feedback that was honest, specific, and objective, yet delivered in a nonjudgmental and open manner was identified as a key feature.
    - Establishing the learning environment. A private location away from the simulation room was preferred.
    - Engaging the learner. Engagement was improved by asking open ended questions, listening, and allowing the learners to provide feedback to others, including the facilitator.
    - Exploring reaction. Acknowledging emotions, especially for learners who were unhappy was seen as important by trainers.
    - Descriptive reflection. Reflection was seen as crucial and included reconstructing events, exploring how events were dealt with, and allowing for criticism aimed at improvement.
    - Analyzing performance. Identification of both positive and negative aspects of performance was seen as important. Feedback on technical and non-technical skills was seen as equally important.
    - Diagnosing areas for improvement. Debriefing was seen not just as a time to review what went well and what did not go well, but as a time to point out specific aspects of performance that need improvement.

- Application and follow-up. Understanding and discussing lessons learned and formulating a specific action plan to apply them was commonly reported as key to an effective debriefing.

Evaluation of the depth of reflection was examined in a qualitative study by (Husebo et al., 2013). In this study, four facilitators were taped conducting debriefings for 81 prelicensure nursing students during 24 debriefings. Facilitators' questions and students' responses were graded for depth of reflection using Gibbs' reflective cycle as a framework (Gibbs, 1988). Gibbs' cycle represents an increasing depth of reflection consisting of 6 stages: description, emotion, evaluation, analysis, conclusion, and action plan.

Subjects included 72 female and 9 male students who ranged in age from 22 to 53 years (mean age 27) who were in the last semester of a three year nursing program. The students were divided into 14 groups of four to seven students. The four facilitators were all female, aged 34-60 years. They had all participated in a three day workshop on simulation based learning, include how to facilitate debriefing discussions with learners.

All recorded debriefings were transcribed verbatim and read 2-6 times. Questions and answers were both coded according to Gibb's stages of reflection by two independent coders. This resulted in five categories of questions and answers (there were no questions or answers in the action plan stage). Rater agreement and interrater reliability were calculated. Rater agreement for question categorization was 82%; for answer coding was 80%; and for answers and questions together was 81%. Interrater reliability was calculated using a K score, which indicates the degree to which the ratings of two independent raters are intercorrelated. The K score for agreement for questions was 0.77 and for answers was 0.79, which indicates moderate to good agreement.

The study found that facilitators asked the most questions at two early stages of reflection, description, and evaluation. This is consistent with the common debriefing practice of asking learners to recount events and explain what they felt went well and what did not go well. Very few of the questions were at the analytic stage focusing on what sense the learners could make of the situation. Classification of participants' answers showed that most of their responses were at the descriptive stage. There were responses at the analytic stage, most of these in direct response to analytic questions. These results point to the necessity of developing facilitators' skills in asking analytic questions in order to trigger metacognitive responses in learners. Debriefing that focuses simply on recounting events and assigning them a positive or negative value does not allow deep analysis of thought processes, which in turn prevents learners from correcting their thought processes for application in future similar situations. This may explain why there were no questions or responses in the action plan phase of Gibbs' cycle. Debriefing at this superficial level represents a lost opportunity for meaningful learning. This study reinforces the need to train debriefing facilitators in questioning techniques.

Student perspectives regarding the elements of debriefing that they regarded as facilitating learning were examined in a qualitative study of 28 prelicensure nursing students (Fey, Scrandis, Daniels, & Haut, 2013). In this study, students at two different points in a baccalaureate nursing curriculum participated in focus groups that lasted between 30 and 60 minutes. Students participated in simulation experiences, followed by debriefing discussions using the Debriefing with Good Judgment model (J. W. Rudolph, Simon, Dufresne, & Raemer, 2006) . The primary author of the study conducted all debriefings. Data collection took place over two semesters to ensure saturation of themes. The focus groups were audio recorded. The recordings were transcribed by one researcher and independently verified by a second researcher. Transcribed focus group discussions were then coded for themes by two research team members working independently. Codes were then compared line-by-line. Emergent themes were identified by the two coders, and verified by a third member of the research team. Themes were then validated and collapsed through member checking sessions that were attended by 28 students (not necessarily the focus group participants). Five themes emerged as being characteristics of debriefing that facilitated learning:

- Safe environment to learn from mistakes. This theme had two meanings. First, the environment was seen as providing a psychologically safe learning environment in which students could examine their mistakes for learning purposes without fear of shame or embarrassment. Second, mistakes could be made without impacting the safety of actual patients.
- Debriefing to explore thoughts. The debriefing discussions were seen as a two way conversation that was conducted primarily to explore the thought processes behind actions. This type of discussion allowed students to understand and correct their thought processes.
- Feedback from multiple perspectives. The incorporation of feedback from peers who participated in and/or observed the simulation, along with feedback from the instructor was seen as valuable.

- All in this together. The mutual support from peers both during the simulation and during debriefing was valued by participants. An important component of this support was normalizing feelings, thoughts, and actions.
- Group facilitation. Specific facilitator actions were seen as facilitating learning. These included managing the flow and pacing of the conversation, being sure to include all participants, active listening techniques and positive nonverbal communication.

One study was located that examined debriefing practices from the perspective of the faculty engaged in facilitating debriefing (Brackenreg, 2004). In this small descriptive study, nine nurse educators who used experiential learning frequently were interviewed about their practices related to the structure of debriefing following experiential learning. It should be noted that the experiential learning activities were not described and may not have been simulation experiences. The educators were asked to describe a successful experiential learning activity and then to describe the structure and amount of time spent on the activity and the debriefing. Five of the nine educators stated that they planned the activity phase in detail, but they did not plan the reflection phase. The time allocated for debriefing was from 10% to 25% of the total time allotted for the activity. Three educators did pre-plan the debriefing phase. This group allotted at least 50% of the total time to debriefing.

This study was small, and derived from self-reported data. However, it was the only study located that examined how faculty members planned debriefing during experiential learning. It is of interest in that it indicates a pressing need for further research and faculty development.

Examination of research studies within the Sim-PICO framework

One framework recommended for use in designing and reporting debriefing studies that outlines the important characteristics of debriefing is termed the Sim-PICO framework (Raemer et al., 2011). This framework was used to guide the development of survey questions for elements of debriefing that were salient, but not associated with one of the concepts of experiential learning theory. The Sim-PICO framework, an adaptation of the PICO framework used to formulate research questions, includes the elements of: the simulation, population studied, intervention applied, comparisons tested, and outcomes determined. Embedded in the Sim-PICO framework are five questions to be answered in order to characterize the debriefing process:

- Who – who is debriefing?
- What – what is the content/method of debriefing?
- When – when does debriefing occur and for what duration?
- Where – where does debriefing take place?
- Why – does a theoretical framework guide the debriefing? (Raemer et al., 2011).

Examination of the quantitative and qualitative studies reviewed in this chapter within the Sim-PICO framework reveals inconsistent reporting of the PICO elements and the five questions that address the intervention and comparison group (who, what, where, when, why). All of the studies did consistently describe the content of the simulations and the research design. All of the studies reported the population, including discipline, level of training, and number of participants. However, descriptions of the intervention and comparison group were frequently not well explained, and answers to the five questions were frequently not clear. See Appendix B for a complete review of the Sim-PICO elements in each study.

Who. Debriefing by competent instructors is critical to learning, and the instructors require both structure and specific techniques (Raemer et al., 2011). In the absence of an assessment of the skill level and/or description of the expertise of the debriefer, it is difficult to draw conclusions about the quality of the debriefings. Within the descriptions of the intervention and comparison group in these studies, complete descriptions of "who" with regard to the expertise and training of the debriefers was not consistently described. Three studies (Boet et al., 2011; Grant, 2010) did describe the level of expertise of the debriefers. Four of the studies (Boet et al., 2011; Grant, 2010; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013; Sawyer et al., 2012) described some level of training or experience that the debriefer had, but did not specify any objective assessment of the debriefers' skill. Two studies (Dreifuerst, 2012) reported assessing the skill of the debriefer using the Debriefing Assessment for Simulation in Healthcare – Student Version, Short Form (Simon et al., 2010). Most studies simply described the debriefer(s) as "faculty" or "instructors". The discipline of the debriefers was consistently reported (i.e. medicine, nursing).

What. Descriptions of the exact content and method of the debriefing discussions were sparse, as were descriptions of any type of structure or debriefing script. Six studies (Boet et al., 2011; Chronister & Brown, 2012; Dreifuerst, 2012; Grant, 2010; Sawyer et al., 2012) reported that the debriefing followed a specific structure. Structures included both overall frameworks as well as specific scripted discussion that were guided by learning objectives. The studies were generally clear about the purpose (e.g. video-assisted debriefing versus verbal only debriefing).

When. Explanation regarding the timing of the debriefing (i.e. post- versus in-simulation) were clear, however, most studies did not report the duration of the debriefing. Six studies clearly stated the duration of the debriefing, which ranged from 20 to 30 minutes (Boet et al., 2011; Chronister & Brown, 2012; Dreifuerst, 2012; Sawyer et al., 2012; Shinnick & Woo, 2010); one stated total time for simulation plus debriefing as 20 minutes (Van Heukelom et al., 2010).

Where. The environment was stated in three studies (Van Heukelom et al., 2010). More specific "where" questions were not answered, including if the debriefing took place in the same room as the simulation, in a separate debriefing room, or at the bedside.

Why. Why a certain method of debriefing was chosen, e.g. use of a theoretical framework, was addressed in three studies (Mariani et al., 2013). The Debriefing for Meaningful Learning model of debriefing was used in one study (Dreifuerst, 2010) and Tanner's Clinical Judgment Model (Tanner CA, 2006) guided the development of the simulation and evaluation of the learners. The Debriefing with Good Judgment model was used in two studies (Fey et al., 2013; Sawyer et al., 2012). While the research questions were usually clear in most of the studies, the underlying theory guiding the research or debriefing methods were often not explicitly stated.

Application of the Sim-PICO framework to these studies revealed that many of the elements critical to evaluating the quality of debriefing were not reported. Because of this, no strong conclusions can be drawn in support of any specific recommendations regarding debriefing models, processes, or technologies. In fact, it is unclear from the literature exactly what debriefing practices were being evaluated in the majority of published studies. These omissions in reporting of the Sim-PICO elements have resulted in research studies that are limited in their ability to be interpreted and/or generalized.

Several themes did emerge consistently throughout the debriefing literature, regardless of the practice setting or discipline. The most influential factor in the success or failure of a debriefing discussion may well be the skill of the facilitator. Facilitating debriefing discussions requires knowledge and skills not normally acquired in most healthcare professional curricula. The need for specific training for debriefing facilitators is clearly stated in the Standards of Best Practice for Simulation (Decker et al., 2013), and in the monograph released following the First Research Consensus Summit of the Society for Simulation in Healthcare (Raemer et al., 2011). Many published studies speak to the value of the facilitator in structuring debriefing sessions and guiding learners in self-reflection. The creation of a safe learning environment is another critical element of debriefing that is primarily the responsibility of the facilitator. Often described as an environment of trust, it reflects the facilitators' skill in establishing a climate in which learners feel free to honestly reflect on and discuss their feelings, thoughts, and decision making processes without fear of penalty or personal shame. Acknowledgment of the emotions of learners seems to be an important component of this trusting environment. Within this environment, discussion should focus not only on actions, but on discovering how the learner framed the situation prior to taking action. Having honest and forthright feedback on performance, delivered in a positive manner, emerges as an element of debriefing that is highly valued by learners. This is especially valued when the feedback is coupled with specific direction about how the learners can improve their future performance. Debriefing should normally be summarized by having learners apply lessons learned to future practice in an attempt to improve future performance. Regarding structural elements, debriefing immediately following the simulation as well as having enough time to discuss all of the important elements of the simulation are important to both facilitators and learners.

These themes are consistent with a recent review of literature on debriefing from aviation, psychology, education, medicine and nursing between the years 2004-2012 (Lusk & Fater, 2013). In this review, several themes emerged as being important to the practice of debriefing. These include:

- the debriefer as a facilitator who provides a safe learning environment;
- active listening techniques;
- facilitating reflective discussion by all participants as a role of the debriefer;
- debriefing should be planned and satisfy learning objectives;
- generalizability of lessons learned to broader contexts should be included in debriefing;
- the time frame for debriefing should be at least as much time as is spent in the simulation but is often longer;
- group sizes were reported as less than 14;
- a structured framework is important to the process. (Lusk & Fater, 2013).

The concept of a safe learning environment is an important theme in the debriefing literature from all fields. Edmondson (2002) describes a psychologically safe learning environment as one in which participants believe that if they make a mistake, they will not be penalized and others will not think less of them for it. This belief allows them to fully participate in experiential learning activities, as they are free to take risks, make suggestions, and ask questions.

Several of the models of debriefing currently in use incorporate these themes into their processes. Debriefing evaluation instruments attempt to measure and quantify these elements. The following sections of the literature review discuss both models of debriefing and evaluation instruments.

Models of Debriefing

There are several models of debriefing in current use, which incorporate many of these critical elements. These models include: the Plus/Delta model, the Gather Analyze, Summarize model (American Heart Association, 2010), the Debriefing with Good Judgment model (J. W. Rudolph et al., 2006), the 3D model (Zigmont, Kappus, & Sudikoff, 2011) and Debriefing for Meaningful Learning (Dreifuerst, 2010; Dreifuerst, 2012) and the CAL model from aviation (Dismukes & Smith, 2000). The Plus/Delta model of debriefing focuses on behaviors that are positive and those that need to change. The name derives from the practice of facilitators creating two columns on paper: one column is headed by the Greek letter Delta, which signifies change and the other column headed by the plus sign, signifying positive behaviors (Fanning & Gaba, 2007). The Gather, Analyze, Summarize model of debriefing can be used with or without a facilitator. It follows three steps: making all the events of the simulation evident, analyzing events and outcomes and summarizing learning (Jeffries, 2012). Literature searches failed to locate any references to a specific theory as the basis for either the Plus/Delta or the Gather, Analyze, Summarize model.

The Debriefing with Good Judgment model is theory-based and focuses on the cognitive frames or mental models that drive the observable behaviors. It combines a specific questioning technique – advocacy/inquiry-- with the facilitators' "basic stance" of curiosity and respect to conduct structured debriefings aimed at allowing participants to analyze their behavior with the goal of surfacing cognitive frames. The structure recommended is a three-phase structure that includes: a "reactions" phase, when participant emotions are acknowledged and discussed, a "review" phase, when events of the simulation are discussed, and a "summary" phase, when lessons learned are summarized for the purpose of developing strategies to apply the lessons in future similar situations. During the review phase, once the cognitive frames have been exposed and examined, participants have the opportunity to re-frame clinical problems in a way that can result in improved performance in the future (Rudolph et al., 2008; Rudolph et al., 2006; Rudolph et al., 2007; Rudolph, Simon, Raemer, & Eppich, 2008)).

The 3D Model of debriefing is an eclectic model that includes elements of the Debriefing with Good Judgment model, adult learning theory, and Kolb's Experiential Learning Theory. The 3D model provides a framework for facilitating debriefing that includes: defusing emotions, discovering how events can build or enhance mental models, and deepening the connection between the new mental models and the practice environment (Zigmont et al., 2011).

Debriefing for Meaningful Learning was developed specifically for use with prelicensure nursing students because it focuses on teaching learners to "think like a nurse”. It defines meaningful learning as learning that results in a change in clinical reasoning (Dreifuerst, 2010; Dreifuerst, 2012). It is a highly structured model of debriefing that is led by a clinical nursing instructor with expertise about the patient population represented by the simulation (Jeffries, 2012). This model derives from educational theoretical frameworks, including Fink’s (2003) significant learning model, Bybee’s (1989) E-5 Framework, and Gibbs’ Reflective Cycle (Dreifuerst, 2010).

The CAL model used in aviation provides flight crews with a simple framework to guide discussion. It incorporates three main concepts: Crew Resource Management (C), Analysis and evaluation of performance (A), and application to Line (i.e. actual flight) operations (L) (Dismukes & Smith, 2000). In this model, facilitators lead debriefing discussions that focus on the application of Crew Resource Management principles such as communication, problem solving, and how they were affected by each other’s actions. In the analysis phase, crew members discuss what went well and what could be improved in a way that assists the crew in analyzing why they made the decision they made and what factors affected their success or failure. The final phase of the CAL model is the application of lessons learned to potential problems in upcoming flight situations.

Instruments for the evaluation of debriefing

There are several published instruments for the evaluation of debriefing which attempt to measure the previously identified critical elements of debriefing. They include the Debriefing Assessment Battery (McDonnell, 1996), the Debriefing Assessment for Simulation in Healthcare (Simon, Rudolph, & Raemer, 2009), the Debriefing Experience Scale (Reed, 2012), and the Objective Structured Assessment of Debriefing (Arora, 2012). These instruments were reviewed for the purpose of ensuring that the salient features of debriefing that they address were included in the survey items. This section will provide an overview of each instrument.

The Debriefing Assessment Battery (McDonnell, 1996) was developed for use in aviation as a way to characterize instructor effectiveness at facilitation (five categories) and the nature of crew participation in debriefings (two categories). It was developed from adult learning theory, facilitation literature and face valid assumptions of what constitutes good facilitation (Dismukes et al., 1997). The categories that rate instructors are: Introduction (of expectations), Questions (to focus on topics and elicit participation), Encouragement (to foster deep reflection), Focus on Crew Analysis and Evaluation (encouraging self-evaluation by crew members), and Use of Videos. The two crew categories are Crew Analysis and Evaluation and Depth of Crew Activity, which correspond closely with items in the instructor category. Each category is rated on a 7-point Likert scale that ranges from 1 (poor) to 7 (outstanding). The Debriefing Assessment Battery reports inter rater reliability as calculated by the Pearson correlation. Coefficients ranged from $r = .73$ to $r = .91$.

The Debriefing Assessment for Simulation in Healthcare (Simon et al., 2009) is a six element, unweighted, criterion-referenced, behaviorally anchored rating scale that evaluates instructor behaviors that are believed to represent optimal behaviors (Brett-Fleegler et al., 2012). The elements of the instrument are: establishes an engaging learning environment, maintains an engaging learning environment, structures the debriefing in an organized way, provokes engaging discussions, identifies and explores performance gaps, and helps trainees achieve or sustain good future performance. Each of the elements is rated from 1 (extremely ineffective) to 7 (extremely effective). Each element is described through the use of dimensions that reflect a behavior that should be demonstrated by the facilitator, such as “described the simulation environment”; “described what would be expected during the activity”; “introduced the learning objectives” ; and “clarified issues of confidentiality”. Reliability is reported as inter-rater reliability and internal consistency. Intra class correlation coefficients for each element was greater than 0.6 for all elements except one and for the instrument overall was .74. To estimate validity, 114 raters scored one of three standardized debriefing instructional videos that represented poor, average, and excellent performance. Repeated measures analysis of variance demonstrated statistically significant differences between the scores given to the poor, average, and excellent videos.

The Debriefing Experience Scale (Reed, 2012) was developed following a comprehensive literature search and review by three nursing simulation experts. The author also describes the influence of Kolb’s Experiential Learning Theory, but does not explicitly state that it provided the theoretical framework for the instrument. Through factor analysis, the original 39 items were reduced to 20 items representing four subscales. Each of the items is rated on two Likert-type scales. Once scale represents learners’ perception of the quality of the experience; one represents learners’ perception of the importance of the items to the overall debriefing experience. Experience is rated from 1 (strongly disagree) to 5 (strongly agree) and Importance, rated from 1 (not important) to 5 (very important). The subscales are

- Analyzing thoughts and feelings
- Learning and making connections

- Facilitator skill in conducting the debriefing
- Appropriate facilitator guidance

Reliability of the overall scale and the subscales is reported as Chronbach's alpha. Chronbach's alpha for the overall scale for the experience items is .93; for the importance items is .91. Chronbach's alpha for each of the subscales for experience is greater than .80; for importance is greater than .61. Three nursing simulation experts estimated content validity through expert review of the items.

