University of Alberta

THE SOCIAL-PSYCHOLOGICAL PROCESS INVOLVED IN USING HUMAN PATIENT SIMULATORS AS A TEACHING/LEARNING MODALITY IN UNDERGRADUATE NURSING EDUCATION

by

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Dedication

I dedicate my dissertation to my wife Allie, my son Nathan and my daughter Holly who showed unwavering support, belief in me and patience during the course of my PhD program. To my wife Allie, you have been my rock through this whole process and I can unequivocally say that without your love and support, especially when it comes to taking the lead in so many areas of our family life, I would not be where I am today. If I am successful in obtaining my PhD in Nursing, I firmly believe this degree is as much yours as it is mine. To my children Nathan and Holly, your love, patience, inquisitiveness and excitement for life was a constant inspiration that served to energize me when I needed it the most. You gave me the drive to pursue this dream. Finally I would like to thank both my parents and Allie's parents for the countless hours of support and babysitting provided. They say it takes a village to raise a family, and I am proof it takes a family to obtain a PhD. Thank you all.

Abstract

The use of the high-fidelity human patient simulator (HPS) based clinical scenario in undergraduate nursing education is a powerful learning tool well suited to modern students' preference for immersive construction of knowledge through the provision of contextually rich reality-based practice and social discourse. To date there has been little indication of research into the social processes in which students engage in a simulated clinical session. The purpose of this paper-based thesis was to explore these social-psychological processes that occur within HPS-based clinical scenarios to inform nurse educators' choice of pedagogical practices when they structure and implement this technology-based learning tool. This exploration began with the first manuscript, which explores this approach to clinical teaching through a critical examination of the application of behaviorist and constructivist pedagogy to high-fidelity scenario-based simulation sessions. The second manuscript critically analyzes the role of clinical scenarios using human patient simulation in promoting transformative learning events in undergraduate nursing education. The third manuscript begins with the assertion that HPS-based learning experiences are in reality social endeavors that serve as a platform for social discourse among learning groups and follows with an analysis of the theoretical and philosophical foundations of the grounded theory research method, demonstrating its suitability to uncovering the social processes within. Finally, the dissertation process culminated in the fourth manuscript, which is a report on a grounded theory study that explored the social-psychological processes that occur within HPS-based clinical scenarios. This

study sampled students and faculty from a Western Canadian baccalaureate nursing program. The data collection consisted of semistructured interviews, supplemented by secondary data from the observation of participants as they engaged in HPS-based clinical scenarios, field notes, analytical and operational memos, and journaling. The process of leveled coding generated a substantive theory that has the potential to enable educators to empower students through the use of fading support, a twofold process comprised of adaptive scaffolding and dynamic assessment that challenges students to realistically self-regulate and transform their frame of reference for nursing practice, while at the same time limiting the threats that traditional HPS-based curriculum can impose.

Acknowledgements

I would like to begin by thanking Dr. Florence Myrick, my PhD program supervisor, for her support and guidance throughout my studies. She was a constant source of unwavering support, using her many talents as well as drawing upon her experience to stretch my thinking. She taught me the importance of skepticism and the need to constantly question our educational practices. Florence was always available for proofreading papers, presentations, and abstracts, as well as critiquing, critically thinking, and problem solving throughout my program and scholarly activities in the Faculty of Nursing. Her ability to both challenge me while at the same time blending in affirmation, even when I struggled, empowered me and built my confidence to become more autonomous in my studies. This was a vital component of my navigation through this educational journey as I attempted to balance family with professional and student roles. Finally, although I am at the beginning of my journey, Florence helped to socialize me into the world of academia and fostered my interest in maintaining a research practice as a professional educator. Thank you.

I would also like to thank the other members of my committee, Dr. Katy Campbell, Dr. Patricia Marck, Dr. Pauline Paul, and Dr. Solina Richter, for their excellent questions, insights, and discourse in guiding me through the dissertation process. Another thank goes to Dr. Diane Billay for her willingness to share her experience and resources from her own PhD program.

Finally, I would be remiss if I did not thank Dr. Joanne Profetto-McGrath and the Faculty of Nursing, University of Alberta, for allowing me access to their

simulation laboratory, student body, and faculty to complete my dissertation. In particular, I would like to thank Penny MacDonald, who was the simulation laboratory coordinator at the time of my data collection, for opening the doors to allow me to recruit the participants and collect data in their facility.

