The Impact of Structured Prebriefing on Nursing Students' Competency Performance, Clinical Judgment and Experience in Simulation

Karin Page-Cutrara

Follow this and additional works at: https://dsc.duq.edu/etd

Recommended Citation

This Worldwide Access is brought to you for free and open access by Duquesne Scholarship Collection. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Duquesne Scholarship Collection. For more information, please contact phillipsg@duq.edu.
THE IMPACT OF STRUCTURED PREBRIEFING ON NURSING STUDENTS’ COMPETENCY PERFORMANCE, CLINICAL JUDGMENT AND EXPERIENCE IN SIMULATION

A Dissertation
Submitted to School of Nursing

Duquesne University

In partial fulfillment of the requirements for the degree of Doctor of Philosophy

By
Karin Page-Cutrara

December 2015
THE IMPACT OF STRUCTURED PREBRIEFING ON NURSING STUDENTS’
COMPETENCY PERFORMANCE, CLINICAL JUDGMENT AND EXPERIENCE IN
SIMULATION

By
Karin Page-Cutrara

Approved September 18, 2015

Melanie T. Turk, PhD, RN
Associate Professor, School of Nursing
Duquesne University, Pittsburgh, PA
(Committee Chair)

Lynn Simko PhD, RN, CCRN
Clinical Associate Professor, School of Nursing
Duquesne University, Pittsburgh, PA
(Internal Committee Member)

Kristina Thomas Dreifuerst, PhD, RN, CNE, ANEF
Assistant Professor, School of Nursing
Indiana University, Indianapolis, IN
(External Committee Member)

Mary Ellen Glasgow, PhD, RN, FAAN
Dean, School of Nursing
Duquesne University, Pittsburgh PA

Rick Zoucha, PhD, PMHCNA-BC, CTN-A, FAAN
Chair, Advanced Role and PhD Programs
Duquesne University, Pittsburgh PA
ABSTRACT

THE IMPACT OF STRUCTURED PREBRIEFING ON NURSING STUDENTS’ COMPETENCY PERFORMANCE, CLINICAL JUDGMENT AND EXPERIENCE IN SIMULATION

By

Karin Page-Cutrara

December 2015

Dissertation supervised by Dr. Melanie Turk, PhD, RN

AIM  To examine the intervention of structured prebriefing, for its effect on students’ simulation performance and their prebriefing experience. Prebriefing is the introductory phase of the simulation process.

BACKGROUND Despite its inclusion in the simulation process, little research is available on prebriefing. Reflection theory and concept mapping informed a model-based structured prebriefing activity for preparing students for meaningful learning in simulation.

METHOD A group-randomized, experimental study of 76 baccalaureate nursing students compared competency performance, clinical judgment, and the perception of the prebriefing experience of those receiving structured prebriefing, to those receiving traditional prebriefing activities. The relationship between simulation performance and students’ self-rated prebriefing experience was also examined.
RESULTS A statistically significant difference was demonstrated between groups for competency performance \((p < .001)\), clinical judgment \((p < .001)\) and prebriefing experience \((p < .001)\). No relationship was found between perception of prebriefing experience and students’ simulation performance.

CONCLUSION Structured prebriefing may impact nursing student competency performance, clinical judgment and perceptions of prebriefing, and meaningful simulation learning.

Key Words: Prebriefing, Simulation, Nursing Education, Clinical Judgment, Simulation Experience
DEDICATION

I dedicate this work to my wonderful family, who were unfailingly supportive of my ‘personal goal’ of a doctoral degree, and who so strongly support my love for nursing education. My husband, Charles, was always incredibly encouraging during my pursuit of this educational goal, and is so proud of this accomplishment of mine. My sons, Alex and Greg, accepted the reality of their mother sitting at the computer for the last four years with exceptional patience and understanding.

My parents are my biggest cheerleaders, and for that I am thankful. Their support of my work and professional life has been constant, and my father’s doctoral degree was an inspiration for pursuing my own. My sisters and extended family were also encouraging as I completed my studies, and I am grateful for their support then, and now.
ACKNOWLEDGEMENTS

I have to acknowledge a number of significant people who helped shape my doctoral experience. As scholars, educators, nurses, and learners, they have each offered guidance and inspiration and were instrumental in the completion of my work.

First, I must recognize the members of my dissertation committee. Dr. Melanie Turk provided such exceptional guidance through the maze of the simulation research process that I never felt lost. Thank you, Melanie, for your cheerfulness, thoughtful critiques of my work and smooth stewardship of my committee. Dr. Lynn Simko acted as a mentor to me since I was admitted to the doctoral program at Duquesne University School of Nursing. Thank you, Lynn, for your consistent support and encouragement. Dr. Kristina Thomas Dreifuerst, from Indiana University, after gamely responding to that first email message out of nowhere, offered such insight into current simulation research and relevant feedback that I always felt grounded. Thank you, Kris, for your mentorship and energy.

Secondly, I would like to thank the Duquesne University School of Nursing for their support over the last four years. As a student, I have learned from every nursing faculty member I encountered. As a developing researcher, their perspectives have been invaluable to me. As a nurse educator myself, I have appreciated their expertise in teaching. As a co-learner in PhD Cohort 18 (otherwise known as the Gr8Journey), I felt a connection with kindred spirits and amazing nurses – and still do.

Lastly, I am grateful to York University in Toronto, Canada and to the Faculty of Health for funding this study. I am thankful for York University School of Nursing’s support of simulation and learning and for my colleagues’ tireless interest in my doctoral progress, both of
which provided me with incentive to keep exploring. Most particularly, I am glad for nursing students’ enthusiasm for innovative learning strategies, and for always wanting to know more.

*How to tell students what to look for without telling them what to see is the dilemma of teaching.*

– Lascelles Abercrombie
Table of Contents

ABSTRACT ............................................................................................................................... iv

DEDICATION .......................................................................................................................... vi

ACKNOWLEDGEMENTS ........................................................................................................ vii

Manuscript Option #2 Part I: Proposal

Specific Aims .......................................................................................................................... 1

Background and Significance ............................................................................................... 3

Theoretical Foundations ....................................................................................................... 4

Concepts for Investigation ................................................................................................... 10

Prebriefing ............................................................................................................................. 10

Competency performance ................................................................................................... 13

Clinical judgment ................................................................................................................ 14

Concept mapping in structured prebriefing ........................................................................ 15

Guided reflection in structured prebriefing .......................................................................... 18

Preliminary Study: Pilot Testing of a Prebriefing Instrument .............................................. 20

Pilot Study Design ................................................................................................................ 21

Sample and recruitment of subjects ................................................................................... 21

Instrument ............................................................................................................................. 21

Collection of data and method of data analysis .................................................................. 23

Pilot Study Summary and Results ......................................................................................... 23
Manuscript Option #2 Part II: Expanded Manuscript

Abstract ................................................................................................................................. 53

Purpose of Study .................................................................................................................. 54

Background and Significance ............................................................................................. 56

Theoretical Foundations ....................................................................................................... 56

Literature Review and Concepts for Investigation ................................................................. 57

Prebriefing .............................................................................................................................. 59

Concept mapping in structured prebriefing ......................................................................... 60

Guided reflection in structured prebriefing .......................................................................... 60

Competency performance ..................................................................................................... 61

Clinical judgment .................................................................................................................. 63

Method .................................................................................................................................. 64

Design .................................................................................................................................. 64

Setting, Population and Sample ............................................................................................ 64

Setting .................................................................................................................................. 64

Population .............................................................................................................................. 65

Determination of sample size ............................................................................................... 65

Instruments ............................................................................................................................ 66

Creighton Competency Evaluation Instrument ....................................................................... 66

Prebriefing Experience Scale ................................................................................................ 68
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Process</td>
<td>70</td>
</tr>
<tr>
<td>Data Analyses to Address Research Questions</td>
<td>74</td>
</tr>
<tr>
<td>Preliminary analyses</td>
<td>74</td>
</tr>
<tr>
<td>Analyses to determine normality of groups</td>
<td>74</td>
</tr>
<tr>
<td>Analyses to determine bivariate normality</td>
<td>76</td>
</tr>
<tr>
<td>Analyses to determine homogeneity of groups</td>
<td>77</td>
</tr>
<tr>
<td>Results</td>
<td>79</td>
</tr>
<tr>
<td>Preliminary Results</td>
<td>79</td>
</tr>
<tr>
<td>Descriptive Results</td>
<td>80</td>
</tr>
<tr>
<td>Sample description based on experimental group</td>
<td>80</td>
</tr>
<tr>
<td>Summary of descriptive data for instruments</td>
<td>81</td>
</tr>
<tr>
<td>Research Question 1: Competency Performance</td>
<td>84</td>
</tr>
<tr>
<td>Research Question 2: Clinical Judgment</td>
<td>85</td>
</tr>
<tr>
<td>Research Question 3: Perceptions of Prebriefing Experience</td>
<td>87</td>
</tr>
<tr>
<td>Research Question 4: Competency Performance and Perceived Prebriefing Experience</td>
<td>88</td>
</tr>
<tr>
<td>Research Question 5: Clinical Judgment and Perceived Prebriefing Experience</td>
<td>89</td>
</tr>
<tr>
<td>Additional Narrative Data</td>
<td>90</td>
</tr>
<tr>
<td>Discussion</td>
<td>92</td>
</tr>
<tr>
<td>Competency Performance</td>
<td>93</td>
</tr>
<tr>
<td>Clinical Judgment</td>
<td>94</td>
</tr>
</tbody>
</table>
List of Tables

Table 1: Reliability Scores for Prebriefing Experience Scale and Subscales ......................... 25
Table 2: A Priori Power Analysis for t-test using G*Power (Faul et al., 2009) ......................... 29
Table 3: Timeline for the Study from Proposal Defense through Dissemination of the Results .. 51
Table 4: Reliability Scores for Prebriefing Experience Scale and Subscales (M) ..................... 70
Table 5: Summary of Inferential Analyses for Addressing Research Questions ...................... 78
Table 6: Summary of Sample Means based on Term ............................................................... 80
Table 7: Descriptive Results by Group for CCEI and Subscales ........................................... 82
Table 8: Descriptive Results by Group for PES and Subscales ............................................. 83
Table 9: Spearman's Correlation for CCEI and PES/subscale Scores .................................... 89
Table 10: Spearman's Correlation for CCEI-CJ and PES/subscale Scores .............................. 91
Manuscript Option #2 Part I: Proposal

The Impact of Structured Prebriefing on Nursing Students’ Competency Performance, Clinical Judgment and Experience in Simulation

Specific Aims

Although simulation research has gained popularity in nursing education over the last decade (Johnson et al., 2012; Rhodes & Curran, 2005), it remains unclear if or how components of the simulation process are effective for nursing student learning (Benner, Sutphen, Leonard, & Day, 2010). The simulation process involves three components: the prebriefing or briefing phase, the simulated practice scenario, and the debriefing phase (Rhodes & Curran, 2005). While student performance during the scenario and the debriefing phases have been widely studied and acknowledged for their significance in learning, prebriefing as a necessary component of simulation has not been well documented for its role in nursing student learning (Page-Cutrara, 2014).

In simulation, traditional prebriefing activities assist learners by introducing scenario objectives, and typically include communication of the patient presentation, participant roles, tasks, time allotment, and an orientation to equipment and to the general environment (Meakim et al., 2013). Despite this functional and technical focus, prebriefing is said to establish the methodology for and culture of learning, and is crucial for directing and evaluating outcomes (Riley, 2008). Therefore, the degree of success in simulation as a learning tool may be influenced before the actual scenario and debriefing occur, through prebriefing. However, this has not been empirically tested.

Because of the potential prebriefing holds, an exploration of how learning could be supported during this phase may lead to further understanding of how well students learn through
simulation, and may facilitate the development of competent practice. The effects of structuring information and thought processes in the prebriefing phase are unexplored in the literature in this context. Therefore, a structured prebriefing intervention may be beneficial in forming essential cognitive skills and meaningful learning that develop clinical competence.

The proposed study will begin to establish a program of simulation research that may clarify the concept of prebriefing for its role in the simulation process in relation to competency development, reflection and learning. In addition, through knowledge gained from this research, nursing faculty will be able to provide simulation experiences that are more evidence-based. Future investigations may include the evaluation of prebriefing for its potential effects on overall learning outcomes that extend to caring in the practice environment. Improved methods for prebriefing of learners would be recognizable to other professions and users of simulation and may consequently support learning in other fields of health care.

Hence, the aims of this study are to describe the use of a structured simulation prebriefing phase for its effects on students’ competency performance and clinical judgment exhibited during simulation and their perceived prebriefing experiences. In this study, a structured prebriefing intervention will involve the use of a researcher-developed and facilitated concept mapping exercise (Appendix A). In this experimental group-randomized study, this single intervention will be employed in a simulation experience with undergraduate nursing students and compared to a similar group of students who will not be exposed to the intervention. The following research questions will be addressed:

1) Is there a difference in competency performance during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a
structured prebriefing intervention and those who participate in traditional prebriefing activities?

2) Is there a difference in clinical judgment during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

3) Do students receiving a structured prebriefing intervention perceive the prebriefing experience differently than students receiving traditional prebriefing?

4) What is the relationship between competency performance and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

5) What is the relationship between clinical judgment and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

**Background and Significance**

Literature that investigates the concepts of prebriefing, competency performance, clinical judgment, and student experiences in terms of concept mapping and guided reflection in structured prebriefing, will be synthesized and evaluated. In order to situate these concepts within the context of the proposed study, support from theoretical frameworks related to constructivism and reflective practice will first be articulated.
Theoretical Foundations

Specific theoretical principles that support concept mapping (Novak & Gowin, 1984) and reflection-before-action (Greenwood, 1993; van Manen, 1991) in the context of prior knowledge and learning, will inform the application of a structured prebriefing model, and the development of a concept mapping worksheet (Appendix A) that will be used as the intervention in the proposed experimental study. These theoretical principles are formed by constructivism and reflection theory, and are frequently cited in the literature as foundational to nursing simulation activities (Burke & Mancuso, 2012; Conceição & Taylor, 2007; Dreifuerst, 2012; Jeffries, 2005; Rutherford-Hemming, 2012).

Constructivism as a learning theory is rooted in the premise that knowledge is actively constructed by the learner rather than passively conveyed through the environment, and is a belief that all knowledge is essentially a product of the learners’ cognitive acts (Irby, Brown, Lara-Alecio, & Jackson, 2013). Constructivism highlights that prior knowledge influences construction of new ideas, and that learning is active. In addition to being subject-centered, constructivism has also been rooted in the premise that all knowledge is socially constructed. Although critiqued as fragmented by these subject-centered versus social distinctions (Davis & Sumara, 2002), the broad scope of constructivism as a learning theory aligns with the multiple aspects of prebriefing activities, because both individual and group learning activities can occur.

Early perspectives on cognitivism, as a basis for constructing information based on perception, thought and memory, were conceptualized by Piaget (1969/2000) as a complex stimulus-response process whereby new information is acquired and filtered, and then incorporated or modified into new constructs, through assimilation and accommodation respectively. Vygotsky (2012) proposed that learning involved actively building new mental
structures; however, as a social constructivist, he emphasized social rather than developmental influences as important in mediating learning. He described a structure similar to scaffolding as a means to mediate the construction of new knowledge using expert modeling and social interaction, and to assist the novice to complete and learn tasks they otherwise would not be able to do on their own, until expertise is developed. Although not originally theorized for use in the educational domain, constructivism had been clearly identified as relating to the work of educators (Irby et al., 2013). This is relevant to prebriefing activities, where nursing students may benefit from modeling of cognitive processes by experienced faculty and must apply prior and situational knowledge, perceive possibilities for action, and anticipate a plan for care (Page-Cutrara, 2015). These aspects will be incorporated into structured prebriefing activities in the proposed study.

Ausubel, Novak and Hanesian (1978) further described the learners’ conscientious choice to integrate with, and construct new knowledge from, prior knowledge as meaningful learning. Meaningful learning was also described by others (Novak & Gowin, 1984; Novak, 2002). Because meaningful learning occurs most easily when new concepts are subsumed under broader and more familiar ones, hierarchical and progressive structures that link concepts and ideas can be used to represent knowledge (Novak, 2002). Specifically during structured prebriefing, meaningful learning may be facilitated through such structure, or mapping, and may emphasize to students the cognitive skills used by nurses.

Because prebriefing activities involve information and ways of thinking that must be incorporated into the subsequent simulation scenario and debriefing phases in a meaningful way in order for learning to occur, constructivism was determined to be an appropriate theoretical grounding for this study. As suggested by Dewey (1938/1997), constructivist theory has a central
tenet of reflective activity, which forms the second theoretical framework guiding this study of prebriefing. The activities supporting the beginnings of new knowledge construction during prebriefing, the first phase of simulation, necessarily involve processes related to anticipation and anticipatory reflection, which were processes described by Schön (1983).

Reflection as an activity originating from, and well documented in the psychology and education literature, has been accepted as an essential component associated with human learning. For instance, Dewey, from his constructivist viewpoint, emphasized the pragmatic view that experience and action have a place in education (1938/1997). Reflective thought was defined by Dewey (2007) as the “active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends” (p.7). He noted a “double movement” (2007, p. 40) of induction and deduction in thinking and reflection, as in “to and from” (2007, p. 40) the meaning of a learning event. Dewey’s five distinct steps of reflection involved the following: identifying a difficulty; defining and describing it; suggesting possibilities; reasoning through solutions; and observing and experimenting to determine a conclusion (2007). These align with how he subsequently described features of judgment: a controversy over opposite claims; a process of defining and describing the claims; and a decision closing the dispute that serves as a principle for deciding future cases (2007). During a structured prebriefing and the subsequent phases of simulation, these reflective steps may be undertaken, and so may be perceived and experienced by the learner, in the process of developing judgment skills.

From Dewey’s work, Schön (1987) developed reflection as a basis for building knowledge and skill as a practitioner, and described two aspects of reflection. The first, *reflection-in-action*, occurs during the event activity, and without interruption of action. This has
been described as “thinking on your feet”, “keeping your wits about you” and “learning by
doing” (Schön, 1983, p. 54), perspectives that are usually associated with learning during a
simulation scenario. Reflection-on-action, a second aspect of reflection described by Schön, may
manifest itself through either thinking back on the action after an event is over, as in debriefing,
or by stopping in the midst of the action itself to consider what has led to that point (Schön,
1987). Reflection-on-action does not happen in the moment, but can occur when routine or daily
knowledge fails to produce an understanding of the situation. Dreifuerst (2009) further identified
reflection-beyond-action and associated reflection with post-simulation activities, extending
reflection beyond simulation experiences to nursing practice. This cycle of reflection as applied
to simulation does not specifically include prebriefing activities, which may occur after nursing
practice and before simulation, and may be influenced by reflection on both what has been
learned and what may be anticipated in the scenario.

To address this gap, Greenwood’s (1993) review of the reflective practice works of
Argyris and Schön may be considered. In her review, Greenwood posited that problem
identification first must depend on the practitioner’s “ability to make sense of the situation”
(1993, p. 1185), which aligns with one of the attributes of prebriefing identified through a
concept analysis, where learners need to consider the situation (Page-Cutrara, 2015). Greenwood
continued to state that the emphasis on reflection-in-and-on-action “undervalues reflection-
before-action” (1993, p. 1186), and that such undervalued reflection-before-action could instead
be useful in activities such as “clinical pre-conferences/briefings” (1993, p. 1196). It is of interest
that she notes that unless these activities take place immediately preceding an action and are
specific to the situation, as in the prebriefing phase, they may not be effective. The anticipatory
aspect of reflection was not discussed by Greenwood (1993).
Van Manen (1991), however, confirmed that reflection functions as a learning experience itself, and therefore it should be incorporated in learning activities in a similar way to other cognitive experiences. He indicated that temporal aspects of reflection, or timing, were important and that therefore, *anticipatory reflection*, oriented to future action, can enable the deliberation of “possible alternatives” (p. 101), allow for planning, and establish an approach to situations in an “organized, decision-making, prepared way” (p. 101). He also hinted that the temporal differences and the rationale for applying reflection at various points in the overall learning experience would require different mental structures. This suggests that structured prebriefing activities, although previously unexplored, can be future-focused, and may be useful in developing anticipatory ways of thinking in simulation that reflect the reality of anticipating and planning care in nursing practice.

Ferry and Ross-Gordon (1998) demonstrated that regardless of experience, reflection could be used to develop expertise with the distinction that more reflective practitioners used a cyclical process, and less reflective practitioners used a step-wise approach to problem solving. Therefore, by structuring prebriefing in the context of simulation learning and as an anticipatory phase to a simulated clinical scenario, the addition of direct anticipation or reflection-before-action can complete a reflective cycle, connecting reflection-beyond-action to reflection-in-action in the simulation process. This cycle is depicted in Figure 1, and serves to situate frameworks of reflection in nursing simulation.

The purpose of this study is to describe the use of a structured simulation prebriefing phase using the theoretical frameworks of constructivism and reflection. These frameworks explain the connection between the structured prebriefing activities of drawing on prior knowledge, reflecting-before-action, and concept mapping for a meaningful simulation learning
experience that potentiates the development of cognitive skills, such as clinical judgment. Figure 2 represents the theoretical model for structured prebriefing activities and the areas of interest as they relate, in the proposed research study. This representation also includes traditional prebriefing activities such as the introduction of objectives and an orientation to equipment, in a structured prebriefing.