The Objective Structured Assessment of Debriefing (OSAD) instrument was developed for use in surgical simulation experiences (Arora, 2012). A rigorous development process included extensive literature review, interviews with 360 end users, and review by experts. Interviews were conducted with practicing surgeons who conduct debriefing, surgical residents who receive debriefing, operating room nurses, and anesthesiologists from the United States, the United Kingdom, and Australia. A discussion of Kolb's Experiential Learning Theory and Schon's Reflective Practice theory were discussed, but were not described as providing the theoretical framework for the study. Eight key features pertaining to an effective debriefing were identified as:

- approach
- learning environment
- learner engagement
- reaction
- reflection
- analysis
- diagnosis and

- application

Each of the categories is rated on a scale of 1 (minimum) to 3 (maximum) regarding how well that element of the debriefing is conducted by the facilitator. Descriptive anchors at the low- mid- and high- point guide the rater. Potential items for inclusion in the final instrument were reviewed by an international panel of seven experts and a content validity index was calculated for both relevance and accuracy of the descriptive anchors. Each had a content validity index of 0.87 or higher, and the overall instrument had a content validity index of 0.94. Concurrent validity was examined by correlating the participants' opinion of the debriefing with the assessors' scoring of debriefing when watching 20 taped debriefing sessions. The correlation was strong, positive and significant ($p = 0.68$, $p < 0.01$). Inter-rater reliability was reported as intra-class correlation of .88. Test-retest reliability was reported as .90.

Many of the critical elements of debriefing from the literature review are present in the debriefing assessment instruments. These elements include the skill of the facilitator, the establishment of an environment that fosters trust, reflective discussions aimed at determining the learners' mental models driving decision making and structuring of the discussion with regard to timing and questioning techniques. These same elements, many of which are present in Kolb's Experiential Learning Theory, drove the development of the survey that forms the basis of this research study. This study will attempt to ascertain characteristics related to debriefing facilitators, including training and measures of competence. Other questions targeting debriefing practices will attempt to measure the frequency with which steps are taken to establish a psychologically safe learning environment, if reflective questions are aimed at uncovering mental models driving actions, if direct and honest feedback is given on performance, and if learning points are summarized and applied to future practice with the goal of improving practice.

CHAPTER 3:
METHODOLOGY

Overview

Prelicensure nursing education programs have expanded the use of human patient simulation greatly in the past decade. The vast majority of prelicensure nursing programs are using human patient simulation, and most faculty surveyed hold the opinion that their programs should be using more simulation (Kardong-Edgren et al., 2012). With the expanding use of simulation in the prelicensure and professional education of nurses and other healthcare professionals, there is a need to ensure that educational theory and empirical evidence guide the practice of simulation based healthcare education, including debriefing. Simulation based healthcare education is built upon decades of simulation research and experience in organizational behavior, the military and the aviation industry.

The evidence base specific to debriefing in healthcare simulation is expanding, but remains inconclusive with regard to the question of specific characteristics of the debriefing process that are associated with improved learning outcomes. In fact, it is not clear from existing published research exactly what debriefing practices are in place. From qualitative studies, expert opinion papers, and quantitative studies, there is growing evidence that certain characteristics of debriefing are critical to assist learners in reflecting on their simulation experience for learning. These characteristics include the provision of a safe learning environment, use of group facilitation techniques, an emphasis on learner self-reflection, the incorporation of multiple perspectives during reflection, and providing the opportunity to apply lessons learned to future clinical situations. The goal of this research study is to determine what debriefing practices are currently in place in accredited prelicensure nursing programs, and to examine variables that may be related to the presence or absence of theory-based debriefing practices. The study used a cross-sectional survey with both open- and closed-ended questions. Data were collected via the internet using Remark Web Survey Version 5 (Gravic, 2013). The survey was sent via the internet to the undergraduate dean or nursing program director at every accredited prelicensure nursing program in the United States.

Research question 1: What debriefing practices are being used in accredited prelicensure registered nursing programs in the United States?

Research question 2: Do characteristics of the designated simulation expert predict the use of theory-based debriefing practices? Characteristics include: highest academic degree held, number of years of experience in nursing education, number of years of experience teaching with simulation, full- or part-time status in simulation position, age range, certification in education or professional development, formal training in simulation-based education, and membership in simulation related professional organizations.

Research question 3: Do nursing program characteristics predict the use of theory-based debriefing practices? Characteristics include: degree(s) offered, size of enrollment in nursing program, public or private status, geographic region, and requirements related to simulation in the curriculum.

Significant relationships between nursing program characteristics and designated simulation expert characteristics were identified using the chi-square test for independence. Once significant relationships were identified, logistic regress analyses were used to determine if certain characteristics of either the nursing program or the designated simulation expert predicted the use of theory based debriefing practices.

Definitions

Simulation is defined as a an experiential activity conducted for learning purposes and formative assessment during which learners provide care to a simulated patient in a realistic environment, followed by a dedicated debriefing period. It excludes simulation that is done for the purpose of teaching isolated psychomotor skills.

Debriefing is an activity that follows a simulation experience and that is led by a facilitator. Participant reflective thinking is encouraged, and feedback is provided regarding the participants' performance while various aspects of the completed simulation are discussed. Participants are encouraged to explore emotions, question, reflect, and provide feedback to each other. The purpose of debriefing is to move toward assimilation and accommodation in order to transfer learning to future situations (Meakim et al., 2013).

Designated simulation expert is a person who is primarily responsible for simulation related activities in a school of nursing. This person may hold a clearly defined position, such as simulation director, simulation coordinator, chair of simulation workgroup or may be a faculty or staff member who is recognized as the simulation champion within the program ***<u>and</u>*** has a percentage of workload devoted to simulation activities.

Design

The study design was a cross-sectional survey with both open- and closed-ended questions. Data were collected via the internet using Remark Web Survey Version 5

(Gravic, 2013) . The electronic survey was chosen because it provided an efficient way to reach every accredited prelicensure nursing program. Additionally, the entire population of prelicensure registered nursing programs was chosen (instead of a sample from that population) in order to improve the representativeness of the final data, and because there are no economic barriers to obtaining a large sample when collecting data via the internet. The survey design and implementation was guided by the tailored design method as outlined by Dillman, Smith & Christian (2009). This method uses the principle of social exchange perspective on human behavior. This perspective assumes that the likelihood of obtaining high quantity and high quality results from a self-administered survey is greater when the respondent trusts that the expected rewards of participation in the study (generation of new knowledge related to simulation based education) will outweigh the anticipated costs of responding (time and effort). This method seeks to minimize the four sources of survey error: nonresponse, coverage, sampling and measurement. Survey procedures for initial and follow up contacts were guided by the method.

Survey procedures that build positive social exchange with the goal of improving the quality and quantity of responses should take into consideration the nature of the population, the content of the survey questions, and the source of the survey. Taking into consideration that potential respondents conduct their work in academic settings, the potential to generate new knowledge related to debriefing in simulation based education was considered to be a motivational factor. The potential to generate new knowledge was balanced with concern for respondent burden, which is the time and effort taken to complete the survey. For this reason, the survey was developed with the goal of obtaining complete information with the smallest number of questions necessary. Review of survey items by a panel of debriefing experts and evaluation of pilot data served as a guide in achieving this balance.

Kolb's Experiential Learning Theory served as a guide in the development of the survey items, which explored debriefing structure as well as debriefing processes. Structural elements included clearly delineated phases of debriefing, the timing of debriefing, the person facilitating the debriefing, theory-based models of debriefing used, evaluation of debriefing and the setting of debriefing. Process elements included techniques used to ensure full engagement of the participants in the experience, as well as techniques used to guide reflection, assist students in assimilating learning, and apply learning to future experiences. In the process of developing the survey items related to debriefing, the concepts of Kolb's Experiential Learning Theory were described (i.e. concrete experience, reflective observation, abstract conceptualization and active experimentation). The descriptions of each concept served as a blueprint for the debriefing survey items. Survey items that represented the content domain related to each of the concepts were developed. In addition to Kolb's Experiential Learning Theory, the Sim-PICO framework as outlined by Raemer et al. (2011) was applied to ensure that other relevant debriefing characteristics were addressed. The Sim-PICO framework, an adaptation of the PICO framework used to formulate research questions, includes the elements of: the simulation, population studied, intervention applied, comparisons tested, and outcomes determined.

Selection of subjects

The survey was sent to every prelicensure registered nursing program in the United States accredited by either the Collegiate Commission on Nursing Education (CCNE) or the Accreditation Commission for Education in Nursing (ACEN). This survey sample pool was selected for several reasons. The recent survey of simulation use in prelicensure registered nursing programs in the United States by the National Council of State Boards of Nursing reported that the majority of programs are using simulation, indicating that this population is capable of responding to the survey questions. Additionally, the entire population of accredited prelicensure registered nursing programs was chosen (instead of a sample from that population) in order to improve the representativeness of the final data, and because there are no economic barriers to obtaining a large sample when collecting data via the internet. Once programs were identified, the nursing program director or appropriate dean was identified as the person to whom the survey was sent by email. The dean or program director was asked to forward the survey to the designated simulation expert. In the absence of a designated simulation expert, the dean or program director was asked to complete the survey. Initially, the survey was sent to 1,440 prelicensure registered nursing programs in the United States, which were identified through CCNE and ACEN lists of accredited programs compiled in October, 2012 and updated in August 2013.

An a priori power analysis was not conducted for this study for several reasons. This study does not seek to report the effect of an intervention on a dependent variable, so there is no need to define a minimum sample size required. Additionally, given the fact that the survey can be sent electronically, there are no economic barriers to including the entire population of prelicensure nursing programs in the sample. Effect size from the current study is reported as the odds ratio that is calculated for each predictor that is entered into the logistic regression model.

Survey Instrument

Theoretical framework for survey items

David Kolb's Experiential Learning Theory guided the development of the survey items related to debriefing. According to Kolb (1984), the experiential learning cycle contains four elements: concrete experience, reflective observation, abstract conceptualization and active experimentation. The reflective observation, abstract conceptualization and active experimentation elements in Kolb's experiential learning model are most directly connected to debriefing as the time to reflect on events and examine their meaning through the participant's mental models or cognitive frames. Following this reflection, new understandings are applied to future situations. The concrete experience element of Experiential Learning Theory precedes the reflective period and influences it to the extent that the learners were adequately prepared for the experience, that they were able to engage in the experience fully and without bias, and that the experience was meaningful to them.

To develop survey items, succinct descriptions of each of the concepts of Kolb's Experiential Learning Theory were developed. The following descriptions of each of the concepts was used to guide development of the initial survey items.

Concrete experience is defined as the perception, through the senses, of the tangible, felt qualities of the world. Participants' ability to learn through concrete experience is enhanced when they can fully involve themselves in a new experience openly and without bias. Concrete experience anchors one end of the "grasping" process that is an integral part of Kolb's theory. Survey items linked to the concrete experience concept were initially conceptualized as items addressing the establishment of a psychologically safe learning environment. The provision of this environment influences the participant's ability to be open and unbiased during debriefing. There were no survey items that focused on the fidelity or the environment or perception of realism, which are more directly linked to concrete experience. This was done primarily to minimize the number of survey items in an attempt to limit respondent burden. Following the expert review, changes were made to this segment of the survey. This process is discussed in the section of the manuscript that describes pilot survey development. Table 3.1 lists the survey items related to psychological safety.

Table 3.1: *Survey items related to psychological safety*

How frequently is a standardized approach to pre-briefing used before a simulation experience? ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer
How often are students given a general idea of the objectives of the learning activity? ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer
Please select the items below that are explicitly discussed with students prior to the simulation. ***Check the box next to all the statements that apply:*** ☐ The simulation is being done for learning and will not be graded ☐ Expectations for student participation in debriefing ☐ The role of the facilitator during debriefing ☐ How long the simulation will last ☐ How long the debriefing will last ☐ Confidentiality of debriefing discussions ☐ That students may experience an emotional response to the simulation ☐ Discussion of the limitations of the simulator ☐ A discussion of a "fiction contract" or "suspending disbelief" ☐ Whether or not the simulation will be recorded ☐ That the focus of debriefing will be participant reflection on the experience ☐ That mistakes are viewed as opportunities to learn about how the participant is thinking ☐ Unable to answer

Reflective observation is defined as attempting to understand and interpret an experience through describing the event, examining the experience from multiple perspectives, and observing others in the experience. Reflective observation anchors one end of the "transforming" process that is the second of the processes depicted in Kolb's model. It is during this time in the cycle of experiential learning that participants begin to examine the events that took place during the experience, especially decisions that were made and/or actions that were taken. Critical to this examination of decisions and actions is self-reflection. The goal of the self-reflection is to assist participants in identifying how they interpreted the events through their existing mental models. See table 3.2 for the survey items that address reflective observation.

Table 3.2: *Reflective observation survey items*

How often are students given the opportunity to discuss their emotional reaction to the simulation at the beginning of debriefing?

- ☐ Almost all of the time (95-100% of the time)
- ☐ Most of the time (60-94% of the time)
- ☐ Some of the time (11-59% of the time)
- ☐ Almost none of the time (0-10% of the time)
- ☐ Unable to answer

How often is feedback given to individual students about their specific actions taken during the simulation?

- ☐ Almost all of the time (95-100% of the time)
- ☐ Most of the time (60-94% of the time)
- ☐ Some of the time (11-59% of the time)
- ☐ Almost none of the time (0-10% of the time)
- ☐ Unable to answer

How often do students give feedback to each other during the simulation?

- ☐ Almost all of the time (95-100% of the time)
- ☐ Most of the time (60-94% of the time)
- ☐ Some of the time (11-59% of the time)
- ☐ Almost none of the time (0-10% of the time)
- ☐ Unable to answer

How often do debriefing facilitators use a record of events to guide debriefing (e.g. written notes, video recording) ?

- ☐ Almost all of the time (95-100% of the time)
- ☐ Most of the time (60-94% of the time)
- ☐ Some of the time (11-59% of the time)
- ☐ Almost none of the time (0-10% of the time)
- ☐ Unable to answer
- ☐ If a record of events is used, please describe ___________________ text box

Table 3.2: *Reflective observation survey items (cont.)*

How often does the facilitator clearly state his/her judgment about the students' performance during debriefing? □ Almost all of the time (95-100% of the time) □ Most of the time (60-94% of the time) □ Some of the time (11-59% of the time) □ Almost none of the time (0-10% of the time) □ Unable to answer

Abstract conceptualization is defined as creating new concepts or models from these reflections that can be integrated into logically sound theories. Creating new concepts or models is accomplished by integrating the current experience with existing theoretical knowledge. Abstract conceptualization anchors the other end of the "grasping" process (opposing concrete experience) in Kolb's model. See table 3.3 for items that address abstract conceptualization survey items.

Table 3.3: *Abstract conceptualization survey items*

How often are students guided in forming new mental models that can be used to improve future practice? ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer
How frequently are current simulation events tied to existing knowledge during debriefing? (e.g. knowledge from coursework and/or clinical rotations) ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer

Active experimentation is defined as using newly created models and concepts to make decisions and solve problems in future similar situations. It is not known to what extent simulation participants are given the opportunity to apply the newly created concepts or models by repeating a similar simulation experience, which would be the best method to implement active experimentation. Because it is believed that most simulations are not repeated, survey items related to active experimentation assume that having participants discuss lessons learned and discuss future application of the lessons are evidence of active experimentation in simulation based education. Active experimentation anchors the other end of the "transforming" process (opposing reflective observation) in Kolb's model. See table 3.4 for items that address active experimentation survey items.

Table 3.4: *Active experimentation survey items*

How often is there a specific point during the debriefing when learning points are applied to future clinical practice? ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer
How often during debriefing are students asked to state specific clinical practices they will change in the future as a result of the learning that took place in the simulation experience? ☐ Almost all of the time (95-100% of the time) ☐ Most of the time (60-94% of the time) ☐ Some of the time (11-59% of the time) ☐ Almost none of the time (0-10% of the time) ☐ Unable to answer

Survey Components

Nursing Program Characteristics

The first group of survey items requested demographic data about the nursing program and data about simulation use. This component of the survey consisted of eight items. See table 3.5 for survey items related to nursing program characteristics.

Table 3.5: *Nursing Program Characteristics*

Variable	Measurement	
Geographic location	Nominal	Eastern
		Southern
		Midwest
		Western
Number of students enrolled	Interval	Number
Degrees offered	Nominal	Diploma
		Associates
		Baccalaureate
		Second degree baccalaureate
		Entry level masters
		Masters
		Doctor of Nursing Practice
		Doctor of Philosophy
Type of institution	Nominal	Public
		Private
Use of simulation	Nominal	Yes
		No
Is simulation required	Nominal	Yes
		No
Clinical substitution	Nominal	Yes, 10% or less
		Yes, 11-25%
		Yes, 26-50%
		Yes, more than 50%
		No
Designated simulation expert	Nominal	Yes
		No

The survey was constructed so that it “branched” in several directions based on answers to key questions. In this first section, question 5 was a branching question. Respondents were asked if their program used simulation as defined for this study. If respondents selected “no” to this item, they were taken to the end of the survey and thanked for their participation. Respondents were also invited to add any other information related to the nursing program characteristics that were felt to be important. Question 8 was also a branching question. This question defined the Designated Simulation Expert and asked respondents if there was one at the school of nursing. If respondents indicated that there was a designated simulation expert, they were taken to the next section, which gathered data about the designated simulation expert. If respondents indicated that such a position did not exist, they were taken directly to the third section of the survey, which contained the debriefing items.

Designated Simulation Expert Characteristics

In the second section, 11 items focused on the characteristics of the designated simulation expert. The intent of the items was to describe the characteristics of the individuals holding these positions as well as to describe the positions themselves. Individual characteristics included teaching experience, educational level, and professional development. Position description characteristics included percentage of workload devoted to simulation, faculty appointment status, and if the designated simulation expert was a registered nurse. See table 3.6 below.

Table 3.6 *Designated Simulation Expert Characteristics*

Variable	**Measurement**	
Registered nurse	Nominal	Yes
		No
Faculty or staff	Nominal	Faculty
		Staff
Percent of workload in simulation	Nominal	25% or less
		26-50%
		51-75%
		76-100%
Years teaching in nursing	Nominal	1-5 years
		6-10 years
		11-15 years
		16-20 years
		21 years or longer
Years teaching in simulation	Nominal	1-3 years
		4-6 years
		7-10 years
		11 years or longer
Age group	Nominal	Younger than 25 years
		26-35 years
		36-45 years
		46-55 years
		56 years or greater
		Choose not to respond
Highest academic degree	Nominal	No academic degree
		Associate
		Baccalaureate
		Masters
		Doctor of Nursing Practice
		Doctor of Philosophy

Table 3.6 *Designated Simulation Expert Characteristics (cont.)*

Variable	**Measurement**	
Source of training	Nominal	Multi-day course
		NLN SIRC modules
		Graduate coursework
		Attendance at conference
		Attendance at workshop
		Simulation consultant
		Manufacturer
Credentials	Nominal	Certified Healthcare Simulation Educator
		Certified Nurse Educator
		American Nurses Credentialing Center
		Other
Professional memberships	Nominal	Association of Standardized Patient Educators
		International Nursing Association for Clinical Simulation and Nursing
		Society for Simulation in Healthcare

Debriefing Items

In the third section of the survey, 21 items addressed debriefing practices. Fourteen items were specifically mapped to the concepts of Experiential Learning Theory. Seven items were related to the Sim-PICO framework that had not been asked in the survey items related to Experiential Learning Theory. Three items related to the provision of a psychologically safe learning environment. Five items gathered data related to the reflective observation concept. Two items related to abstract conceptualization. Two items related to active experimentation. Nine items related to the Sim-PICO framework and debriefing evaluation instruments and related to other details about debriefing practices, including questions about the skill of the debriefing facilitators, the debriefing environment, and the timing of debriefing. See Appendix B for the complete survey.