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CHAPTER 1:

INTRODUCTION AND BACKGROUND

The proliferation of human patient simulators (HPSs) in undergraduate nursing education raises questions about the application of well-informed pedagogical practices. Despite a growing body of research into this technology-based learning tool, there is insufficient evidence on which to base decisions on best practice to both structure simulation-based curriculum and facilitate HPS-based clinical scenarios that meet the learning needs of the modern adult learner (Cant & Cooper, 2009; Cooper & Taqueti, 2007; Day-Black & Watties-Daniels, 2006; Kaakinen & Arwood, 2009; Ravert, 2002; Rourke, Schmidt, & Garga, 2010). Although HPS-based clinical scenarios facilitate group process and social construction of knowledge (Lasater, 2007; Leigh & Hurst, 2008; Parker & Myrick, 2010; Perkins, 2007), there has been inadequate research into these social processes to date (Day-Black & Watties-Daniels, 2006). The current body of research that has shown evidence of both students' and educators' perceived efficacy of simulation and moderate evidence of improved skill performance and/or retention to validate the practice of high-fidelity-based simulated scenarios in nursing education. Unfortunately, the current state of knowledge has specific limitations, including an overemphasis on empirical research methodology (Bradley & Postlethwaite, 2003); at the same time, however, external validity is lacking as a result of informal evaluation methods and problems with rigor (Harder, 2010; Leigh, 2008; Ravert, 2002). Other limitations include the limited use of theory-based research methods (Kaakinen & Arwood, 2009; Rourke et al.,

2010), which has often led to many findings that are too focused on the mere description of a phenomenon (Rourke et al., 2010). Inquiry into HPS-based learning is required to be able to conceptualize the social processes that occur within and thereby develop theoretical foundations not only to inform the implementation of simulated clinical scenarios, but also to guide future studies. There is a need to move beyond the hypothetico-deductive approach and build a theoretical framework based on the processes that occur in high-fidelity simulation. Uncovering the social-psychological processes that occur with the HPS-based simulated clinical learning environment will assist nursing educators in their choice of pedagogical practices when they develop simulation curriculum. This process will also serve to foster future research, whether deductive or inductive, that most accurately reflects the complex social processes that those who participate in HPS-based clinical scenarios experience.

Motivation

My motivation to conduct this study began with my orientation to the use of high-fidelity HPS in undergraduate nursing education. I became increasingly aware of the preference of the millennial generation of learners for the immersive, realistic, and high-tech learning experiences that encourage social discourse and the creation of their own knowledge. Thus the potential power of this exploratory learning tool appeared well suited to the learning preferences and perspectives of the modern adult learner. On a personal level, in part because of my affinity for technology, my initial exposure to HPS-based clinical scenarios ‘grabbed’ my interest beyond its mere academic potential. Throughout my original orientation I

was intrigued by the ability of a robotic manikin to draw learners into engaging with it on an almost human level, by which I mean simply that the participants at times appeared to experience emotions and feelings similar to those expected in dealing with live patients in real clinical environments. During a simulation preparation workshop, I still remember watching a veteran paramedic with many years of field experience crying after engaging in a problematic cardiac arrest scenario. At this same workshop I witnessed yet another veteran paramedic become visibly angry after participating in a medical emergency that also involved interpersonal conflict. I saw firsthand the ability of this tool to impact not only the learner's cognitive domain, but also the affective domain. Unfortunately, the positive impacts are lessened when the teacher and/or the simulation-based curriculum structure are not informed by sound knowledge of pedagogy.

When I began to utilize HPS-based clinical scenarios in my work as a nursing instructor, I became increasingly frustrated with the apparent dearth of research beyond the simple validation of this technology-based learning tool. Many nursing programs and nurse educators utilize computer-controlled manikins guided by software developed by the manikin manufacturers themselves. Although nurses were undoubtedly asked to contribute to the software/design, this raises concerns about whether the outcomes of high-fidelity HPS-based learning tools developed by profit-motivated companies truly reflect the values and beliefs of the nursing profession. This consideration is especially troublesome if nurse educators rely solely on the structured objectives and scenario trajectories in the

pre-packaged software. As Dewey (1902/2008) noted, “The map is not a substitute for a personal experience. The map does not take the place of an actual journey” (p. 20). Although I strongly believe that some form of behaviorist structuring of HPS learning sessions is unavoidable and necessary (see manuscript 4), it does not preclude the need to individualize experiences whenever possible. This approach requires insight into the processes that govern the HPS-based clinical scenario in undergraduate nursing education. I also strongly believe that without increased awareness of the social processes to inform the choice of pedagogy in the design and implementation within, we risk propagating skills and knowledge that undermine the values and beliefs of the nursing profession. We also risk devaluing the learner’s voice and limiting the effectiveness of this potentially powerful technology-based learning tool.