**Figure 1: Cycle of Reflection throughout the Nursing Simulation Process**

![Reflection Process Diagram]

The study will explore the outcome variables of competency performance and clinical judgment in simulation, and students’ experiences in simulation learning. Although it has been acknowledged that experience has been over-studied in simulation research (Kardong-Edgren, Adamson, & Fitzgerald, 2010), students’ experiences with prebriefing specifically will be investigated in this study because there is little documentation on the prebriefing phase of simulation.
Concepts for Investigation

**Prebriefing.** High fidelity simulation activities in nursing education as a tool for clinical learning have been a focus for their general significance to practice (Benner et al., 2010). Several comprehensive literature reviews have established this simulation method as having a significant role in teaching nursing (Cant & Cooper, 2010; Harder, 2010; Hyland & Hawkins, 2009; Neill & Wotton, 2011; Norman, 2012).

Figure 2: Structured Prebriefing Model (+includes traditional prebriefing activities)

Still, research on the components of simulation and its outcomes for student learning is lacking. When compared to the research available on debriefing (Arafeh, Snyder Hansen, & Nichols, 2010; Dreifuerst, 2012; Husebø, Dieckmann, Rystedt, Søreide, & Friberg, 2013; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013; Neill & Wotton, 2011; Shinnick, Woo, Horwich, & Steadman, 2011), the component of prebriefing in particular has received little attention for how it may contribute to learning.
A literature review of prebriefing, as a component of undergraduate nursing student simulation, was conducted and showed prebriefing as indeed understudied (Page-Cutrara, 2014). This published literature review [Page-Cutrara, K. (2014). Use of prebriefing in simulation: A literature review. *Journal of Nursing Education, 53*(3), 136-141. doi: 10.3928/01484834-20140211-07] is available through the *Journal of Nursing Education* at [http://www.healio.com/nursing/journals/jne](http://www.healio.com/nursing/journals/jne). Traditional prebriefing activities are defined by the *International Nursing Association for Clinical Simulation and Learning* (INACSL) as introducing scenario objectives, and typically include communication of the patient presentation, participant roles, tasks, time allotment, and an orientation to equipment and to the general environment (Meakim et al., 2013). However, several published articles described varying and inconsistent activities of prebriefing, and reported indirect findings that this phase was complex, may have benefit for developing mental models in learners, and should be facilitated by experts (Deckers, 2011; Husebö, Friberg, Söreide, & Rystedt, 2012; Miller, Riley, Davis, & Hansen, 2008; Titzer, Swenty, & Hoehn, 2012). There was no clear evidence in the published literature that prebriefing had been examined from the perspective of any sort of specific structure. The review of prebriefing found that gaps in nursing simulation knowledge existed which were related to learner expertise with simulation overall, the level of learner support necessary during prebriefing for optimal learning (without undermining the learning process), the development of independent problem-solving, the use of objectives, and the impact and meaning of the scenario for the learner (Page-Cutrara, 2014).

Prebriefing has been conceptually identified in the literature as not only a time for preparing learners for the functional and operational aspects of the simulation scenario and debriefing phases, but “as a time to prepare students for practicing the intentionality of *noticing*
during patient care” (Jeffries, 2014, p. 222). Such intentional noticing, as a cognitive activity, requires the ability of the learner to clearly consider the clinical situation and be open to cues and new ways of thinking. Clear objectives and structured facilitation by expert faculty to support this way of thinking, and a “mental checklist” (Jeffries, 2014, p. 222) or mental model, may enhance development of this essential skill in novice learners. Metacognitive strategies plan, monitor and regulate cognition so that mental modeling of self-regulating behaviors becomes apparent in the learners themselves (McMillan, 2010). For novice nursing students who do not have experience or practice in thinking like a nurse or with the processes of reflection (Schön, 1987; Tanner, 2006), embedding structures such as those espoused by reflection theorists in a structured prebriefing activity could support metacognition, or thinking about thinking (Burke & Mancuso, 2012; Chartier, 2001; Kuiper & Pesut, 2004).

A concept analysis of prebriefing was also conducted (Page-Cutrara, 2015). Defining attributes of prebriefing were revealed and include: considering the situation; perceiving meaning; and anticipating a plan in clinical simulation which supports learning and thinking. Additionally, antecedents, those events or instances that occur prior to prebriefing and which support its attributes, include not only objectives, prior experience and knowledge, and structures for learning, but an openness to thinking that, if modeled, would support development of reflective practice (Page-Cutrara, 2015). However, the connections between prebriefing attributes and the structures discussed in the literature that support mental modeling and reflection have not been fully investigated.

Overall, despite the paucity of studies directly focused on this concept, prebriefing was shown in the literature to have potential for developing students’ cognitive skills such as noticing aspects of the clinical situation, anticipating patient needs, and applying existing knowledge in
order to meet simulation objectives (Page-Cutrara, 2014). Such skills may be facilitated by studying structured prebriefing as an independent variable in research, for its potential relationship to the development of competency and judgment in nursing.

**Competency performance.** Because of the limited attention prebriefing has had in the literature, and despite its recognition as a phase of the simulation process, prebriefing has not been considered for its role in the development of competency during clinical simulation. Indeed, the term *competency* has been identified as difficult to define in nursing (Girot, 1993), and the literature has been found to “lack consensus, being replete with controversy, ambiguity, confusion and contradiction” (Cowan, Norman, & Coopamah, 2007, p. 23). Competency has been described as spanning many domains of nursing practice (Benner, 2001), and as including the skill of anticipating future possibilities (Benner, Tanner, & Chesla, 2009). Similarly, the attributes of prebriefing reflect not only cognitive activities, but, because prebriefing is situated at the beginning of the simulation process, necessarily include an anticipation of affective and psychomotor aspects of care to be delivered.

Competency is defined as the “knowledge, skill, ability and judgment required for safe and ethical nursing practice” (College of Nurses of Ontario, 2014, p. 4). Legal definitions of competency are acknowledged as contextual and relate to what a reasonable and prudent practitioner with similar levels of knowledge and experience would do under comparable circumstances; competency functions as a reference for evaluating the standard of care for registered nurses (College of Nurses of Ontario, 2014). As a goal of nursing practice in education settings, however, competency remains a specific focus of the simulation process and nursing student learning (Blum, Borglund, & Parcells, 2010; Kardong-Edgren, Quint, & Adamson, 2010; National Council of State Boards of Nursing, 2009; Sportsman et al., 2009; Yuan, Williams, &
For the purposes of this proposed study, competency as defined by Hayden et al. is the:

- ability to observe and gather information, recognize deviations from expected patterns, prioritize data, make sense of data, maintain a professional response demeanor, provide clear communication, execute effective interventions, perform nursing skills correctly, evaluate nursing interventions, and self-reflect for performance improvement within a culture of safety (2014, p. 244).

The performance of competency, or competency performance, will be considered as such in this proposed study, in the context of learning.

Because competency is multifaceted, it has been a challenge to measure (Benner, 1982; Tilley, 2008). Girot asserted that if competency is concerned with the “ability to coordinate cognitive, affective and psychomotor skills, in the carrying out of nursing activities” (1993, p. 84), or performance, then assessments should address such multiple elements. Cowan and colleagues (2007) concluded that a holistic conception of competency would most accurately illustrate the complexity of cognition, performance, skills, values and attitudes as interconnected. However, prebriefing has not been explored from the perspective of influencing competency performance as a dependent variable, which contributes to a lack of understanding of this phase’s role in learning during simulation of complex clinical practice experiences, rather than single tasks.

**Clinical judgment.** Tilley’s (2008) concept analysis of competency indicated that one of the consequences of competency includes clinical judgment. Tanner defined clinical judgment as “an interpretation or conclusion about a patient’s needs, concerns or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as
deemed appropriate by the patient’s response” (2006, p. 204). Clinical judgment was further explicated by Benner, Tanner and Chesla (2009) as “the way in which nurses come to understand the problems, issues, or concerns of clients and patients, to attend to salient information, and to respond in concerned and involved ways” (p. 200). These authors suggested that the understanding of this term involves deliberate decision-based competence that involves many aspects of care. For instance, the skill of simultaneously looking forward and back, characteristic of anticipatory reflection and of more experienced nurses exhibiting clinical judgment (Benner, Stannard, & Hooper, 1995; Tanner, 2006), is a skill comprised of the integration of multiple competencies. However, prebriefing structures that help prepare novice nurses and students for the essential skill of clinical judgment are not clearly evident in the simulation literature.

In 2006, Tanner first proposed a model of clinical judgment for simulation, involving key aspects of noticing, interpreting, responding and reflecting. Since then, only a few studies have explored clinical judgment in undergraduate nursing students in relation to simulation design and prebriefing in particular (Chmil, Turk, Adamson, & Larew, 2015); a recently published study indicated that traditional prebriefing activities such as reviewing patient case notes online and an orientation to the simulation area were rated low by students as assisting with clinical judgment development (Kelly, Hager, & Gallagher, 2014). An understanding of how structured prebriefing may support improved simulation delivery, undergraduate student competency performance, and therefore clinical judgment would assist in filling the gaps in the simulation literature.

**Concept mapping in structured prebriefing.** The experiences of students engaged in simulation, and in prebriefing specifically, should be meaningful for affecting changes in knowledge and long term learning (Fink, 2003). During such experiences, “too often neither leaders nor participants know what they are to observe or what meaning these observations are
supposed to convey” (Novak & Gowin, 1984, p. 48). A framework or structure to clarify meaning may be helpful during the prebriefing phase of simulation.

Concept mapping has been identified in non-nursing and nursing simulation research and practice as a way to augment meaningful learning (August-Brady, 2005; Conceição & Taylor, 2007; Decker et al., 2010; Gerdeman, Lux, & Jacko, 2013; Hicks-Moore & Pastirk, 2006; Muirhead, 2006; Taylor & Littleton-Kearney, 2011; Wahl & Thompson, 2013). Concept mapping serves to connect the cognitive and reflective processes in a framework that is understandable to the learner. Novak and Gowin (1984) have built on the works of Ausubel (1978) who stated that rather than rote learning, meaningful learning occurs when the learner intentionally chooses to integrate new information into existing knowledge. Concept mapping (Novak & Gowin, 1984) is a visual prompt for making sense of information, and as a pre-instructional tool, is best achieved by: 1) carefully selecting key concept labels for the map template; 2) helping students to search their cognitive structures for relevant concepts; 3) helping students construct propositions or links between concepts; and 4) helping them to discriminate between specific facts or events and the more inclusive concepts or ideas those facts or events represent (p. 41-42). These activities can clue students as to errors in thinking and any misinterpretations they should anticipate, or look out for (August-Brady, 2005). Concept mapping can enable them to use pre-existing knowledge and their assessment of a situation to develop clinical decision-making skills. As such, concept mapping activities fit with the self-regulation and metacognitive skills needed in a simulated clinical setting and, as a component of a structured prebriefing intervention, may serve to fill the gaps in understanding of the potential role for prebriefing.
Fink (2003) described significant learning experiences as involving both process and outcome; “students will be engaged in their own learning, there will be a high energy level associated with it, and the whole process will have important outcomes or results” (p. 6-7). Fink (2003) further suggested that with concept mapping, Novak and Gowin (1984) have extended this concept, and indicated that not only are changes in behavior evident as a result of significant learning, but that changes in the meaning of the experience are also produced. One of the interactive components of significant learning, learning how to learn, specifically addresses how to inquire and construct knowledge. Learning how to learn, aligns with the identified prebriefing attributes of considering the situation, perceiving possibilities, and anticipating a plan (Page-Cutrara, 2015). Structured prebriefing that supports these attributes may potentially contribute to how students learn.

Concept maps help users develop critical thinking and clinical judgment to support informed decision-making (Taylor & Littleton-Kearney, 2011; Wahl & Thompson, 2013). Gerdeman et al. (2013) used a concept map based on Tanner’s Clinical Judgment Model (2006) to support students’ construction of clinical cases. Deckers (2011) reported using a white board to map out care planning prior to a simulation. Dreifuerst (2012) incorporated concept mapping in debriefing activities to develop meaningful learning. Yet, the use of this activity to structure prebriefing has not been directly explored.

The use of concept maps provides a learning experience that allowed students to integrate content that is consistent with a constructivist paradigm. The cyclical, rather than linear nature of learning, in terms of reflecting on prior experience during prebriefing for example (see Figure 1), facilitates the continual development of decision-making skills and competent judgment in practice, and contributes to a more meaningful experience. As such, learning during the
simulation process may not manifest itself solely after the scenario is complete. Instead, learning activities such as concept mapping may be woven into the prebriefing phase to create a more connected learning experience representative of how nursing students prepare for and think about practice.

**Guided reflection in structured prebriefing.** The ability to anticipate a plan for care and future clinical possibilities is a quality of a competent nurse (Benner, Tanner, & Chesla, 2009), and has been identified as an attribute of the prebriefing phase (Page-Cutrara, 2015). However, the incorporation of structures that support anticipation has not been extensively reported in prebriefing literature, and so warrant investigation.

The use of reflection to facilitate construction of meaningful learning is widely evident in education, nursing and simulation literature. For instance, Hatton and Smith (1995) discussed the idea of a time frame for reflection and thinking about an experience, and the deliberation of alternative actions which may be implemented in the future. Structured, articulated learning was highlighted by Ash and Clayton (2004) to reduce risks of poor quality reflective practices and guide reflection in service learning programs.

Guided reflection as a particular structure for facilitating learning differs from self-reflection or group-based reflection, and instead supports learners during the reflective process via a facilitator. Johns (2013) indicated that guided reflection between the facilitator and learner occurs over time, which could suggest that this sort of support should not occur at a single point, such as in debriefing. He describes that the role of the facilitator is to encourage and motivate the learner without being overly prescriptive in providing the answers, and without this guidance, novice practitioners would struggle to learn (2013). Successful reflection is exceedingly difficult without facilitation of an expert (Duffy, 2008), and so requires the right guide, a
reflective framework, a readiness of the facilitator for what unfolds, and the ability to reflect on reflection. These aspects are supported by the National League for Nursing/Jeffries Simulation Framework (Jeffries, 2012), where the integration of guided reflection by an expert is a recognized element. In the context of this framework, the applications of the cycle of reflection and guided reflection have been connected to the simulation scenario phase through reflection-in-action, to the debriefing phase through reflection-on-action, and post-simulation through reflection-beyond-action. Again, prebriefing is the only phase of the simulation process yet to be explored for its part in supporting the reflective cycle via guided reflection.

The experience of the simulation process has been associated with guided reflection in various ways, particularly in relation to nursing students. A literature review of debriefing strategies (Dufrene & Young, 2014) indicated that all forms of debriefing as a form of guided reflection improved individuals’ perceptions of competence. On the other hand, Smith and Roehrs (2009) found that guided reflection was not solely correlated with reports of satisfaction or self-confidence with simulation, but that clear objectives, traditionally embedded in prebriefing, were significant for perceived learning. Therefore, more research is needed to articulate relationships between simulation, prebriefing and the outcomes of learning.

In addition to filling the significant gaps in the body of simulation knowledge as they relate to prebriefing, this proposed research is student-centered and may be beneficial for developing students’ entry-to-practice competencies and essential learning outcomes. Students may benefit from the proposed study if learning concepts of competency performance, clinical judgment, concept mapping and guided reflection are linked meaningfully to practice during a structured prebriefing phase.
The impact of this proposed study’s results on nursing simulation research could alter the way facilitators or faculty approach prebriefing, strengthen the teaching-learning link, and suggest further topics for research on briefing essential information in relation to various simulations. This research, which builds knowledge of a previously unexplored area of simulation, may further support students’ development of competence and a stronger connection of simulation to the reality of clinical practice.

In order to strengthen the evaluation of prebriefing activities in the context of students’ simulation experiences, a pilot study was conducted to assess the Prebriefing Experience Scale (PES), which will be used to measure students’ experiences during the prebriefing phase. The following section provides an overview of the pilot study results.

**Preliminary Study: Pilot Testing of a Prebriefing Instrument**

As a precursor to the proposed study, a pilot study was conducted to test the feasibility of using a prebriefing tool, adapted from the Debriefing Experience Scale (DES) (Reed, 2012), in the prebriefing phase of the simulation experience. The purpose of this tool is to evaluate the prebriefing experience of students and their perception of its importance for learning. The research questions for this pilot were as follows:

1) Are upper year baccalaureate students able to satisfactorily complete the Prebriefing Experience Scale (PES), adapted from the DES, for the evaluation of prebriefing experiences prior to a simulated clinical scenario by identifying a numeric score for each item, answering demographic data, and providing comments on their experience?

2) Is the PES tool for evaluation of the prebriefing phase of a simulated clinical experience of upper year baccalaureate nursing students comparable in terms of internal consistency reliability to the original tool?
Pilot Study Design

Sample and recruitment of subjects. The non-experimental pilot study was conducted at a large university, in Ontario, Canada in the 5000-square-foot nursing simulation centre (NSC). Ethics approval was obtained from the university where the pilot occurred, and from the university that was overseeing the pilot and its implementation. A small convenience sample of volunteer participants \( N=19 \) to explore the feasibility of using this adapted tool was recruited from the pool of undergraduate nursing students enrolled in the upper years of their programs. Upper year students are defined as students in the third or fourth year of the 4-year BScN program, and as those in the second year of the compressed 2-year BScN program. These groups have comparable curricular exposure to nursing content and clinical experiences, and so, for the purposes of the pilot study, the use of upper year students maximized participation. To ensure all students were contacted and none were excluded from this opportunity, recruitment was directed to the entire group and involved several approaches including a general student list-serve email sent by the undergraduate program assistants, class announcements by faculty not connected to the study and posted flyers. Informed consents were obtained prior to beginning the pilot study activities. A coffee card was offered to participants as an incentive.

Instrument. The tool was adapted from the DES (Reed, 2012) which was originally designed to evaluate the experience of nursing students during the debriefing phase and their perception of its importance. The DES included measurement of the students’ experience using 20 items across four subscales: 1) Analyzing Thoughts and Feelings; 2) Learning and Making Connections; 3) Facilitator Skill in Conducting the Debriefing; and 4) Appropriate Facilitator Guidance. In the subscale of Analyzing Thoughts and Feelings, there are four items addressing emotional, psychological, behavioral and environmental aspects of debriefing. Learning and
Making Connections is focused on the process and learning experience of the student during debriefing, and its eight items are based on the support from the literature that learning occurs through reflection in this phase. The five items relating to Facilitator Skill in Conducting the Debriefing address faculty skill in managing content and structure of the debriefing and relate to verbalization and time allowances. Lastly, the subscale Appropriate Facilitator Guidance is measured by three items that are more specific to facilitation in terms of teaching strategies other than verbalization, and assess general activities such as constructive evaluation and guidance. Participants respond to each of the 20 items on a 5-point Likert-type scale, that ranges from strongly agree to strongly disagree for rating experience, and not important to very important for rating perception of importance. Reed (2012) refined the Experience scale items through a factor analysis and demonstrated internal consistency reliability in debriefing with Cronbach’s alpha of the overall scale as .93; individual subscales ranged from .80 to .89. Reed did not conduct a factor analysis on the Importance scale portion of this dual scale, however did report Cronbach’s alpha as follows: overall scale .91; individual subscales ranged from .61 to .85.

There are no prebriefing tools documented in the literature. Because similarities exist between debriefing and prebriefing in terms of student reflection and faculty facilitation activities, the DES items were modified slightly to assess the first phase in simulation by changing the term debriefing to prebriefing. Seven additional words/phrases in the scale items were also changed to accommodate for the timing of prebriefing as the first phase of the simulation process, and grammar was corrected (see Prebriefing Experience Scale [PES], Appendix B). It was necessary to compare the use of this adapted tool in the prebriefing phase with its original use and the reliability scores in debriefing research. Therefore, a small sample of
participants was recruited for a pilot study to demonstrate internal consistency reliability comparable to the original tool.

**Collection of data and method of data analysis.** The participants were asked to engage in a one-hour long simulation experience, scheduled at times convenient for them. This experience included three phases. First, a 20-minute researcher-facilitated introductory or prebriefing phase was provided to students with information about objectives and the patient scenario. This phase included an orientation to the roles the students will play and the equipment in the simulated patient room. The clinical simulation scenario, with a focus on care of a patient with myocardial infarction/chest pain, then ran for 20 minutes, and was followed by a 20-minute debriefing period.

The PES was administered to the participants immediately after the prebriefing phase of the simulation process. IBM SPSS Version 22.0 software was used to analyze the quantitative data. An internal consistency reliability analysis of the *Experience* and *Importance* scales, and their subscales for experience and perceived importance was conducted; Cronbach’s alpha values were compared with the original DES tool. Additionally, demographic data and comments were collected using the tool (Appendix B).

**Pilot Study Summary and Results**

The PES was administered to the upper year nursing student participants (*N*=19). Hertzog (2008) indicated that a sample size of 10-15 per group may be sufficient to meet feasibility aims of a pilot study, but more participants should be recruited for instrumentation aims.

Eighteen females and one male participated. The PES responses and the associated demographic information were reviewed for missing entries or data entry errors; the data were complete with the exception of one missing ‘age’ entry. Otherwise, the students ranged in age
from 20 to 55 years, with an average age of 30.5 years. As part of their nursing education, all had prior simulation experience, and reported an average of seven previous simulation sessions, with a range of 2 to 20 sessions. All were in the upper years of their BScN programs (21% in Year 3, and 32% in Year 4 of the 4-year program, and 47% in the last year of the 2-year compressed degree program). All participants reported that the tool was easy to use.

The Cronbach’s alpha value on the 20-item PES Experience scale was .94, which was comparable with the original DES Experience scale value of .93. Experience subscale scores ranged between .77 and .88 (see Table 1); this is an accepted range (Hertzog, 2008; Nunnally, 1978). According to Hertzog (2008), samples having fewer than 25 participants per group in a pilot study need an observed alpha close to .8 to achieve reasonable confidence in an instrument’s use.