Expert Review

To estimate content validity, the original survey items were reviewed by three simulation content experts who have specific expertise in debriefing. Expert #1 is an internationally recognized debriefing researcher and author. She is the primary author of a well-known model of debriefing that is used in simulation centers internationally (J. Rudolph et al., 2008). Expert #2 is an internationally recognized debriefing researcher and author. Her doctoral dissertation resulted in the creation of a model of debriefing that is increasingly being adopted in undergraduate nursing programs in the United States (Dreifuerst, 2010). Expert #3 is a debriefing researcher and author who completed the basic and graduate courses in simulation based healthcare education at the Center for Medical Simulation in Cambridge, MA. Her doctoral dissertation measured the effect of the use of the Debriefing with Good Judgment model on graduate nursing students' clinical reasoning (Morse, 2012).

The experts were asked to evaluate the survey questions for clarity and to evaluate if the questions adequately represent the salient characteristics of debriefing. Experts were asked to suggest additional items if it was determined that existing items did not adequately capture debriefing elements. Items could also be deleted based on the advice of the expert panel.

To further estimate content validity, experts were given the succinct description of the concepts of Experiential Learning Theory that are relevant to debriefing (i.e. concrete experience, reflective observation, abstract conceptualization, and active experimentation). They were asked to: (1) link each item to its respective theoretical concept; (2) assess the relevancy of the items to the content addressed by the concept by rating them on a 4-point rating scale and; (3) judge the extent to which they believe the items on the tool adequately represent the concepts relevant to debriefing. See Appendix A for expert review document.

The determination was made to delete survey items if either (1) there was disagreement by two of the three experts about which concept the item linked, or (2) two or more of the experts were unable to determine which concept an item linked to. Based on these criteria, three survey items were deleted. One survey item (#26) was retained despite the fact that two or more of the experts did not agree on the theory linkage. This decision was made because all three experts agreed that the item was very relevant, and the disagreement about theory linkage was believed to be an error.

A content validity index was calculated for each of the debriefing survey items following review of the items by the expert panel. The experts were asked to rate the relevance of each debriefing survey item on a scale of 1 to 4. The ratings represented:

- 1 – Not relevant
- 2 – Somewhat relevant
- 3 – Quite relevant
- 4 – Very relevant

Content validity of each item was calculated as the percentage of reviewers who rated the item “quite relevant” or “very relevant”. Agreement of two of the three experts was determined to be acceptable. Based on the content validity index, one item was deleted. The content validity index of all of the debriefing items was calculated as the overall percentage of items that had a content validity index of 1.00. The content validity index for the group of debriefing items is .86. See Appendix D for survey content validity index.

A re-conceptualization of a group of survey items resulted from the advice of one of the expert panel members. Survey items 21-24 were originally conceptualized as linking to the concrete experience concept of Experiential Learning Theory because the items created a psychologically safe learning environment. This type of environment enhances the participants' ability to learn through concrete experience it facilitates their ability to fully involve themselves in a new experience openly and without bias. After reflecting on the expert's advice that creating a psychologically safe learning environment creates a context in which all of the concepts of Experiential Learning Theory can flourish, the decision was made to keep the survey items without linking them to any one concept.

Protection of Human Subjects

This research study was reviewed by the Institutional Review Board at the University of Maryland School of Nursing, Baltimore, MD. IRB approval was granted, with the determination of exempt status. See Appendix C for Institutional Review Board letter.

Pilot study procedure

Following the expert review process, the pilot survey was finalized. The purpose of the pilot survey is to identify problems with the survey and related implementation procedures. Originally, 13 prelicensure nursing programs were contacted to elicit their participation in the pilot survey. The entry level dean or program director or the designated simulation expert at each program was sent an email on September 3, 2013 asking them to participate. The type of schools included baccalaureate (9 schools), associate degree (2 schools) and diploma (2 schools). The diploma schools did not respond to the email, and therefore, no diploma schools participated in the pilot survey. Prelicensure nursing programs that agreed to participate in the pilot survey included nine baccalaureate programs and two associate degree programs. The eleven schools represented all geographic regions of the United States (i.e. Eastern, Southern, Midwest, and Western).

The designated simulation expert or program director at each of the pilot schools received an email with a direct link to the survey, with instructions for completing it. See Appendix D for the content of the email. Respondents were not required to enter a password to access the survey. Participants were asked to complete the survey within two weeks. A reminder was sent to all participants one week after the original email. Completed pilot surveys were evaluated for overall response rates, item nonresponse issues, and unanticipated response patterns.

Eight pilot surveys were returned, for a response rate of 73%. Pilot surveys were returned from two associate degree schools and six schools offering a baccalaureate degree or higher. Respondents did not recommend the addition or deletion of any items. There were no missing data in the responses. This is likely due to the fact that respondents could not progress in the survey if a question was not answered. Survey items that requested respondents to type a response were all answered (e.g. name of simulation center at which the designated simulation expert received training). The average time required to complete the survey by pilot participants was 14 minutes, as measured by the survey software program. Because no survey items were added or deleted based on the pilot study, the pilot data are included in the final analysis.

Final Survey Procedures

Consideration was given to the timing of the initial and follow-up communications. In acknowledgment of the heavier workload associated with the beginning and the end of semester, the final survey was sent to all nursing programs on October, 20, 2013. In order to facilitate sending emails to 1,440 school of nursing, email addresses were entered into the University's mailing list server. See Appendix E for the content of the initial and follow up emails. The dean or program director at each school of nursing was identified through the school's website; this is the person to whom the email was sent on October 20, 2013. Fifty-six emails "bounced" back immediately, which represented approximately 3.8% of the total number of emails sent. Efforts were made to identify the cause of the returned email. Several problems were identified and corrected. Examples of errors corrected included email addresses with typographical errors and personnel changes at the school of nursing. Some errors were not able to be rectified, as the emails were verified as being accurate according to the school of nursing's websites.

A number of other schools could not participate for several reasons. Some schools required the Institutional Review Board at their university to approve the study (which was not feasible in the amount of time allotted for data collection). Some schools were erroneously sent the email when they did not have prelicensure programs. One program declined to participate because their accreditation was pending. The final sample size, once the above issues were either corrected or emails deleted, was 1,407 prelicensure nursing programs.

Follow up reminders were sent at two week intervals on November 3 and November 17, 2013. The survey closed on November 25, 2013.

Data collection and recording

Follow up communication was guided by Dillman, et al.'s (2009) tailored design method. Initial as well as follow up communications were designed to demonstrate positive regard for participants' time and expertise. See Appendix E for content of email. Each follow up reminder was worded differently. Follow up reminders were designed to provide social validation by informing non-responders that others similar to themselves have already responded. Each follow-up reminder stated that the survey is approaching completion and that opportunities to respond are limited. Other methods employed to improve response rates in follow up communications included restating the potential contribution to new knowledge, thanking respondents in advance, appealing to educators' desire to improve educational processes, and making responding to the survey as convenient as possible by providing a direct link to the survey in each follow up reminder.

Confidentiality of responses was ensured by not collecting any identifying information such as internet protocol addresses or email addresses from respondents. The drawback of these measures to ensure confidentiality of responses is that there was no way to verify that only one response was received from each school. Survey instructions did ask the dean or program director to either fill out the survey or to forward it to the designated simulation expert for completion.

Data processing and analysis

Data were collected using Remark Web Survey Software 5 for both the pilot survey and the final survey. This survey software has the capability to download data directly to a statistical analysis software program. Data were downloaded into the Excel software program by staff in the Learning Technologies Department. Data were then uploaded into the IBM SPSS 21 statistical analysis software program. This served to minimize errors in data entry.

Data related to program and simulation expert characteristics was analyzed using descriptive statistics. Categorical variables are reported using frequencies only; continuous variables are reported using frequencies and measures of central tendency. In addition to providing baseline data about the nursing programs, descriptive statistics were also used in the process of evaluating variables for violation of assumptions underlying inferential statistical techniques. Prior to regression analysis, the assumptions of logistic regression were evaluated. They include independence of errors, ratio of cases to variables, outliers, and multicollinearity. Independence of errors means that the cases of data should not be related to each other. Because internet protocol addresses were not collected, it is not known for certain if multiple responses were received from any schools.

Ratio of cases to variables becomes problematic when there are too few cases in relation to the number of variables. Failure to meet this assumption would be evident in extremely high standard errors. No consistent rule for the ratio of cases was found in the literature; in fact, not all sources listed this ratio as an assumption of logistic regression. Ratios stated in the literature ranged from 5:1 to 20:1. Rather than a specific ratio of cases to variables, this assumption was tested by ensuring a minimum cell count of 5 (Field, 2009; Pallant, 2007; Peng, Lee, & Ingersoll, 2002; Tabachnick & Fidell, 2007). Data were examined for outliers through examination of residuals; outliers may result in lack of goodness of fit of the model. Multicollinearity refers to a condition in which predictors are too highly correlated with each other. Redundant predictors should not be included in the regression model. Preliminary analysis of the data was used to determine the amount of missing data. The only missing data were three respondents who entered zero as the number of students enrolled in the nursing program. This represented 0.5% of responses. The zero value was replaced with the mean value of 213.

Debriefing characteristic data were examined using descriptive statistics as well as regression analysis to determine if characteristics of the simulation expert predict certain debriefing practices. Predictor variables in the logistic regression model included characteristics of the nursing program and the designated simulation expert. Outcome variables included the characteristics of debriefing. Categorical variables in the survey were evaluated using the chi-square test for independence to determine if a relationship existed between two variables (Field, 2009; Pallant, 2007). Further inferences about relationships between variables were determined through the use of regression analysis. Because the outcome variables are categorical, logistic regression was used. Binary logistic regression was used for dichotomous variables; multinomial logistic regression was used for categorical variables with more than two response categories. This type of analysis allows prediction of an outcome given a known value of the predictor (Field, 2009). Reliability of the final data was estimated using internal consistency (Chronbach's Alpha) for the questions related to debriefing.

Finally, an attempt to quantify the degree to which theory based debriefing is being practiced was calculated based on point values assigned to each possible answer choice. It is acknowledged that this criterion is arbitrary; it is an attempt to quantify the elements of Experiential Learning Theory that are being used. The responses to each survey item related to debriefing are categorical and relate to the frequency of each debriefing practice. Point values were assigned as follows:

- All of the time = 4 points
- Most of the time = 3 points
- Some of the time = 2 points
- None of the time = 1 point
- Unable to answer = 0 points

To arrive at a determination regarding the use of theory based debriefing in each simulation program, point values for the survey items related to the concepts of experiential learning theory were totaled. The categories are: reflective observation, abstract conceptualization, and active experimentation. Maximum points available in each category are:

- reflective observation – 20 points
- abstract conceptualization – 8 points
- active experimentation – 8 points

A program was considered to practice theory based debriefing if they are awarded half or more of the points available in all three categories.

Data from open-ended questions were recorded and will be evaluated in a later phase of this study. Data will be evaluated using established qualitative content analysis techniques. This includes coding answers, and analyzing the codes for the emergence of themes.

Limitations

Potential limitations of this study include the four common sources of bias in surveys: nonresponse, measurement, coverage, and sampling. Each of these were addressed using specific strategies.

Non-response

To minimize coverage and sampling error, surveys were sent to every accredited prelicensure nursing program in the United States. Several strategies were incorporated into the study to minimize nonresponse. Nonresponse error was minimized by following up the initial survey with reminders at weeks 2 and 4. The timing and content of the follow-up reminders was guided by Dillman, Smyth, and Christian's (2009) implementation strategy. Each follow up reminder was worded differently, and was worded in a way that was intended to appeal to educators' desire to improve nursing education. Several emails from potential respondents indicated that they did not respond because they did not have a simulation program or a designated simulation expert. This point was clarified in follow-up emails by explaining that all programs, regardless of the scope of their simulation programs, had valuable data to contribute and were encouraged to complete the survey.

The timing of the initial and follow-up emails was taken into consideration. There is no established optimal timing for follow up messages. In order to allow for the maximum number of responses, the survey was kept open for 5 weeks, with reminders at two week intervals. All emails were sent on a Sunday evening so that the emails would be in respondents' inboxes early in the morning on a Monday. Many replies were received on the day that emails were sent. In order to minimize the amount of missing data, the survey was constructed so that all questions required an answer before moving on to the next question.

Measurement error

Measurement error refers to inaccuracy of responses. This was minimized through careful survey question design and pilot testing. First, three debriefing experts reviewed the proposed survey for content validity. This was accomplished by having the experts provide evaluation of the survey's representativeness of debriefing practices, completeness, and adherence to Kolb's Experiential Learning Theory. Pilot testing provided the opportunity to identify any problems with individual survey items or overall survey procedures.

Coverage and sampling error

Coverage error was minimized by including every accredited prelicensure nursing program in the United States in the sample. The consequence of this is that prelicensure nursing programs who are not accredited by the ACEN or AACN were not included in the sample, which may have excluded existing nursing programs. Another potential source of sampling error is the fact that internet protocol addresses were not collected, so it is not possible to say with certainty that only one response was received from each school. Final sample size and representativeness will be discussed in Chapter 4.

Limitations also include the fact that the data were all self-reported, so the accuracy of the answers cannot be objectively assessed. The results of this survey may not be generalizable to other groups of simulation users such as other prelicensure professional schools and/or simulation centers that primarily serve licensed practitioners. There are several limitations related to the theoretical framework. The fact that only one theoretical framework was used limits the examination of the characteristics of debriefing to only those that relate to Experiential Learning Theory. There are potentially other important concepts that were not examined as a result of the use of only one framework. The other theory-related limitation is the fact that no survey items focused on the Concrete Experience concept. As this concept precedes the other concepts, it has the ability to affect subsequent concepts in the experiential learning process. In this study, it is not known how this part of the cycle may have affected the others.

CHAPTER 4:
RESULTS

The purpose of this research study was to determine what debriefing practices are currently in place in accredited prelicensure nursing programs in the United States, and to examine variables that may be related to the presence or absence of theory based debriefing practices. Variables examined include characteristics of each school of nursing and characteristics of the staff or faculty member who is identified as the simulation expert in each nursing program. The research questions addressed were:

Research question 1: What debriefing practices are being used in accredited prelicensure registered nursing programs in the United States?

Research question 2: Do characteristics of the designated simulation expert predict the use of theory based debriefing practices? Characteristics include: highest academic degree held, number of years of experience in nursing education, number of years of experience teaching with simulation, full- or part-time status in simulation position, age range, certification in education or professional development, formal training in simulation-based education, and membership in simulation related professional organizations.

Research question 3: Do nursing program characteristics predict the use of theory-based debriefing practices? Characteristics include: degree(s) offered, size of enrollment in nursing program, public or private status, geographic region, and requirements related to simulation in the curriculum.

The study design was a cross-sectional survey with both open- and closed-ended questions. Data were collected via the internet using Remark Web Survey Version 5 (Gravic, 2013) . The survey was sent to every CCNE and ACEN accredited prelicensure nursing program in the United States. The survey was designed with a maximum of 40 questions. Respondents answered different numbers of questions based on the direction in which the survey branched from certain items. For example, if a nursing program did not use simulation as defined for this survey, five questions were answered, and the survey ended. If a nursing program used simulation, but did not have a designated simulation expert, respondents did not answer the questions related to characteristics of the designated simulation expert. This eliminated 11 items, and a total of 29 questions were answered by respondents who used simulation but did not have a designated simulation expert. Nursing programs who used simulation and had a designated simulation expert answered all 40 questions. All respondents were give opportunities to add narrative comments.

Response patterns

The original list of schools that met the criteria of being prelicensure programs with accreditation from either CCNE or ACEN numbered 1,440. The dean or program director at each school was sent an email inviting them to participate in the research study on October 20 2013. Fifty seven emails were returned immediately, which represented approximately 4.0 % of the total number of emails sent. Efforts were made to identify the cause of the returned email. Several problems were identified and corrected. Examples of errors corrected included email addresses with typographical errors and personnel changes at the school of nursing. Some errors were not able to be rectified, as the emails were verified as being accurate according to the school of nursing's websites. Any verified email that bounced twice was deleted from the list.

A number of other schools could not participate for several reasons. Some schools required the Institutional Review Board at their university to approve the study, which was not feasible in the amount of time allotted for data collection. Some schools were erroneously sent the email when they did not have prelicensure programs. One program could not participate because its accreditation was pending. The sample pool, once the above issues were either corrected or emails deleted, was 1,407.

A total of 504 completed surveys were returned. This number includes the eight responses from the pilot survey, since no changes were made to the survey following the pilot study. Included in these responses were two responses from schools that did not have prelicensure programs, as identified by respondents in the comments section. These responses were eliminated, for a total of 502 completed responses. Response rate was calculated using the both the original sample pool (1,440) and the final sample pool (1,407). Response rate using the original sample pool was 35%. Response rate using the final sample pool was 36%. According to Dillman (2009), an adequate sample size from the population of 1,440 is 286. This sample size estimate is based on a 95% confidence interval (or margin of error), and maximum variation in responses to the questions of interest.

Each prelicensure nursing program included in the final sample was sent a total of three emails inviting their participation in the study. Response patterns related to the percentage of responses received following each email were evaluated. The initial email was sent on October 20, 2013. Following the initial email, 51% of total responses were received. The first follow up reminder was sent on November 3, 2013. Following the first reminder, 31.7% of total responses were received. The final email was sent on

November 17, 2013. A total of 17.3% of responses were received after the second reminder. The survey closed on November 25, 2013.

Data Screening

Prior to analysis, data were screened for accuracy, missing data, and outliers. Data were also evaluated for the assumptions of logistic regression: independence of errors, ratio of cases to variables, outliers and multicollinearity. Independence of errors was evaluated with each regression model by evaluating the dispersion parameter. This parameter is the ratio of chi-square goodness of fit statistic to its degrees of freedom. Overdispersion is present when this ratio is 2 or greater (Field, 2009). Outliers were addressed in the enrollment data by categorizing enrollment in quartiles (as previously discussed).

Multicollinearity was assessed by evaluating the collinearity diagnostics and tolerance and VIF statistics. Using collinearity diagnostics, examination of the variance proportions demonstrated an absence of high proportions of variance on the same eigenvalues, indicating that the variables were not highly correlated (Field, 2009). Multicollinearity was also evaluated using tolerance and VIF statistics. Tolerance and VIF statistics indicated a high degree of mulitcollinearity for the variables related to the characteristics of the designated simulation expert (e.g. faculty status, percent of workload dedicated to simulation, years of experience with teaching and simulation, age, highest degree and having formal training in simulation). See Appendix G for multicollinearity data. Clear guidelines for deleting variables were not located, and collinearity can be ignored if the goal of the analysis is prediction (Field, 2009; Tabachnick & Fidell, 2007).

Sample description: Overall and representativeness evaluation

The sample pool for this study was 1,440 accredited prelicensure nursing schools representing all entry level nursing degree types; 33 schools were identified as not participating, leaving 1,407 schools as eligible to complete surveys. Table 4.1 lists demographic data collected from each of the 502 completed surveys that comprised the primary sample, with a few national comparison features. There was no missing data for the demographic questions. Eighteen schools did not use clinical simulation as defined for this study (3.6% of participating schools), and so did not answer questions about the designated simulation or debriefing practices. The remaining sample of 484 schools was compared to the original sample to determine if the groups were equivalent. Chi-square test for independence indicated that the sample of 484 schools using simulation was comparable to the total number of participating schools (n=502) as no statistical differences were found ($p > .05$), indicating there were no biases in the features assessed. For analyses beyond demographics, this study sample of 484 schools was used.