Key Concept: HPS

Because of the variety of definitions of HPS in the literature, it is necessary to define HPS as I have utilized it in this study. Nursing education programs often use human-like manikins, which can range from low fidelity to high fidelity, as tools to facilitate exploratory learning. *High-fidelity* refers to the most technologically advanced versions, which are able to mimic many human physiological responses to trauma, illness, and interventions (Medical Education Technologies, Inc. [METI], 2004). Nursing students are able to apply nursing interventions such as medication administration (among many others) after assessing alterations in health in the HPS. The instructor or facilitator controls the manikin through a computer to replicate physiological changes in health status

and acuity during a simulated clinical scenario. Often the HPS is placed in a room designed to mimic a clinical environment (e.g., hospital room) to realistically simulate a nursing care experience (Yaeger et al., 2004).

Overview of the Dissertation Manuscripts

The following is an overview and critical analysis of the four manuscripts that comprise this paper-based dissertation. They present the output of my doctoral research and illustrate the trajectory of my conceptualization and the development of my meaning schemes throughout my study that culminated in the report on my findings in manuscript four. In manuscript one my thought processes began with my concern about insufficient evidence to support the current pedagogical practices in developing and implementing HPS-based curriculum. After reviewing the literature on HPS use in undergraduate nursing education, I felt it necessary to begin with an article (manuscript one) in which I critically analyze the potential application of pedagogy in HPS-based clinical scenario use. Although I originally designed this paper as a deconstruction of the roles of both behaviorist and constructivist pedagogy in simulation education, I feel that its major contribution to nursing literature is the call for nurse educators to extrapolate the learning theories and practices that underpin the application of this learning tool. Dewey (1938) stated, "I have said that educational plans and projects . . . are thereby committed to framing and adopting an intelligent theory. . . . Otherwise they are at the mercy of every intellectual breeze that happens to blow" (p. 51). This manuscript is a personalized call to the profession of nursing to uncover the processes that underpin HPS-based clinical scenario utilization and

thereby inform our choices of pedagogical practices that are well suited to the learning needs of the modern adult learner.

Continuing along the trajectory I undertook to develop my research program, manuscript two demonstrates the further development of my meaning schemes and knowledge with regard to the practice of HPS-based clinical scenarios in undergraduate nursing education. Through the course of developing my research proposal, my overall doctoral program, and even my work as a nursing instructor, I gained an increasing awareness of the role of the social construction of knowledge in the group processes and peer filtering of knowledge within the high-fidelity simulated clinical environment. This role reaffirms that, although simulation is a powerful tool, it is simply a tool (Shovein, Huston, Fox, & Damazo, 2005), and it does not preclude the need to be aware of the social processes that students experience when they engage in high-fidelity simulated scenarios. Therefore the roles of social discourse and perspective transformation in Mezirow's (1994, 1995) transformative learning theory came to the forefront throughout the development of my study and the subsequent data analysis. HPS-based clinical scenarios, with their use of group process, peer filtering of knowledge, and critical reflection, are well suited to aiding in the transformation of meaning schemes and perspectives that is necessary for new practitioners to thrive in the modern healthcare environment (Parker & Myrick, 2010). Uncovering these processes, therefore, necessitates a research method with an epistemological foundation in social constructivist learning theories.

Manuscript three moves further through my research program's trajectory to demonstrate the further evolution of my conceptualization and meaning schemes with regard to using high-fidelity simulation as a teaching tool. This evolution took the form of a critical analysis of the applicability of grounded theory method to the examination of HPS-based clinical scenarios in undergraduate nursing education. In this paper I posited that HPS-based clinical scenarios are in reality social endeavors that lead to the collaborative creation of knowledge. Unfortunately, there has been a dearth of research beyond the scientific paradigm (Bradley & Postlethwaite, 2003) or simple description of the phenomenon (Rourke, Schmidt, & Garga, 2010) to uncover the complex social processes that occur during the learners' participation in a high-fidelity simulated clinical session. Through critical deconstruction I demonstrate that grounded theory, with its foundation in symbolic interactionism and social constructionism, is well suited to uncovering these social processes, with the goal of developing insight into pedagogical approaches that are congruent with the learning needs and preferences of modern adult learners. Through critical reflection and contextual analysis I had found an applicable research method to guide my dissertation study, as manuscript four demonstrates.