In terms of further considering internal consistency, corrected item-total correlations were also considered; .30 is suggested as an acceptable level when checking the performance of items on a previously developed instrument (Hertzog, 2008; Nunnally, 1978). The corrected item-total correlation coefficients were greater than .30 for all items in this scale when evaluating each item and how it correlated with the total scale score. The mean inter-item correlation was .43.

The PES Experience portion of the tool produced results comparable to the original DES tool. The slightly lower Appropriate Facilitator Guidance subscale result (α = .77), while still within the acceptable range for psychology tools, may be related to the small size of the 3-item subscale; as the number of items increases, α will increase (Cortina, 1993; Field, 2013). This smaller subscale’s corrected item-total correlations were higher, however, ranging from .55 to .74.
The Cronbach’s alpha values for the PES Importance scale and its subscales, on which psychometric testing was not conducted, can be found in Table 1. The value for the 20-item PES Importance scale was .87, compared to .91 of its DES counterpart. However, two of the PES’s four Importance subscale alpha values were very low which were not comparable to Reed’s DES results (2012), and the associated corrected item-total correlations further suggested these were not reliable (ranging from -.00 to .45 and -.02 to .31).

Table 1: Reliability Scores for Prebriefing Experience Scale and Subscales

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Cronbach’s Alpha: Experience Scale</th>
<th>Cronbach’s Alpha: Importance Scale</th>
<th>Items in Scale and Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall scale</td>
<td>.94</td>
<td>.87</td>
<td>20</td>
</tr>
<tr>
<td>Analyzing thoughts and feelings</td>
<td>.81</td>
<td>.26</td>
<td>4</td>
</tr>
<tr>
<td>Learning and making connections</td>
<td>.88</td>
<td>.76</td>
<td>8</td>
</tr>
<tr>
<td>Facilitator skill in conducting the prebriefing</td>
<td>.80</td>
<td>.83</td>
<td>5</td>
</tr>
<tr>
<td>Appropriate facilitator guidance</td>
<td>.77</td>
<td>.35</td>
<td>3</td>
</tr>
</tbody>
</table>

Limitations of this pilot study may be related to the small sample size, and the self-report nature of student responses and interpretation of the scale items’ meanings. However, the range of age and simulation experience in this study’s participant group suggested a varied sample reflective of the student population; where homogeneity could result in a low estimated alpha (Hertzog, 2008), a varied sample may have addressed the sample size issues. The use of the PES Experience portion of the scale, in a larger study and in conjunction with other types of
measurement tools may address these limitations and supplement the data gathered on the variables of interest.

Therefore, the Importance portion of the PES, although having an acceptable overall α-value, did not have comparable results to the DES. The results from this pilot study appear to support the use of the Experience scale aspect of the PES only. This will be appropriate for addressing the main research question of the primary study relating to students’ experiences in prebriefing.

**Research Methodology**

The concepts of prebriefing, competency performance, clinical judgment, and student experiences with concept mapping and guided reflection during structured prebriefing, will be explored through the proposed research study. The aims of this study are to describe the use of structured prebriefing for its effects on baccalaureate (BScN) nursing students’ competency performance and clinical judgments exhibited during simulation, and their perceived prebriefing experiences, and compare these effects to a group exposed to traditional prebriefing. An experimental, group-randomized design will be used; structured prebriefing will be the single intervention. The following sections will expand on the design and methodologies.

**Setting**

The research study will be conducted at a large university in Ontario, Canada. This institution has research support and simulation resources that will be available to address the specific aims of this simulation study. Conduction of the study will occur in the nursing simulation centre (NSC). Serving 1200 nursing students, the 5000-square-foot NSC can accommodate up to 50 students at a time for clinical education and development of basic and advanced nursing skills. The NSC is equipped with four SimMan® mannequins to enhance
student learning activities. In addition, the NSC has a complete Vital Sim® Family, and other simulators and training models, and the necessary medical equipment and supplies to provide students with an adjunct to their clinical placement learning, and faculty with essential resources to conduct simulation-based research in nursing education.

**Population and Sample**

Participants will be recruited from a large convenience sample of approximately 400 BScN nursing students who will enroll in a fourth-year-level medical-surgical nursing course during the sixth and seventh term of a traditional 4-year program. Two sections of the course will be offered during the fall for those students in their seventh term, and two sections of the course will be offered in the winter for those in their sixth term, with approximate enrollments of 100 students each, during the 2014-2015 academic session. This population was selected because of the requirement for these students to perform competently and develop clinical judgment skills in the upper years of the program. Students from two terms will be targeted in order to broaden the participant pool. All students in these two terms will have met the same program admission criteria; will have had the same medical-surgical program preparation; will be recruited from the same 4-year program; will have had the same amount of clinical and simulation experience due to exposure to the same curricular structure and content; and will have met the same prerequisite requirements for the fourth-year-level medical-surgical nursing course. The ability to read, speak, and write in English is a requirement for program admission, so all participants will be able to speak English.

Demographic characteristics will be used to describe the experimental and control groups. The sample will reflect the student population in the school of nursing where a large number of the students enrolled in the BScN program are female; approximately 20% of the
students are male. This study will be inclusive of women and minorities and will not discriminate against the participation of a specific gender, race or ethnicity.

Therefore, inclusion criteria are enrollment in a fourth year medical-surgical course (a classroom component, and a practicum and laboratory component of 144 hours), and agreement to participate. There are no exclusion criteria. The researcher will not have any current academic or extra-curricular connections to the student group, and will not be involved in grading or advising any students during the time that the study takes place.

_A priori_, the sample size was determined using G*Power analysis (Faul, Buchner, Erdfelder, & Lang, 2009). A two-tailed _t_-test set at _p_ = .05 with a power of 80% and a medium effect size of _d_ = .5 as per Cohen (1988), suggests 64 participants in each of the experimental and control groups, for a total sample size of 128 (Table 2). The topic of prebriefing has not been previously explored; however similar quantitative studies on debriefing, which is a comparable simulation activity, have used comparable guidelines for significance, power and effect (Dreifuerst, 2012; Mariani et al., 2013). Other _a priori_ analyses for other statistical tests indicate recommendations for the same or fewer participants. For instance, a significance level was set at _p_ = .05 with a power of 80% and a medium effect size of _f_ = .25 as per Cohen (1988) for an analysis of covariance (ANCOVA). A total sample size of approximately 128 participants, with 64 in each of the experimental and control groups will be considered adequate to look for differences between the experimental and control groups, for potentially controlling for the term in which the data is collected (sixth and seventh term). These power analyses will provide the most conservative estimate of sample size, based on possible covariates, if required.
## Participant Recruitment and Group-Randomization Procedures

Institutional Review Board (IRB) approval will be obtained from the university where the study will be conducted, and the university that will oversee the study and its implementation. Recruitment will occur through email messaging and the use of posters, and through face-to-face course announcements by the researcher, to first target seventh term-students enrolled in two sections of a fourth year medical-surgical course offered during the fall term, and then, sixth term-students enrolled in two sections of a fourth year medical-surgical course offered during the winter term. Face-to-face course announcements will occur at the mid-class break and at the beginning.

### Table 2: A Priori Power Analysis for t-test using G*Power (Faul et al., 2009)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
</tr>
<tr>
<td>Tail(s)</td>
<td>2</td>
</tr>
<tr>
<td>Effect size $d$</td>
<td>0.5</td>
</tr>
<tr>
<td>$\alpha$ error probability</td>
<td>0.05</td>
</tr>
<tr>
<td>Power (1-β err prob)</td>
<td>0.8</td>
</tr>
<tr>
<td>Allocation ratio N2/N1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Non-centrality parameter $\delta$</td>
<td>2.8284271</td>
</tr>
<tr>
<td>Critical $t$</td>
<td>1.9789706</td>
</tr>
<tr>
<td>$Df$</td>
<td>126</td>
</tr>
<tr>
<td>Sample size group 1</td>
<td>64</td>
</tr>
<tr>
<td>Sample size group 2</td>
<td>64</td>
</tr>
<tr>
<td>Total sample size</td>
<td>128</td>
</tr>
<tr>
<td>Actual power</td>
<td>0.8014596</td>
</tr>
</tbody>
</table>
end of the class time to enable direct recruitment. To reduce possible anxiety and perceived conflicts, students will be informed that the research activities will occur separately from the course and will not influence the grades in any of their courses. Informed consent will be obtained from those volunteering for the study (see Appendix C). A $10 coffee card will be provided to all participants who consent to the study, whether they withdraw from, or remain in the study.

A group-randomized design will be implemented. The sections of participants who consent to take part during the fall (seventh) term will be randomly assigned to either the experimental or the control group; group-randomization of the sections in the winter (sixth) term course will occur also. This random assignment of a section to either the experimental or control group will be determined by a coin toss (heads for control group, and tails for experimental group). Individual randomization in this study is prohibitively complex, as the two sections’ course schedules and available times to participate in the study differ, and therefore may provide a barrier to recruitment and participation. This design and combination of fall and winter student participants into a single experimental and a single control group will be geared to moderate the challenges presented by: 1) practical impediments of using a single randomization procedure for individuals in both course sections in a term where scheduling differs; 2) practical impediments of including the winter term students, who will not have enrolled in the fourth-year-level medical-surgical course yet, in a single randomization procedure at the beginning of the study; 3) possible imbalances of experimental and control group participant numbers if students in both terms were randomized as one; and 4) recruitment occurring over a longer period and across two terms (Polit & Beck, 2012). Additionally, it is anticipated that the design and the assignment of
fall and winter participants to both the experimental and control groups will increase power of the group comparison (Matts & Lachin, 1988) and will control for possible term effects.

The students enrolled in the fall term will be targeted for recruitment first. The two sections of this course offered in the fall term will receive the same course content in the same term and are in the same cohort/year, in the same traditional 4-year BScN program. Consenting students will be assigned identification numbers in each of the fall sections.

In the fall term, random assignment of a section to either the experimental or control group will be determined via a coin toss after recruitment occurs, to maintain allocation concealment (Doig & Simpson, 2005; Vickers, 2006). In an attempt to maintain intervention fidelity and limit the possible influence of information passing between participants, the traditional prebriefing activities of the control group participants will be delivered to the participants in one section (heads). The participants in the other section will form the experimental group and will receive the prebriefing intervention (tails). All participants will receive at least the standard simulation protocol offered at the host institution. Immediately upon recruitment, participants will have the opportunity to sign up for an available time slot convenient to their schedule, in order to ensure a prompt communication of expected participant activity. Information on group allocation will not be available to the participants until after they are recruited and consent to the study. This group-randomization procedure will be repeated during the winter term. Therefore, both the experimental and control groups will be comprised of participants from each term.

**Prebriefing Experience as Study Variable**

Traditional or structured prebriefing will be offered to the groups in this proposed study. Both formats are described in the following sections.
**Traditional prebriefing.** Traditional prebriefing activities that follow the INACSL standards (Meakim et al., 2013), include orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation. This is the standard convention used at the university where the study will be conducted. As part of prebriefing, students are sent the scenario topic and introductory information the day before the scheduled simulation via email, and have the opportunity to read it on their own. In the NSC, traditional prebriefing involves an independent review of the topic, the main objectives for the simulation, and a simulated patient chart. The facilitator orients the students to the simulation space, the location of the equipment that may be required during the scenario, and the mannequin functionalities. The facilitator describes the time frames for the phases of the simulation process, and discusses the roles the students will play (main nurse, supporting nurse). Students are asked if they have questions or require clarification about what they have reviewed, before beginning the simulation scenario. For the proposed study, this will be the process for participants in the section receiving the traditional prebriefing. A structured prebriefing on the other hand, will not only include traditional prebriefing activities, but also will incorporate the theoretical principles of concept mapping and reflection-before-action in the following manner.

**Structured prebriefing.** In the proposed study, participants in the section randomly assigned to the intervention of structured prebriefing will also receive the topic sent via email, and review the equipment, environment, mannequin, roles, time allotment, main objectives, and the simulated patient chart. The researcher, as facilitator, will provide participants with the structured prebriefing worksheet (researcher-developed, see Appendix A) to engage participants in actively thinking and to assist with anticipatory reflection on the scenario (based on the information provided and the context of their prior knowledge and learning), and to visually
guide cognitive and reflective processes according to the principles of concept mapping. Aspects of the Structured Prebriefing Model (Figure 2) such as *prior knowledge and learning* are evident in the worksheet structure and content, and are based on constructivism and reflection, and the principles of concept mapping (Novak & Gowin, 1984) and *reflection-before-action* (Greenwood, 1993). The worksheet uses language associated with clinical judgment (*noticing, interpreting, responding* and *reflecting*, as cited in Tanner, 2006) and relates to competency performance and the nursing process and is structured to include the attributes of prebriefing (*considering the situation, perceiving meaning*, and *anticipating a plan*, as cited in Page-Cutrara, 2015). These help form key concept labels of the map-style worksheet.

Participants will be made aware of the structure of the concept map worksheet, which is comprised of three sections. The first section of the worksheet allows participants to summarize what they know in writing, in the context of simulation, and draws their attention to the learning objectives. These concepts have been identified as antecedents of structured prebriefing (Page-Cutrara, 2015). A facilitator, as a necessary support for structured prebriefing and the activity of guided reflection in particular (Johns, 2013), encourages reflection-before-action (Greenwood, 1993) and the initial steps of the reflective process such as identifying, defining and describing the problem (Dewey, 2007). The researcher, as facilitator, can ask, “After reviewing this patient’s situation, what do you see as some of the challenges he is facing?” In this way, participants are supported in *considering the situation* presented in the simulation and in developing awareness, or noticing skills, which have been connected to performance and clinical judgment (Benner, Tanner, & Chesla, 2009).

In the second section of the worksheet, *perceiving meaning* as a key concept is highlighted. Participants will be supported through prompts for drawing on prior knowledge and
experiences, and may begin to actively anticipate and construct knowledge when mapping out several interpretations of the simulated patient’s presentation. The researcher can ask, “Based on what you know so far, what possible interpretations could be made as to why this is happening?” Cueing for misinterpretations can occur through exploring rationale or asking about missing information. Cognitive processes such as questioning will be encouraged, and anticipatory and reflective processes such as suggesting possibilities (Dewey, 2007) also may begin to develop new meanings for the participant.

In the last section of the worksheet, participants are asked to anticipate a plan for care required and to anticipate a possible nursing response for each of the interpretations. To support this, and to reflect the reality of competency performance in practice, participants are asked to anticipate what may be needed from other health care professionals. A facilitator guides participants to reason through these solutions (Dewey, 2007) by encouraging forward reflection, towards possible consequences or conclusions. The researcher can ask, “If you select that plan, what do you see happening as a result?” Anticipatory reflection or reflection-before-action becomes evident during these sections. Although the visual schema of the concept map worksheet is linear in structure, guided reflection can offer the participants an opportunity to connect the prebriefing activities with thinking and reflection that continues into the scenario, the debriefing phase, and beyond in a more circular manner (Figure 1).

Although structured prebriefing activities will be only employed in the experimental group simulation process, the same data collection instruments and procedures will be utilized for both the experimental and control groups.
**Instruments**

The use of the following instruments will facilitate the examination of the study’s variables of interest: the *Creighton Competency Evaluation Instrument* (CCEI), and the *Prebriefing Experience Scale* (PES). Demographic data including gender, age, number of previous simulation experiences, and term will be collected, to support descriptive and inferential statistical analyses.

Demographic data will be collected as part of the PES, as piloted, to provide information on gender (nominal level), age of the participant at the time of the study (ratio level), and the number of previous nursing simulation experiences (ratio level). Term will be noted. These types of demographic data are collected in nursing simulation and educational studies that are focused on academic, learning and/or performance outcomes (Eggenberger, Keller, & Locsin, 2010; Husebø et al., 2012). Nardi and Kremer (2003) suggested that the ability of students to self-reflect may be a characteristic connected with academic progress, which may relate to possible term effects.

Competency performance, clinical judgment and perceived prebriefing experience variables will be represented by scores or data from the CCEI and the PES. These tools produce interval level data. Although there is some debate in the literature concerning the level of data produced by Likert-type scales, they approximate interval properties (Jamieson, 2004; Polit, 2010). A description of the tools, their reliability and validity, and the study variables they are associated with are presented.

**Creighton Competency Evaluation Instrument.** The CCEI (Hayden et al., 2014) was adapted from the *Creighton Simulation Evaluation Instrument* (CSEI) (Todd, Manz, Hawkins, Parsons, & Hercinger, 2008) as a quantitative instrument to evaluate students’ performance
during either a simulated or a live clinical experience. The CSEI that was initially developed is used to measure competency across a range of items, and includes subscales of Assessment, Communication, Critical Thinking and Technical skills (Todd et al., 2008). Several studies have cited reliability and internal consistency with the CSEI (Adamson, Kardong-Edgren, & Willhaus, 2012; Adamson et al., 2011); faculty inter-rater reliability was 0.952 and intra-rater reliability was 0.883. Cronbach’s alpha was used to measure internal consistency ($\alpha = 0.979$) of the CSEI.

The CSEI subscale language was modified in the revised CCEI based on feedback from the developers, and to align with four of the six Quality and Safety in Nursing Education (QSEN) competencies in order to more closely mirror the clinical environment; the two subscales of Critical Thinking and Technical Skills were changed to Clinical Judgment and Patient Safety respectively (Hayden et al., 2014). Because of this proposed study’s focus on competency performance and higher level reflective and cognitive skills such as clinical judgment, a tool that measures competency with clinical judgment as a component, rather than technical skills, is more meaningful and more appropriate.

Therefore, the CCEI, selected for this study, is a 23-item dichotomous scale divided into four competency subscales of Assessment, Communication, Clinical Judgment and Patient Safety (see Appendix D). Evaluators score each item as either 0 or 1, where 1 indicates achievement of competency, for a maximum total score of 23 points; scores are converted to percentages. The Clinical Judgment subscale (CCEI-CJ) will have a maximum score of 9 points. The CCEI was developed to evaluate senior level nursing students in both associate and baccalaureate degree programs. It was intended for use in groups but has also been used to evaluate individual students (Adamson & Kardong-Edgren, 2012; Hayden et al., 2014). Hayden et al. (2014) confirmed Cronbach’s alpha for inter-rater reliability as >.90, and reported acceptable content
reliability, validity and usability results. These were comparable to the original CSEI tool. The evidence from Hayden et al. (2014) supported the use of the CCEI in both the simulation and the clinical environment. This instrument's limitations include the absence of a documented theoretical framework and the use of a categorical scale. The use of a categorical scale does not allow for any item gradation (Cates, 2014).

Prior to using the tool for data collection in the proposed study, the researcher, as the single rater/scorer, will review each item in the CCEI in terms of the acute care simulation scenario that will be used for the study. The purpose of the review will be to establish a consistent rating methodology and improve reliability and validity of the scoring by the researcher on the specific action of student performance that will constitute competency. For instance, the competency item prioritizes appropriately may include three criteria in order for a participant to be scored as demonstrating that competency item in a consistent manner.

In this way, the CCEI will be used to measure and compare competency performance during the simulation scenario between and within the experimental and control groups. The CCEI-CJ items will be specifically considered for comparing higher-order cognitive nursing skills between these groups. Use of this instrument will assist in addressing Research Questions 1, 2, 4 and 5.

**Prebriefing Experience Scale.** The *Debriefing Experience Scale* (DES), first documented in 2012 by Reed, was developed to evaluate the nursing student debriefing experience during simulation. Reed (2012) refined items for the DES through a factor analysis and demonstrated internal consistency reliability with Cronbach’s alpha of the overall scale as .93. Content validity was obtained through feedback from students and simulation experts in the initial DES study.
Given the paucity of research and tools available on prebriefing (Husebø et al., 2012; Page-Cutrara, 2014), an adaptation of the DES to the PES, will support measurement of the students’ perceived experience during the prebriefing phase. The DES was adapted simply by replacing the word *debriefing* with *prebriefing*, and included minor grammatical revisions. Therefore, the PES (see Appendix B), with four categories of *Analyzing Thoughts and Feelings, Learning and Making Connections, Facilitator Skill*, and *Appropriate Facilitator Guidance*, similarly has 20 items for response on a 5-point Likert-type scale that range from *strongly agree* to *strongly disagree*. In previous studies using the DES, only individual scale items have been reported (Reed, 2012; Reed, 2013). After consultation with Dr. S. Reed (Personal communication, July 31, 2014), means of PES subscale totals (interval level) will be used as measurements in the proposed study, as well as the means of the overall scores. For instance, the subscale *Learning and Making Connections* will be assessed because its items - *learning opportunities, finding meaning, and processing information* - may be potentially facilitated by structured prebriefing activities (which will include concept mapping and guided reflection).

The PES pilot study demonstrated internal consistency reliability with Cronbach’s alpha of the overall scale as .94, and of the subscales as ranging from .77 to .88. To extend the results of this pilot study, reliability and validity of the PES will also be assessed during this proposed study. In this way, the experience of students in both the experimental and control groups will be measured. Use of the PES scale will assist in addressing Research Questions 3, 4 and 5.