Table 4.1: *Characteristics of sample: demographic variables*

Characteristic	Sample Pool N=1440		Participating Schools N=502		Schools using simulation N=484		Group Comparison Statistics
	n	%	n	%	n	%	
Geographic Region							
Eastern	326	23	119	23.7	111	22.9	x^2 =5.1(p=.17)
Southern	477	33	165	33.0	160	33.2	
Midwest	412	29	133	26.4	129	26.6	
Western	225	16	85	16.9	84	17.3	
Schools by highest undergraduate degree offered							
Diploma	59[a]	3.2	18	3.6	17	3.5	x^2=.21(p=.65)
Associates	1084[a]	59	212	42.2	197	40.7	x^2=3.1(p=.08)
Baccalaureate	696[a]	38	273	54.4	270	55.8	x^2=2.4(p=.12)
Schools by all degrees offered[b]							
Diploma			19	3.8	18	3.7	x^2 =.16(p=.69)
Associates			238	47.3	230	47.4	x^2 =.07(p=.80)
Baccalaureate			277	55.1	264	54.4	x^2 =2.2(p=.13)
2nd Degree Baccalaureate			95	18.9	92	19.0	x^2 =.06(p=.80)
Entry Level Masters			36	7.2	35	7.2	x^2 =.06(p=.81)
Masters			155	30.8	148	30.5	x^2 =.59(p=.44)
Doctor of Nursing Practice			85	16.9	84	17.3	x^2 =1.7(p=.20)

Table 4.1: *Characteristics of sample: demographic variables (cont.)*

Characteristic	**Sample Pool N=1440**		**Participating Schools N=502**		**Schools using simulation N=484**		**Group Comparison Statistics**
Doctor of Philosophy			46	9.1	46	9.1	x^2 =1.8(p=.18)
Diploma			19	3.8	18	3.7	x^2 =.16(p=.69)
Public vs Private							
Public	910	63	334	66.4	323	66.6	x^2 =.23(p=.63)
Private	530	36	169	33.6	162	33.4	
Total enrollment quartiles							
25%			128	25.5	123	25.4	x^2 =5.8(p=.12)
50%			124	24.7	120	24.8	
75%			143	28.5	134	27.7	
100%			107	21.3	107	22.1	
Simulation used			484	96.2			

a. Data from National League for Nursing Annual Survey, Fall 2012. Includes non-accredited schools
b. Totals more than 100%; schools offer multiple degrees

Responses in the primary sample (n=502) were received from each geographic region of the country, and from schools representing all entry level degree programs. Many respondents reported offering multiple degrees at their institution. In order to assess the distribution of undergraduate programs in the sample, school responses were recoded so that each school's highest undergraduate degree was indicated. One school offering both a diploma and an associate's degree was recoded to associate's degree. Thirty two schools offered both associate's degree and baccalaureate degree; they were recoded to baccalaureate degree category. After recoding, there were 18 (3.6%) schools offering diploma degrees, 212 (42.2%) schools offering associate's degrees, and 273

(54.4%) schools offering baccalaureate degrees. This distribution of degree types differs from the distribution of degrees listed in a recent National League for Nursing survey (National League for Nursing, 2013). However, data from this survey included all schools regardless of accreditation status. It indicated that the percentage of diploma schools in the United States is 3.2%, which is similar to the percentage of diploma schools in the survey sample (3.5%). The representation of associate and baccalaureate degrees differs considerably, with NLN data reporting that 58.9% of schools offer associate's degrees and 37.8% offer baccalaureate degrees. In the primary sample for this study, associate degree schools represent 40.7% of total responses, and baccalaureate degree schools represent 55.8% of total responses. Baccalaureate degree programs comprise a much higher percentage of the sample in this research study.

The primary sample was comprised of 66.3% public schools (n=333) and 33.7% private schools (n=169). This distribution is similar to the distribution in the sample pool. The total number of students enrolled in the prelicensure program(s) at each school ranged from 11 to 1200, with a mean of 252 and a standard deviation of 176. Median enrollment was 211 students. Due to the skewed distribution and large standard deviation, school enrollment was divided into quartiles. The first quartile included schools with enrollment from 1-120; 25.5% of schools were in this quartile. The second quartile included schools with enrollment from 121-211; 24.7% of schools were in this quartile. The third quartile included schools with enrollment from 212-350; 28.5% of schools were in this quartile. The fourth quartile included schools with enrollment from 351-1200; 21.3% of schools were in this quartile.

Characteristics of schools using simulation

Data from schools using simulation (i.e. the study sample) were evaluated for the integration of simulation and presence of a designated simulation expert. See Table 4.2 for data related to simulation integration and the presence of a designated simulation expert.

Table 4.2: *Simulation integration and presence of a designated simulation expert n=484*

Characteristic	N	%
Simulation required		
Yes	458	94.6
No	26	5.4
% of Clinical time substituted with simulation		
None(do not substitute)	107	22.1
10% or less	189	39.0
11-25%	144	29.8
26-50%	20	4.1
More than 50%	3	0.6
Unsure of percentage	21	4.3
Designated Simulation Expert		
Yes	382	78.9
No	102	21.1

Simulation was identified as a required part of the curriculum in 94.6% of schools who are using simulation as defined for this study. The percentage of hours of required clinical time that is substituted with simulation varied, with 22.1% of schools not allowing simulation to be substituted for clinical hours. Of those who substitute simulation for clinical time, 69% are substituting up to a quarter of the clinical hours. The majority of schools (78.9%) report having a designated simulation expert.

Designated simulation expert description

As noted above nearly 4 out of 5 schools report that there is a faculty or staff member who has a percentage of their workload devoted to simulation. The characteristics of the designated simulation expert are presented in Table 4.3.

Table 4.3: *Characteristics of the designated simulation expert (n=382)*

Characteristic	N	%
Registered Nurse	373	97.6
Faculty or Staff		
Faculty	295	77.2
Staff	87	22.8
% of workload devoted to simulation		
25% or less	89	23.3
26-50%	94	24.6
51-75%	71	18.6
76-100%	128	33.5
Years teaching in nursing		
1-5	132	34.6
6-10	120	31.4
11-15	62	16.2
16-20	28	7.3
21 years or longer	40	10.5
Years teaching with simulation		
1-3	125	32.7
4-6	171	44.8
7-10	72	18.8
11 years or longer	14	3.7
Age in years		
Less than 25	1	0.3
26-35	40	10.5
36-45	78	20.4
46-55	141	36.9
56 years or more	120	31.4

Table 4.3: *Characteristics of the designated simulation expert (n=382)(cont.)*

Characteristic	N	%
choose not to respond	2	0.5
Highest academic degree		
Associates	6	1.6
Bachelors	32	8.4
Masters	282	73.8
Doctor of Nursing Practice	18	4.7
Doctor of Philosophy	44	11.5

The designated simulation expert is a registered nurse in 97.6% (n=373) of responding schools. In 77.2% (n=295) schools, this position is a faculty appointment. Varying amounts of workload are dedicated to simulation. Of the four categories, the largest group (33.5%, n=128) has 76-100% of their workload devoted to simulation. In 47.9% of schools, 50% or less of workload is devoted to simulation.

Sixty-six percent (n=252) of respondents report that the designated simulation expert has been teaching in a school of nursing for less than 10 years. Those teaching between 10 and 20 years make up 23.5% of the sample. Only 10.5% (n=40) have been teaching in nursing more than 20 years. Examination of the number of years teaching using clinical simulation demonstrates that 78% (n=296) have been teaching using simulation for 6 years or less. Those teaching using clinical simulation for 7-10 years represent 18.8% (n=72) of respondents. Only 14 (3.7%) designated simulation experts have been teaching using clinical simulation for 11 years or longer.

The majority of designated simulation experts hold a master's degree: 73.8% (n=282). Doctoral degrees are held by 16.2% (n=62). Those holding a baccalaureate degree or associates degree represent 10% (n=38) of the sample. None of the schools had a designated simulation expert who did not have an academic degree.

The designated simulation expert has received formal training in simulation in 80% (n=307) of responding schools. Table 4.4 describes the sources and kinds of training.

Table 4.4: *Source of training for designated simulation experts*

Characteristic	**N**	**%**
Source of Training*		
Workshop in Academic Setting	181	47.3
Simulation Consultant	153	39.9
Simulation Center	119	31.1
NLN SIRC modules	110	28.7
Graduate course(s)	65	17.0
NLN Scholars	13	3.4
Simulation Centers listed as Source of Training		
Drexel University	26	5.4
Center for Medical Simulation	6	1.2
Gordon/WISER Center	5	1.0
Oregon Health and Sciences University	4	0.8
Healthcare Simulation Center, South Carolina	2	0.4
MFAST Johns Hopkins University	2	0.4
New York Simulation Center	2	0.4
Springfield Community College	2	0.4
Other	26	5.4
N/A	406	83.9
Certifications*		
Certified Healthcare Simulation Educator	24	6.3
Certified Nurse Educator	63	16.4
American Nurses Credentialing Center-Board Certified	24	6.3
Membership in Professional Organization*		
ASPE	11	2.9
INACSL	180	47.0
SSH	210	54.8

***may not total 100%

Respondents were asked to report the source of the training, and 363 (95%) of simulation experts had received training from multiple sources. The most frequently selected response was training from a manufacturer of simulation equipment (79.6%).

Conferences were a source of training for 71.8% (n=275) of respondents. Workshops held in academic settings were a source of training for 47.3% (n=181) of respondents. Simulation consultants provided training for 39.9% (n=153) of respondents. Simulation training from a simulation training center was the source of training for 31.1% (n=119) of respondents. Simulation centers cited as sources of training by more than two schools included: Drexel University (26 schools), The Center for Medical Simulation (Harvard) (6 schools), The Gordon and WISER centers (5 schools), and Oregon Health and Sciences University (4 schools). The NLN Simulation Innovation Resource Center was a source of training for 28.7% (n=110) of respondents. Sixty-five respondents (17%) reported having taken graduate level courses in simulation. Thirteen respondents (3.4%) had participated in the NLN Leadership Development Program for Simulation Educators. Of those with some type of formal training, 64.9% had academic training from simulation center course, graduate level coursework, or the NLN program.

Certifications held by designated simulation experts included: Certified Nurse Educator, 16.4% (n=63); Board certification in professional development from the American Nurses Credentialing Center, 6.3% (n=24); and Certified Healthcare Simulation Educator, 6.3% (n=24). Designated simulation experts belonged to several simulation-related professional organizations. The majority, 54.8% (n=210) belonged to the Society for Simulation in Healthcare. Those holding membership in the International Nursing Association for Clinical Simulation and Learning represented 47% (n=180) of respondents. Eleven respondents (2.9%) held membership in the Association of Standardized Patient Educators.

Debriefing environment and practices

Before exploring the first aim of the study, which is to identify what debriefing practices are being used in accredited prelicensure registered nursing programs in the United States, several questions were asked in an attempt to describe the learning environment. Of particular interest is what is done to establish a psychologically safe learning environment during prebriefing. Because an environment of psychological safety influences students' ability to engage fully and without bias in the experiential learning activity, it is critical to assess this concept in order to provide context for the subsequent assessment of debriefing practices. Survey items related to psychological safety were originally conceptualized as a component of the concrete experience of Kolb's experiential learning theory. Following the expert review process, the decision was made that the nature of psychological safety was not related only to concrete experience, but was a factor in allowing all phases of the experiential learning cycle to flourish. Given the importance of psychological safety to all phases of simulation and debriefing, the survey items were retained in the final survey, and the practices are described below.

Practices related to psychological safety

A psychologically safe learning environment enhances the simulation participant's ability to engage in both the simulation and subsequent debriefing. In order to understand steps taken to establish this environment, survey items related to the establishment of a psychologically safe learning environment were included. The reported practices take place prior to simulation experiences, during prebriefing. See Table 4.5 for practices related to establishing a psychologically safe learning environment.

Table 4.5: *Practices related to psychological safety*

Practice	N	%
Standardized Approach to Prebriefing		
All of the time	265	54.8
Most of the time	93	19.2
Some of the time	70	14.5
None of the time	33	6.8
Unable to answer	23	4.8
Objectives for simulation reviewed		
All of the time	224	66.9
Most of the time	112	23.1
Some of the time	29	6.0
None of the time	11	2.3
Unable to answer	8	1.7
Topics discussed during prebriefing		
Simulation being done for learning	400	82.6
Expectations of students	377	77.9
Role of facilitator	265	54.8
Length of simulation	360	74.4
Length of debriefing	251	51.9
Confidentiality	360	74.4
Possible emotional responses	231	47.7

Table 4.5*: Practices related to psychological safety (cont)*

Practice	**N**	**%**
Limitations of simulator	307	63.4
Fiction contract or suspension of disbelief	194	40.1
Videotaping	334	69.0
Focus of debriefing is reflection	339	70.0
Mistakes are opportunities to learn	440	90.9

Prebriefing is the time prior to a simulation experience when students are given preparatory information. It is surprising to see that only about half of the schools use a standardized approach consistently. It is suggested that prebriefing include discussion of the equipment, orientation to the environment, roles, time allotment, objectives and overview of the patient situation a discussion of the benefits and limits of the simulated clinical experience, what will be expected of learners, and how the debriefing will be conducted. Discussion should also include the fact that debriefing is a time for learning, and whether or not video playback will be used. Examination of the data demonstrate that prebriefing follows these suggested guidelines the majority of the time. Two thirds of schools report reviewing objectives all of the time. One important component of psychological safety is explaining to students that mistakes are expected, not penalized, and are viewed as opportunities for learning. Fortunately, 91% of schools are doing this during prebriefing. Topics that are discussed with the least frequency (approximately half of the time or less) are the role of the facilitator, the length of time for debriefing, that the students may experience an emotional response to the simulation, and a discussion of a "fiction contract" or suspending disbelief. In order to facilitate student self reflection during debriefing, the fact that self reflection is expected should be explained to students prior to the simulation. This is only being done by 70% of schools.

Data analysis related to debriefing practices

Research question 1: What debriefing practices are being used in accredited prelicensure registered nursing programs in the United States?

All debriefers

In addition to answering questions about the designated simulation expert, respondents answered questions about all debriefers, which included any member of the faculty or staff in a school of nursing who conduct debriefing discussions. When answering questions about all debriefers, respondents based their answers on what they believed to be the primary practices or characteristics for most debriefers. See Table 4.6 for Characteristics of all debriefers.

Table 4.6: *Characteristics of all debriefers (n = 484)*

Characteristic	**N**	**%**
Debriefers are faculty members who can affect course grade	159	32.9
Debriefers' competency regularly assessed	92	19.0
Method of competency assessment*		
Observation without specific instrument	75	
Debriefing Assessment for Simulation in Healthcare (all versions)	23	
Objective Structured Assessment of Debriefing	4	
Debriefing Experience Scale	2	

*totals more than 92; some listed multiple methods of assessment

The Standards of Best Practice for Simulation specifically state that debriefers should have formal training and competency assessment (Decker et al., 2013). This is not the case in most of the responding schools of nursing. Less than half (47.5%) report that debriefers have received training. The competence of debriefers is rarely assessed, with only 19.0% of respondents reporting regular assessment of competency. When competence is assessed, an instrument with reported reliability and/or validity is often not used. Of the 92 respondents reporting competency assessment of debriefers, 75 (81.5%) report that competence is assessed through observation without the use of a specific instrument. The Debriefing Assessment for Simulation in Healthcare (Simon et al., 2009 & 2010) was the most frequently cited instrument used for assessment of competence (n=23, 30.6%). It was also found that debriefers are faculty members who can affect course grades in approximately one third of responding schools (32.9%).

The debriefing environment

The study also sought to describe the debriefing environment, including the timing and location of debriefing. See Table 4.7 for elements of the debriefing environment.

Table 4.7: *Debriefing Environment*

Characteristic		N	%
Debriefing follows a structure		228	47.1
A theory or model guides debriefing		166	34.3
Guiding theory or model			
	Debriefing with Good Judgment	25	5.8
	Jeffries/NLN	22	4.5
	Debriefing for Meaningful Learning	16	3.3
	General Learning Theories	14	2.9
	Plus/Delta	12	2.5
	GAS	9	1.9
	Tanner Clinical Judgment	8	1.7
	General Nursing Theories/Models	6	1.2
	Benner Novice to Expert	5	1.0
	Schon Reflective Learning	3	0.6
	INACSL	3	0.6
	3D	2	0.4
	CAE	2	0.4
	PEARLS	2	0.4
	Socratic Questioning	2	0.4
	Other/non-specific	19	3.9
Timing of debriefing			
	Immediately following the simulation	459	94.8
	During the simulation	12	2.5
	Several hours after the simulation	4	0.8
	During the next class period	2	0.4

Table 4.7: *Debriefing Environment (cont.)*

Characteristic		N	%
	Debriefing does not follow most simulations	1	0.2
	Unable to answer	6	1.2
Length of debriefing			
	Less time than simulation	203	41.9
	As much time as simulation	113	23.3
	More time than in simulation	143	29.5
	Unable to answer	25	5.2
Place of debriefing			
	Same room as the simulation	180	37.2
	Room away from the simulation	293	60.5
	Unable to answer	11	2.3
A record of events guides debriefing			
	Almost all of the time	192	39.6
	Most of the time	100	20.6
	Some of the time	91	18.8
	None of the time	72	14.8
	Unable to answer	30	6.2
Behavioral assessment tool guides debriefing		94	19.4
Video of simulation is reviewed		181	37.4
	Whiteboard used for teaching	170	35.1
	Facilitator and students seated together	280	57.9

Examination of the data reveals two items of concern regarding guiding frameworks for debriefing. Less than half of respondents report debriefing having a structure. In almost two thirds of responding schools, there is no theory guiding debriefing. The actual number of schools using a theory or model may be lower than reported. When asked to list the guiding theory or model, some responses were not actual theories or models (e.g. INACSL, CAE, Socratic questioning). Subtracting the number of responses that were not theories or models, the number of programs using a theory or model to guide debriefing is actually 151 (31.2%). The most frequently cited models used were Debriefing with Good Judgment (cited by25), the NLN/Jeffries Simulation Framework (cited by 22) and Debriefing for Meaningful Learning (cited by 16).

With regard to timing of debriefing, 94.8% of respondents report that debriefing takes place immediately following the simulation. The length of time spent debriefing demonstrates wide variation. Only a small majority of respondents (52.8%) indicate that time allotted for debriefing is at least as much time as the simulation, often more. Less time is spent in debriefing than is spent in the simulation in 41.9% of cases.

The data indicate that debriefing is often not guided by a record of events from the simulation. In only 60.2% of cases is a record of the events of the simulation used to guide debriefing. This record of events is often described as handwritten notes. Use of a behavioral assessment tool or video playback to guide debriefing is not normally used. Other descriptions of the debriefing environment indicate that most debriefing takes place in a room away from the simulation. Additionally, the facilitator sits with students slightly more than half of the time. Use of a whiteboard for teaching purposes is not frequent.

Debriefing practices by theoretical concept

Survey items were developed that sought to capture the frequency with which concepts of Kolb's Experiential Learning Theory were embedded in debriefing practices. The five survey items developed to focus on the reflective observation concept are shown in Table 4.8.

Table 4.8: *Survey items related to reflective observation*

Reflective Observation Survey items	N	%
Emotions discussed at the start of debriefing		
Almost all of the time (95-100%)	305	63.0
Most of the time (60-94%)	96	19.8
Some of the time (11-59%)	44	9.1
Almost none of the time (0-10%)	12	2.5
Unable to answer	27	5.6
Feedback is given to individuals about specific actions taken		
Almost all of the time (95-100%)	287	59.3
Most of the time (60-94%)	127	26.2
Some of the time (11-59%)	44	9.1
Almost none of the time (0-10%)	11	2.3
Unable to answer	15	3.1
Students give feedback to each other		
Almost all of the time (95-100%)	209	43.2
Most of the time (60-94%)	148	30.6
Some of the time (11-59%)	80	16.5
Almost none of the time (0-10%)	24	5.0
Unable to answer	23	4.8
A record of simulation events used to guide debriefing		
Almost all of the time (95-100%)	191	39.5
Most of the time (60-94%)	100	20.7
Some of the time (11-59%)	91	18.8
Almost none of the time (0-10%)	72	14.9
Unable to answer	30	6.2

This concept addresses participants' attempt to understand and interpret an experience through self-reflection, observing others in the experience, describing the event and examining the experience from multiple perspectives. Acknowledgment of the emotional activation that occurs in the simulation is necessary in order to validate and dissipate the feelings. Discussing the students' emotions at the beginning of debriefing provides the opportunity for students to defuse the emotions. Discussion of emotions at the beginning of debriefing is occurring most or all of the time in 82.8% of cases.

Debriefing and the feedback given during reflective observation phase is the primary opportunity to close the gap between desired and actual performance (Rudolph, 2006). In 85.5% of cases, this is taking place. Providing feedback from multiple perspectives is an important element during the reflective observation portion of the experiential learning cycle (Kolb, 1984). The perspective of the peer observers provides an important perspective in addition to that of the facilitator and the active participants. Peer feedback is incorporated into debriefing most or all of the time in 73.8% of cases.