The attached manuscripts reveal the development and conceptualization throughout the progression of my dissertation and doctoral program of my knowledge and meaning schemes with regard to the use of HPS-based clinical scenarios in undergraduate nursing education. Figure 1 reflects this sequential development of ideas and frames of reference. As this figure and the discussion

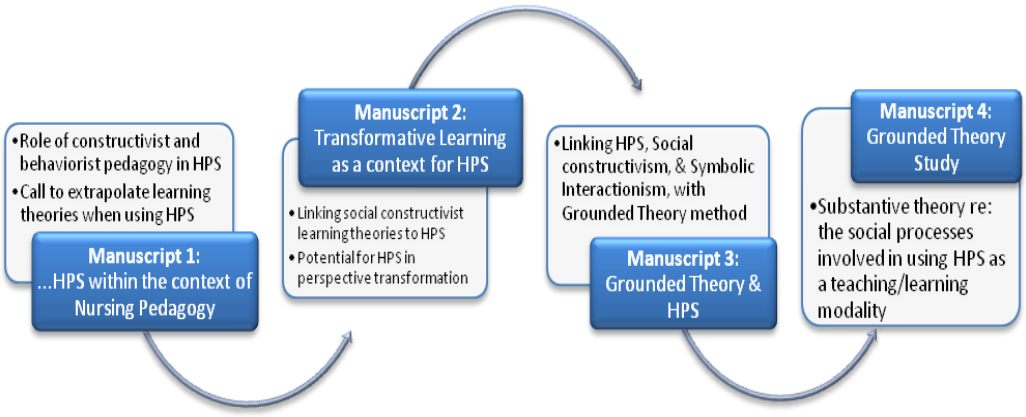
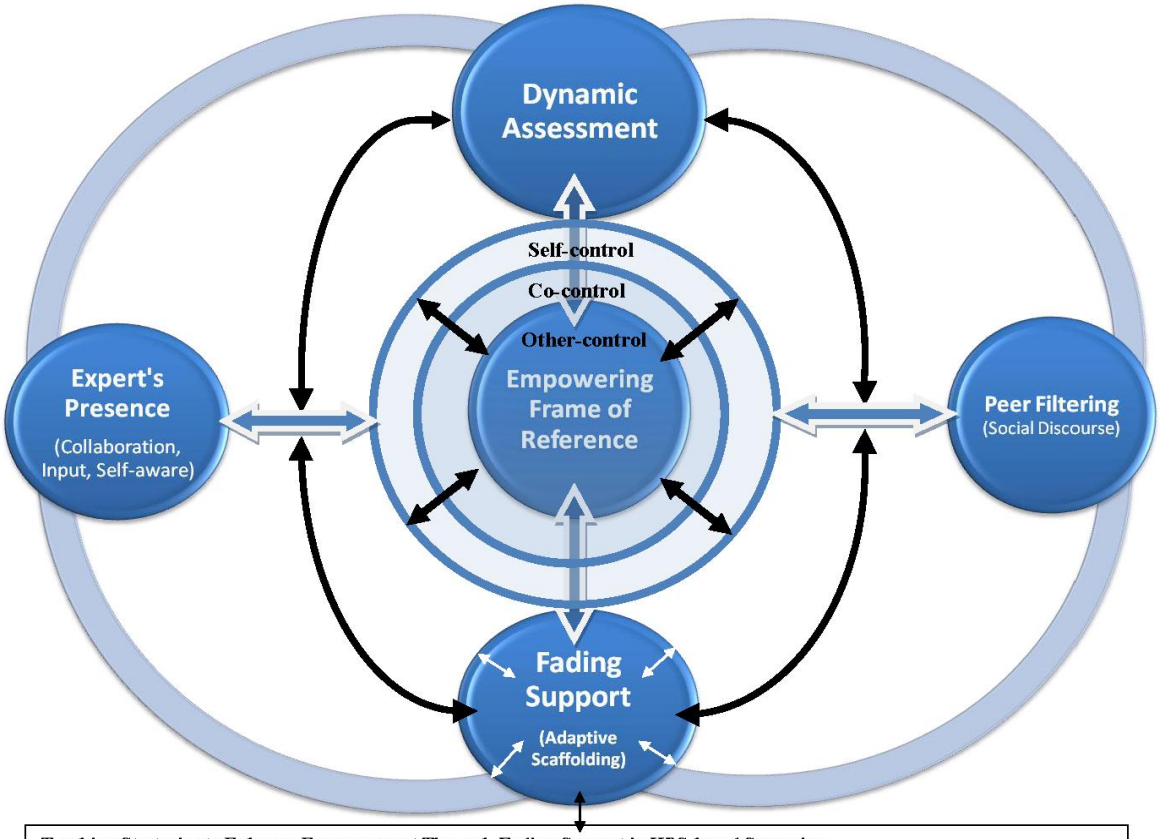