**Procedures for Data Collection**

After informed consent is obtained using a process to be approved by the IRBs of the university where the study will be conducted and the supervising university, participants recruited from a fourth-year-level medical-surgical course during the sixth (winter) and seventh
(fall) term of a traditional 4-year BScN program will be randomly assigned by section during each term to either the experimental or control groups, according to the described group-randomization procedure. Participants will be assigned an identifier number and will sign up to attend the NSC in pairs, according to the time slots available to their section. Pairs of participants will facilitate both the enactment of the communication aspects of the scenario and verbalization of thoughts, for the benefit of the evaluation process, while enabling the researcher to clearly visualize and record participant competency performance. Participants enrolled in the course in the seventh term of the program will sign up to one of the available one-hour time slots during the last five weeks of the fall term. Those enrolled in the course in the sixth term of the program will sign up to one of the available one-hour time slots during the third to eighth week of the winter term. Appendix E provides an overview of the order in which data will be collected in this experimental study.

The NSC, where the study will take place, is equipped with four SimMan® high fidelity mannequins. Separate areas are available for prebriefing and debriefing activities. The simulation process will be the same for both the experimental and control groups with the exception of the intervention of the structured prebriefing for the experimental group.

In this study, control group participants will arrive to the NSC during their assigned time slot and be invited to sit at a comfortable table. The control group will receive the traditional prebriefing activity that involves an orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation as defined by the INACSL (Meakim et al., 2013), and as outlined (see Appendix F). The intervention group will receive the traditional prebriefing activity as well as a structured intervention (see Appendix G) that uses a faculty-guided concept mapping worksheet (Appendix A).
All participants will complete the PES after either the traditional (20 minutes) or the structured (30 minutes) prebriefing at a table away from the clinical simulation room. The participants will be directed to fill out the PES according to the instructions provided, i.e., to the best of their ability, and based solely on the activity they will have just experienced. Labeled with participant identifier codes only, the PES forms will be immediately reviewed for missing data by the researcher, as they are collected from the participants.

All participants will engage in the same clinical simulation. A standardized CAE Healthcare scenario, “Chest Pain Management of the Postoperative Patient”, familiar to the researcher, will be employed (see Appendix H), and will run for 15 minutes. This scenario is comprised of an initial assessment, the onset of angina, and the resolution of chest pain. Participants will be expected to plan, prioritize, and evaluate the patient’s care. During the clinical simulation, competency performance will be evaluated for each participant, by the researcher, using the CCEI (Hayden et al., 2014) as seen in Appendix D.

Once the scenario is finished, the two participants and the researcher will debrief the simulation in the debriefing area for 15 minutes. Debriefing will follow the questions provided in the CAE Healthcare standardized scenario outline (see Appendix H). The experimental group participants will be able to refer to the worksheet exercise during the debriefing. The researcher will check that the CCEI has been completed before providing the coffee card, thanking and dismissing the participants. This will conclude the data collection and participant activity.

**Plans for Data Analysis**

The IBM SPSS Version 22.0 Premium software (including Bootstrapping add-on) will be used for analyzing all quantitative data. After each day of data collection, the researcher, to maintain accuracy of the database, will enter the raw scores and any related data into the SPSS.
data file. Data will be double-checked for accuracy by the researcher against the original completed scale/instruments.

**Preliminary data analysis.** A preliminary investigation will be conducted to address missing data, outliers, normality and homogeneity and will assist with describing the sample and variables of interest, identifying possible relationships between variables, and examining whether assumptions underlying the selected inferential statistical tests have been met. Underlying assumptions for specific inferential tests will be discussed in the context of each research question.

Summarizing demographic and other variables using descriptive statistics such as frequencies, means, standard deviations of the means, and variances will provide the researcher with an initial overview of the nature of the sample and variables of interest. Missing data will be visually inspected. Although to date there are no empiric guidelines on what constitutes excessive missingness, the extent of missing data will be considered significant if greater than 15% of the responses are missing on a given variable (Fox-Wasylyshyn & El-Masri, 2005); in this case group mean substitution will be used. Similarly, if a pattern of missing data is observed, replacing the missing data with the group mean that the participant belongs to will be considered; however it may make the differences between groups appear larger (Tabachnick & Fidel, 2013). If there is no apparent pattern, missing data may be discarded if a $t$-test between a group with missing data (dummy coded) and a group without, is non-significant (Polit, 2010). As discussed earlier, missingness will be reduced as much as possible by checking instrument and scale completeness at the time of collection.

Outliers among dichotomous variables will be evaluated in terms of extremely uneven splits (i.e., 90-10) for instance, between the experimental and control group numbers. Continuous
univariate variables will be reviewed for outliers using minimum and maximum values, and graphs such as box plots. Multivariate outliers will also be detected based on an evaluation of standardized residuals of two standard deviations from the mean through the SPSS default (Zresid), which is the difference between the observed probability for competency performance or clinical judgment, for instance, and the predicted probability, based on the model (Polit, 2010). If at an absolute value of 2.58 (Field, 2013; Polit, 2010), the outlier may be removed from the analysis. If this is the case, isolating a possible reason why the results were unusual will be documented, and outlying cases will be described.

Normality will be addressed to improve the strength of the data and results. Skewness and kurtosis will be considered for all continuous variable sets, and scatter plots will be created. This will be done after the assessment for outliers so that normality may be more meaningfully dealt with. The Kolmogorov-Smirnov test (p < .05) will be used to test the outcomes for normality (Polit, 2010). If normality is an issue that is related to small sample size, transformations may be considered to correct this (Tabachnick & Fidell, 2013).

Homogeneity of variance will be considered next in the data screening process. This is usually met when group sizes are relatively equal (within one and a half times the size of each other) (Polit, 2010). Violation of this assumption may produce Type II errors if there is a large variation between groups, despite an overall large sample size. Therefore, a significant Levene’s test for homogeneity of variance (p < .05) based on the data collected (i.e., CCEI total scores) will be used to indicate possible heterogeneity. If there is significant variability, consideration will be given to the value of using statistical tests to control for this. Once the data is cleaned, descriptive statistics, including the group size, frequencies, means, standard deviations, standard
error, plots and confidence intervals (CI) (95%) will be examined for both groups prior to conducting the inferential analyses.

In addition to the analyses that relate to the research questions, internal consistency reliability across items of the CCEI and PES will be explored. Cronbach’s alpha values will be compared with previous CCEI literature (Hayden et al., 2014; Hayden et al., 2014; Parsons et al., 2012) and the PES pilot study results. Item-total correlations will also be considered for the PES; .30 will be considered as an acceptable level (Hertzog, 2008; Nunnally, 1978).

**Research question 1.** The first question, “Is there a difference in competency performance during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” will be tested in the following way. In an unadjusted analysis, the total CCEI scores of the experimental and control groups will be statistically compared using a two-tailed independent samples t-test (α = .05). This will focus on establishing how likely it is that the null hypothesis is true (the means of the total CCEI scores of the two groups are the same), or not. Although t-tests are relatively robust to violations of normality, if the data are not normally distributed, the nonparametric analogue of the t-test, the Mann-Whitney U test, will be conducted (Polit & Beck, 2012).

In an adjusted analysis, an ANCOVA will be used to examine the total CCEI scores between the experimental and control groups, controlling for the covariate of term of enrollment (sixth vs. seventh term). The covariate will be coded as 0 for the sixth term and 1 for the seventh term, and treated as separate independent variables (Polit, 2010). The variance ratio (ratio of less than 2, as per Polit, 2010), and Levene’s test for homogeneity of variance (p ≤ .05) will be used, and plots of residuals will be inspected. In addition to the assumptions that were investigated in
the preliminary analyses, scatter plots will be examined for the assumption of the independence of covariates/independent variables and curvilinearity. If linearity is a concern, transformations may be considered (Polit, 2010). If it is determined that the assumption of homogeneity of regression across groups is violated through testing using a customized model (Field, 2013), bootstrapping\(^1\) will be employed (Field, 2013), or other statistical testing will be considered (Polit, 2010). Effect size using an adjusted eta-squared will be determined \((f = .25\) is considered a medium effect, as per Cohen, 1988). Therefore, in this adjusted model, the influence of time spent in the program (term), on the variability in CCEI scores can be examined, and statistically controlled in the final analysis, if necessary.

**Research question 2.** The second question, “Is there a difference in clinical judgment during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” will be addressed using the same methodology described under Research Question 1, with the exception that the means of the CCEI *Clinical Judgment* subscale (CCEI-CJ) scores will be examined for difference instead of the means of the total CCEI scores. In an unadjusted analysis, the CCEI-CJ scores of the experimental and control groups will be statistically compared using a two-tailed independent samples t-test \((\alpha = .05)\). This testing focuses on establishing how likely it is that the null hypothesis is true (the means of the CCEI-CJ scores of the two groups are the same), or not. In an adjusted analysis, an ANCOVA will be conducted as previously described, using CCEI-CJ scores as the dependent

\(^1\) Bootstrapping is a technique from which the sampling distribution is estimated by taking repeated samples with replacement from the data set; the statistic of interest is calculated for each sample from which the sampling distribution of the statistic is estimated. The standard error of the statistic is estimated as the standard deviation of the sampling distribution created from the bootstrapped samples. Then, CI and significance can be computed (Field, 2013)
Research question 3. The third question, “Do students receiving a structured prebriefing intervention perceive the prebriefing experience differently than students receiving traditional prebriefing?” will be tested using two-tailed independent samples $t$-tests ($\alpha = .05$) to statistically compare the means of the PES total scores, and each PES subscale scores, between the experimental and control groups. These tests will focus on establishing how likely it is that the null hypothesis is true (the means of the PES total and each PES subscale score of the two groups are the same), or not. Because the groups will be relatively equal in size, pooled variance will be used to estimate the standard error of the distance. Levene’s test for equality of variances will be used to determine if variance is a concern. If Levene’s test is significant ($F$ statistic $p < .05$), then the null hypothesis that the variances are equal will be rejected; the $t$ from the separate variance formula will be reported instead. Although $t$-tests are relatively robust to violations of normality, if the data are not normally distributed, the nonparametric analogue of the $t$-test, the Mann-Whitney $U$ test, will be conducted (Polit & Beck, 2012).

In addition, other information that will be determined will include CI ($\alpha=.05$ at 95%) to provide information on the precision of the estimates of mean differences. Effect size, or the magnitude of any relationship, will be estimated with Cohen’s $d$ and be categorized as small if .20, medium if .50 and large if .80 (Cohen, 1988). Effect size information will be useful if future studies are conducted so results can be compared. The following two questions serve to examine potential relationships between the variables explored in Research Questions 1, 2 and 3.

Research question 4. The fourth question, “What is the relationship between competency performance and the perceived prebriefing experience during a clinical simulation
scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” will be tested using correlation and multiple linear regression analyses. Both of these statistical tests aim to examine the association between the variables in question in different ways.

The purpose of these analyses is to test the null hypotheses that the correlation is 0, and that there is not an association between the experimental and control groups’ total CCEI scores, and the PES total and subscale scores. As a preliminary analysis, bivariate correlations will be conducted to examine whether total CCEI scores in each of the experimental and control groups co-vary with the PES total and four PES subscale scores. A two-tailed, Pearson’s product-moment correlation will be conducted; although a violation of bivariate normality would have only a small effect for the projected sample size, bootstrapping procedures (95% CI) may be considered if normality of any of the variables, identified in the preliminary analyses, is a concern. Bootstrapping may provide a calculation of robust CIs around rs, which may determine a level of precision of these results (Polit, 2010). To compare the results (r) between the independent groups, an r-to-z transformation will be computed for significance (Field, 2013; Lee & Preacher, 2013, September). A value of .3 will be considered a medium effect size (Cohen, 1988) for the difference between correlation coefficients. It is noted that an a priori analysis for a two-tailed bivariate correlation using G*Power (Faul et al., 2009), set at ρ=.3, α = .05, and with a power of 80%, recommended a total sample size of 82, less than what was represented in Table 2.
To seek further information on how the relationships between total CCEI scores (as the dependent variable) and the PES total and subscale scores (as the ‘predictor’ variables) differ between the experimental and control groups, multiple linear regression will be used.

Because regression assumes linearity of variables, the residual scatter plots will be examined for the distribution of errors of prediction; normality and homoscedasticity will be also be determined. Homoscedasticity is important in regression analyses, and although there is no test, this will be seen graphically, and in an initial residual scatter plot that reflects a rectangular shape, with a concentration of data at the centre line (Polit, 2010). If problematic, this may be corrected by transformation of the original data. Transformations, in any case, will be selected as the last option because the accurate interpretation of the original data could be lost with this process. If these assumptions have been violated, bootstrapping and transformations to stabilize the variance will be considered (Polit, 2010). Outliers, as discussed in the preliminary analysis, will also be identified through further analysis of the residuals; extreme cases as indicated in the SPSS output, will be eliminated.

Interaction terms will be constructed to test the interactions of each of the experimental and the control groups, with PES total and subscale scores, on total CCEI scores. The main results of $R^2$ will indicate the proportion (%) of variance in competency performance accounted for by the group membership and PES scores. The $R^2$ values closer to 1.0 are desirable (Polit, 2010). Term may be controlled for using a hierarchical multiple regression model, in the first block. As inadequate sample size can increase the risk of Type II errors, an a priori power analysis for the number of subjects needed to reject the null hypothesis that $R^2$ is zero was conducted; this is less than what was calculated for the previous a priori analyses, and so overall sample size should be adequate.
Research question 5. The fifth question, “What is the relationship between clinical judgment and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” will be tested using correlation and multiple linear regression analyses.

The purpose of these analyses is to test the null hypotheses that the correlation is 0 and that there is an association between the experimental and control groups’ clinical judgment subscale scores and the PES total and subscale scores. Analyses between the CCEI-CJ scores and the PES total and four PES subscale scores for the experimental and control groups will be explored using similar methods to those described in Research Question 4. Considerations for power will be the same as in the previous question. Term may be controlled for using a multiple regression hierarchical model.

The justifications presented for the statistical data analyses in this proposed study, which will include a review of data cleaning based on assumptions and tests used to address each research question, will support a clear implementation of the research activities. The methodology will assist a systematic exploration of the identified research questions and various aspects of the structured prebriefing intervention in the context of undergraduate nursing student learning.

Study limitations. Issues associated with acquiring a large enough sample size for normality and to reflect homogeneity are one of the significant anticipated limitations. Attrition between the time of consent and collection of data, given students’ busy schedules, and challenges with scheduling the students may be anticipated. Prompt data collection and the establishment of a lab schedule that fits with the participants’ classes will help mediate this issue.
The $10 coffee card offered to those who agree to participate may encourage attendance at the lab.

Researcher bias may be possible when evaluating competency performance in the experimental group, given that this proposed study is not blinded. The researcher, however, will be on sabbatical during the time of recruitment and data collection, and so any prior knowledge of the student groups’ academic performance that may affect accurate scoring will be limited. Similarly, control group participants completing the PES may score themselves lower should they discover that they have not received the experimental worksheet and structured prebriefing activity. To mediate this possibility and to convey fairness and transparency, participants will be informed during recruitment that they will be receiving one of two prebriefing formats that meet the standards, and that the purpose of the study is to explore these formats. Conversely, the self-report nature of the PES may lead intervention group participants to score themselves higher than is accurate because they understand they have been assigned to the experimental group. Reminding participants to complete the scoring honestly and based on their immediate experience may assist in reducing inaccuracies and increasing reliability of the responses.

Because agreement to participate in the study is voluntary, selection bias may be a limitation whereby only academically keen or higher-performing students are recruited. Recruitment messaging will be aimed at the benefits for all students to participate, and the possible value of additional practice time, the use of QSEN and NCLEX-RN®-focused simulations, and the opportunity for exploring cognitive strategies that may help improve general understanding of course content and concurrent clinical experiences. In addition to procedural limitations, results from this proposed study (see Table 3 for the timeline) will be generalizable
only to BScN students in a traditional program with the characteristics of those of the recruited sample.
Table 3: Timeline for the Study from Proposal Defense through Dissemination of the Results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Finalize pilot and proposal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defend proposal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek ethics approval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write results section</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finalize dissertation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defend dissertation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disseminate results/write article</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Addendum to Manuscript Option #2 Part I: Proposal

This document is structured to conform to Duquesne University School of Nursing’s Manuscript Option #2 dissertation format. Part I of this document comprises the full, approved proposal for the main study, and was written in the future tense. Part II comprises an expanded manuscript that describes the full study and its results, for submission to a journal. This addendum therefore serves to clarify the slight differences that are evident between the proposal, and the subsequent conduction of the study.

All processes outlined in the proposal were followed during the conduction of the study. The theoretical frameworks and models were unadjusted, and the literature base was unchanged. The methodology in terms of the population, setting, participant pool, intervention and the research process remained the same. Several factors, however, necessitated the extension of the data collection period during the winter term, from 6 to 12 weeks. Due to the lower-than-expected sample size, the alternate analyses that were proposed for a non-normal distribution of data were incorporated.

The proposed analyses for Research Questions 4 and 5 aimed to test whether competency performance scores and clinical judgment scores were correlated with perceived prebriefing experience scores. Because of the non-normal distribution of data, a bootstrapped Spearman’s correlation was selected, instead of the Pearson’s product-moment correlation, as the most appropriate test for analyses of these questions. None of the variables were correlated, so multiple regression analyses were not conducted. Part II will describe the conduction of the study in its entirety, its results, and the implications for research and education in nursing simulation.
Manuscript Option #2 Part II: Expanded Manuscript

Abstract

AIM To examine the intervention of structured prebriefing, for its effect on students’ simulation performance and their prebriefing experience. Prebriefing is the introductory phase of the simulation process.

BACKGROUND Despite its inclusion in the simulation process, little research is available on prebriefing. Reflection theory and concept mapping informed a model-based structured prebriefing activity for preparing students for meaningful learning in simulation.

METHOD A group-randomized, experimental study of 76 baccalaureate nursing students compared competency performance, clinical judgment, and the perception of the prebriefing experience of those receiving structured prebriefing, to those receiving traditional prebriefing activities. The relationship between simulation performance and students’ self-rated prebriefing experience was also examined.

RESULTS A statistically significant difference was demonstrated between groups for competency performance ($p < .001$), clinical judgment ($p < .001$) and prebriefing experience ($p < .001$). No relationship was found between perception of prebriefing experience and students’ simulation performance.

CONCLUSION Structured prebriefing may impact nursing student competency performance, clinical judgment and perceptions of prebriefing, and meaningful simulation learning.

Key Words: Prebriefing, Simulation, Nursing Education, Clinical Judgment, Simulation Experience
The Impact of Structured Prebriefing on Nursing Students’ Competency Performance, Clinical Judgment and Experience in Simulation

Over the last ten years, simulation in nursing education has become increasingly prevalent for teaching nursing students a variety of clinical skills. Consequently, nursing research in the area of simulation has grown in an effort to understand, and provide evidence for, the ways in which it is incorporated into pre-licensure programs. Aspects associated with student performance during the simulation scenario phase, including anxiety and confidence, and aspects of the debriefing phase have been of primary interest to nursing education researchers. However, it remains unclear if or how the phases of the simulation process are effective for student clinical learning. In particular, the phase of prebriefing, as the first phase in the simulation process, has been overlooked in nursing research for its role in simulation learning.

**Purpose of Study**

Prebriefing activities, provided to the learner before the simulation scenario begins, include: information about the objectives; patient history and current status; learner roles and tasks; time allotment; and an orientation to the simulation equipment and the general environment (Meakim et al., 2013). Activities during the prebriefing phase establish the methodology for, and culture of, learning; as such, they may be important for directing and evaluating learning outcomes of simulation (Riley, 2008). At this time, the effect of prebriefing on simulation as a learning tool, and for enhancing student performance, has not been specifically tested. Therefore, an exploration of how nursing students may be supported during this phase, through additional structured learning and reflective activities, could provide educators with a further understanding of how simulation is used, and greater evidence for simulation pedagogy.
The aim of this study was to describe the intervention of a structured prebriefing activity, for its effect on students’ simulation competency performance, clinical judgment, and their perception of the prebriefing experience. The single intervention of a theory-based, researcher-developed and -facilitated prebriefing, employed in a simulation experience with undergraduate nursing students, was compared to the simulation experience of a similar group of students who were not exposed to this intervention. This group-randomized experimental study sought to address the following research questions:

1) Is there a difference in competency performance during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

2) Is there a difference in clinical judgment during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

3) Do students receiving a structured prebriefing intervention perceive the prebriefing experience differently than students receiving traditional prebriefing?

4) What is the relationship between competency performance and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

5) What is the relationship between clinical judgment and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional
baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?

**Background and Significance**

There is a paucity of nursing literature available on prebriefing (Page-Cutrara, 2014). Concepts of prebriefing, competency performance, clinical judgment, and concept mapping and reflection were examined in the context of simulation for student learning, and from the theoretical frameworks of constructivism and reflective practice.

**Theoretical Foundations**

The application of a structured prebriefing intervention (Appendix A), was founded on theoretical principles that support reflection-before-action (Greenwood, 1993; van Manen, 1991) and concept mapping (Novak & Gowin, 1984). These principles are formed from reflection theories and constructivism, which are frequently cited in nursing simulation literature (Burke & Mancuso, 2012; Conceição & Taylor, 2007; Dreifuerst, 2012; Jeffries, 2005; Rutherford-Hemming, 2012).