The survey item "the facilitator clearly states his/her judgment about the students' performance during debriefing" had the lowest frequency of responses in the most to all of the time categories (58.2%). Narrative comments related to this item suggest that some respondents view the facilitator sharing their judgments as something to be avoided. Comments included: students should identify their own performance problems (n=6), the focus of debriefing is only on positive actions (n=6), debriefing is a non-judgmental environment (n=5), and feedback is only given to the group, not to individuals (n=4).

The abstract conceptualization concept of Kolb's theory is described as the time when students grasp new information through the examination of existing mental models to determine their applicability to the current situation. This examination of mental models may result in the creation of new models by integrating the current experience with existing knowledge to create logically sound theories. Two items focused on abstract conceptualization (Table 4.9).

Table 4.9: *Survey items related to abstract conceptualization*

Abstract Conceptualization Survey items	N	%
Students are guided in forming new mental models		
Almost all of the time (95-100%)	158	32.6
Most of the time (60-94%)	182	37.6
Some of the time (11-59%)	73	15.1
Almost none of the time (0-10%)	20	4.1
Unable to answer	51	10.5
Simulation is tied to existing knowledge		
Almost all of the time (95-100%)	281	58.1
Most of the time (60-94%)	164	33.9
Some of the time (11-59%)	16	3.3
Almost none of the time (0-10%)	5	1.0
Unable to answer	18	3.7

Assisting students in forming new mental models is done most or all of the time in 70.2% of cases. This phase of the experiential learning cycle is the primary opportunity for facilitators to correct erroneous thinking. Tying the current simulation to existing knowledge allows students to integrate the new experience with existing knowledge through assimilation and/or accommodation. Respondents report that this practice takes place most or all of the time in 92% of cases.

The final concept of Kolb's theory is the active experimentation phase (Table 4.10).

Table 4.10: *Survey items related to active experimentation*

Active experimentation Survey items	**N**	**%**
Learning points are applied to future clinical practice		
Almost all of the time (95-100%)	212	43.8
Most of the time (60-94%)	153	31.6
Some of the time (11-59%)	57	11.8
Almost none of the time (0-10%)	10	2.1
Unable to answer	52	10.7
State specific clinical practice to be changed as a result of learning in current simulation		
Almost all of the time (95-100%)	152	31.4
Most of the time (60-94%)153	31.6	33.9
Some of the time (11-59%)	89	18.4
Almost none of the time (0-10%)	44	9.1
Unable to answer	46	9.5

In this phase of the experiential learning cycle students apply newly created models and theories to make decisions and solve problems in future similar situations. In simulation based education, this often takes the form of a final discussion during which learning points are summarized and students discuss practice changes that will be made based on the new learning. The goal of this phase is to begin the process of embedding new learning into practice. The first of two survey items related to active experimentation asked how frequently learning points are applied to future clinical practice during debriefing. In 75.4% of cases, this is done most to all of the time. The second item asked how frequently students are asked to state specific clinical practices that they will change in the future as a result of learning that took place in the current simulation. This practice occurs with much less frequency, with 65.3% of cases reporting that it occurs most to all of the time.

A summary variable was created to represent whether or not the school was practicing theory based debriefing congruent with Kolb's experiential learning theory in all three categories most of the time. A large proportion of the schools using simulation are using theory based debriefing practices within each of the three areas of conceptualization. A majority of responding schools (82.2%) achieved the majority of points available in all three categories.

Regression analysis

Research questions 2 and 3 seek to identify the characteristics of the designated simulation expert and/or the nursing program that predict the use of debriefing practices that are consistent with the concepts of Kolb's experiential learning theory.

Prior to any modeling, categories of several variables were combined due to small numbers and an uneven distribution across the categories. A new age variable was created with four categories: less than 35 years, 36-45 years, 46-55 years, and 56 or more years. Respondents were given the option "choose not to respond" for this item. Two respondents who chose not to provide an age (0.5% of the data related to the designated simulation expert) were assigned the value for the mode of the sample (46-55 years) so that they were not dropped out of the logistic regression models.

The variable "years teaching with simulation" was collapsed. Originally four categories, it was collapsed to three because the last category (11 years or longer) contained only 3.7% of the data. This category was combined with the category "7-10 years" to create the final categories: 1-3 years, 4-6 years, and 7 years or greater.

The variable "years teaching in a school of nursing" was collapsed. Originally five categories, it was collapsed to three. The final categories are: 1-5 years, 6-10 years and greater than 10 years.

Then an initial exploration of the data was performed to identify significant relationships using the chi square test for independence. In cases where expected cell counts were less than 5, the Fisher's Exact Probability test was used to obtain the correct p-value. Once significant relationships were identified ($p < .05$), logistic regression analysis was used to evaluate the strength of the relationships in the presence of other covariates.

Research question 2: Do characteristics of the designated simulation expert predict the use of theory-based debriefing practices? Characteristics include: highest academic degree held, number of years of experience in nursing education, number of years of experience teaching with simulation, full- or part-time status in simulation position, age range, certification in education or professional development, formal training in simulation-based education, and membership in simulation related professional organizations.

The initial chi-square test for independence found significant associations between the outcome variable (theory based debriefing) and the following characteristics: having formal training in simulation (x^2 =9.56, $p \leq .01$), having academic training in simulation (x^2 =5.30, $p=.02$), and age (x^2 =10.90, $p=.01$). Characteristics of the designated simulation expert that had no association to theory based debriefing included:

holding a registered nurse license, the percentage of workload devoted to simulation, highest degree held, number of years teaching with simulation, certifications, memberships in professional organizations and faculty status. Consideration was given to the fact that the types of training that the designated simulation expert has engaged in are known, and differ in their type. Because not all types of training are equivalent, the variable "academic training" was created to represent types of training that may be more in depth and/or theory based. Unadjusted odds ratios for the significant associations are presented in table 4.11.

Table 4.11: *Estimated proportions and unadjusted odds ratio for the association between use of theory based debriefing and designated simulation expert characteristics*

			Unadjusted Odds Ratio	95% C.I. for Odds Ratio		p
	N	%		Lower	Upper	
General training	269	88	2.57	1.39	4.76	<.01
Academic training	218	88	1.92	1.09	3.38	.02
Age						
35 years or less	41	70.7	1.0			
36-45	78	84.6	2.28	.92	5.66	.08
46-55	143	90.9	4.14	1.71	9.99	<.01
56 or more	120	82.5	1.20	.86	4.43	.11

The next step was to determine if the associations remained when other covariates were introduced into the model. Because academic training is encompassed under general training, both variables were entered into separate regression models. The designated simulation expert variables for age and general training were entered into a logistic regression model to assess the unique contribution of each variable. Results of the analysis are presented in table 4.12.

Table 4.12: *Estimates of adjusted odds ratios between the use of theory based debriefing and designated simulation expert characteristics*

	Adjusted Odds Ratio	**95% C.I. for Odds Ratio**		**p**
		Lower	Upper	
General Training	2.35	1.23	4.48	.01
Age				
35 years or less	1.0			
36-45	2.02	.80	5.11	.14
46-55	3.36	1.36	8.31	.01
56 or more	1.51	.64	3.56	.35

The model as a whole explained between 4.3% (Cox and Snell) and 7.5% (Nagelkerke) of the variance in the use of theory based debriefing, and correctly classified 84.8% of cases. Both variables made a unique, statistically significant contribution to the model when entered together. The association between the use of theory based debriefing with formal training in simulation still remains once age is controlled for (adjusted odds ratio of 2.4 (95% CI 1.2 – 4.5). Additionally, when training is taken into account, a designated simulation expert who is in the 46-55 year old age group is 3.4 times more likely to practice debriefing that is consistent with experiential learning theory most of the time compared to one aged 35 years and under.

In consideration of the fact that academically oriented training is an important subset of all possible sources of training, a logistic regression model was created to test the significance of the academic training variable while controlling for age. Academic training and general training were not entered into the same regression model out of concern for multicollinearity. Results of the analysis are presented in Table 4.13.

Table 4.13:*Estimates of adjusted odds ratios between the use of theory based debriefing and designated simulation expert characteristics*

	Adjusted Odds Ratio	**95% C.I. for Odds Ratio**		**p**
		Lower	Upper	
Academic Training	1.86	1.03	3.36	.04
Age				
35 years or less	1.0			
36-45	2.13	.85	5.35	.11
46-55	3.67	1.50	9.00	<.01
56 or more	1.60	.68	3.73	.28

The model as a whole explained between 3.7% (Cox and Snell) and 6.5% (Nagelkerke) of the variance in the use of theory based debriefing, and correctly classified 84.8% of the cases. It is a poorer fit for the data compared to the model in Table 4.12. Both variables made a unique, statistically significant contribution to the model when entered together. The association between the use of theory based debriefing with academic training in simulation still remains once age is controlled for (adjusted odds ratio of 1.9 (95% CI 1.03-3.36). Additionally, when training is taken into account, a designated simulation expert who is in the 46-55 year old age group is 3.7 times more likely to practice debriefing that is consistent with experiential learning theory most of the time compared to one aged 35 years and under.

Several considerations about the data called for further examination of factors that may predict the use of theory based debriefing. Consideration was given to the fact that debriefing is facilitated by faculty other than the designated simulation expert, and that the subject completing the survey was asked to base their answers on what they believed the practices of all debriefers to be. Several questions were asked about all debriefers that were based on the review of debriefing literature. These questions asked if debriefers were trained in debriefing techniques and if their competency was assessed. It is hypothesized that having trained debriefers, and assessing the competence of the debriefers will result in the use of theory based debriefing. The recommendation that debriefing discussion be purposely structured is another theme that emerges from debriefing literature. Generally, debriefing discussion should have a period of recalling events, a period of reflecting on their meaning, and a period of distilling lessons learned for future application. For this reason, the variables training for all debriefers, assessment of all debriefers, and debriefing having a structure were examined for their association to theory based debriefing. As seen in Table 4.14, all had a significant association with the use of theory based debriefing.

Table 4.14: *Estimated unadjusted odds ratio of the association between all debriefer characteristics and the use of theory based debriefing*

			Unadjusted Odds Ratio	**95% C.I. for Odds Ratio**		**p**
	N	%		Lower	Upper	
Debriefer training	197	40.1	2.50	1.93	4.52	<.01
Debriefer competence assessed	82	16.9	4.28	1.50	12.20	<.01
Debriefing follows structure	202	41.7	3.21	1.75	5.89	<.01

These significant variables related to all debriefers were entered into a logistic regression model to examine the relationships in the presence of other covariates. The dataset used for this analysis included all schools, regardless of whether or not there was a designated simulation expert (n=484). Results of the logistic regression analysis are presented in Table 4.15.

Table 4.15: *Estimated adjusted associations between the use of theory based debriefing and all debriefer characteristics*

	Adjusted Odds Ratio	**95% C.I. for Odds Ratio**		**p**
		Lower	Upper	
Training, all debriefers	1.78	1.02	3.11	.04
All debriefers competence assessed	4.24	1.47	12.25	<.01
Debriefing follows structure	3.16	1.79	5.58	<.01

This model explains between 9.2% (Cox and Snell) and 15.2% of the variance in theory based debriefing. This model correctly classified 82.2% of the data. In this logistic regression model, programs in which all debriefers are trained are 1.8 times more likely to practice theory based debriefing compared to programs that do not provide training to debriefers. Programs that assessed the competence of all debriefers were 4.2 time more likely to practice debriefing that is consistent with experiential learning theory most of the time compared to programs that do not assess the competence of debriefers when holding several other variables constant. Nursing programs in which debriefing follows a structure are 3.2 times more likely to practice debriefing that is consistent with experiential learning theory most of the time. In this model, once other variables are held constant, training for debriefers and training for the designated simulation expert are no longer statistically associated with theory based debriefing.

In summary, logistic regression analysis demonstrated that several variables have a statistically significant association with the use of theory based debriefing practices when controlling for the contribution of other variables. Several variables related to the designated simulation expert are significantly associated with the use of theory based debriefing practices, including training and belonging to the age group 46-55 years. Several variables related to all debriefers had a significant association to the use of theory based debriefing (regardless of the presence of a designated simulation expert). When debriefers receive training and have their competence assessed, nursing programs are more likely to practice debriefing that is consistent with experiential learning theory most of the time. When debriefing follows a structure, nursing programs are also more likely to practice debriefing that is consistent with experiential learning theory most of the time.

Research question 3: Do nursing program characteristics predict the use of theory-based debriefing practices? Characteristics include: degree(s) offered, size of enrollment in nursing program, public or private status, geographic region, and requirements related to simulation in the curriculum.

The Chi square test for independence was used to identify characteristics of the nursing program that had a significant relationship to the use of theory based debriefing. The only significant relationship identified was between theory based debriefing and having a designated simulation expert. The unadjusted odds ratio for this analysis is presented in table 4.16.

Table 4.16: *Estimated proportions and unadjusted odds ratio for the association between use of theory based debriefing and nursing program characteristics*

	Theory based debriefing				**X^2(p)**	**Crude Odds Ratio**	**95% C.I. for Odds Ratio**		**p**
	No		Yes				Lower	Upper	
	N	%	N	%					
Geographic Location					3.97(.26)				
Eastern	14	13	97	87		1.0			
Southern	31	19	129	81		.60	.30	1.20	.14
Midwest	28	22	101	78		.52	.26	1.04	.07
Western	13	15	71	85		.79	.35	1.78	.57
Public vs Private					.91(.34)				
Public	61	19	261	81		.78	.47	1.30	.34
Private	25	15	137	85		1.0			
Simulation required					1.58(.21)				
Required	79	17	379	83		1.77	.72	4.34	.22
Not required	7	27	19	73		1.0			
Percentage of clinical substitution					7.91(.16)				
None	28	26	79	74		1.0			
10% or less	32	17	157	83		1.74	.98	3.09	.06
11-25%	21	15	123	85		2.08	1.10	3.91	.02
26-50%	2	10	18	90		3.19	.70	14.63	.14
Unsure of percentage	7	27	19	73		2.13	.58	7.77	.25
Designated Simulation Expert					8.29(<.01)				
Yes	58	15	324	85		2.11	1.26	3.54	<.01
No	28	28	74	72		1.0			

The analysis determined that nursing programs with a designated simulation expert are 2.1 times more likely to practice debriefing that is consistent with experiential learning theory most of the time. Because no other nursing program related variable demonstrated a significant relationship to theory based debriefing, logistic regression analysis was not required.

Summary

This chapter discussed the results of the data analysis. Responses from 502 completed surveys were included in the demographic analysis. Subsets of the data were used for certain analyses, e.g. 484 nursing programs using simulation; 382 schools reporting a designated simulation expert. Data were screened for accuracy, missing data, and the assumptions of logistic regression. Several variables were recoded to address categories with small sample sizes. Several new variables were computed to create variables that represent concepts of interest (e.g. theory based debriefing, academic training).

Descriptive statistics were used to describe practices related to psychological safety, debriefing, and the debriefing environment. Results indicate that practices related to psychological safety and debriefing generally reflect the concepts of Kolb's experiential learning theory and practice recommendations from simulation literature.

The relationship between the use of theory based debriefing practices and the characteristics of the nursing program, the designated simulation expert and all debriefers were evaluated using logistic regression. The single nursing program characteristic that demonstrated a statistically significant relationship to the use of theory based debriefing practices was the presence of a designated simulation expert. Characteristics of the designated simulation expert that were associated with the use of theory based debriefing were having training in simulation and being in the 46-55 year old age group. Examination of the characteristics of all debriefers determined that training in debriefing and assessment of competence as well as debriefing having a structure were most likely to be associated with the use of theory based debriefing.

Descriptive data were used to provide insight into the debriefing environment. Factors described include the timing of debriefing, use of video review, theories or models guiding debriefing, and use of various aids to guide debriefing.

CHAPTER 5:
SUMMARY, CONCLUSIONS, IMPLICATIONS
AND RECOMMENDATIONS

Summary

This study examined debriefing practices in place in accredited prelicensure nursing programs in the United States. The study also sought to identify characteristics of the nursing program and/or the designated simulation expert at each school that are associated with the use of theory based debriefing practices. Theory based debriefing practices in this study refer to practices that reflect the concepts of Kolb's experiential learning theory. Nursing program characteristics that were examined included geographic location, size of enrollment, types of degrees offered, public or private status, requirements related to simulation in the curriculum, and the presence of a designated simulation expert. Characteristics of the designated simulation expert that were examined included highest academic degree held, number of year of experience teaching in nursing and teach with simulation, full- or part time status in simulation position, age range, specialty certification, and membership in simulation related professional organizations.

In addition to the specific characteristics listed above, data were collected that describe general debriefing practices and the debriefing environment. Survey items targeting general debriefing practices were guided by a review of the simulation literature as well as the Sim-PICO framework. The Sim-PICO framework provides a framework for designing and reporting debriefing research. It seeks to answer the following questions about debriefing: who is debriefing?; what is the reason for the simulation?;

where is debriefing taking place?; when is debriefing being done?; why was the study done in a certain way (i.e. is there a theoretical framework)?

A non-experimental cross sectional design using a web-based electronic survey was used to collect data via the internet from accredited prelicensure nursing programs in the United States. The questionnaire consisted of a maximum of 40 questions that gathered demographic information as well as information about debriefing practices. Completed surveys were received from 502 nursing programs, which represents a 36% response rate. The majority of responding schools (96.2%, n=484) used simulation as defined for this study. This subset of the sample was used for analyses of debriefing practices.

Descriptive analyses were used to create an emerging picture of debriefing practices in prelicensure nursing education in the United States. The relationship of nursing program characteristics and designated simulation expert characteristics as well as general debriefing practices to the use of theory based debriefing was examined. Significant relationships were identified through chi-square analysis. The specific contributions of each of the significant variables to the use of theory based debriefing was examined using logistic regression analysis. The remainder of this chapter will discuss conclusions reached, limitations of the study, and implications for nursing education, practice and research.

Conclusions

The research questions in this study sought to describe the current state of debriefing in simulation based education in prelicensure nursing education programs in the United States. The study also examined variables that may affect the frequency with which nursing programs' simulation programs practiced debriefing that is consistent with Kolb's experiential learning theory. The three research questions were: 1) What debriefing practices are being used in accredited prelicensure registered nursing programs in the United States?, 2) Do characteristics of the designated simulation expert predict the use of theory based debriefing practices?, and 3) Do nursing program characteristics predict the use of theory-based debriefing practices? This is the first known survey of debriefing practices in prelicensure nursing programs in the United States, and the descriptive data were analyzed in order to describe the current state in debriefing in simulation based education.

Several broad conclusions were reached following data analysis. Simulation is an established part of prelicensure nursing curricula in the vast majority of responding prelicensure nursing programs. Reported debriefing practices are consistent with the concepts of Kolb's experiential learning theory most of the time. The majority of responding schools have an identified faculty member with primary responsibility for simulation based educational activities. The only nursing program related characteristic that was associated with the use of theory based debriefing was the presence of this designated simulation expert. The characteristics of this person that were associated with theory based debriefing were having had general simulation training, having had simulation training that was academic in nature, and being in the 46-55 year old age group. When analyzing all debriefers (in addition to the designated simulation expert), it was found that training for all debriefers and assessment of the competence of all debriefers were significantly associated with the use of theory based debriefing. Additionally, it was found that when debriefing follows a structure it is more likely that theory based debriefing is being practiced. Additional debriefing data provide information about debriefing structure, debriefing processes, and the debriefing environment.

Descriptive data analysis

In addition to describing the sample, comparisons to national level data are made on several characteristics. The final sample size (n=502) represents a 36% response rate and provides an adequate sample size given the sample pool of 1,407; the sample of schools using simulation (n=484) represents a 34% response rate, and also provides an adequate sample size to represent the population within a 5% margin of error (i.e. 95% confidence interval) (Dillman, Smyth, & Christian, 2009). The distribution of geographic regions in the final sample is representative of the sample pool when compared to national level statistics. This is an important factor in mitigating the effect of any local or regional simulation practices. The distribution of public versus private institutions was also representative of the sample pool when compared to national level statistics. Responses were received from diploma, associate, baccalaureate, and entry level masters degree programs.