Figure 1. Relating the manuscripts.

demonstrate, this progression led to a grounded-theory-guided study and the subsequent emergence of findings that uncover the social-psychological processes that occur during student engagement in traditionally delivered high-fidelity simulation sessions. The use of leveled coding and constant comparative analysis of the data led to the emergence of the core variable *empowering through fading support* (Figure 2). At the heart of this variable is the role of, among other things, the threat of social observation, peer filtering, and complexity in cognitively overwhelming students' meaning schemes and rudimentary frames of reference with regard to not only the knowledge and clinical skills embedded within the simulated clinical scenario, but also the interaction with the technology itself. This process led to the need to promote the pedagogical ebb and flow entrenched in the educational practices of adaptive scaffolding and dynamic assessment in delivering high-fidelity simulation learning sessions. I believe that these practices increase the confidence of beginning practitioners as they reframe their cognitive conceptualizations of their burgeoning meaning schemes with regard to clinical

Figure 2: Empowering Through Fading Support



practice. The social processes that I described in manuscript four inform this substantive theory and thereby enrich the body of knowledge on the use of immersive, reality-based learning experiences such as HPS-based clinical scenarios.

Manuscript Summaries

To further demonstrate the interrelatedness of the four manuscripts that comprise this dissertation, I will summarize each. In conjunction with Figure 1 and the previous overview, these summaries will help readers to further conceptualize their understanding of the linkages among the papers and will thereby demonstrate the development of my ideas and the emergence of the substantive theory that I discuss in manuscript four.

Manuscript 1: A Critical Examination of High-Fidelity Human Patient Simulation Within the Context of Nursing Pedagogy

This paper is a critical analysis of the application of both constructivist and behaviorist pedagogies to the implementation of high-fidelity HPS-based clinical learning sessions. An initial concern is the lack of research on the use of educational philosophy to guide the utilization of this technology-based learning tool in undergraduate nursing education. This is especially troublesome in light of the learning preferences and expectations of the millennial generation currently entering undergraduate nursing programs. The proliferation of technology in nursing education (e.g., high-fidelity HPS), along with the digital revolution (Dede, 2005; Kraidy, 2002) and the millennial generation's preferences for collaborative, reality-based immersion (Bassendowski, 2007; Skiba, 2007), will

inevitably alter nursing pedagogy. Therefore, depending on the desired learning outcomes, nurse educators must be aware of the pedagogical structures that underpin HPS-based clinical curriculum. To this end, I deconstructed the two dominant learning theories in modern nursing education, behaviorism and constructivism, and considered guidelines for the application of each form of pedagogy to facilitate high-fidelity simulated learning sessions. I suggested that both forms of pedagogy play a role in the development of simulation curriculum. Depending on whether the goal is the rote learning of factual knowledge and psychomotor skills or, conversely, the enhancement of problem solving (clinical judgment) and/or group process, nurse educators should consider the application of behaviorist or constructivist pedagogy in designing HPS-based clinical scenarios. Guidelines for behaviorist-based simulation include the incorporation of low levels of acuity and complexity to avoid overwhelming the cognitive schema of adult learners, the repetition of learning experiences, theory supplementation, and the incorporation of modular learning as a framework for simulation-based curricula. Conversely, guidelines for constructivist-based simulation include access to a variety of information resources in the simulation laboratory, the negotiation of learning objectives between the instructor and the students, and the creation of messy or poorly structured scenarios that involve uncertainty, increased acuity, and amplified environmental noise. I also recommended that educators consider a blend of philosophical constructs in developing HPS-based clinical scenarios for use in undergraduate nursing education.