Reflective theories and constructivism are related; Dewey (1938/1997) suggested that constructivist learning theory includes a central tenet of reflective activity. Schön (1987) subsequently proposed reflection as a basis for building knowledge and skill as a practitioner. In simulation, which prepares nurses for practice, reflection is embedded through reflection-in-action (Schön, 1987), which occurs while enacting the scenario, and reflection-on-action (Schön, 1987), which occurs during debriefing while thinking back on action after the scenario is over. Additionally, reflection-beyond-action (Dreifuerst, 2009) has been described as reflection that extends to post-simulation activities during debriefing. Greenwood further (1993) identified that reflection-before-action could also be useful during activities such as “clinical pre-
conference/briefings” (p. 1196). This reflective activity that could occur during the prebriefing phase, necessarily involves a future-focus of *anticipatory reflection* (van Manen, 1991), and like reflection-beyond-action, could mirror the reality of anticipating and planning care in nursing practice. As a means for constructing and articulating plans for care, concept-maps, as structures that represent links between concepts and ideas (Novak & Gowin, 1984), may assist with modeling the cognitive skills used by nurses in practice. In this way, a connection between reflection-beyond-action and reflection-in-action, by reflection-before-action, serves to situate concepts of reflection theory for the purposes of building knowledge and skills in nursing simulation. This cycle of reflection, in the context of simulation, is depicted in Figure 3.

In this study that aims to explore the use of a structured simulation prebriefing phase, the theoretical frameworks of constructivism and reflection form the basis for a structured prebriefing model, which links prior knowledge, reflection-before-action, and concept mapping, for a meaningful simulation learning experience. A structured prebriefing phase of the simulation experience may potentiate the development of cognitive skills such as clinical judgment. Figure 4 represents a theoretical model for structured prebriefing activities, in the context of this study.

**Literature Review and Concepts for Investigation**

A literature review was conducted to understand the nature of the concepts to be described in the study, and the connection to prebriefing in the context of prelicensure nursing student simulation learning. Prebriefing, structured prebriefing (in terms of concept mapping and guided reflection), competency performance, and clinical judgment will be described.
Figure 3: Cycle of Reflection throughout the Nursing Simulation Process (M)

Structured Prebriefing

Reflection-before-action
(Greenwood, 1993)

Reflection-beyond-action
(Dreifuerst, 2009)

Simulation Scenario

Debriefing/Post-Simulation

Reflection-in-action
(Schön, 1987)

Reflection-on-action
(Schön, 1987)

After Action/Debriefing

Figure 4: Structured Prebriefing Model (+includes traditional prebriefing activities) (M)
**Prebriefing.** Prebriefing activities have been defined by the *International Nursing Association for Clinical Simulation and Learning* (INACSL) as introducing scenario objectives, and including communication of the patient state, participant roles, tasks, time allotment, and an orientation to the simulation equipment and to the general environment (Meakim et al., 2013). However, a literature review of prebriefing showed prebriefing as understudied (Page-Cutrara, 2014). This review identified that gaps in the simulation knowledge base included definition and purpose of prebriefing, the learning structures used in prebriefing, and its use in relation to learner outcomes.

A concept analysis of prebriefing defined its attributes as including: considering the situation, perceiving meaning, and anticipating a plan to support learning and thinking (Page-Cutrara, 2015). This analysis recommended further research to increase knowledge of the contribution of prebriefing activities to the simulation experience, and to address questions about the optimal delivery of simulation for learning. An expansion of the INACSL definition was suggested to include the idea that information and activities are provided to learners in consideration of their level of knowledge, learning needs and prior experiences, and that prebriefing is structured for anticipatory reflection and planning (Page-Cutrara, 2015).

While not the primary focus in the general simulation literature or in published research, prebriefing, however, has been described indirectly as a complex phase in simulation that not only prepares learners for the functional and operational aspects of the simulation scenario and debriefing phases, but as a “time to prepare students for practicing the intentionality of noticing during patient care” (Jeffries, 2014, p. 222). Clear objectives and expert structured facilitation can support the learner in noticing, as can a “mental checklist” (Jeffries, 2014, p. 222), or mental model. For nursing students who do not have experience or practice in thinking like a nurse or
with using the process of reflection (Schön, 1987; Tanner, 2006), embedding concept mapping-type activities and reflective structures could support metacognition, or thinking about thinking (Burke & Mancuso, 2012; Chartier, 2001; Kuiper & Pesut, 2004).

**Concept mapping in structured prebriefing.** Evidence of the use of concept mapping-type activities in simulation occurs in the nursing literature as a way to augment meaningful learning, and to support structured learning activities during the prebriefing phase (August-Brady, 2005; Conceição & Taylor, 2007; Decker et al., 2010; Gerdeman, Lux, & Jacko, 2013; Hicks-Moore & Pastirik, 2006; Muirhead, 2006; Taylor & Littleton-Kearney, 2011; Wahl & Thompson, 2013).

Extending the work on meaningful learning by Ausubel (1978), Novak and Gowin (1984) identified concept mapping as a visual prompt for making sense of information, and as a pre-instructional tool for linking or discriminating between concepts or facts. In the nursing literature, concept mapping has helped learners develop critical thinking, clinical judgment and decision-making during simulation and in clinical situations (Deckers, 2011; Dreifuerst, 2012; Gerdeman et al., 2013; Taylor & Littleton-Kearney, 2011; Wahl & Thompson, 2013). The use of concept mapping also requires reflection on prior knowledge to establish meaning, and so guided reflection may also serve to structure prebriefing.

**Guided reflection in structured prebriefing.** Reflection, as another way of supporting the development of thinking, has been documented extensively in education literature. Structured, articulated learning has been reported to reduce risks of poor quality or superficial reflection (Ash & Clayton, 2004). The reflective process can be facilitated using timeframes and an opportunity to deliberate on alternative actions for future implementation (Hatton & Smith, 1995). Guidance of anticipatory reflective practices could develop a learners’ ability to anticipate
a plan for patient care, which is a quality of a competent nurse (Benner, Tanner, & Chesla, 2009), and has been identified as an attribute of the prebriefing phase (Page-Cutrara, 2015).

Guided reflection as a structure for facilitating learning differs from self-reflection or group-based reflection, and instead supports learners during the reflective process via a facilitator. Johns (2013) indicated that guided reflection between the facilitator and learner occurs over time, which could suggest that this sort of support should not occur at a single point, such as in debriefing. Johns described that the role of the facilitator encourages and motivates the learner without being overly prescriptive in providing the answers, and that without this guidance, novice practitioners struggle to learn (2013). Successful reflection is exceedingly difficult without facilitation of an expert (Duffy, 2008), and so requires the right guide, a reflective framework, a readiness of the facilitator for what unfolds, and the ability to reflect on reflection. These aspects are supported by the National League for Nursing/Jeffries Simulation Framework (Jeffries, 2012), where the integration of guided reflection by an expert is a recognized element. Again, prebriefing is the only phase of the simulation process yet to be examined for its part in supporting the reflective cycle via guided reflection, or for other learning outcomes.

Competency performance. Because of the limited reporting on prebriefing as a topic of interest in the literature, and despite its recognition as a phase of the simulation process, prebriefing has not been considered for its relationship or role in the development of learner competency during nursing simulation. The term competency has been difficult to define in nursing (Girot, 1993). Legal definitions of competency are acknowledged as contextual and relate to what a reasonable and prudent practitioner with similar levels of knowledge and experience would do under comparable circumstances; competency also functions as a reference
for evaluating the standard of care for registered nurses (College of Nurses of Ontario, 2014).

Competency remains a specific focus of the simulation process and nursing student learning (Blum, Borglund, & Parcells, 2010; Kardong-Edgren, Quint, & Adamson, 2010; National Council of State Boards of Nursing, 2009; Sportsman et al., 2009; Yuan, Williams, & Fang, 2012). For the purposes of this study, competency is defined as the:

- ability to observe and gather information, recognize deviations from expected patterns, prioritize data, make sense of data, maintain a professional response demeanor, provide clear communication, execute effective interventions, perform nursing skills correctly, evaluate nursing interventions, and self-reflect for performance improvement within a culture of safety (Hayden, Keegan, Kardong-Edgren, & Smiley, 2014, p. 244).

The performance of competency, or competency performance, was considered in this study in the context of learning rather than evaluation.

Several studies have explored competency in the context of learning, using instruments such as the Creighton Simulation Evaluation Instrument (CSEI) (Franklin, Sideras, Gubrud-Howe, & Lee, 2014; Frontiero & Glynn, 2012; Sharpnack, Goliat, Baker, Rogers, & Shockey, 2013) and the related Creighton Competency Evaluation instrument (CCEI) (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). One of these studies compared simulation preparation methods in undergraduate nursing students (Franklin et al, 2014). Generally, however, competency performance has not been associated with simulation prebriefing activities, which contributes to a lack of understanding of prebriefing’s role in learning during simulated clinical practice experiences.
**Clinical judgment.** Tilley’s (2008) concept analysis of competency indicated that one of the consequences of competency includes clinical judgment. Tanner defined clinical judgment as “an interpretation or conclusion about a patient’s needs, concerns or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient’s response” (2006, p. 204). She further described a clinical judgment model for simulation, involving aspects of **noticing, interpreting, responding** and **reflecting.** However, prebriefing structures that help prepare novice nurses and students for the essential skill of clinical judgment are not a focus in the simulation literature. Only a few studies have explored clinical judgment in nursing students in relation to simulation design and prebriefing in particular (Chmil et al, 2015; Kelly, Hager, & Gallagher, 2014). One of these studies by Kelly and colleagues (2014) indicated that traditional prebriefing activities such as reviewing simulated patient histories and an orientation to the simulation area were rated low by students for assisting with clinical judgment development. Therefore, understanding how a structured prebriefing format may support nursing student competency performance, and therefore clinical judgment, would assist in filling the gaps identified in the simulation literature.

The purpose of this study was to examine prebriefing as structured by concept mapping-type activities and guided reflection for its effect on competency performance and clinical judgment. The aims of this study were to examine the use of a structured prebriefing intervention on nursing students’ competency performance and clinical judgment exhibited during simulation, to describe their perceived prebriefing experience, and to compare these effects to a group exposed to traditional prebriefing.
Method

Design

This study used an experimental, group-randomized block design, with structured prebriefing as the single intervention. Students in each of the fall (seventh) and winter (sixth) terms of a Baccalaureate of Science in Nursing (BScN) program, were already enrolled in one of two sections of the medical-surgical course targeted by this study. Groups were randomized by course section, in blocks (each term). Therefore each term, the two sections of students taking this course, who consented to participate, were randomly assigned to either the experimental or control group. The combination of participants from both terms into a single experimental and a single control group was designed to moderate challenges presented by the practical impediments of randomizing winter term students in the fall, possible significant imbalances between the experimental and control group participant numbers, and to avoid prolonged recruitment that could affect randomization (Polit & Beck, 2012). Additionally, it was anticipated that the random assignment of fall and winter participants to both the experimental and control groups would increase the power of the group comparison (Matts & Lachin, 1988), and control for possible term affects.

Setting, Population and Sample

Setting. The study was conducted at a large university school of nursing in Ontario, Canada, in the nursing simulation center (NSC). This center was equipped with SimMan® mannequins, one of which was used in the study’s simulation experiences. Simulation center support staff were available to assist with technical aspects of the simulations, but were not involved in conducting the study or in collecting data.
Population. Participants were recruited from a large convenience sample of 379 BScN students enrolled in a fourth-year medical-surgical, clinical nursing course during the sixth and seventh term of a traditional 4-year program. This population was selected because of the requirement for these students to perform competently at the course level, and to develop clinical judgment skills during the upper years of the program. All students in this targeted course: met the same program admission criteria; were recruited from the same 4-year program type; had the same amount of medical-surgical clinical and simulation experience due to exposure to the same curricular structure and content; and, met the same prerequisite requirements for the fourth-year medical-surgical course. The ability to read, speak, and write in English is a requirement for program admission, so all students were able to speak English.

Determination of sample size. Because there was little prior data reported on the concept of prebriefing, conventional guidelines for determining sample size (Cohen, 1988) were applied to an a priori power analysis using G*Power (Faul, Buchner, Erdfelder, & Lang, 2009). A two-tailed t-test set at $p = .05$ with a power of 80% and a medium effect size of $d = .5$ suggested that 64 participants were needed in each of the experimental and control groups, for a total sample size of 128. Based on this, 128 participants were estimated as necessary to achieve adequate power. Similar quantitative studies on debriefing activities, which is a comparable simulation activity, have used comparable a priori guidelines for significance, power and effect (Dreifuerst, 2012; Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2013).

In the fall term, from a total of 157 students enrolled in two sections of the medical-surgical course, 38 consented to participate, and 31 completed the study. This low completion rate was related to the initiation of a data collection period of approximately two weeks occurring late at the end of the term, and time constraints in the participants’ fall schedules.
Recruitment in the winter term was conducted, in order to increase the sample size, and targeted a pool of 222 students enrolled in two sections of the medical-surgical course. Of these students, 65 consented to participate, and 45 actually completed the study. Although the recruitment event occurred at the beginning of this term, term schedules, demands on the students’ time, and a university-wide labour disruption lasting several weeks, affected retention. Scheduling and rescheduling of participants therefore ran over approximately 12 weeks.

When combined, a total of \( N = 76 \) participants completed the study. This sample size did not meet the \textit{a priori} criteria for the desired number of participants. However, given that the participant pool was exhausted, analyses of the results from a total of 76 participants were conducted. Post hoc power was determined for each analysis to determine the impact on the results.

\textbf{Instruments}

Two instruments were used to collect data. The participants’ simulation activities were assessed using the \textit{Creighton Competency Evaluation Instrument} (CCEI), this instrument’s \textit{Clinical Judgment} subscale (CCEI-CJ), and the \textit{Prebriefing Experience Scale} (PES). The participant scores from the experimental group on these measurements were compared to those scores from the control group.

\textbf{Creighton Competency Evaluation Instrument.} The CCEI (Hayden et al., 2014) was adapted from the \textit{Creighton Simulation Evaluation Instrument} (CSEI) (Todd, Manz, Hawkins, Parsons, & Hercinger, 2008) as a quantitative instrument to evaluate students’ performance during either a simulated or a live clinical experience. The CSEI that was first developed, is used to measure competency across a range of items, and includes subscales of \textit{Assessment, Communication, Critical Thinking} and \textit{Technical Skills} (Todd et al., 2008). Studies have cited
reliability and internal consistency with the CSEI; faculty inter-rater reliability was 0.952 and intra-rater reliability was 0.883 (Adamson & Kardong-Edgren, 2012; Adamson et al., 2011). Internal consistency of the CSEI was measured using Cronbach’s alpha 0.979 (Adamson et al., 2011). The CCEI, used in this study, is a 23-item dichotomous scale divided into four competency subscales of Assessment, Communication, Clinical Judgment (CCEI-CJ) and Patient Safety (Appendix D). Each item was scored categorically as either 0 or 1, where 1 indicated achievement of competency, for a maximum total score of 23 points; total scores were converted to percentages (Hayden et al, 2014). The CCEI-CJ has a maximum score of 9 points.

The CCEI was developed to evaluate senior level nursing students in both associate and baccalaureate degree programs; it was intended for use in groups but has also been used to evaluate individual students (Adamson & Kardong-Edgren, 2012; Hayden et al., 2014). Hayden et al. (2014) confirmed Cronbach’s alpha for inter-rater reliability as >.90, and reported acceptable content reliability, validity and usability results. These results were comparable to the original CSEI tool. An internal consistency reliability statistic has not been reported in the literature specifically for the CCEI. The evidence from Hayden et al. (2014) supported the use of the CCEI in both the simulation and the clinical environments. This instrument's limitations included the absence of a documented theoretical framework and its use of a categorical scale. The use of a categorical scale does not allow for any item gradation (Cates, 2014).

Training videos for the CSEI which were applicable to the CCEI, and clarified the nature of the competency items in advance of data collection, were reviewed by the researcher prior to using the CCEI. Expert faculty consultation was also sought prior to data collection to verify the relevance of the competencies to the study participants’ current medical-surgical coursework and program-level expectations. The researcher was the sole rater of all participants, and referred to
the item-rating criteria during all scoring. Scoring followed the convention for the CCEI; a percentage was calculated based on the number of items rated as competent and divided by the number of items assessed (Hayden et al., 2014). A percentage was also calculated for the 9-item CCEI-CJ, which was used to measure clinical judgment.

**Reliability of CCEI.** Reported reliability of the CCEI has emphasized inter-rater reliability, agreement percentages, and test-retest designs (Hayden et al., 2014). An internal consistency reliability statistic has not been reported in the literature specifically for the CCEI. Inter-rater reliability statistics on individual items could not be calculated on the CCEI in this study, as there was only one rater of different participants’ unique performances. No repeated measures or opportunities to compare ratings in a similar simulation situation were included in the design of the study.

Therefore, in this study, after permission for use was obtained (Appendix I), internal consistency reliability was examined, on a single scoring by the single researcher. The Cronbach’s alpha value on the categorical, 23-item instrument overall was .71, which is acceptable for the nature of the variable (Cohen, 1988). The subscale results were less acceptable, although based on fewer items, and a greater number of items are associated with higher internal consistency (Cortina, 1993; Field, 2013). The CCEI-CJ Cronbach’s alpha value of the 9 item subscale measuring clinical judgment was .60, which is less than acceptable according to Cohen (1988). Because internal consistency of this tool has not been previously reported, there is no opportunity to compare these findings to the published literature.

**Prebriefing Experience Scale.** The *Debriefing Experience Scale* (DES), first documented in 2012 by Reed, was developed to evaluate the nursing student debriefing experience during simulation. Reed (2012) refined items for the DES through a factor analysis
and demonstrated internal consistency reliability with Cronbach’s alpha of the overall scale as .93. Content validity was obtained through feedback from students and simulation experts in the initial DES study.

Given the paucity of research and tools available on prebriefing (Husebø, Friberg, Søreide, & Rystedt, 2012; Page-Cutrara, 2014), an adaptation of the DES to the Prebriefing Experience Scale (PES) supported measurement of the participants’ perceived experience during the prebriefing phase. The DES was adapted by replacing the word debriefing with prebriefing, and included minor grammatical revisions. Therefore, the PES (Appendix B), with four categories of Analyzing Thoughts and Feelings (PES-ATF), Learning and Making Connections (PES-LC), Facilitator Skill in Conducting the Prebriefing (PES-FS), and Appropriate Facilitator Guidance (PES-FG), has 20 items for response on a 5-point Likert-type scale that range from strongly agree to strongly disagree. The overall PES scores and subscale totals were used as measurements in the study. Although it is recognized that the student experience has been over-studied in simulation research (Kardong-Edgren, Adamson, & Fitzgerald, 2010), students’ experiences with prebriefing have not been documented. The PES, like the DES, includes an area for participants to provide short written comments about the prebriefing experience.

Reliability of PES. Because the PES tool was adapted from the DES, a pilot study was conducted prior to this study which demonstrated internal consistency reliability with Cronbach’s alpha of the overall scale as .94 (Table 4). To extend the results of the pilot study, reliability and validity of the PES were also assessed in this study. Cronbach’s alpha value was .92, which was comparable to previous results. The subscale reliability scores are reported in Table 4, and were also comparable. The item ‘prebriefing environment was physically comfortable’, in the subscale Analyzing Thoughts and Feelings was the only item which had a
less-than-acceptable corrected item-total correlation of < .3 (Hertzog, 2008; Nunnally, 1978). Deletion of this item did not result in a change in the overall scale reliability, and only a marginal improvement in the related subscale reliability at .68 Cronbach’s alpha. Therefore, the item was retained.

Table 4: Reliability Scores for Prebriefing Experience Scale and Subscales (M)

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Cronbach’s Alpha: Pilot Study</th>
<th>Cronbach’s Alpha: Main Study</th>
<th>Items in Scale/Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (PES)</td>
<td>.94</td>
<td>.92</td>
<td>20</td>
</tr>
<tr>
<td>Analyzing Thoughts and Feelings (PES-ATF)</td>
<td>.81</td>
<td>.61</td>
<td>4</td>
</tr>
<tr>
<td>Learning and Making Connections (PES-LC)</td>
<td>.88</td>
<td>.85</td>
<td>8</td>
</tr>
<tr>
<td>Facilitator Skill in Conducting the Prebriefing (PES-FS)</td>
<td>.80</td>
<td>.70</td>
<td>5</td>
</tr>
<tr>
<td>Appropriate Facilitator Guidance (PES-FG)</td>
<td>.77</td>
<td>.82</td>
<td>3</td>
</tr>
</tbody>
</table>

Research Process

Informed consent was obtained from students volunteering for the study, using a process that was approved by the Institutional Review Boards of both the university where the study occurred and the university overseeing the study design and implementation (Appendix C). This study was inclusive of women and minorities and did not discriminate against the participation of a specific gender, race or ethnicity. Therefore, inclusion criteria were enrollment in a fourth year medical-surgical course (a classroom component, and a practicum and laboratory component of 144 hours), and agreement to participate. There were no exclusion criteria. The researcher did not have any current academic or extra-curricular connections to the student group, and was not involved in grading or advising any students during the time that the study took place.
Once informed consent was obtained, participants were assigned an identifier number and signed up in groups of two, for a simulation time convenient to their course section’s schedule. Participants were assigned to either the experimental or control group according to their course section during each term, using the previously described group-randomization procedure. The control group received the traditional prebriefing activity which included an orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation as outlined by the INACSL document (Meakim et al., 2013) (Appendix F). Participants were also asked if they had questions or required clarification about what they reviewed prior to beginning the simulation scenario. This is the standard convention used in simulations at the university site where the study occurred. A structured prebriefing on the other hand, included these traditional prebriefing activities, and incorporated the theoretical principles of concept mapping and reflection-before-action in the following manner.