There is concern about selection bias because of two demographic variables. First, nursing programs offering a baccalaureate degree as their highest undergraduate degree are overrepresented in the study sample compared to national level statistics. This may represent a selection bias in that diploma and associate degree programs did not respond to the study at the same rate. Reasons for this may be the fact that these diploma and associate degree programs focus on teaching, not on research, and potential respondents at these schools did not perceive that the incentive (generation of new knowledge related to simulation based education) adequately compensated for the cost (time and effort). It may also be possible that diploma and associate degree programs may have responded at a lower rate because they use simulation at a lower rate than baccalaureate programs. However, chi-square analysis did not demonstrate a significant association between type of undergraduate degree offered and the use of simulation.

Second, 96.2% of responding schools reported using simulation as defined for this study. This may also represent selection bias. Schools that use simulation and/or schools that are invested in developing debriefing skills may have been more motivated to respond than other schools. This concern is reinforced by the data from the National Council of State Boards of Nursing survey, which reported that 87% of nursing programs used simulation (Kardong-Edgren et al., 2012). This possibility was identified as a concern during the first survey response period. Two emails were received by the researcher declining to fill out the study for the stated reason that their program did not use simulation. Responses were sent to the schools encouraging their participation, with the explanation that the survey would be very brief, and would provide important information. Following this, the second email sent to the sample pool addressed this issue directly and encouraged those schools without simulation programs or designated simulation experts to respond. Despite these efforts, it is possible that schools using simulation may have responded in greater proportion than schools who do not use simulation, and the rate at which schools of nursing are using simulation may not be accurately represented by the data.

Response variation to the survey items addressing the concepts of experiential learning theory across cases is also a concern. Using the outcome variable of theory based debriefing, 82% of cases responded with “most of the time” or “all of the time” to the survey items based on the concepts of experiential learning. This response pattern may also suggest selection bias in that only schools practicing theory based debriefing responded.

The possibility of measurement bias must also be considered in light of the lack of variation in responses to the survey items examining the concepts of experiential learning theory. This response pattern may be inaccurate for several reasons. Respondents may not have accurately estimated the frequency with which certain practices took place. Respondents may have actually been reporting their personal debriefing practices, and not the practices of most of the debriefers, as was requested. It is also possible that respondents selected the response that they perceived as being the most socially acceptable response, rather than the most accurate.

The subset of respondents reporting simulation use included 484 schools. Simulation is integrated into the curriculum in the form of required simulation experiences in 458 of those schools. The value of augmenting traditional clinical education with clinical simulation is reflected in the fact that 77.9% of responding schools substitute hours previously spent in clinical environments with simulation experiences. From these data, it is clear that clinical simulation is heavily used in prelicensure nursing education. To support this specialized teaching methodology, the majority of nursing programs (78.9%) report having a faculty or staff member with primary responsibility for the simulation program (i.e. the designated simulation expert).

While the majority of responding schools report having a designated simulation expert, in most cases, that position is not devoted to solely to the clinical simulation program. In fact, only one third of the nursing programs in this study report that 76-100% of designated simulation expert's workload is devoted to simulation. Given the fact that facilitating simulation experiences requires specialized knowledge and skills, it may be expected that devoting more of the simulation expert's workload to simulation activities would be associated with a higher frequency of the use of theory based debriefing. However, the data did not support this; the percentage of workload devoted to simulation had no association to theory based debriefing. It is possible that the effect size of differences in workload devoted to simulation is not sufficient to detect a difference, and this represents a Type II error.

The descriptive data do provide a profile of the typical designated simulation expert in prelicensure nursing programs in the United States. This person has been teaching in nursing for less than 10 years, and has been teaching with simulation for less than six years. However, this person is likely 46 years old or older. Assuming that nurses generally enter practice by the age of 30, this may suggest that, while relatively new to teaching in nursing, and teaching with simulation, the person in this position has 10 or more years of clinical experience. If this is the case, learners should benefit from this clinical experience, as simulation strives to replicate clinical environments and the broad goal of simulation based education is to improve clinical decision making skills. The negative side of this is the fact that many designated simulation experts may be approaching retirement age within the next decade, which may result in a deficit of people qualified to administer simulation programs if succession planning is not undertaken.

The majority of designated simulation experts hold master's degrees (73.8%), and 16.2% hold doctoral degrees. This does not reflect national statistics from the American Association of Colleges of Nursing (2005), which reports that masters' degree are held by 52.1% of all faculty, and doctoral degrees are held by 47.9%. The low proportion of designated simulation experts with doctoral degrees is a concern for several reasons. As an emerging field, and as a teaching methodology that is heavily used in prelicensure nursing education, there is a strong need to ensure that practices are theory based, evidence based, and that rigorous research in simulation based education is conducted. Doctorally prepared nurses typically enact the roles of translating evidence to practice and generating new knowledge through research. That the vast majority of designated simulation experts are prepared at the masters level does not position prelicensure nursing education programs to maximize the learning and research opportunities that simulation based education provides.

Also of concern is the level and type of simulation training that the designated simulation expert has engaged in. Of the 382 schools that report having a designated simulation expert, only 80.2% of the schools reported that the designated simulation has any training in simulation based education. The Standards of Best Practice for Simulation (Decker et al., 2013) and the research monograph published by the Society for Simulation in Healthcare (Raemer et al., 2011) clearly state that specialized training in simulation based education is required for simulation facilitators. Respondents were also asked to describe the source of training. The most frequently cited source of training was manufacturers of simulation equipment. While manufacturers may provide training that is based on educational theory, it is difficult to conceive of training from a manufacturer that is completely unbiased. It is likely that this type of education focuses more on the technology than the teaching technique. The second most frequently cited source of training was attendance at a simulation conference. While more likely to be a source of peer-reviewed information than training from a manufacturer, conference attendance does not ensure a complete, well rounded source of training. Training that is more academic in nature, i.e. likely to follow a comprehensive curriculum, was a source of training for only 51% of the designated simulation experts. Since having a designated simulation expert was the one nursing program characteristic that was associated with the use of theory based debriefing, the proper training of this individual is critical. Without academically oriented training, it is difficult to build a comprehensive simulation program that integrates with the curriculum and to provide faculty development for other debriefers that is built upon a strong theoretical foundation.

Overall, the picture of simulation integration in prelicensure nursing education programs and the designated simulation expert with oversight of the simulation program presents a mixed picture. Simulation is a recognized component of prelicensure nursing education in the United States. Most programs support the simulation program by designating a faculty member to have responsibility for simulation based education. Unfortunately, not all programs have this designated person, nor has this person likely received comprehensive training in the use of this specialized teaching methodology. As schools of nursing strive to balance providing simulation based education to their learners with efficient use of resources, it may be that resources are being directed toward the technology, and not the proper development of the facilitator. A re-evaluation of resource allocation may be called for. Nursing programs and others who use simulation based education are often pressured to show simulation's value in terms of learning outcomes; without a properly trained facilitator, it is less likely that learning will be maximized and less likely that outcomes will be measured appropriately. Given these factors, it will be difficult to achieve the desired learning outcomes.

In recognition of the fact that debriefing discussions are being facilitated by faculty members other than the designated simulation expert, respondents were asked to describe practices related to all debriefers. The low rate at which debriefers are trained and their competency is assessed is an additional concern. Less than half of schools using simulation report that debriefing facilitators have been trained in debriefing techniques. Even fewer schools (19%) report assessing the competence of all debriefers. The small number of schools reporting assessment of debriefers indicated that they do not usually use valid or reliable instruments for competency assessment. This is of significant concern. It is a generally held belief that debriefing is critical to learning in simulation based education. Debriefing is a complex process which requires knowledge of educational theories, facilitation techniques, and clinical knowledge in order for learning outcomes to be maximized. Without debriefers who are skilled in debriefing, it is unlikely that learning outcomes will be maximized. Again, resource allocation must be questioned: are resources being disproportionately devoted to equipment at the expense of the development of the educators using the equipment? If so, this should be reconsidered. Equipment does not teach students; educators do. The educators facilitating simulation based education must have specialized training if simulation is to have its desired impact.

In addition to the fact that competence of debriefers is not routinely assessed, this situation raises the question about observation of debriefing practices that were reported in this study. If debriefers are not being assessed, they are likely not being observed during debriefing. The accuracy of the data reporting debriefing practices therefor must be questioned. Respondents were specifically asked to answer the debriefing study based on what they believed to be the practices of all debriefers at their institution. However, if debriefers are not observed/assessed, on what basis were these questions answered? It may be that survey items related to debriefing were answered based on the practices of the person completing the survey, or based on what the person completing the survey thinks to be the proper debriefing practices.

Survey items related to general debriefing practices were guided by the Sim-PICO framework. These data provide further understanding of important characteristics of debriefing. From this data, it appears that debriefing is being facilitated without any type of guiding framework in the majority of cases. Only 31% of programs report that a theory or model guides debriefing, and debriefing follows a structure in only 47% of nursing programs. The literature from aviation, the military and healthcare are consistent in the recommendation that debriefing follow a structure, and that it be guided by some type of theoretical framework.

The summary picture of debriefing being facilitated without a guiding model or theory by untrained personnel whose competency is not assessed is of grave concern. The likelihood of learners improving their clinical decision making skills in this environment is minimal. Simulation educators will not be able to justify the resources used for simulation in the absence of improved learning outcomes. Improvements in learning outcomes cannot be achieved in the absence of skilled facilitators. It is incumbent on the designated simulation expert, as the leader within the organization, to advocate for and/or provide comprehensive faculty development and to ensure that those facilitating debriefing are competent.

Regression analysis

Research questions 2 and 3 sought to identify characteristics of the nursing program or designated simulation expert that were associated with the use of theory based debriefing. The outcome variable theory based debriefing represents whether or not respondents answered “most of the time” or “all of the time” to the majority of the items that were based on the concepts of Kolb’s experiential learning theory. It is a nonspecific indicator in that it does not speak to the quality of the debriefing, and it is recognized that the data are a self reported estimate of the use of these practices.

Chi square analysis of nursing program characteristics identified only one characteristic that was significantly associated with theory based debriefing: the presence of a designated simulation expert. Because no other possible covariates were identified, no multivariate statistical analyses were done.

Regression analysis of characteristics of the designated simulation expert demonstrated the following. Formal training for the designated simulation expert was associated with the use of theory based debriefing, as was having had training that was academic in nature. This finding is consistent with debriefing literature, the Standards of Best Practice for Simulation, and the recommendations from the research monograph published by the Society for Simulation in Healthcare: training for simulation facilitators is necessary in order to ensure that simulation based education is being conducted correctly.

In consideration of the fact that faculty members other than the designated simulation expert are facilitating debriefing, several characteristics of all debriefers were also examined for their relationship to the use of theory based debriefing. Similar to the designated simulation expert, training for all debriefers was significantly associated with the use of theory based debriefing. In addition, when debriefer competence is assessed, theory based debriefing is more likely to occur. Structuring debriefing discussions is also significantly associated with the use of theory based debriefing. Although these characteristics in the regression model are associated with theory based debriefing, these practices are likely tied directly to the designated simulation expert as the leader in the simulation program. It is likely the faculty member in that position who has oversight of training for all debriefers, who determines practices related to assessing the competence of debriefers, and who influences debriefing structure through faculty development.

Limitations

This study had several limitations. The fact that all the data were self reported is a limitation. The validity of the reported practices is further called into question because respondents reported a very low rate of competency assessment of debriefers. In the absence of observation for the purpose of assessment, it is unclear how respondents could speak with confidence to actual practices.

Selection bias is likely present. The rate at which respondents reported using simulation is higher than the rate recently reported by the National Council of State Boards of Nursing. It is likely that nursing programs using simulation responded at a higher rate than programs who do not use simulation. Selection bias may also be evident in the fact that programs offering baccalaureate degrees responded at a higher rate than diploma or associate degree schools compared to national statistics.

Measurement bias may also be present. Steps were taken through the expert review process and the pilot survey to ensure that survey items represented the salient features of debriefing to be measured. Neither the expert reviewers nor the pilot participants recommended any changes in question structure. Respondents were asked to report debriefing practices based on answer choices reflecting the frequency with which certain debriefing practices were conducted. Estimating these frequencies may have been challenging without a dedicated period of observing debriefing sessions, and answers may not accurately reflect practices. Responses may instead represent what the respondent knows to be correct debriefing practices or their own personal practices rather than the practices of all debriefers at their institution.

One concern related to the data was multicollinearity of several of the variables related to the designated simulation expert. Collinearity diagnostics suggested that it was not a concern, as the variables did not load highly onto the same eigenvalues. However, tolerance and VIF statistics identified multicollinearity between the variables percent of workload devoted to simulation, years of experience teaching in nurse, years of experience teaching with simulation, age, highest degree, and formal training. Given the fact that this was a fairly homogenous group, it is not surprising that several variables were highly correlated. The majority of these variables were not entered into regression models, with the exception of age and formal training, which were in the final regression model that evaluated the relationship between the variables and the use of theory based debriefing. It is recognized that this may have influenced the regression model.

The use of only one theoretical framework represents an additional limitation. Important concepts related to debriefing may have been overlooked if they were not congruent with Kolb's experiential learning theory. Schon's reflective learning theory is one example of a theory that include concepts that are salient to debriefing. Schon's theory describes and explains the reflective processes in more depth. Creating survey items that captured concepts from reflective learning theory may have provided additional important information. Additionally, the way in which theory based debriefing was captured as an outcome variable is a very imprecise measure and may not accurately measure the use of theory based debriefing practices.

The results of this study cannot be generalized to simulation users in all settings (e.g. other health professions schools, acute care settings). Each setting is unique in their simulation program, and generalization beyond this sample is not possible. While the sample size seems to provide the ability to generalize findings to the sample pool of all prelicensure nursing programs, the fact that baccalaureate nursing programs were represented in a much higher proportion compared to national statistics indicates that generalization should be carefully considered.

Implications and recommendations

Education

With the broad acceptance of simulation in prelicensure nursing education, nursing education programs must embrace not only the technology, but also the theoretical basis for the use of the technology. In the same way that theories such as deliberate practice underpin the way in which psychomotor skill acquisition is taught, the theories of experiential learning and reflective practice must underpin simulation based education. Debriefing, as the time during which learning is consolidated should be practiced in a standardized way. Variability in debriefing practices will result in inconsistent learning outcomes and/or lost opportunities for learning. Literature from the field of education and simulation based education in particular are consistent in recommending that debriefing should be structured. This structure should minimally include attention to learners' emotions, an accurate review of the events of the simulation, and reflection on learners' decision making processes.

The importance of the designated simulation expert as the driver of improved educational practices related to simulation is clear. This person, as the simulation leader, has the obligation to ensure that debriefing facilitators are trained, that the competence of debriefers is assessed, and that a theory or model guides debriefing. The finding that the designated simulation expert is a faculty member is positive. Holding a faculty appointment allows the designated simulation expert to more easily gain access to decision making bodies within nursing programs such as curriculum committees. It also positions the designated simulation as a colleague of other faculty members, allowing for a higher likelihood of input into educational practices across the curriculum.

Designated simulation experts have an obligation to realize their value to educational outcomes and fulfill their responsibility to the students. As leaders, they have an obligation to educate themselves about evidence based teaching practices, assessment methods, and faculty development techniques. The designated simulation expert must establish a rigorous program of faculty development, competency assessment of simulation facilitators, and measurement of learning outcomes. This person should also advocate for proper allocation of resources, i.e. faculty development rather than the acquisition of more technology.

Results of this study have implications for the administration of nursing education programs. Because the presence of a designated simulation expert is significantly associated with the use of theory based debriefing, deans and/or nursing program directors should establish a faculty position that has oversight of the simulation program. This person should have formal training in simulation based education with particular emphasis on debriefing techniques.

Data analysis also suggests that having formal training and assessing the competence of all debriefers (not just the simulation administrator) is significantly associated with the use of theory based debriefing. Deans and/or program directors should support the proper professional development and training of all debriefers. Acknowledging that debriefing training for every member of the faculty may not be feasible, consideration should be given to the possibility that the number of faculty who facilitate simulations and debriefing discussions should be limited. This limited number of facilitators can then become true expert practitioners of simulation based education. Simulation facilitators should have their competency assessed on a regular basis. Several instruments with evidence of validity and reliability exist to assist in this competency assessment.

A standardized curriculum for debriefing training should be developed. This training program should be based on a conceptual model that includes the theoretical basis for debriefing, the concept of psychological safety, and the characteristics of the simulation administrator that are associated with theory based debriefing practices. This standardized curriculum should be applicable to all simulation settings (e.g. prelicensure education, graduate education, professional development).

Research

Several characteristics of debriefers were identified as being associated with theory based debriefing. Specifically, training for and competency assessment of debriefers were identified as significant characteristics. Further research should aim at identifying more specific training models or training content that impact learning outcomes. In order to develop a training program, a guiding conceptual framework should be developed. This conceptual framework can be developed through a consensus method such as the Delphi technique using recognized debriefing experts. This process should incorporate the theories that inform debriefing, the characteristics of the facilitator and the current evidence based debriefing practices from all fields (i.e. healthcare, aviation, and the military). The outcome of this process would be recommendations for the content of debriefing training programs.

This conceptual framework can serve a dual purpose. As salient elements of debriefing are identified for inclusion in faculty development for debriefing facilitators, these elements can also serve as a basis for a measure of theory based debriefing. Eventually, a scoring rubric can be developed that serves as an objective measure of the quality of debriefing practices.

Research related to the reliability and validity of existing instruments for the assessment of debriefing competence is necessary. There is preliminary evidence of the reliability and validity of the DASH instrument and the OSAD instrument for objectively rating debriefing; more evidence is necessary. The Debriefing Experience Scale is an instrument that assesses debriefing from the perspective of the learner. This instrument has evidence for reliability; more research is needed to estimate validity. However, the DASH instrument has several versions, including a version for objective raters and a version that is completed by students. Concentrating research efforts on this instrument may be more efficient in the long run. Any research that is carried out on instruments, debriefer training, or debriefing structure must ultimately be evaluated by its ability to translate into improved learning outcomes.

Practice

This research study examined debriefing practices in prelicensure nursing education. However, simulation is being used in the ongoing professional development of practicing nurses and advanced practice nurses. One example of this is the TeamSTEPPS training program developed by the Agency for Healthcare Research and Quality that is increasingly being adopted for the training of health care teams (Agency for Healthcare Research and Quality, 2013). Implications from this study may also apply to nursing practice. Simulation is an accepted training methodology for skill acquisition, clinical decision making and team based training. However, the resources required for simulation training in terms of both equipment and personnel may present an excessive burden for health care delivery systems that constantly struggle to provide care with limited resources. It is imperative that simulation training demonstrate an impact on patient outcomes if the cost is to be justified. There is beginning evidence that simulation training does positively impact patient outcomes and results in cost savings (Barsuk, Ahya, Cohen, McGaghie, & Wayne, 2009; McGaghie, Issenberg, Cohen, Barsuk, & Wayne, 2011; Wayne, Barsuk, O'Leary, Fudala, & McGaghie, 2008).

Drawing upon conclusions from this study, recommendations for maximizing the benefit of simulation training for practicing nurses can be made. Those with oversight of continuing education programs for professional nurses that include simulation should have specialized training in the theoretical underpinnings of simulation based training. This training should include facilitation and debriefing skills in order to maximize learning. Finally, a clear understanding of research methodology is required in order to appropriately document learning and the translation of simulation based learning on patient outcomes.

Summary

Debriefing is critical to learning in simulation based education. This study provides unique data about the current state of debriefing in prelicensure nursing education programs. With the widespread adoption of simulation as a teaching methodology in nursing education programs, it is necessary to ensure that educational theory provides the underpinning for its application. The data from this study indicate that this is often not the case.

There were several positive findings, including the fact that most prelicensure nursing programs do designate a faculty member to have primary responsibility for simulation based learning activities. The data also indicate that debriefing practices generally reflect the concepts of experiential learning theory most of the time and that the psychological safety of students is addressed during simulation based learning activities.