This paper is published (see Appendix G) as Parker, B. C., & Myrick, F. (2009). A critical examination of high-fidelity human patient simulation within the context of nursing pedagogy. *Nurse Education Today, 29*(3), 322-329.

Manuscript 2: Transformative Learning as a Context for Human Patient Simulation

In this paper I again voiced my concern about the lack of research into the use of HPS in nursing education beyond simple validation and suggest the need to uncover the role of educational philosophies and learning theories in our educational practices. Nursing education is challenged with the tasks of not only socializing students into the profession, but also helping them to develop knowledge and skills that are applicable to the modern healthcare environment. Therefore, in this paper I critically analyzed the role of HPS-based clinical scenarios in transforming students' perceptions of their meaning schemes and rudimentary frames of reference. I conducted this analysis by discussing Mezirow's (1994, 1995) transformative learning theory and focusing on the role of experience, social discourse, and critical reflection in transforming learners' meaning with regard to their experiences with the phenomenon of HPS. I suggested that HPS-based clinical scenarios are well suited to delivering disorientating dilemmas that upset learners' meaning schemes. Upsetting their perceived knowledge, values, and beliefs about clinical practice through exposure to HPS helps students learn to interpret the dilemma and ultimately incorporate the new meanings into their cognitive schema. Similar to constructivist pedagogy, transformative learning theory promotes educational practices to empower

learners. These practices help students to define own their own goals, make choices during the learning experience, and problem-solve; help the instructor to model through the experiential engagement of learners; and encourage regular, non-competitive feedback (Mezirow, 1991). Other strategies specific to HPS utilization that were recommended in this paper include repeating HPS scenario sessions, increasing students' exposure to foster the development of trusting relationships in the learning environment, debriefing immediately, using video playback to promote critical reflexivity, and encouraging peer evaluation in the debriefing process. Nurse educators should also consider using gradual or incremental disorientating dilemmas for more junior learners instead of exposing them to highly traumatic, emotionally charged experiences to avoid overwhelming or even traumatizing them and hindering their ability to cognitively process the scenario and the clinical skills/inherent within.

This paper is published (see Appendix H) as Parker, B. C., & Myrick, F. (2010). Transformative learning as a context for human patient simulation. *Journal of Nursing Education*, *49*(6), 326-332.

Manuscript 3: The Grounded Theory Method: Deconstruction and Reconstruction in a Human Patient Simulation Context

This paper begins with the argument that, despite being a technology-based learning tool, high-fidelity HPS-based simulation is a value-laden, social Endeavour and therefore requires a research method that reflects this epistemological stance. With a foundation in social constructionism and symbolic interactionism, it is argued that grounded theory is well suited to analyzing

nursing students' experiences during HPS scenarios. I critically analyzed these learning theories (Blumer, 1969; Gergen, 1999) and the conceptual underpinnings of grounded theory to deconstruct this method and demonstrate its applicability to simulation research. The importance of social discourse in simulation education is linked to the grounded theory method. I presented examples of social discourse such as the traditional debriefing session and the peer teamwork (student pairs or clinical teams) that often occur during HPS-based clinical scenarios and link these strategies to grounded theory through an analysis of the literature and critical reflection to show their ability to serve as conduits for peer filtering and the social construction of knowledge. The paper closes with a call for the refocusing of simulation research beyond empiricism or simple validation to methods better suited to the analysis of social phenomenon. There are those who consider science ill suited to an analysis of this complex social phenomenon because it forces data into preconceived frameworks and thereby oversimplifies the description that emerges. Blumer argued that social-based research needs to begin at the level of abstract conceptualizations; hence, grounded theory with its thematic analysis is appropriate for high-fidelity HPS research. In conclusion, I suggested that the lack of applicable research to date means that the grounded theory method is required to be able to offer the broad generalizations necessary to apply the findings to a variety of simulation settings across different undergraduate nursing programs.

This paper has been submitted to the following journal and is queued for review as Parker, B. C., & Myrick, F. (2010). The grounded theory method: Deconstruction and reconstruction in a human patient simulation context.