The experimental group received the structured intervention (Appendix G), which included all the traditional prebriefing activities that the control group used (Appendix F), plus a researcher-developed concept mapping worksheet (Appendix A) and guided reflection. Participants randomly assigned to the intervention of structured prebriefing reviewed the equipment, environment, mannequin, roles, time allotment, main objectives, and the simulated patient chart. The researcher, as facilitator, provided participants with the structured prebriefing worksheet (Appendix A) to engage participants in actively thinking, assist with anticipatory reflection on the scenario, and visually guide cognitive and reflective processes. Aspects of the Structured Prebriefing Model (Figure 4) such as prior knowledge and learning are evident in the worksheet structure and content, and are based on constructivism and reflection, the principles of concept mapping (Novak & Gowin, 1984), and reflection-before-action (Greenwood, 1993). The
worksheet used language consistent with clinical judgment (*noticing, interpreting, responding* and *reflecting*, as cited in Tanner, 2006), competency performance and the nursing process, and the attributes of prebriefing (*considering the scenario, perceiving meaning, and anticipating a plan*, as cited in Page-Cutrara, 2015).

Participants were oriented to the structured prebriefing worksheet, which was comprised of three sections. The first section of the worksheet allowed participants to summarize, in writing, what they knew about the patient’s situation, in the context of the learning objectives. The researcher, as facilitator, asked questions such as, “After reviewing this patient’s situation, what do you see as some of the challenges he is facing?” In this way, participants were supported in *considering the situation* presented in the simulation and in developing awareness, or noticing skills, which have been connected to performance and clinical judgment (Benner, Tanner, & Chesla, 2009).

In the second section of the worksheet, *perceiving the meaning* of the patient situation was highlighted. Participants were supported to identify possible interpretations of the patient situation, through facilitative prompts for drawing on prior knowledge and experiences, such as, “Based on what you know so far, what possible interpretations could be made as to why this is happening?” Cueing by the researcher for misinterpretations occurred through exploring participants’ rationale or by asking about missing information.

In the last section of the worksheet, participants were asked to *anticipate a plan* for care and to anticipate nursing responses for each of the possible interpretations of the patient situation identified in the second section. To support this, and to reflect the reality of competency performance in practice, participants were asked to anticipate what may be needed from other
health care professionals. The researcher also asked questions such as, “If you anticipate that plan of care, what do you see happening as a result?”

Both types of prebriefing activities were timed at no more than 30 minutes. For both groups, data was derived from the PES which was immediately completed by all participants individually after the prebriefing activity. The PES included an area for participants to write comments about their experience; this was an optional activity, and no question prompts were provided.

With the exception of the intervention of the structured prebriefing for the experimental group, the simulation process was the same for both the experimental and control groups. All participants used the same simulation equipment and engaged in the same clinical simulation scenario. A standardized CAE Healthcare scenario, “Chest Pain Management of the Postoperative Patient”, was employed (Appendix H). This scenario was comprised of an initial assessment, the onset of angina, and the resolution of chest pain; the number of required performance competencies was adjusted for this study’s time frames. The two participants’ roles during the simulation scenario, as nursing students caring for a patient, were comparable, and they were instructed to ‘talk aloud’. Participants were expected to plan, prioritize, and evaluate the patient’s care.

During the clinical simulation, competency performance was evaluated separately for all participants, by the researcher, using the CCEI tool (Hayden et al., 2014). Separate scoring was accomplished by the researcher’s thorough knowledge of both the scenario and the criteria for evaluating each CCEI item, direct observation of participants’ activities and interactions, and attention to the verbal articulations of each participant’s thought processes (i.e., which participant initiated a particular intervention, or change to the care of the patient).
Once the scenario was finished, the participants and the researcher debriefed the simulation for approximately 15 minutes, using the same format for both groups (Appendix H). The researcher verified that the PES and CCEI were completed, provided a coffee card, then thanked and dismissed the participants. This concluded the intervention, data collection and participant activity.

Data Analyses to Address Research Questions

IBM SPSS Version 22.0 Premium software was used for all quantitative analyses. Preliminary analyses were conducted to assess missing data, outliers, normality and homogeneity, to determine assumptions and the selection of inferential statistical tests, prior to addressing the research questions.

Preliminary analyses. All data for each variable was visually inspected for missingness, and none were observed. Missing data was not noted in any statistical tests, in either the control or experimental groups. Outliers in the experimental and control groups’ scores were investigated. Examination of the descriptive data, and construction of box plots for CCEI scores and CCEI-CJ scores, based on these groups, did not show outliers. However, box plots constructed for PES scores for the experimental group only, showed three mild univariate outliers as the minimum values in this group.

Identification of outliers on the variables was conducted through analysis of the descriptive data, frequencies, box plots and standard residuals. No outliers were present in the aggregate CCEI or CCEI-CJ scores, but two mild outliers were identified in the aggregate PES scores. All outliers were noted during the subsequent determinations of normality.

Analyses to determine normality of groups. The normality of collected data from the CCEI, CCEI-CJ and the PES was explored. It was expected that the aggregate CCEI, CCEI-CJ,
and PES scores would follow a normal distribution. It was also expected that the CCEI, CCEI-CJ, and PES scores, for each of the experimental and control groups, would follow a normal distribution. The presence of normal or non-normal distributions would determine which statistical tests or possible transformations would be necessary.

A 1-sample Kolmogorov-Smirnov test was used to evaluate normality of the CCEI data across the whole sample ($N = 76$). For these CCEI scores ($M = 71.2, SD = 14.3, SEM = 1.6$), the results $D(76) = .1, p = .06$ indicated that the scores did not deviate significantly from normal. No outliers were observed in a box plot of the CCEI data. The same test was conducted on the experimental ($M = 79.9, SD = 8.8, SEM = 1.4$) and control ($M = 60.5, SD = 12.4, SEM = 2.1$) groups separately, with similar results for significance and no outliers.

The CCEI-CJ scores ($M = 77.2, SD = 18.6, SEM = 2.1$) across the whole sample were not normally distributed, using the 1-sample Kolmogorov-Smirnov test, at $D(76) = .17, p < .001$; a Shapiro-Wilk test gave the same result $W(76) = .91, p < .001$. The scores were negatively skewed ($S = -.51, SE = .28; K = -.76, SE = .55$), with no outliers. Similarly, both the experimental ($M = 89.1, Mdn = 88.9, SD = 10.6, SEM = 1.6$) and control ($M = 62.5, Mdn = 64.6, SD = 15.7, SEM = 2.7$) groups showed results of non-normality. No outliers were apparent in these groups.

The PES scores ($M = 92.2, Mdn = 95.0, SD = 7.7, SEM = .88$), across the whole sample were significant for the 1-sample Kolmogorov- Smirnov test, at $D(76) = .19, p < .001$; a Shapiro-Wilk test gave the same result $W(76) = .85, p < .001$. A box plot of PES data identified two mild outliers. Additionally, a markedly negative skew ($S = -1.16, SE = .28$) and kurtosis ($K = .43, SE = .55$) confirmed non-normality of these scores. The experimental ($M = 95.7, Mdn = 97.0, SD = 4.5, SEM = .69$) and control groups ($M = 87.8, Mdn = 90.5, SD = 8.6, SEM = 1.5$)
were also tested separately; the experimental group significantly varied from normal and showed three mild outliers, while the control group did not deviate statistically significantly from normal, according to the more sensitive $W(34) = .94, p = .06$. Removal of the identified outliers from the PES data did not result in corrections to normality. Bootstrapping$^2$ techniques to 2000 bootstrap samples did not correct the data.

To attempt to address this non-normality and negative skewness of the PES scores, a transformation of the scores (reflect and LG10) was conducted. This resulted in a1-sample Kolmogorov-Smirnov test at $D(76) = .085, p = .20$. However, a Shapiro-Wilk test, which is more powerful for detecting normality in smaller samples (Field, 2013), differed at $W(76) = .96, p = .024$, suggesting a non-normal distribution. For the PES scores, normality results were inconsistent; the whole sample PES and the experimental group scores were significantly non-normal, but the control group scores demonstrated normality on one test.

**Analyses to determine bivariate normality.** Regression standardized residual plots between the PES (independent) and CCEI (dependent) scores were assessed. Normality was violated; two outliers $\geq 2.58$ were removed without noted changes to normality. Similarly, residual plots were considered between the PES (independent) and CCEI-CJ (dependent) scores. Outliers were identified and removed, without changes to normality.

In addition, Q-Q plots for the PES, CCEI, and CCEI-CJ were examined. Normality was demonstrated by the CCEI scores; the CCEI-CJ and PES scores showed similar skewed distributions to each other. Failure to meet bivariate normality typically only has a small effect

---

$^2$ Bootstrapping is a technique from which the sampling distribution is estimated by taking repeated samples with replacement from the data set; the statistic of interest is calculated for each sample from which the sampling distribution of the statistic is estimated. The standard error of the statistic is estimated as the standard deviation of the sampling distribution created from the bootstrapped samples. Then, CI and significance can be computed (Field, 2013). This technique is designed to increase robustness.
on the validity of the statistical tests, particularly when the sample size is larger than 15 (Polit, 2010).

**Analyses to determine homogeneity of groups.** A significant Levene’s test ($p < .05$) was used to indicate possible heterogeneity. To test for homogeneity of experimental and control groups, a Levene’s test for equality of variances as part of an independent samples $t$-test, was performed for the CCEI scores, the CCEI-CJ scores, and the PES scores. For the CCEI scores, Levene’s test was significant, at $p = .04$, indicating equal variances could not be assumed; for CCEI-CJ scores, $p = .02$, indicating equal variances could not be assumed; and for total PES scores, $p < .001$, again, indicating equal variances could not be assumed. Bootstrapping techniques did not affect the significance of any of these results. However, homogeneity is usually met when group sizes are relatively equal. In this study, the experimental to control group ratio, where $n_{\text{exp}} = 42$, and $n_{\text{cont}} = 34$, was 1.3; at $<1.5$, this was therefore acceptable (Polit, 2010).

Therefore, based on the identified inconsistencies in the variables’ normality and homogeneity results, and in consideration of the instruments, various analyses were conducted to address the research questions (see Table 5). The appropriate statistical tests for comparison and relationship were considered in terms of robustness to violation of assumptions, the nature of the variables, and the fit to the research question. Bootstrapping was used in some instances to increase robustness of statistical testing, where assumptions were not met.
<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Instrument</th>
<th>Variable</th>
<th>Statistical Test(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is there a difference in competency performance during a clinical simulation</td>
<td>CCEI</td>
<td>Overall competency performance scores; experimental, control groups</td>
<td>$t$-test; ANCOVA</td>
</tr>
<tr>
<td>scenario between nursing students in a traditional baccalaureate program who</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participate in a structured prebriefing intervention and those who participate in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>traditional prebriefing activities?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Is there a difference in clinical judgment during a clinical simulation</td>
<td>CCEI-CJ</td>
<td>Clinical judgment subscale scores; experimental, control groups</td>
<td>Mann-Whitney $U$; bootstrapped</td>
</tr>
<tr>
<td>scenario between nursing students in a traditional baccalaureate program who</td>
<td></td>
<td></td>
<td>$t$-test; bootstrapped ANCOVA</td>
</tr>
<tr>
<td>participate in a structured prebriefing intervention and those who participate in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>traditional prebriefing activities?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Do students receiving a structured prebriefing intervention perceive the</td>
<td>PES</td>
<td>Perceived prebriefing experience scores; experimental, control groups</td>
<td>Mann-Whitney $U$; bootstrapped $t$-test</td>
</tr>
<tr>
<td>prebriefing experience differently than students receiving traditional prebriefing?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) What is the relationship between competency performance and the perceived</td>
<td>CCEI; PES</td>
<td>Overall competency performance; perceived prebriefing experience scores;</td>
<td>Bootstrapped Spearman’s correlation</td>
</tr>
<tr>
<td>prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?</td>
<td></td>
<td>perceived prebriefing experience scores; experimental and control groups</td>
<td></td>
</tr>
<tr>
<td>5) What is the relationship between clinical judgment and the perceived prebriefing</td>
<td>CCEI-CJ; PES</td>
<td>Clinical judgment subscale scores; perceived prebriefing experience;</td>
<td>Bootstrapped Spearman’s correlation</td>
</tr>
<tr>
<td>experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?</td>
<td></td>
<td>experimental and control groups</td>
<td></td>
</tr>
</tbody>
</table>
Results

Preliminary Results

Prior to addressing the research questions, homogeneity of variance was tested to support the design of combining the fall and winter terms each into the experimental and control groups. Total scores were examined for possible differences between terms \((n_{\text{fall}} = 31, n_{\text{winter}} = 45)\) on the variables of age, previous simulation experience, and the scores for the Creighton Competency Evaluation Instrument (CCEI), the CCEI Clinical Judgment subscale (CCEI-CJ), and the Prebriefing Experience Scale (PES).

The variable age for the overall sample \((M = 26.0, SD = 6.8)\) was examined for significant differences between terms (Table 6). An independent samples \(t\)-test (two-tailed) with Levene’s test for equality of variances was used to look for significant differences in age between terms. The results, \(F = .44, p = .51\), and \(t(74) = 1.1, p = .28\), were not significant, so there was no significant difference in age between terms.

Simulation experience in the overall sample, where the unit of measurement was the number of discrete high-fidelity simulation exposures in the program using a computerized mannequin \((M = 2.9, SD = 1.8)\) (Table 6), was also tested to look for differences in previous simulation experiences between the fall and winter term groups. The results, \(F = .55, p = .46\), and \(t(74) = -.09, p = .92\), were not significant, indicating no difference in this variable between terms.

The CCEI scores \((M = 71.2, SD = 14.3)\), between terms, were not significantly different, \(F = .06, p = .81\) for the Levene’s test, and \(t(74) = 1.5, p = .14\), 95% confidence interval (CI) [-1.6, 11.5]. The CCEI-CJ scores \((M = 77.2, SD = 18.6)\) of this instrument also showed no variance between terms, where Levene’s test \(F = .68, p = .41\), and \(t(74) = .98, p = .33\), 95% CI [-4.4, 12.9]. For the PES scores \((M = 92.2, SD = 7.7)\), there was also no difference in mean scores.
between terms (see Table 6); \( F = 1.15, p = .29 \) for the Levene’s test, and \( t(74) = .26, p = .79, 95\% CI [-3.11, 4.06] \). In summary, these initial results show that there is no difference in overall variance of age, previous simulation experience, or in CCEI, CCEI-CJ and PES scores, based on term, and confirmed the research design for combining homogeneous fall and winter term groups into both the experimental and control groups.

Table 6: Summary of Sample Means based on Term

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Age (years)</th>
<th>Simulation Experience (number of high fidelity exposures)</th>
<th>CCEI Scores (%)</th>
<th>CCEI-CJ Scores (%)</th>
<th>PES Scores (out of 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall sample (N = 76)</td>
<td>( M = 26.0 )</td>
<td>( M = 2.9 )</td>
<td>( M = 71.2 )</td>
<td>( M = 77.2 )</td>
<td>( M = 92.2 )</td>
</tr>
<tr>
<td>SD = 6.8</td>
<td>SD = 1.8</td>
<td>SD = 14.3</td>
<td>SD = 18.6</td>
<td>SD = 7.7</td>
<td></td>
</tr>
<tr>
<td>Fall (seventh) term (n = 31)</td>
<td>( M = 27.0 )</td>
<td>( M = 2.9 )</td>
<td>( M = 74.1 )</td>
<td>( M = 79.7 )</td>
<td>( M = 92.5 )</td>
</tr>
<tr>
<td>SD = 7.0</td>
<td>SD = 1.8</td>
<td>SD = 13.6</td>
<td>SD = 19.9</td>
<td>SD = 8.4</td>
<td></td>
</tr>
<tr>
<td>Winter (sixth) term (n = 45)</td>
<td>( M = 25.3 )</td>
<td>( M = 2.9 )</td>
<td>( M = 69.2 )</td>
<td>( M = 75.4 )</td>
<td>( M = 92.0 )</td>
</tr>
<tr>
<td>SD = 6.7</td>
<td>SD = 1.8</td>
<td>SD = 14.5</td>
<td>SD = 17.7</td>
<td>SD = 7.2</td>
<td></td>
</tr>
</tbody>
</table>

**Descriptive Results**

Sample description based on experimental group. The collection of demographic data included: gender, age, and number of previous simulation experiences. The overall participant sample was representative of the student population enrolled in this nursing program. The majority of participants were female (92%; \( n = 70 \)). The proportion of male participants was comparable to the proportion of males enrolled in the course sections (10%), and at the school. Participants ranged in age from 20 to 49 years, with an average age of 26.0 years (SD = 6.8).

The experimental group (\( n = 42 \)), who were exposed to structured prebriefing, were comprised of 91% female (\( n = 38 \)), and 9% male (\( n = 4 \)) participants. The ages for the
The ages for the control group ranged from 20-49 years, and averaged 25.9 years ($SD = 7.5$). Most control group participants reported having between 2-4 previous simulation experiences (55.9%). Therefore, the demographics were represented similarly in the experimental and control groups.

**Summary of descriptive data for instruments.** The instrument scores used to measure competency performance, clinical judgment and perceived prebriefing experience in undergraduate nursing students who received either a structured prebriefing intervention or the traditional prebriefing, were examined. A summary of the descriptive data for the CCEI and the PES are available in Tables 7 and 8. The CCEI was used to measure both competency performance and clinical judgment in all study participants. Comprised of four subscales ($Assessment$, $Communication$, $Patient Safety$ and $Clinical Judgment$), the CCEI as a whole was used to assess competency performance and its $Clinical Judgment$ subscale (CCEI-CJ) was used to assess clinical judgment. The PES was used to measure the perceived prebriefing experience of all study participants. The results of each of the five research questions are presented next.
### Table 7: Descriptive Results by Group for CCEI and Subscales

<table>
<thead>
<tr>
<th>Instrument/Subscales</th>
<th>Whole Sample (N = 76)</th>
<th>Experimental (n = 42)</th>
<th>Control (n = 34)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>CCEI (23 items)</td>
<td>71.2</td>
<td>38.1</td>
<td>95.7</td>
</tr>
<tr>
<td></td>
<td>(68.0, 74.5)</td>
<td>(77.2, 82.6)</td>
<td>(56.2, 64.8)</td>
</tr>
<tr>
<td>CCEI Assessment (3 items)</td>
<td>71.0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(64.4, 77.7)</td>
<td>(75.6, 91.0)</td>
<td>(46.5, 65.3)</td>
</tr>
<tr>
<td>CCEI Communication (5 items)</td>
<td>68.9</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(65.2, 72.7)</td>
<td>(69.3, 76.5)</td>
<td>(57.1, 71.2)</td>
</tr>
<tr>
<td>CCEI Clinical Judgment (9 items)</td>
<td>77.2</td>
<td>37.5</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(72.9, 81.4)</td>
<td>(85.8, 92.4)</td>
<td>(57.0, 68.0)</td>
</tr>
<tr>
<td>CCEI Patient Safety (6 items)</td>
<td>63.4</td>
<td>16.7</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(58.5, 68.3)</td>
<td>(63.4, 76.4)</td>
<td>(48.6, 62.2)</td>
</tr>
</tbody>
</table>
### Table 8: Descriptive Results by Group for PES and Subscales

<table>
<thead>
<tr>
<th>Instrument/Subscales</th>
<th>Whole Sample (N = 76)</th>
<th>Experimental (n = 42)</th>
<th>Control (n = 34)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>PES (out of 100)</td>
<td>92.2</td>
<td>70.0</td>
<td>100</td>
</tr>
<tr>
<td>PES-ATF (out of 20)</td>
<td>18.1</td>
<td>11.0</td>
<td>20.0</td>
</tr>
<tr>
<td>PES-LC (out of 40)</td>
<td>36.4</td>
<td>25.0</td>
<td>40.0</td>
</tr>
<tr>
<td>PES-FS (out of 25)</td>
<td>23.6</td>
<td>18.0</td>
<td>25.0</td>
</tr>
<tr>
<td>PES-FG (out of 15)</td>
<td>14.1</td>
<td>9.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

PES-ATF: Analyzing Thoughts and Feelings subscale  
PES-LC: Learning and Making Connections subscale  
PES-FS: Facilitator Skill in Conducting the Prebriefing subscale  
PES-FG: Appropriate Facilitator Guidance subscale
Research Question 1: Competency Performance

The first question, “Is there a difference in competency performance during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” was explored using an independent samples t-test to compare the mean total Creighton Competency Evaluation Instrument (CCEI) scores between the experimental group exposed to structured prebriefing, and the control group which received the traditional prebriefing. The data revealed that, on average, CCEI scores for the experimental group who were exposed to structured prebriefing ($M = 79.9$, $SD = 8.8$), and for the control group ($M = 60.5$, $SD = 12.4$), were different by -19.4, 96% CI [-24.4, -14.3]. This difference was significant $t(57.5) = -7.70$, $p < .001$, and represented a large effect, $d = 1.8$ (Cohen, 1988) (using http://www.uccs.edu/~lbecker/). Post hoc power was estimated at 1.0, using G*Power analysis (Faul et al., 2009).

Because data was collected from participants over two terms (sixth vs. seventh term), and because length of enrollment in a program as a pre-existing condition may be a potential influence on differences in competency performance, an additional adjusted analysis was conducted. An ANCOVA was used to examine the CCEI scores between the experimental and control groups, while controlling for the covariate of term. No interaction was evident between term and group membership (experimental, control), as a predictor of CCEI scores, $F(1,75) = .46$, $p = .50$, partial $\eta^2 = .01$. An ANCOVA, then, revealed that the covariate of term was not significantly related to CCEI scores, $F(1,73) = .62$, $p = .43$, $\eta^2 = .01$. There was a significant effect of group membership on the CCEI scores, $F(1,73) = 59.9$, $p < .001$, partial $\eta^2 = .45$, when controlling for the effect of term. The large effect size was noted (partial $\eta^2 = .45$). Observed
power was 1.0 ($\alpha = .05$). Levene’s test for homogeneity of variance in this ANCOVA was $F(1,74) = 5.43, p = .023$, indicating significant differences in group variances. However, the variance ratio was 1.98, which is less than 2, and so variance was not considered problematic (Polit, 2010). Therefore, a statistical difference was evident in competency performance between the experimental group that received the structured prebriefing, and the control group that received a traditional prebriefing, with a large effect. In this instance, structured prebriefing strongly affected competency performance of participants during a simulation.