The most important findings relate to the competence of debriefers. The vast majority of debriefers have no training in debriefing techniques. Also, the competence of debriefers is rarely assessed. Given these facts, use of the term “designated simulation expert” throughout this study is not appropriate, as expertise may not have been developed and/or assessed. A more appropriate term may be “simulation administrator”.

If nursing programs continue to embrace simulation as a teaching methodology, and especially if simulation is to partially replace clinical experiences for students, it is imperative that debriefing facilitators be trained and that their competence be assessed on an ongoing basis. Without competent debriefers, it is unlikely that improvements in learning outcomes from simulation based education will occur. This may represent a significant missed opportunity to affect the development of clinical decision making skills in prelicensure nursing students, and ultimately a missed opportunity to make care safer for patients.

APPENDIX A: EXEMPT DETERMINATION

University of
Maryland, Baltimore
Institutional Review Board (IRB)
Phone: (410) 706-
5037
Fax: (410) 706-
4189
Email:
hrpo@som.umaryland
.edu

EXEMPT DETERMINATION

Date: September 3, 2013

To: Louise S. Jenkins
RE: HP-00056069
Type of Submission:
Initial Review Type of
IRB Review: Exempt

Determination Date: 9/3/2013

This is to certify that University of Maryland, Baltimore (UMB) Institutional Review Board (IRB) has reviewed the above referenced protocol entitled, "*Debriefing Practices in Nursing Education Programs in the United States*."

Your protocol has been determined to be exempt under 45 CFR 46.101(b) from IRB review based on the following category(ies):
Category (1): Research conducted in established or commonly accepted educational settings, involving normal educational practices. (Both the procedures involve normal education practices and the objectives of the research involve normal educational practices.)

Category (2): Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that Human Subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the Human Subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, insurability, or reputation. If the research involves children the procedures are limited to (1) the observation of public behavior when the investigator(s) do not participate in the activities being observed and (2) the use of educational tests.

The IRB made the following determinations regarding this submission: - No specific determinations made.

In conducting this research you are required to follow the requirements listed in the INVESTIGATOR MANUAL.
Investigators are reminded that the IRB must be notified of any changes in the study. Research activity involving veterans or the Baltimore VA Maryland Healthcare System (BVAMHCS) as a site, must also be approved by the BVAMHCS Research and Development Committee prior to initiation. Contact the VA Research Office at 410-605-7131 for assistance.

In conducting this research you are required to follow the requirements listed in the INVESTIGATOR MANUAL.
Investigators are reminded that the IRB must be notified of any changes in the study. Research activity in which the VA Maryland Healthcare System (VAMHCS) is a recruitment site or in which VA resources (i.e., space, equipment, personnel, funding, data) are otherwise involved, must also be approved by the VAMHCS Research and Development Committee prior to initiation at the VAMHCS. Contact the VA Research Office at 410-605-7000 ext. 6568 for assistance.

The UMB IRB is organized and operated according to guidelines of the International Council on Harmonization, the United States Office for Human Research Protections and the United States Code of Federal Regulations and operates under Federal Wide Assurance No. FWA00007145.

If you have any questions about this review or questions, concerns, and/or suggestions regarding the Human Research Protection Program (HRPP), please do not hesitate to contact the Human Research Protections Office (HRPO) at (410) 37 or HRPO@som.umaryland.edu.

APPENDIX B:
DEBRIEFING STUDIES WITH SIM-PICO FRAMEWORK APPLIED

All studies are quantitative unless otherwise noted.

Boet et al, 2011, Canada	
Simulation	Intraoperative cardiac arrest
Population	Anesthesiology residents ; n=50
Intervention & Comparison	***Who***: The debriefer was one instructor who had completed formal simulation teaching course and a one year fellowship in simulation based education
	What: Self debriefing vs Instructor-facilitated debriefing; standardized structure using ANTS framework
	When: Post-simulation; duration- 20 minutes both groups
	Where: simulation center
	Why: No theoretical framework was reported. Outcome being evaluated was formative self assessment vs formative instructor led assessment
Outcome	No significant differences were found between groups by debriefing method using the Anesthesia Non-technical skills (ANTS) instrument.
Byrne et al, 2002, United Kingdom	
Simulation	Anesthesia emergencies
Population	Anesthesiology residents; n=32
Intervention & Comparison	***Who***: The debriefers were senior trainee anesthetists who had been familiarized with the simulator.
	What: short explanation plus video review vs short explanation only; structure not reported
	When: Post-simulation; duration not reported
	Where**:** simulation center
	Why: No theoretical framework was reported.
Outcome	No significant differences were found between groups. Measure- time to intervention, clinical documentation

Cantrell, 2008, United States (qualitative study)	
Simulation	Three pediatric simulations
Population	Undergraduate nursing students; n=11
Intervention & Comparison	***Who***: nursing faculty
	What: evaluated the impact of structured debriefing using video playback through focus groups.
	When: verbal debriefing done immediately post-simulation; structured debriefing using video playback occurred two weeks after the simulation. Structured debriefing was embedded in focus groups lasting one hour.
	Where: simulation center
	Why: no theoretical framework reported
Outcome	Students desired debriefing to immediately follow simulation; method of debriefing seen as less important than the timing.
Chronister and Brown et al, 2011, United States	
Simulation	Cardiac arrest
Population	Undergraduate nursing students; n=37
Intervention & Comparison	***Who***: nursing faculty
	What: video-assisted verbal debriefing vs verbal only debriefing; standardized structure using 13 questions derived from objectives.
	When: post-simulation; duration- 30 minutes both groups
	Where: simulation center
	Why: Nursing Education Simulation Framework used to guide design of study
Outcome	Video-assisted group improved skill time; verbal group improved knowledge retention. Measure – quality of skills, skill time, knowledge retention.
Dieckmann et al., 2009, Denmark. (survey and observational study)	
Simulation	CRM and medical simulations
Population	22 simulation directors responded to survey; three instructors observed for debriefing interaction analysis

Intervention & Comparison	***Who***: simulation directors and debriefing facilitators
	What: questionnaire about roles of debriefing facilitators and observation of debriefing communication patterns
	When: not addressed
	Where: simulation center
	Why: Harden and Crosby's 12 roles of the medical teacher used as survey questions
Outcome	Wide variation in communication patterns in debriefing. The only role seen as being significantly different between medical vs CRM simulations was that of information provider
Driefuerst, 2012, United States	
Simulation	Simulations in an adult medical-surgical nursing course
Population	238 Undergraduate nursing students
Intervention & Comparison	***Who***: nursing faculty (control group); PI and author of DML model for experimental group
	What: structured vs unstructured debriefing using the Debriefing for Meaningful Learning (DML) model
	When: post-simulation; duration not addressed
	Where: simulation center
	Why: no theoretical framework reported
Outcome	DML group had significantly better scores on the Health Sciences Reasoning Test. DML group rated debriefing higher using the DASH instrument.
Fey et al., unpublished, United States (qualitative study)	
Simulation	Simulations in an adult medical-surgical nursing course
Population	28 undergraduate nursing students

Intervention **&** **Comparison**	***Who***: one debriefer (primary author)
	What: students' perceptions of characteristics of debriefing that facilitate learning
	When: post-simulation; 30-60 minutes
	Where: simulation center
	Why: Kolb's Experiential Learning Theory guided study; Debriefing with Good Judgment model used in debriefing
Outcome	Five themes emerged: Safe environment, multiple perspectives, debriefing to explore thoughts, all in this together, and facilitation.
Grant, 2010, United States	
Simulation	Patient requiring intubation
Population	Undergraduate nursing students (n=34), graduate nursing students (n=6)
Intervention **&** **Comparison**	***Who***: Faculty with expertise in debriefing for video-assisted group; graduate student who had worked with expert faculty for one year for verbal only debriefing group.
	What: video-assisted verbal debriefing vs verbal only debriefing; standardized structure for debriefing questions.
	When: post-simulation; duration not specified
	Where: simulation center
	Why: no theoretical framework reported. Used components as described by Jeffries (2006) as a guide in the development, implementation and evaluation of the simulation
Outcome	Video-assisted group had a higher frequency of selected patient safety behaviors; no difference between groups in total performance score. Measure-behavioral checklist
Husebo, et al., 2013, Norway (qualitative study)	
Simulation	Cardiac arrest
Population	Undergraduate nursing students; n=81 and nursing faculty; n=5

Intervention & Comparison	***Who***: nursing faculty	
	What: evaluated facilitators' questions and students' answers for level of reflection as defined by Gibbs.	
	When: post-simulation; duration varied from 5.5 to 30 minutes (median value 20.5)	
	Where: simulation center	
	Why: Gibbs; Reflective Learning Cycle	
Outcome	Facilitators asked mostly descriptive or evaluative questions. Students' responses were mostly descriptive or emotional.	
Lasater, 2007, United States (qualitative)		
Simulation	Simulations in nursing course focused on acutely ill adults	
Population	Undergraduate nursing students; n=8	
Intervention & Comparison	***Who***: nursing faculty	
	What: evaluated students' perceptions of high fidelity simulation and debriefing	
	When: post-simulation;	
	Where: simulation center	
	Why: Tanner's Clinical Judgment model	
Outcome	Students recognized the critical value of reflection during debriefing, desired more direct feedback on performance	
Mariani et al, 2012, United States		
Simulation	Care of post operative patient & care of patient with small bowel obstruction	
Population	Undergraduate nursing students; n=86	

Intervention & Comparison	***Who***: Intervention group: clinical faculty who had attended Debriefing for Meaningful Learning (DML) debriefing workshop; Control group: clinical faculty
	What: DML model (intervention group) vs unstructured debriefing (amount of time and nature of feedback left to discretion of instructor)
	When: post- simulation; duration not specified
	Where: simulation center
	Why: DML model applied to debriefing. Tanner's Clinical Judgment Model applied to simulation and learner evaluation
Outcome	No significant differences between groups. Measure-Lasater Clinical Judgment Rubric
Morgan et al, 2009, Canada	
Simulation	Anesthesia emergencies
Population	Anesthesiologists; n=58
Intervention & Comparison	***Who***: academic anesthetists familiar with simulation and Anesthesia Crisis Resource Management (ACRM)
	What: instructor facilitated debriefing (PowerPoint & video review with discussion) vs home study (peer reviewed articles) or no educational intervention
	When: post-simulation; reported
	Where: simulation center (instructor-facilitated group)
	Why: no theoretical framework reported
Outcome	Instructor facilitated group showed significant improvement in checklist. No difference between groups on global rating scale. Measure- dichotomous checklist and global rating scale
Savoldelli et al, 2006, Canada	
Simulation	Intra-operative cardiac arrest
Population	Anesthesia residents; n=42

Intervention & Comparison	***Who***: two skilled instructors
	What: verbal only debriefing vs video-assisted verbal debriefing vs no debriefing. Debriefing described as constructive comments targeting mostly non technical skills.
	When: post simulation; duration reported as "until learner's questions and instructor comments were exhausted"
	Where: simulation center
	Why: no theoretical framework reported
Outcome	Verbal and verbal + video groups significantly better than no debriefing group; no difference between debriefing groups. Measure - ANTS
Sawyer, 2012, United States	
Simulation	Neonatal resuscitation
Population	Pediatric and family medicine residents; n=30
Intervention & Comparison	***Who***: one facilitator (primary author)
	What: video-assisted verbal debriefing vs verbal only debriefing; standardized structure using 13 questions derived from objectives.
	When: post-simulation; duration- 20 minutes both groups
	Where: simulation center
	Why: Debriefing with Good Judgment model guided the debriefing; Sim-PICO framework guided the development and reporting of the study
Outcome	No significant difference in Neonatal Resuscitation Performance Evaluation
Shinnick et al, 2011, United States	
Simulation	Acute decompensated heart failure
Population	Undergraduate nursing students; n=162

Intervention & Comparison	***Who***: one research team member at each site	
	What: where in simulation greater knowledge gains occurred- "hands on" alone or "hands on plus debriefing"; debriefing described as "guided reflection"	
	When: post-simulation. Duration 30 minutes	
	Where: simulation center	
	Why: no theoretical framework reported.	
Outcome	Knowledge only increased after debriefing. Measure- 12 item multiple choice test	
Van Heukelom, 2010, United States		
Simulation	ACLS algorithms	
Population	Third year medical students; n=161	
Intervention & Comparison	***Who***: emergency medicine faculty	
	What: in simulation debriefing vs post simulation debriefing; debriefing described as structured, 3-step method guided by simulation learning objectives.	
	When: in- and post- simulation; total time for simulation + debriefing – 20 minutes	
	Where: at bedside for in-simulation group; in simulation center for post-simulation group	
	Why: no theoretical framework reported	
Outcome	Post simulation group ranked 3 measures higher. Measure- self reported confidence and knowledge and satisfaction with experience	
Welke, 2009, Canada		
Simulation	3 ACLS resuscitation simulations	
Population	Anesthesiology residents; n=30	

Intervention & Comparison	***Who***: experienced instructor
	What: instructor facilitated video-assisted verbal debriefing vs self-paced multimedia instruction. No standardized structure for instructor-led group- described as "constructive critique until questions were answered and observations were addressed" ; multimedia debriefing standardized to reflect objectives of crisis management
	When: post-simulation; duration not reported
	Where: simulation center
	Why: no theoretical framework reported
Outcome	No significant differences between groups. Measure- ANTS

APPENDIX C:
Final Survey Questions: Debriefing Practices

<u>Program Characteristics</u>

1. What is the geographic location of this nursing program?

    - ☐ Eastern Region (Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and Washington, D.C.)
    - ☐ Southern Region (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, and West Virginia)
    - ☐ Midwest Region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Oklahoma, and Wisconsin)
    - ☐ Western Region (Washington, Oregon, California, Nevada, Arizona, Utah, Idaho, Wyoming, Montana, Colorado, New Mexico, Alaska, Hawaii)

2. Approximately how many students are enrolled in your prelicensure registered nurse program(s)?

    ________ (text box)

3. What nursing degree(s) are offered at your institution? ***Check the box next to as many options as apply:***

    - ☐ Diploma
    - ☐ Associate Degree
    - ☐ Baccalaureate Degree
    - ☐ Second degree Baccalaureate

- ☐ Entry level Master's Degree
- ☐ Master's Degree
- ☐ Doctor of Nursing Practice Degree
- ☐ Doctor of Philosophy Degree
- ☐ Other: ____________ (text box)

4. Is your school of nursing a public or a private institution?

   - ☐ Public
   - ☐ Private

5. For the purpose of this survey, clinical simulation is defined as: ***an experiential activity conducted for learning purposes and formative assessment during which learners provide care to a simulated patient in a realistic environment, followed by a dedicated debriefing period. It does not include the activities conducted for the sole purpose of teaching and testing of psychomotor skills or simulations that are done for summative evaluation (i.e. grading).*** Does your program currently use simulation as defined for this study?

   - ☐ Yes
   - ☐ No

   If respondents answered no to question 5, the survey ended.

6. If you answered yes to question 5, are the simulations a required part of the curriculum in any of the courses offered?

   - ☐ Yes

- No

7. Is simulation used to substitute for hours that were previously spent in traditional clinical placements?
   - Yes, 10% or less
   - Yes, 11% - 25%
   - Yes, 26% - 50%
   - Yes, more than 50%
   - Yes, not sure how much
   - No, simulation is not used to substitute for clinical hours
8. For the purposes of this survey, ***a designated simulation expert is defined as: a person who is primarily responsible for simulation based educational activities. This person may hold a clearly defined position, such as simulation director, simulation coordinator, chair of simulation workgroup or may be a faculty or staff member who is recognized as the simulation champion within the program and has a percentage of workload devoted to simulation activities.*** Is there a designated simulation expert in your nursing program?
   - Yes
   - No

If respondents answered "no" to question 8, they were taken to question 21.

Please add any other information related to nursing program characteristics at your school that you feel is important

____________________ (text box)

Designated Simulation Expert Characteristics

9. Is the Designated Simulation Expert a registered nurse?

    - ☐ Yes
    - ☐ No

10. Is the Designated Simulation Expert position a faculty appointment or a staff position?

    - ☐ Faculty
    - ☐ Staff

11. What percentage of the Designated Simulation Expert's workload is dedicated to simulation?

    - ☐ 25% or less
    - ☐ 26-50%
    - ☐ 51-75%
    - ☐ 76-100%

12. How long has the Designated Simulation Expert been teaching in a school of nursing?

    - ☐ 1-5 years
    - ☐ 6-10 years
    - ☐ 11-15 years
    - ☐ 16-20 years
    - ☐ 21 years or longer

13. How long has the Designated Simulation Expert been teaching using clinical simulation (as defined for this survey)?

    - ☐ 1-3 years
    - ☐ 4-6 years

- 7-10 years
- 11 years or longer

14. What is the age group of the Designated Simulation Expert?
    - Younger than 25 years
    - 26-35 years
    - 36-45 years
    - 46-55 years
    - 56 years or greater
    - Choose not to respond
15. What is the highest academic degree held by the Designated Simulation Expert?
    - No academic degree
    - Associate degree
    - Baccalaureate degree
    - Master’s degree
    - Doctor of Nursing Practice degree
    - Doctor of Philosophy degree
16. Has the Designated Simulation Expert received formal training in simulation-based education?
    - Yes
    - No
17. If you answered yes to question 16, what was the source of the training? ***Check the box next to as many options as apply:***
    - Multi-day training course at simulation center

- Name of simulation center: _______________ text box

- ☐ National League for Nursing Simulation Innovation Resource Center modules
- ☐ National League for Nursing Simulation Scholars Program
- ☐ Graduate level coursework
- ☐ Attendance at simulation conference(s)
- ☐ Attendance at workshop in an academic setting
- ☐ Training from simulation consultant
- ☐ Training from manufacturer of simulation equipment
- ☐ Other: ___________________________ text box

18. Does the Designated Simulation Expert hold membership in any of the simulation organizations listed below? ***Check the box next to as many options as apply:***

- ☐ Association of Standardized Patient Educators
- ☐ International Nursing Association for Clinical Simulation and Learning
- ☐ Society for Simulation in Healthcare
- ☐ Other: please list __________ (text box)

19. Does the Designated Simulation Expert hold any of the education-related credentials listed below? ***Check the box next to as many options as apply:***

- ☐ Certified Healthcare Simulation Educator (CHSE)
- ☐ Certified Nurse Educator (CNE)
- ☐ American Nurses Credentialing Center – Professional Development (BC)

☐ Other: please list ________ (text box)

20. Please add any other information related to the Designated Simulation Expert's characteristics that you feel is important

____________________ (text box)

Debriefing Items

21. How frequently is a standardized approach to pre-briefing used before a simulation experience?

☐ Almost all of the time (95-100% of the time)

☐ Most of the time (60-94% of the time)

☐ Some of the time (11-59% of the time)

☐ Almost none of the time (0-10% of the time)

☐ Unable to answer

22. How often are students given a general idea of the objectives of the learning activity?

☐ Almost all of the time (95-100% of the time)

☐ Most of the time (60-94% of the time)

☐ Some of the time (11-59% of the time)

☐ Almost none of the time (0-10% of the time)

☐ Unable to answer

23. Please select the items below that are explicitly discussed with students prior to the simulation. ***Check the box next to all the statements that apply:***

☐ The simulation is being done for learning and will not be graded

☐ Expectations for student participation in debriefing

- The role of the facilitator during debriefing
- How long the simulation will last
- How long the debriefing will last
- Confidentiality of debriefing discussions
- That students may experience an emotional response to the simulation
- Discussion of the limitations of the simulator
- A discussion of a “fiction contract” or “suspending disbelief”
- Whether or not the simulation will be recorded
- That the focus of debriefing will be participant reflection on the experience
- That mistakes are viewed as opportunities to learn about how the participant is thinking
- Unable to answer

24. How often are students given the opportunity to discuss their emotional reaction to the simulation at the beginning of debriefing?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer
25. How often is feedback given to individual students about their specific actions taken during the simulation?
    - Almost all of the time (95-100% of the time)

- Most of the time (60-94% of the time)
- Some of the time (11-59% of the time)
- Almost none of the time (0-10% of the time)
- Unable to answer

26. How often do students give feedback to each other during the simulation?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer
27. How often do debriefing facilitators use a record of events to guide debriefing (e.g. written notes, video recording)?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer
    - If a record of events is used, please describe ___________________ text box
28. How often does the facilitator clearly state his/her judgment about the students' performance during debriefing?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)

- Some of the time (11-59% of the time)
- Almost none of the time (0-10% of the time)
- Unable to answer

29. How often are students guided in forming new mental models that can be used to improve future practice?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer
30. How frequently are current simulation events tied to existing knowledge during debriefing? (e.g. knowledge from coursework and/or clinical rotations)
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer
31. How often is there a specific point during the debriefing when learning points are applied to future clinical practice?
    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)

- Unable to answer

32. How often during debriefing are students asked to state specific clinical practices they will change in the future as a result of the learning that took place in the simulation experience?