**Research Question 2: Clinical Judgment**

The second question, “Is there a difference in clinical judgment during a clinical simulation scenario between nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” was explored using a Mann-Whitney $U$ test to compare the distribution of scores on the *Clinical Judgment* subscale (CCEI-CJ) of the CCEI, between the experimental group exposed to structured prebriefing, and the control group which received the traditional prebriefing. A Mann-Whitney $U$ test indicated that clinical judgment, as measured by the CCEI-CJ scores, was significantly greater for the experimental group who received structured prebriefing ($Mdn = 88.9$) than for the control group ($Mdn = 64.6$), $U = 128.5, Z = -6.2, p < .001, r = -0.71$.

To further explore this difference, given the non-normality of the CCEI-CJ scores, a robust bootstrapped two-tailed $t$-test was conducted, to 2000 samples; equal variances were not assumed $F(74) = 5.4, p = .023$, and $t(55.9) = -8.4, p < .001$ produced similar results for significance. The actual BCa 95% CI for the experimental group means [85.7, 92.2] and the
control group means [57.3, 67.8], indicated difference and no overlap. This indicated that structured prebriefing may affect clinical judgment.

An adjusted analysis, using ANCOVA, examined the CCEI-CJ scores between the experimental and control groups, controlling for the covariate of term. Levene’s test for homogeneity of variance in this ANCOVA was $F(1,74) = 5.5, p = .022$, indicating significant differences in group variances. The variance ratio was 2.2, which is greater than 2; this violation could be problematic (Polit, 2010), so bootstrapping was used to adjust for this variance. Therefore, a robust, bootstrapped ANCOVA to 2000 samples showed that the that the covariate of term was not significantly related to differences in CCEI-CJ scores, $F(1,73) = .002, p = .97$, but that this relationship was weak, partial $\eta^2 < .001$. There was a significant effect of group membership on the CCEI-CJ scores, $F(1,73) = 74.0, p < .001$, partial $\eta^2 = .50$, when controlling for the effect of term. The large effect size was noted (partial $\eta^2 = .50$). Observed power was 1.0 ($\alpha = .05$).

In this adjusted analysis, however, homogeneity of regression was violated, since a significant interaction between term as a possible covariate, and group membership (experimental, control) as a predictor of CCEI-CJ scores, existed $F(1,75) = 4.62, p = .04$, partial $\eta^2 = .06$, with a medium effect across the groups. Therefore, where the preliminary results demonstrated statistically insignificant differences between terms on mean clinical judgment scores, and while a large statistical difference was evident in clinical judgment between the experimental and the control groups, term may have had a medium effect on the participants’ clinical judgment, in this study. In this instance, differences between groups’ clinical judgment may have been influenced by structured prebriefing or by the term variable.
Research Question 3: Perceptions of Prebriefing Experience

The third question, “Do students receiving a structured prebriefing intervention perceive the prebriefing experience differently than students receiving traditional prebriefing?” was examined using a Mann-Whitney U test to compare the distribution of Prebriefing Experience Scale (PES) scores between the experimental group exposed to structured prebriefing, and the control group which received the traditional prebriefing. The Mann-Whitney U test indicated that perception of prebriefing experience, as measured by the PES scores, was greater for the experimental group who received structured prebriefing ($M = 95.7$, $SD = 4.5$, $Mdn = 97.0$) than for the control group ($M = 87.6$, $SD = 8.6$, $Mdn = 90.0$), $U = 281.0$, $Z = -4.54$, $p < .001$, $r = -.52$.

To confirm this difference, and given that both the experimental and control groups were both similarly negatively skewed, a robust bootstrapped two-tailed $t$-test was also conducted, to 2000 samples. Equal variances were not assumed, $F(74) = 24.5$, $p < .001$; $t(47.4) = -4.9$, $p = <$ .001. The actual BCa 95% CI values were for the experimental group means [94.2, 97.0] and for the control group means [85.0, 90.6] indicated difference, and no overlap, implying structured prebriefing may have affected participants’ prebriefing experiences.

Therefore, a large statistically significant difference was evident in the higher scoring of the perceived prebriefing experience by the experimental group that received the structured prebriefing, compared to the control group that received a traditional prebriefing. While normality and homogeneity were concerns, the means and medians for PES scores were observed to be higher for the structured prebriefing group. Structured prebriefing resulted in higher scoring by the experimental group for how prebriefing was perceived.
Research Question 4: Competency Performance and Perceived Prebriefing Experience

The fourth question, “What is the relationship between competency performance and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” was examined using correlation analysis. Spearman’s rho correlation coefficient was employed to examine the relationship between the experimental and control groups’ CCEI scores, and the PES, and four PES subscale scores. Given the concerns regarding normality and linearity of the PES variable, a bootstrapping technique was again used to produce robust confidence intervals, as these would be unaffected by the distribution of the scores, while significance values might be (Field, 2013).

Table 9 shows non-significant positive bootstrapped within-group correlations of the experimental group CCEI scores with the PES scores, and its subscales, and non-significant negative correlations of the control group CCEI scores with the PES scores, and its subscales, with the exception of a positive CCEI/PES-FS correlation. The BCa 95% CIs for these non-significant correlations each crossed zero, and confirmed that the population value could be negative, positive, or may not exist. The experimental and control group’s low $r_s$ values, and related $R^2$ indicate that the proportion of variance in the ranks that CCEI-CJ and the PES and subscale scores share are very minimal and have a small effect. The a priori power analysis recommended a total sample size of 82 for a two-tailed bivariate correlation (Faul et al., 2009). Using G*Power (Faul et al., 2009), post hoc analyses revealed that the results with a small effect were underpowered. Therefore, in this instance, it was not evident that competency performance was related to students’ perceived prebriefing experiences.
<table>
<thead>
<tr>
<th>Variable Relationship</th>
<th>Experimental (Structured)</th>
<th>Control (Traditional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( r_s )</td>
<td>Sig.</td>
</tr>
<tr>
<td>CCEI/PES</td>
<td>.09</td>
<td>.56</td>
</tr>
<tr>
<td>CCEI/PES-ATF</td>
<td>.03</td>
<td>.84</td>
</tr>
<tr>
<td>CCEI/PES-LC</td>
<td>.09</td>
<td>.56</td>
</tr>
<tr>
<td>CCEI/PES-FS</td>
<td>.04</td>
<td>.79</td>
</tr>
<tr>
<td>CCEI/PES-FG</td>
<td>.18</td>
<td>.27</td>
</tr>
</tbody>
</table>

Bootstrap results are based on 2000 bootstrap samples.
CCEI: Creighton Competency Evaluation Instrument
PES: Prebriefing Experience Scale
PES-ATF: Analyzing Thoughts and Feelings subscale
PES-LC: Learning and Making Connections subscale
PES-FS: Facilitator Skill in Conducting the Prebriefing subscale
PES-FG: Appropriate Facilitator Guidance subscale

**Research Question 5: Clinical Judgment and Perceived Prebriefing Experience**

The fifth and last question, “What is the relationship between clinical judgment and the perceived prebriefing experience during a clinical simulation scenario for nursing students in a traditional baccalaureate program who participate in a structured prebriefing intervention and those who participate in traditional prebriefing activities?” was examined using correlation analysis, in a similar manner to the fourth question. Spearman’s rho correlation coefficient was again employed to examine the relationship between the experimental and control groups’ CCEI-CJ scores, and the PES, and PES subscale scores. As in the previous research question, bootstrapping techniques were used to generate robust confidence intervals, given the results of the preliminary analyses.
Table 10 shows non-significant, primarily positive bootstrapped correlations of the experimental group scores, with the exception of the negative CCEI-CJ/PES-FG correlation, with the PES scores and its subscales. Non-significant, negative correlations of the control group CCEI scores, with the exception of the significant CCEI-CJ/PES-ATF and CCEI-CJ/PES-FS correlations, with the PES scores and its subscales, were observed. The BCa 95% CIs for the non-significant correlations each crossed zero, and confirmed that the population value could be negative, positive, or may not exist. The experimental group’s low \( r_s \) values and related \( R^2 \) indicate that the proportion of variance in the ranks that CCEI-CJ and the PES and subscale scores share are very minimal. The control group’s slightly larger \( r_s \) values, and related \( R^2 \) indicate also indicate minimal effect sizes. The \textit{a priori} power analysis recommended a total sample size of 82 for a two-tailed bivariate correlation (Faul et al., 2009). However, similar to the previous question, these results were underpowered. Therefore, in this instance, it was not evident that clinical judgment was related to students’ perceived prebriefing experiences.

**Additional Narrative Data**

The PES instrument included an area for participants to provide short written comments on the prebriefing experience; this was an optional activity, and no question prompts were provided. In the experimental group \((n = 42)\), 38% of participants offered feedback, compared with only 15% of participants in the control group \((n = 34)\). All comments were positively framed.

Comments from the experimental group participants, who had just been exposed to structured prebriefing and the use of the worksheet to prepare for the simulation, wrote comments that reflected language that was present in the worksheet itself (refer to Appendix A).
### Table 10: Spearman's Correlation for CCEI-CJ and PES/subscale Scores

<table>
<thead>
<tr>
<th>Variable Relationship</th>
<th>Experimental (Structured)</th>
<th>Control (Traditional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r_s$</td>
<td>Sig.</td>
</tr>
<tr>
<td>CCEI-CJ/PES</td>
<td>.10</td>
<td>.54</td>
</tr>
<tr>
<td>CCEI-CJ/PES-ATF</td>
<td>.09</td>
<td>.59</td>
</tr>
<tr>
<td>CCEI-CJ/PES-LC</td>
<td>.11</td>
<td>.51</td>
</tr>
<tr>
<td>CCEI-CJ/PES-FS</td>
<td>.02</td>
<td>.90</td>
</tr>
<tr>
<td>CCEI-CJ/PES-FG</td>
<td>-.04</td>
<td>.80</td>
</tr>
</tbody>
</table>

<sup>a</sup>**Correlation is significant at the .01 level (2-tailed)**  
<sup>*</sup>Correlation is significant at the .05 level (2-tailed)  
<sup>a</sup>Unless otherwise noted, results are based on 2000 bootstrap samples.  
<sup>b</sup>Based on 1998 samples.  
CCEI-CJ: Creighton Competency Evaluation Instrument Clinical Judgment subscale  
PES: Prebriefing Experience Scale  
PES-ATF: Analyzing Thoughts and Feelings subscale  
PES-LC: Learning and Making Connections subscale  
PES-FS: Facilitator Skill in Conducting the Prebriefing subscale  
PES-FG: Appropriate Facilitator Guidance subscale

For instance, participants indicated that:

"**Prebriefing is really helpful in getting thoughts together and gives time to plan care ahead and plan for anticipated problems.**"

"**It is a great experience of linking theory with practice. It promotes to think critically and not just memorization from books.**"

"**Allowed me to make connections and reflect back on my clinical experiences.**"

"**The prebriefing helped in identifying priority action.**"

"**Very helpful in organizing my thoughts – I feel prepared for the simulation (and at clinical)**"
Participants in the control group offered similar feedback, which included comments such as:

“The prebriefing allowed me to make connections w/ my clinical experience and made the simulation more realistic – instead of in the past I was just given a scenario on paper and told to act it out with a group of students.”

“Prebriefing allowed me the time to analyze the situation, ask questions that I had or was unsure about. As well as access the environment.”

“The prebriefing allowed me to make connections w/ my clinical experience and made the simulation more realistic.”

The purpose of the comment area was to allow participants the opportunity to identify specific prebriefing activities or impressions of their perceived learning that were especially important to them. No opportunities for formally collecting further comments later in the simulation process were built into the study design. Participants volunteered verbal comments directly to the researcher after the simulation process was complete; all participants found the experience helpful and several participants in the experimental group requested access to the structured prebriefing worksheet because they thought it may be valuable to them in the practice environment.

Discussion

The aim of this group-randomized, experimental study was to examine the effect of a structured prebriefing intervention, for facilitating aspects of guided reflection and meaningful learning in BScN student participants, on competency performance, clinical judgment and perceived prebriefing experience. Statistically significant differences were evident between the higher-scoring experimental group which received the intervention, and the control group, in
competency performance, clinical judgment and perceived prebriefing experiences. No relationships were found between perceived prebriefing experiences and competency performance or clinical judgment.

Prebriefing has not been described extensively in the literature (Husebø et al., 2012; Page-Cutrara, 2014). The findings from this study are therefore important for two reasons. Firstly, this study describes a theoretically-based model of structured prebriefing that is consistent with current nursing simulation frameworks for promoting reflection, and meaningful learning. Secondly, this study’s findings support model-based structured prebriefing activities for significant improvements in competency performance and clinical judgment, as outcomes of simulation, and on students’ perceptions of their prebriefing experience.

**Competency Performance**

Significantly higher scores in competency performance for BScN student participants were noted in the experimental group that received a structured prebriefing, with a large effect, compared to the control group. Nursing students’ ability to perform competently is a specific focus of simulation education (Hayden et al., 2014; Kardong-Edgren et al., 2010). Prebriefing, as an acknowledged component of the simulation process, had not been clearly linked with learning outcomes of simulation. The findings from this study provide evidence of an association of structured, rather than traditional, prebriefing activities, with better competency performance.

Current literature is supportive of these results. The importance of prebriefing is “evident in the performance of the simulation” (Brackney & Priode, 2015, p. 135). Waxman (2010) stipulated that simulation preparation of nursing student learners should include cognitive competency activities such as case plan or preparation sheets to augment skills, knowledge and thinking abilities. Preparatory exercises involving prioritization and preparation for caring for the
simulated patient were evident in studies, where competency or simulation performance were assessed (Blum et al., 2010; Bogossian et al., 2014; Bruce et al., 2009; Fero et al., 2010; Potter & Allen, 2012; Scherer, Bruce, Graves, & Erdley, 2003; Wagner, Bear, & Sander, 2009); however, prebriefing activities had not been expressly evaluated for their relationship to competency performance.

This study’s structured prebriefing activity was not designed for the researcher to provide participants with answers, or to tell them which actions should be undertaken during the simulation, but was geared to model reflection-before-action and the reflective cycle (Figure 1), and to facilitate a concept mapping-type exercise, based on the Structured Prebriefing Model (Figure 2). Learner identification of appropriate plans for simulated patient care, using cues and guidance from the simulation facilitator, is an important aspect of prebriefing (Chamberlain, 2015; Page-Cutrara, 2015), and was encouraged through this study’s design. This study also contributes to a theory-based body of simulation knowledge that has been under-represented in the current literature (Kaakinen & Arwood, 2009; Rourke, Schmidt, & Garga, 2010).

Clinical Judgment

Significantly higher scores in clinical judgment for BScN student participants were noted in the experimental group that received a structured prebriefing, when compared to the control group. However, these findings are considered cautiously, because of the potential interactions between term and group membership. This study’s findings for clinical judgment are similar to those for competency performance, where a single, model-based, structured prebriefing intervention had an effect on the demonstration of this skill in nursing students. Aspects of clinical judgment, identified by Tanner (2006) were also reflected in the structured prebriefing worksheet.
Clinical judgment, as a more complex skill and outcome of simulation (Benner, Tanner, & Chesla, 2009), has been evaluated in the literature in studies that have included various approaches for preparing students for simulation; again, however, a specific association between prebriefing and clinical judgment had not been examined. Those simulation studies that have demonstrated improved clinical judgment have incorporated different approaches to prebriefing, such as verbally articulating thought processes, expert modeling, and written preparatory materials (Johnson et al., 2012; Rhodes & Curran, 2005; Sharoff, 2012).

The suggested association between group membership and term, for clinical judgment scores, may further indicate the complexity of such skill development; clinical judgment is known to develop over time and across the trajectory of a nursing program (Benner, Tanner, & Chesla, 2009; Nardi & Kremer, 2003). More information is needed on how clinical judgment may be augmented through simulation, since it is essential for how professional nurses perform, and for how students should be prepared (Benner, Sutphen, Leonard, & Day, 2010). This study’s results add to the understanding of this concept by describing a tentative, significant association between prebriefing and enhanced clinical judgment.

**Perceived Prebriefing Experience**

A statistical difference in the perceived prebriefing experience, between the higher rating by the experimental group that received the structured prebriefing and the control group that received a traditional prebriefing, was demonstrated. Additional narrative data, in the form of written comments, were obtained to further enhance knowledge about participants’ perceptions of the prebriefing experience.

The prebriefing instrument and the items associated with its four subscales relate to perceived prebriefing learning, and the learning environment. These align with the simulation
frameworks currently used in simulation practice (Jeffries, 2012). As a participant-scored instrument, expected bias was manifested in strongly negatively skewed, or highly positively rated, results, most notably by the group that received the structured prebriefing. Although participant perceptions of simulation are over-utilized in simulation research (Kardong-Edgren et al., 2010), the prebriefing experience data provides preliminary information on how students value learning frameworks specifically during prebriefing, which was previously undocumented.

The results of this study align with other literature documenting learner preferences for simulation. Nursing students favor simulation as an important learning experience (Brackney & Priode, 2015; Cant & Cooper, 2010; Jeffries, 2005) and value additional simulation learning strategies that are employed, such as guided reflection (Smith & Roehrs, 2009) and concept mapping exercises (Decker et al., 2010).

More than twice as many participants in the experimental group commented on their prebriefing experience, as compared those in the control group. Participants’ written comments on their prebriefing experiences reflected the language in the worksheet, including words such as anticipate and plan. This may indicate immediate modeling of decision-making processes. Comments also related to safety and feelings of stress. In the experimental group, a participant observed that the prebriefing was “very effective in analysing thoughts in a less threatening manner.” By comparison, a control group participant commented, “I find simulation in the lab environment is stressful... in real life situation I would be scared and would question my skills” which did not reflect a perception of lessened stress, or of feeling safe. Prebriefing can serve to provide a safe and trusting learning environment (Chamberlain, 2015; Page-Cutrara, 2015).
The Relationship of Competency Performance and Clinical Judgment to Prebriefing Experience

No statistically significant relationship between competency performance or clinical judgment, and perceived prebriefing experiences was observed. The general incongruence between participants’ positive self-assessment of their perceived learning experience, and their researcher-scored performance during the scenario, may be explained by the possibility of increased satisfaction in general, with any prebriefing or similar supportive simulation design component (Smith & Roehrs, 2009). Such incongruence between self-perceptions of learning and actual performance outcomes has been documented in the nursing simulation literature (Bambini, Washburn, & Perkins, 2009).

In the control group, statistically significant negative correlations between prebriefing experiences associated with Analyzing Thoughts and Feelings and Appropriate Facilitator Guidance subscales, and clinical judgment, were noted. These may possibly be explained by participants’ generally high self-perceptions of organized thought processes and resolution of unsettled feelings with prebriefing (which contrasted with generally lower demonstrations of control group clinical judgment), and participants’ inability to accurately evaluate their own learning (Bambini, Washburn, & Perkins, 2009). Although associated with low power, these results illustrate the identified challenges in education and research of an overreliance on student ratings as indicators of learning.

Implications for Nursing Education

Overall, the results of this study support the use of a model-based, structured prebriefing activity in simulation and nursing student education. Identified gaps in the simulation knowledge base included the learning structures used in prebriefing, and its use in relation to learner
outcomes. The results of this study begin to address these identified gaps, and have implications for educators in the: 1) application of a structure to simulation prebriefing, for developing competency and clinical judgment skills; and 2) incorporation of innovative teaching-learning approaches during simulation, at the learner’s knowledge level.

Simulation has been described as a strategy for assisting students in the development of clinical skills. While competency and clinical judgment have been a focus in the literature, prebriefing has not been investigated for its impact on these skills in nursing students. The findings of this study are also consistent with the current literature that links simulation to the development of competencies (Foronda, Liu, & Bauman, 2013; Garrett, MacPhee, & Jackson, 2011; Jeffries, 2005). Prebriefing activities have been discussed in research as potential means for supporting thinking, assessment and how learners respond to cues (Ashley & Stamp, 2014). What this study adds, is that a structured prebriefing, as an extension of traditional prebriefing activities, may contribute to the development of these requirements for learning to be a nurse. A theory-based model, such as the one developed during this study, can provide direction for educators delivering prebriefing activities.

The findings of this study may be used by educators to support student nurses, who, at a novice or advanced beginner level of performance (Benner, 2001), could benefit from structured preparation and guided reflection prior to a simulated clinical experience. This sort of activity may provide the opportunity for stronger development of skills, earlier in the simulation learning process and in the reflective cycle. While educators may hesitate to provide details to students before a simulation, at a novice level and with increased simulation scenario complexity, a facilitated structured prebriefing that guides students to reflect forward, and construct knowledge, may have benefits for developing thinking structures that are required in practice
settings. This study suggests possibilities for a re-conceptualization by educators of how students are prepared in the simulation process. Such preparation may fit with current approaches to simulation that are geared the level of learner knowledge (Jeffries, 2012), but require the use of more teaching-oriented strategies by educators during the prebriefing phase, to support novice students as they learn to think like nurses.