    - Almost all of the time (95-100% of the time)
    - Most of the time (60-94% of the time)
    - Some of the time (11-59% of the time)
    - Almost none of the time (0-10% of the time)
    - Unable to answer

38. Do all debriefers receive training in debriefing techniques?

    - Yes
    - No

39. Is the skill set of debriefers assessed on a regular basis?

    - Yes
    - No

40. If you answered “yes” to question 32, how is the skill set of the debriefer assessed?

    - Using the Debriefing Assessment for Simulation in Healthcare (DASH) Instrument – Rater Version
    - Using the Debriefing Assessment for Simulation in Healthcare (DASH) Instrument – Student Version
    - Using the Debriefing Experience Scale (DES) Instrument

- ☐ Using the Observational Structured Assessment of Debriefing (OSAD) Instrument
- ☐ Observation and assessment of debriefing without use of a published instrument
- ☐ Other: please explain __________ (text box)

41. Is there a theory or model that guides debriefing practices?

    - ☐ Yes
    - ☐ No
    - ☐ Please state theory or model used (may list more than one): _______________

42. Where does debriefing take place?

    - ☐ In the same room as the simulation
    - ☐ In a room away from the simulation
    - ☐ Unable to answer

43. When does debriefing usually occur?

    - ☐ Primarily during the simulation experience
    - ☐ Immediately after each simulation experience
    - ☐ Several hours after the simulation experience, but the same day
    - ☐ Following the simulation experience, during the next class period
    - ☐ Following the simulation experience, multiple days later
    - ☐ Debriefing does not follow most simulation experiences
    - ☐ Unable to answer

44. Which of the following describes the debriefing environment: **Select all that apply**

- ☐ Same room as simulation
- ☐ Separate room from simulation with students in rows of chairs
- ☐ Separate room from simulation with students at one table with facilitator separate from students
- ☐ Separate room from simulation with students and facilitator seated together
- ☐ Facilitator uses a whiteboard to write notes, create concept maps, illustrate points
- ☐ Facilitator reviews video/audiotape with students during debriefing
- ☐ A behavioral assessment tool used to record events and responses during the simulation is referred to during debriefing
- ☐ The facilitator is a faculty member who can influence the learners' grades
- ☐ Unable to answer

45. In general, how much time is spent debriefing?

- ☐ 50% or less of the time than is spent in the simulation (e.g. simulation case lasts 20 minutes, debriefing lasts 5-10 minutes)
- ☐ More than 50% of time than is spent in the simulation, but still less time than is spent in the simulation (e.g. simulation case lasts 20 minutes, debriefing lasts 11-19 minutes)
- ☐ As much time as is spent in the simulation
- ☐ Approximately 1.5 times as much as is spent in the simulation case

- ☐ Approximately 2 times as much as is spent in the simulation case
- ☐ More than 2 times as much as is spent in the simulation case
- ☐ Unable to answer

46. Do debriefing discussions follow a specific structure?

- ☐ Yes
- ☐ No
- ☐ Please describe the structure: _________________ text box
- ☐ Please add any other information related to debriefing practices that you feel is important

____________________ (text box)

APPENDIX D:
Rating table: Debriefing Questions

Content Validity Index, Lynn method

	KM	JR	KD	Item CVI (3)	Item CVI (2)
21	4	4	4	1.00	1.00
22	3	4		? 1.00 or .67	1.00
23	4	4	3	1.00	1.00
24	4	4	2	.67	1.00
25	4	4	4	1.00	1.00
26	4	4	4	1.00	1.00
27	4	3	3	1.00	1.00
28	3	3	1	.67	1.00
29	4	4	4	1.00	1.00
30	4	4	4	1.00	1.00
31	3	4	4	1.00	1.00
32	4	4	4	1.00	1.00
33	4	4	3	1.00	1.00
34	4	4	4	1.00	1.00
35	4	4	4	1.00	1.00
36	4	3	3	1.00	1.00
37	2	3	1	0	.50
38	4	4	4	1.00	1.00

	KM	JR	KD	Item CVI (3)	Item CVI (2)
39	4	4	2	.67	1.00
40	4	4	3	1.00	1.00
41	4	4	4	1.00	1.00
42	4	4	3	1.00	1.00
43	4	4	3	1.00	1.00
44	4	4	4	1.00	1.00
45	4	4	4	1.00	1.00
				CVI Instrument: .88 (if #22 = .67) or **.91** (if #22 = 1.00)	**CVI Instrument: .97**

Content Validity Index, Waltz method

	KM	JR	KD
21	4	4	4
22	3	4	
23	4	4	3
24	4	4	2
25	4	4	4
26	4	4	4
27	4	3	3
28	3	3	1
29	4	4	4
30	4	4	4
31	3	4	4
32	4	4	4
33	4	4	3
34	4	4	4
35	4	4	4
36	4	3	3
37	2	3	1
38	4	4	4
39	4	4	2
40	4	4	3

	KM	JR	KD
41	4	4	4
42	4	4	3
43	4	4	3
44	4	4	4
45	4	4	4

Content Validity Index, Lynn method

	KM	JR	KD	Item CVI (3)
21	4	4	4	1.00
23	4	4	3	1.00
24	4	4	2	.67
25	4	4	4	1.00
26	4	4	4	1.00
27	4	3	3	1.00
28	3	3	1	.67
29	4	4	4	1.00
30	4	4	4	1.00
32	4	4	4	1.00
33	4	4	3	1.00
35	4	4	4	1.00
36	4	3	3	1.00
38	4	4	4	1.00
39	4	4	2	.67
40	4	4	3	1.00
41	4	4	4	1.00
42	4	4	3	1.00
43	4	4	3	1.00
44	4	4	4	1.00

	KM	JR	KD	Item CVI (3)
45	4	4	4	1.00
				CVI Instrument: .86 (18 of 21 rated 3 or 4)

APPENDIX E:
DEBRIEFING STUDY – PILOT SURVEY

Fey, Mary

Sent: Monday, September 30, 2013 7:24 PM

To:

Dear ___________,

Thank you for agreeing to take part in the pilot phase of this research study, which is being completed as a part of my dissertation. This is a brief survey of debriefing practices that will be sent to every accredited prelicensure nursing program in the United States. I estimate that it will take approximately 20 minutes to complete.

Participation in this research study is voluntary. Following the link below will take you directly to the survey. Instructions for completion of each question are included in the survey. You will be asked to provide an answer or to select the best answer to each of the 46 items. At the conclusion of the survey, you will receive a message informing you that the survey is complete. Your responses will be anonymous. All data will be de-identified by a member of the Learning Technologies Department before it is sent to the research team.

Because this is the pilot phase, please feel free to add feedback about the wording of each question, the ease of answering each question, and your thoughts about the survey overall. There is a text box after most questions; please add comments as needed.

A few instructions for completing the survey –
-An answer is required for each question in order to move to the next page.
-Please go to the next page by clicking on the "continue" button at the bottom of each page
-Only use the navigation buttons on the survey to advance to the next page; do not use your browser's navigation buttons to move forward or backward
-Any answer can be changed while still on a page. To change all of the answers on a page, click on the "reset" button at the bottom.
-Once you have selected "continue" to go to the next page, you cannot go back.
-If you realize that you wanted to comment on a question after having left the page, there is a comment box at the end of the survey to write the comments
-It is not possible to start the survey and then complete it at another time

Please follow this link to complete the survey: https://surveys.son.umaryland.edu/cgi-bin/rws5.pl?FORM=debrief

Please contact me with any questions. By email: fey@son.umaryland.edu; by phone: 410-706-5688. The Principal Investigator for this research study is Dr. Louise Jenkins; she can be reached at jenkins@son.umaryland.edu or 410-706-4296.

Thank you for helping with this phase of the study
Mary Fey MS, RN
PhD Candidate
University of Maryland School of Nursing

Debriefing study - pilot survey follow up

Fey, Mary

Sent: Monday, October 07, 2013 5:36 PM

To:

Dear __________,

I'm following up on the email I sent you last week about the debriefing survey I am doing for my dissertation. I know how valuable your time is, and I really appreciate your interest in helping me with this initial phase of the research study.

I do not know which of the pilot schools have sent the responses that have been received to date. If you have already completed the survey, I'd like to say thank you. If you have not had a chance yet, I hope that you can take 15-20 minutes to complete it. The survey will close on Monday, Oct 14th. Your responses will help make the final survey the best that it can be before it is sent to every accredited prelicensure nursing program in the United States.

Please follow this link to complete the survey: https://surveys.son.umaryland.edu/cgi-bin/rws5.pl?FORM=debrief
Thank you for your time. Your response is so important!

Sincerely,
Mary

Mary Fey MS, RN, CHSE
PhD Candidate
Assistant Professor
Director, Clinical Simulation Laboratories
University of Maryland School of Nursing
Baltimore, MD 21201

Debriefing Research Study

Fey, Mary

Sent: Sunday, October 20, 2013 7:26 AM

To: debriefing@lists.umaryland.edu

Dear Nursing Colleague,

This letter is to invite you to take part in a national survey: Debriefing Practices in Nurse Education Programs in the United States. This survey is a research study that is being sent to every accredited prelicensure nursing program in the United States. It is the first known survey of its kind. This study will provide baseline information about the state of the science in simulation based nursing education in the United States. It has been approved by the Institutional Review Board at the University of Maryland. The survey contains 46 items that will gather data about each nursing program and the debriefing practices in place at each. It is estimated that the survey will take approximately 15 minutes to complete. Participation in this research study is voluntary.

This study is being sent to the entry level dean or program director at each school of nursing. I am requesting the survey be forwarded to the faculty or staff member who is the designated simulation expert at each school. The designated simulation expert is the person who is primarily responsible for simulation related activities in a nursing school. This person may hold a clearly defined position, such as simulation director, simulation coordinator, chair of simulation workgroup or may be a faculty or staff member who is recognized as the simulation champion within the program and has a percentage of workload devoted to simulation activities. If your program does not have a simulation expert, it is requested that the dean or program director complete the survey.

Following the link below will take you directly to the survey. Instructions for completion of each question are included in the survey. You are asked to provide an answer or to select the best answer to each of the items. At the conclusion of the survey, you will receive a message informing you that the survey is complete. Your responses will be anonymous. All data will be de-identified by a member of the Learning Technologies Department before it is sent to the research team.

A few instructions for completing the survey –
-An answer is required for each question in order to move to the next page.
-Please go to the next page by clicking on the “continue” button at the bottom of each page
-Only use the navigation buttons on the survey to advance to the next page; do not use your browser’s navigation buttons to move forward or backward
-Any answer can be changed while still on a page. To change all of the answers on a page, click on the “reset” button at the bottom.

-Once you have selected "continue" to go to the next page, you cannot go back.
-If you realize that you wanted to comment on a question after having left the page, there is a comment box at the end of the survey to write the comments
-It is not possible to start the survey and then complete it at another time

Please follow this link to the survey:
https://surveys.son.umaryland.edu/cgi-bin/rws5.pl?FORM=debriefing

Complete instructions are found in the survey. Please contact me with any questions. By email: fey@son.umaryland.edu; by phone: 410-706-5688. The Principal Investigator for this study is Dr Louise Jenkins; she can be reached at jenkins@son.umaryland.edu or 410-706-4296.

Thank you for your participation in this important study.

Sincerely,

Mary Fey MS, RN
PhD Candidate
Assistant Professor
Director, Clinical Simulation Laboratory
University of Maryland School of Nursing

National Debriefing Study

Fey, Mary

Sent: Sunday, November 03, 2013 5:01 AM

To: debriefing@lists.umaryland.edu

Dear Nursing Colleague,

You were recently sent an email inviting you to complete a brief survey about simulation debriefing practices. If you have already completed the survey, thank you for your participation. There has been a strong response, but more responses are needed in order to have enough data to accurately represent the state of the science in in simulation based healthcare education. If you have not yet completed the survey, I hope that you can take the time to do so before the survey closes. The survey should take less than 15 minutes to complete.

Prelicensure nursing programs that do not currently have a simulation program or who do not have a simulation director can still provide very important information, and will be able to complete the survey in much less time. All responses are anonymous.

Please follow this link to the survey
https://surveys.son.umaryland.edu/cgi-bin/rws5.pl?FORM=debriefing

Complete instructions are found in the survey. Please contact me with any questions. By email: fey@son.umaryland.edu; by phone: 410-706-5688.

Thank you for your consideration; your response is very important.

Mary Fey MS RN
PhD Candidate
Assistant Professor
Director, Clinical Simulation Laboratories
University of Maryland School of Nursing
Baltimore, MD
fey@son.umaryland.edu

Debriefing survey ending

Fey, Mary

Sent: Sunday, November 17, 2013 6:28 AM

To: debriefing@lists.umaryland.edu

Dear Nursing Colleague,

Thank you to all who have completed the national debriefing survey; response has been strong. Nursing schools from every region of the United States have responded. The data collection phase of this study will end this Monday, November 25th, and I want to give everyone who has not yet responded one more opportunity to respond before closing the survey. It should take less than 15 minutes to complete.

Prelicensure nursing programs that do not currently have a simulation program or who do not have a simulation director can still provide very important information, and will be able to complete the survey in much less time. All responses are anonymous.

Please follow this link to the survey
https://surveys.son.umaryland.edu/cgi-bin/rws5.pl?FORM=debriefing

Complete instructions are found in the survey. Please contact me with any questions. By email: fey@son.umaryland.edu; by phone: 410-706-5688.

Thank you for your consideration; your response is very important.

Mary Fey MS RN
PhD Candidate
Assistant Professor
Director, Clinical Simulation Laboratories
University of Maryland School of Nursing
Baltimore, MD
fey@son.umaryland.edu

APPENDIX F:
COLLINEARITY DIAGNOSTICS

Designated Simulation Expert Characteristics

Dimension	Eigenvalue	Condition Index	(Constant)	Faculty or Staff	% of work load in simulation	Years teaching in nursing	Years teaching with simulation	Age	Highest degree	Formal training in simulation
1	11.48	1.00	.00	.00	.00	.00	.00	.00	.00	.00
2	5.32	1.47	.00	.00	.00	.00	.00	.00	.00	.00
3	1.92	2.44	.00	.00	.00	.00	.00	.00	.00	.00
4	1.13	3.19	.00	.00	.00	.00	.00	.00	.00	.00
5	1.11	3.21	.00	.00	.00	.00	.00	.00	.00	.00
6	*0.93*	3.49	.00	.00	.00	.00	.00	.00	.00	.00
7	0.85	3.68	.00	.00	.00	.00	.00	.00	.00	.00
8	0.77	3.86	.00	.00	.00	.00	.00	.00	.00	.00
9	0.71	4.01	.00	.00	.00	.00	.00	.00	.00	.00
10	0.65	4.20	.00	.00	.00	.00	.00	.00	.00	.00
11	0.54	4.60	.00	.00	.00	.00	.00	.00	.00	.00
12	0.49	4.85	.00	.00	.00	.00	.00	.00	.00	.00
13	0.40	5.38	.00	.00	.00	.00	.00	.00	.00	.00

Dimension	Eigenvalue	Condition Index	(Constant)	Faculty or Staff	% of work load in simulation	Years teaching in nursing	Years teaching with simulation	Age	Highest degree	Formal training in simulation
14	0.34	5.82	.00	.00	.00	.00	.00	.00	.00	.00
15	0.33	5.94	.00	.00	.00	.00	.00	.00	.00	.00
16	0.27	6.58	.00	.00	.00	.00	.00	.00	.00	.00
17	0.23	7.00	.00	.00	.00	.00	.00	.00	.00	.00
18	0.19	7.76	.00	.00	.00	.00	.00	.00	.00	.00
19	0.12	9.77	.00	.00	.00	.00	.00	.00	.00	.00
20	0.07	12.48	.00	.00	.00	.00	.00	.00	.00	.01
21	0.06	14.20	.00	.00	.00	.00	.00	.00	.00	.02
22	0.05	15.68	.00	.00	.00	.00	.00	.00	.00	.79
23	0.01	31.14	.83	.00	.00	.00	.00	.00	.00	.00
24	0.01	40.17	.01	.00	.00	.00	.00	.00	.99	.17
25	0.00	136.51	.00	.01	.39	.22	.00	.03	.00	.00
26	0.00	215.65	.00	.13	.44	.53	.08	.11	.00	.00
27	0.00	236.11	.12	.02	.04	.04	.29	.76	.00	.00

Dimension	Eigenvalue	Condition Index	(Constant)	Faculty or Staff	% of work load in simulation	Years teaching in nursing	Years teaching with simulation	Age	Highest degree	Formal training in simulation
28	0.00	333.471	.03	.83	.12	.21	.63	.11	.00	.00
1	11.48	1.00		.00	.00	.00	.00	.00	.00	.00
2	5.32	1.47		.00	.00	.00	.00	.00	.00	.00
3	1.92	2.44		.00	.00	.01	.00	.00	.00	.00
4	1.13	3.19		.00	.03	.01	.00	.00	.00	.00
5	1.11	3.21		.00	.25	.02	.00	.22	.00	.04
6		3.49			.24	.04	.00	.41	.00	.02
	0.93			.00						
7	0.85	3.68		.00	.02	.28	.00	.08	.00	.03
8	0.77	3.86		.00	.06	.35	.00	.02	.00	.00
9	0.71	4.01		.00	.05	.00	.00	.04	.00	.00
10	0.65	4.20		.00	.01	.18	.00	.07	.02	.01
11	0.54	4.60		.00	.24	.00	.00	.05	.10	.39
12	0.49	4.85		.00	.03	.05	.00	.02	.00	.01
13	0.40	5.38		.00	.03	.00	.00	.00	.32	.20

Dimension	Eigenvalue	Condition Index	(Constant)	Faculty or Staff	% of work load in simulation	Years teaching in nursing	Years teaching with simulation	Age	Highest degree	Formal training in simulation
14	0.34	5.82		.00	.00	.00	.00	.00	.14	.17
15	0.33	5.94		.00	.01	.00	.00	.02	.35	.03
16	0.27	6.58		.00	.00	.00	.00	.01	.00	.00
17	0.23	7.00		.00	.00	.00	.00	.01	.00	.01
18	0.19	7.76		.00	.01	.00	.00	.03	.02	.01
19	0.12	9.77		.00	.00	.01	.00	.00	.00	.00
20	0.07	12.48		.00	.00	.01	.00	.00	.00	.00
21	0.06	14.20		.00	.00	.00	.00	.00	.00	.00
22	0.05	15.68		.00	.00	.00	.00	.00	.00	.00
23	0.01	31.14		.83	.00	.00	.00	.00	.01	.00
24	0.01	40.17		.01	.00	.00	.00	.00	.00	.00
25	0.00	136.51		.00	.00	.01	.22	.00	.00	.00
26	0.00	215.65		.00	.01	.00	.53	.00	.01	.00
27	0.00	236.11		.12	.00	.00	.04	.00	.00	.00

Dimension	Eigenvalue	Condition Index	(Constant)	Faculty or Staff	% of work load in simulation	Years teaching in nursing	Years teaching with simulation	Age	Highest degree	Formal training in simulation
28	**0.00**	**333.471**		**.03**	**.83**	**.00**	**.21**	**.00**	**.01**	**.01**

Dependent variable: Theory based debriefing (yes or no)

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