**Limitations**

This study had several limitations. A lack of prior nursing research on prebriefing, with regards to measurement of simulation outcomes, was a barrier to finding tools to measure activities associated with this phase of simulation. For instance, the adaptation of the original DES, to the PES, although successfully piloted, may not have adequately captured valid outcomes of the learning experienced by participants. Response bias may have led to extreme responses that reflected traits of the participants, rather than the item on the scale (Polit & Beck, 2012).

Sample size was a limitation that may have affected several aspects of the study. A larger, more robust study is warranted to validate these findings. The internal consistency reliability of the CCEI was likely affected by low study enrollment. Issues with normality and homogeneity, and associated significance values, may have been influenced by a smaller sample size than was identified a priori. This was a concern in the examination of the relationship between perceived prebriefing experience and outcomes of competency performance and clinical judgment. Post hoc power analysis revealed the results were underpowered for comparisons between groups on these variables. The challenge of adding to students’ workload with participation in the study may have affected recruitment and retention.
This study examined student participants in the upper years of a BScN program, and therefore findings may not be generalizable to nursing students at earlier stages in their development of competency performance or clinical judgment. Additionally, selection bias was a strong limitation and may have affected the scores of the PES, because volunteer participants may have traits that differ from non-participating students.

While not specifically measured in this study, differences also may be explained by the use of the structured prebriefing worksheet and the associated guided reflection and attention from the researcher, as facilitator, which were components of the intervention. These components may have especially motivated experimental group participants to perform better during the scenario. The researcher, as both rater and interventionist, was also a source of potential bias from the Hawthorne effect and the subject-expectancy effect.

The merits of educational research, comparing one learning activity to another activity that delivers added opportunities for learning, have been debated for their value; more education is assumed to be better than less (Norman, 2014). Hence, the findings of this research, as a first step in specifically focusing on prebriefing in nursing simulation, are considered from a theoretical standpoint, and highlight the need for further work.

**Recommendations for Further Research**

This study provides an initial look at aspects of prebriefing activities in simulation learning of nursing students, and could form a foundation for future research on this concept. In order to expand the simulation knowledge base in nursing student education, other research is required in this area.

A similar study involving a larger sample size that considers the use of individual randomization of students, and one that includes more faculty support and involvement, may
provide increased rigor, and further information on the concept of prebriefing for related research. This may result in more normally distributed data that more closely approximates the population of interest. Involvement of more raters, to expand information on the CCEI tool and verify internal consistency for comparison with its use in other studies, would be valuable. The training of other faculty in the application of a structured prebriefing model to simulation prebriefing activities would foster standardization, which could improve measurement of learning outcomes by removing any influence one facilitator may have on the results obtained in future studies.

Collecting feedback on perceived prebriefing experiences from study participants after the simulation scenario, and before the debriefing phase, may correct for the very high self-scoring in the PES tool. While the intent in this initial study was for the PES to capture participants’ perceptions immediately after experiencing the prebriefing phase, the actual impact of the learning in this phase may not have been accurately perceived by the participants until after experiencing the simulation scenario.

Participants in this study also indicated the potential for use of the worksheet in the clinical environment to organize their thinking. The usefulness of principles of concept mapping and reflection in practice, as a way to connect thinking during simulation to thinking during actual patient care experiences, is another possibility for future research examining nursing student learning.

Lastly, the mismatch that was observed between students’ self-rated perceptions of prebriefing and their researcher-rated competency performance and clinical judgment, reinforces that future research should not focus on such self-report instruments.
Conclusion

This study provides a foundation for prebriefing research in nursing simulation. The study demonstrated the intervention of a model-based, structured prebriefing activity, informed by concept mapping and reflection theory, for enhancing competency performance, clinical judgment and students’ perception of their prebriefing experience.

Participants exposed to structured prebriefing demonstrated significantly higher scoring of competency performance, clinical judgment, and of their prebriefing experiences. No relationship was found between students’ self-rated prebriefing experience and students’ actual simulation performance. Although there were limitations, this study describes new knowledge about prebriefing and its connection to meaningful learning in simulation.
References


Hayden, J., Smiley, R., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: Longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(Suppl. 2), S3-S64.


Norman, G. (2014). Data dredging, salami-slicing, and other successful strategies to ensure rejection: Twelve tips on how to not get your paper published. *Advances in Health Sciences Education Theory and Practice, 19*, 94. doi:10.1007/s10459-014-9494-8


doi:http://dx.doi.org/10.1016/j.ecns.2011.01.001


doi:10.3928/01484834-20090518-07


Appendix A: Structured Prebriefing Worksheet

A. From the information that you have been given for this scenario, what have you noticed about this patient and their care so far? Consider the situation and learning objectives.

B. From what you have noticed about this patient and their care so far, what can you interpret about the patient’s situation based on your knowledge and experience? There may be several possibilities to think about. Drawing on your own knowledge, note how you made your interpretation(s), and if you need to further assess for missing information.

Interpretation #1

Rationale

Interpretation #2

Rationale

Interpretation #3

Rationale
C. From what you have interpreted, what can be reasonably anticipated for each possibility (what do you think may happen)? How could you respond in each of these situations to the patient’s needs? List your anticipated plan(s) and note the rationale for each.

a) Plan for nursing care

<table>
<thead>
<tr>
<th>Response #1</th>
<th>Response #2</th>
<th>Response #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale</td>
<td>Rationale</td>
<td>Rationale</td>
</tr>
</tbody>
</table>

How could others respond? What do you anticipate you might need from others?

b) Plan for communications with other health care professionals

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale</td>
<td>Rationale</td>
<td>Rationale</td>
</tr>
</tbody>
</table>

D. Reflect on these anticipated responses now, and on how you are feeling. Then, as you engage in the upcoming scenario and in the safe care of the patient, conduct your assessment of the patient’s situation and select the appropriate response based on what you find. You may need to modify your care if you assess new information. Discuss this in the debriefing.
## Appendix B: Prebriefing Experience Scale

Prebriefing Experience Scale (PES) (adapted from Prebriefing Experience Scale [Reed, 2012])

Little is known about participants’ experience during prebriefing (the introduction to the simulation which involves a review of the objectives, equipment, environment, patient information, context, and roles). You can add to your professional knowledge by giving your opinions. Please complete the survey below. Your views are very valuable. There is no right or wrong answer.

Circle the number below that best reflects your opinion about your prebriefing experience.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>NA</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prebriefing helped me to analyze my thoughts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2. The facilitator reinforced aspects of the healthcare team’s behavior</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3. The prebriefing environment was physically comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>4. Unsettled feelings from the simulation were resolved by prebriefing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>5. Prebriefing provided me with a learning opportunity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>6. Prebriefing was helpful in processing the simulation information</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>7. My questions about the simulation were answered by prebriefing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Undecided</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------</td>
<td>----------</td>
<td>-----------</td>
<td>--------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>10. I became more aware of myself during the prebriefing session</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>11. Prebriefing helped me to clarify problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>12. Prebriefing helped me to make connections between theory and real-life situations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

**Facilitator Skill in Conducting the Prebriefing**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. The facilitator allowed me enough time to verbalize my feelings before commenting</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>14. The prebriefing session facilitator talked the right amount during prebriefing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>15. Prebriefing provided a means for me to reflect on my plans prior to the simulation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>16. I had enough time to prebrief thoroughly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>17. The prebriefing session facilitator was an expert in the content area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Appropriate Facilitator Guidance**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. The facilitator taught the right amount during the prebriefing session</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>19. The facilitator provided constructive feedback during prebriefing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>20. The facilitator provided adequate guidance during the prebriefing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>

Comments:

*We would like to know a little more about you:*

Gender: [ ] Female [ ] Male  
Age: _______  
Number of participants in your prebriefing group: _______

Approximate number of simulations you have participated in previously as a nursing student: _______

THANK YOU FOR HELPING US TO UNDERSTAND THE PREBRIEFING EXPERIENCE!
Appendix C: Approved Informed Consent and Institutional Approval

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: The Impact of Structured Prebriefing on Nursing Students’ Competency Performance, Clinical Judgment and Experience in Simulation

INVESTIGATOR: Karin Page-Cutrara, BNSc MN RN PhD(c) (Principle Investigator), Duquesne University, School of Nursing HNES 325, York University, Toronto, ON 416-736-2100 ext 33920

ADVISOR: (if applicable) Melanie Turk, PhD RN (Chair), Assistant Professor 518 Fisher Hall, Duquesne University School of Nursing Pittsburgh, PA 15282 412-396-1817

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the PhD degree in Nursing at Duquesne University.

PURPOSE: You are being asked to participate in a research project that seeks to investigate the prebriefing phase of a simulation experience (the introductory phase of the simulation that includes an orientation to the environment and equipment, patient information, and roles), and students’ competency performance (general nursing skills), clinical judgment (decision-making), and perceptions of prebriefing, during a computer-simulated clinical scenario in the Nursing Simulation Centre (NSC). It is anticipated that the results of this research will help nurse educators understand simulation experiences and teach students about thinking like a nurse. If you agree to take part in the study, the following will occur:

- As a BScN student at the York University School of Nursing, you will participate in an experimental study that uses high fidelity simulation.
• You will be randomly assigned to either a control group or an experimental group and will receive a type of prebriefing activity. You may not be aware of which group you are assigned to.

• Regardless of the group you are assigned to, you will participate in two activities:
  o A clinical simulation experience in the NSC with one other nursing student (which includes prebriefing, a clinical scenario, and debriefing activities); and
  o The completion of a prebriefing survey which includes some demographic information such as gender, age, and year.

• During the clinical scenario, you will be rated on your competency performance, which includes a rating of your clinical judgment, by the principle investigator.

• We will attempt to accommodate your schedule as best we can when booking the time for the simulation. The activities for this study will be self-scheduled around your major courses, during this current term.

• The entire study will take approximately 1 hour of your time.

• This study will not be associated with any nursing course or program, and your participation will occur outside of your normal school work. Your grades and your progression in the nursing program will not be affected whether you decide to participate in this study or not. Your performance and ratings will be confidential and will not be communicated whatsoever to any of your course instructors at any time.

• Simulation activities will be comprised of clinical nursing content you have already been exposed to. Information on the clinical scenario will be provided to you the day before the simulation via email. Specific preparation is not required for either the experimental or the control group.

These are the only requests that will be made of you.

RISKS AND BENEFITS:

We do not foresee any risks or discomfort from your participation in the study, other than those you encounter in everyday life. The simulation activity will be similar to what you have experienced in your nursing program, and with the possible exception of the worksheet, will be the same for the experimental and control groups. During the study’s clinical simulation experience in the NSC, you may become
anxious or stressed about your performance, or your colleague’s performance. A debriefing period, a normal part of the simulation activity, will be available to you regardless of your group assignment, and will be held immediately after the simulation so you can discuss your performance and learning. There is a chance that someone could find out you were in the study and learn something about you that you did not want others to know. Your privacy will be protected as best as possible.

Although not required for your program, it is possible that participation in this study, regardless of your group assignment, will provide you with an additional learning opportunity and build on your knowledge of nursing. It will also provide information to researchers about assessing this first phase of the simulation experience, prebriefing.

**COMPENSATION:**
A $10 coffee card will be offered as compensation for your time in the study. You can withdraw from the study at any time and still be eligible to receive the coffee card for agreeing to participate in the study. Participation in the project will require no monetary cost to you.

**CONFIDENTIALITY:**
Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All written materials and consent forms will be stored in a locked file in the researcher’s office. Your response(s) will only appear in statistical data summaries. All materials will be destroyed at the completion of the research. Confidentiality will be provided to the fullest extent possible by law.

**RIGHT TO WITHDRAW:**
You are under no obligation to participate in this study. You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible.

**SUMMARY OF RESULTS:**
A summary of the results of this research will be supplied to you, at no cost, upon request.
VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may call Prof. Karin Page-Cutrara either by telephone at 416-736-2100, extension 33920 or by e-mail (kcutrara@yorku.ca). I may also contact Prof. Page-Cutrara’s Chair, Dr. Melanie Turk at 412-396-1817. This research has been reviewed and approved by the Human Participants Review Sub-Committee at York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines, as well as the Institutional Review Board at Duquesne University, Pittsburgh, PA, USA. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca), or Dr. Linda Goodfellow, Chair of the Duquesne University Institutional Review Board at 412-396-6326).

LEGAL RIGHTS AND SIGNATURES:

I, (please print your name) ________________________________, consent to participate in study The Impact of Structured Prebriefing on Nursing Students’ Competency Performance, Clinical Judgment and Experience in Simulation conducted by Prof. Karin Page-Cutrara. I have understood the nature of this study and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Participant Name (Printed)  Participant's Signature  Date

Researcher Name (Printed)  Researcher's Signature  Date
Memo

To: Karin Page-Cutrara, Assistant Lecturer at York (PhD Student, Duquesne University), Nursing
From: Alison M. Collins-Mrakas, Sr. Manager and Policy Advisor, Research Ethics
Issue Date: Mon Nov 17 2014
Expiry Date: Tue Nov 17 2015
RE: The Impact of Structured Prebriefing on Nursing Students' Competency Performance, Clinical Judgment and Experience in Simulation Certificate #: e2014 - 331

I am writing to inform you that the Human Participants Review Sub-Committee has reviewed and approved the above project.

Should you have any questions, please feel free to contact me at: 416-736-5914 or via email at: acollins@yorku.ca.

Yours sincerely,
Alison M. Collins-Mrakas M.Sc., LLM
Sr. Manager and Policy Advisor,
Office of Research Ethics

RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE

Upon receipt of an ethics approval certificate, researchers are reminded that they are required to ensure that the following measures are undertaken so as to ensure on-going compliance with Senate and TCPS ethics guidelines:

1. **RENEWALS**: Research Ethics Approval certificates are subject to annual renewal.
   a. Researchers will be reminded by ORE, in advance of certificate expiry, that the certificate must be renewed
      i. Researchers have 2 weeks to comply to a reminder notice;
      ii. If researchers do not respond within 2 weeks, a final reminder will be forwarded. Researchers have one week to respond to the final notice;
   b. **Failure to renew an ethics approval certificate or** (to notify ORE that no further research involving human participants will be undertaken) may result in
suspension of research cost fund and access to research funds may be suspended/withheld;

2. AMENDMENTS: Amendments must be reviewed and approved PRIOR to undertaking/making the proposed amendments to an approved ethics protocol;

3. END OF PROJECT: ORE must be notified when a project is complete;

4. ADVERSE EVENTS: Adverse events must be reported to ORE as soon as possible;

5. AUDIT:
   a. More than minimal risk research may be subject to an audit as per TCPS guidelines;
   b. A spot sample of minimal risk research may be subject to an audit as per TCPS guidelines.

FORMS: As per the above, the following forms relating to on-going research ethics compliance are available on the Research website:

1. Renewal
2. Amendment
3. End of Project
4. Adverse Event
Appendix D: Creighton Competency Evaluation Instrument (with permission)

Used and included with permission of Dr. Mary Tracy, Creighton University
Appendix E: Data Collection Process Diagram
Appendix F: Traditional Prebriefing Guidelines for Simulation Scenario

Traditional Prebriefing Activities (up to 30 minutes):

1. Welcome participants to the laboratory; verify registration in the study by confirming identity.

2. Provide participants with the overview of the scenario, the objectives, and the patient chart. Allow participants to independently review this material for orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation. Ask, “Do you have any questions at this time?”, and “Do you understand the objectives of this scenario?”

3. Orient the participants to the simulation space, the location of the equipment that may be required during the scenario, and the mannequin functionalities.

4. Describe the time frames for the phases of the simulation process by saying, “The scenario will run approximately 15 minutes. Afterwards, we will debrief for 15 minutes.”

5. Ask the participants to decide which roles they students will play (main nurse, supporting nurse). Ask the students to ‘think aloud’ as they engage in the scenario.

6. Participants are asked if they have questions or require clarification about what they have reviewed, before beginning the simulation scenario, i.e., “Do you have any questions before we get started?”

7. Provide the participants with the Prebriefing Experience Scale form. Say, “Please complete this survey, to the best of your ability, and based solely on the prebriefing or introductory activity that you have just experienced.”
Appendix G: Structured Prebriefing Guidelines for Simulation Scenario

Structured Prebriefing Activities (up to 30 minutes):

1. Welcome participants to the laboratory; verify registration in the study by confirming identity.

2. Provide participants with the overview of the scenario, the objectives, and the patient chart. Allow participants to independently review this material for orientation to the equipment, environment, mannequin, roles, time allotment, objectives, and patient situation. Ask, “Do you have any questions at this time?”, and “Do you understand the objectives of this scenario?”

3. Orient the participants to the simulation space, the location of the location of the equipment that may be required during the scenario, and the mannequin functionalities.

4. Describe the time frames for the phases of the simulation process by saying, “The scenario will run approximately 15 minutes. Afterwards, we will debrief for 15 minutes.”

5. Ask the participants to decide which roles they students will play (main nurse, supporting nurse). Ask the students to ‘think aloud’ as they engage in the scenario.

6. Provide the participants with the Structured Prebriefing Worksheet, to engage participants in actively thinking and to assist with reflection on the scenario. Ask questions such as, “Based on what you know from your clinical experiences, and what you have learned in your courses, please fill in the first section of the worksheet.” Then ask, “After reviewing this patient’s situation, what do you see as some of the challenges he is currently facing?” or “What is the main concern with this patient?”

7. Ask participants to fill out the second section of the worksheet. Then ask questions such as, “Based on what you know so far, what possible interpretations could be made as to why this is happening with the patient?” Cueing for misinterpretations can occur through exploring rationale or asking about missing information. Ask, “Is there anything that you think you may need more information on?”

8. Ask participants to fill out the last section of the worksheet. Guide participants to reason out loud through possible solutions and the associated consequences or conclusions. Ask questions such as, “If you anticipate that plan of care, what do you see happening as a result?” Participants are asked to anticipate what may be needed from other health care professionals; ask, “If you plan for this care, what orders may you expect from the physician?”

9. Participants are directed to save their worksheet to review in debriefing, and asked if they have questions or require clarification about what they have reviewed, before beginning the simulation scenario, i.e., “Do you have any questions before we get started?”
10. Provide the participants with the *Prebriefing Experience Scale* form. Say, “Please complete this survey, to the best of your ability, and based solely on the prebriefing or introductory activity that you have just experienced.”
Appendix H: Simulation Scenario for Chest Pain Management of the Postoperative Patient

Overview:

The participants are caring for a 35-year-old morbidly obese, white male admitted one day ago for an elective laparoscopic adjustable gastric banding. Other than obesity, he has no history of significant medical problems. The clinical simulation experience takes place on the morning of the first postoperative day, when the patient develops chest pain after moving from his bed to a chair. This three-stage simulation provides the participants with the opportunity to manage the care of a postoperative patient who develops chest pain.

Learning Objectives:

Participants will:

- Design an individualized plan of care for the nursing management of a postoperative laparoscopic adjustable gastric banding patient who experiences chest pain
- Prioritizes the implementation and approach to the nursing care of the postoperative laparoscopic adjustable gastric banding patient who experiences chest pain
- Evaluates the patient’s response to interventions and modifies the nursing care as appropriate

Required Performance Competencies:

- Reviews patient’s medical record
- Performs hand hygiene before and after patient contact
- Demonstrates appropriate use of personal protective equipment (PPE)
- Introduces self to patient
- Verifies patient identity with two identifiers
- Conducts basic environmental safety assessment and maintains safety measures
- Uses therapeutic communication to establish rapport and reduce patient anxiety
- Calculates and administers medications safely according to the Eight Rights
- Provides developmentally appropriate education
- Evaluates effectiveness of communication
- Evaluates effectiveness of education
- Documents all findings, interventions and patient responses

Stage 1: Initial Assessment

- Performs an initial and complete postoperative assessment
- Assesses for a deep vein thrombosis
- Assesses surgical drain and incision sites
- Evaluates pain
- Ensures accuracy of IV fluid rate and delivery
- Encourages deep breathing exercises
- Encourages use of incentive spirometer
- Evaluates compliance and outcome with oral fluid intake
- Evaluates laboratory results
- Administers scheduled medications correctly according to the Eight Rights
- Discontinues urinary catheter
- Assists patient out of bed to a chair

State 2: Onset of Angina
- Performs a focused assessment
- Recognizes abnormal findings: complaint of chest pain, increase in blood pressure and pulse rate, oxygen desaturation
- Assesses chest pain
- Assists patient back to bed
- Notifies healthcare provider of patient status and seeks orders for chest pain relief

Performance Measures After State 2 Orders Received:
- Administers chewable aspirin according to the Eight Rights
- Administers 3 doses of nitroglycerin according to the Eight Rights
- Initiates oxygen therapy at 4 LPM via nasal cannula
- Calls for STAT ECG
- Appropriately monitors patient’s response to medications
- Consults internist per request of surgeon

State 3: Chest Pain Relieved
- Performs focused assessment
- Notifies healthcare provider of patient’s response to interventions

Questions to be asked during debriefing:
- What was the experience like for you?
- What happened and why?
- What did you do and was it effective?
- Discuss your interventions (technical and non-technical). Were they performed appropriately and in a timely manner?
- How did you decide on your priorities for care and what would you change?
- How did patient safety concerns influence your care? What did you overlook?
- In what ways did you personalize your care for this patient and family members (recognition of culture, concerns, anxiety)?
- Discuss your teamwork. How did you communicate and collaborate? What worked, what didn’t work and what will you do differently next time?
- What will you take away from this experience?

(from CAE Healthcare)
Appendix I: Permission to Use CCEI (email)

Permission was granted to use the Creighton Competency Evaluation Instrument in this study, and include a copy in this document by permission of Dr. Mary Tracy.