Manuscript submitted for publication to *International Journal of Qualitative Methods.*

Manuscript 4: The Pedagogical Ebb and Flow of Human Patient Simulation: Empowering Through a Process of Fading Support

By using the grounded theory method, I analyzed the main guiding question, "What is the social-psychological process involved in using HPS as a teaching/modality to educate undergraduate nursing students?" Another related area of focus for this study was the participants' ideas on how HPS-based clinical scenarios could be designed to best meet the learning needs of modern adult learners. Glaserian grounded theory was the methodology of choice because it is a useful approach when there is a lack of research on a particular phenomenon (Wuest, 2007; Wuest & Stern, 1990); in this case, the interplay among the variables embedded in the social-psychological process involved in a high-fidelity simulated clinical session. For this study, sampling commenced with a total of 16 participants who took part in 45 semistructured interviews (see Appendix A for the invitation to participate in the interviews). Of these 16 participants, 5 were faculty and 11 were students from a baccalaureate nursing program at a degree-granting academic institution in a large urban area in Western Canada. In addition to conducting the interviews, I gathered supplementary data by observing another 28 students and two faculty participants in HPS-based clinical scenario sessions. I further supplemented the interviews and observations with field notes, memos, and journaling.

From the constant comparative process and leveled coding that are characteristic of grounded theory (Glaser, 1978; Schreiber, 2001; Walker & Myrick) emerged a substantive theory that focused on the roles of the educational practices of dynamic assessment and adaptive scaffolding in facilitating HPS-based clinical scenarios to prepare and empower nursing students for increasingly independent practice. Gradually increasing their self-regulation of the simulated clinical learning experience leads to empowerment. The core variable that was revealed was empowering through fading support; *fading support* refers to the role of dynamic assessment or adaptive scaffolding in promoting the social construction of knowledge within the HPS learning environment. The term *adaptive scaffolding* evolved from Vygotsky's (1978) social learning theory, which asserts that students learn best when they are engaged within a zone of *proximal development*. This term is defined on a basic level as the distance between what students can accomplish without assistance and what they can accomplish with the assistance of an expert (i.e., someone able to carry out the task; Lajoie, 2005; Lantoff, 2009; Vygotsky, 1978). *Scaffolding* refers to the support from the expert to assist the learners with aspects of the task that are they are unable to perform independently. This support frees the learners to focus on other aspects of the task that they can accomplish with their current knowledge level and capabilities (Stone, 1998). *Fading* refers to educators' progressive removal of support during similar learning experiences when the learners demonstrate (through dynamic assessment) increasing comfort and capacity levels to independently carry out the task (Hadwin, Wozney, & Pontin, 2005; Lajoie,

2005). This process is designed to adapt the HPS-based clinical scenario to a more learner-centric pedagogical foundation that promotes the development of sophisticated frames of reference with regard to clinical skills and knowledge.

This process emerged from the data and demonstrates potential threats by exposing students with limited experience and underdeveloped (or, for some, unrefined) knowledge to the social learning process that is characteristic of many HPS-based simulated clinical learning experiences. For many students, especially more novice learners (e.g., first- and second-year program students), there appears to be a significant potential for their self-esteem and confidence in their clinical knowledge and skills to be threatened in a high-fidelity simulated clinical session. Transformative learning theory involves the concept of a frame of reference or meaning scheme that learners develop through exposure to a phenomenon (Cranton & King, 2003; Mezirow, 1994). The meaning scheme encompasses a set of beliefs, values, and feelings about the recently experienced phenomenon (Mezirow, 1994). At first, this meaning scheme is unrefined because it is based only on the initial experience; but after repeated exposure to the phenomenon, the frame of reference develops, matures, and increases the learners' capacity to process similar experiences. Mezirow (1995) referred to this repeated exposure as "disorientating dilemmas" (p. 50) that challenge learners' meaning schemes and push them to critically reflect on the experience. Through reflection, the learners then incorporate new knowledge into their meaning schemes, which transforms their perspectives on the phenomenon (Cranton & King, 2003). Although HPS-based clinical scenarios have the potential to transform nursing students' meaning

schemes with regard to clinical practice and knowledge (Parker & Myrick, 2010), there is also the potential, as the data from this study demonstrate, to overwhelm the cognitive capacity and cause feelings of anxiety, stress, fear, and disengagement.

In summary, this study showed that high-fidelity simulated clinical learning exposure has the potential to generate feelings of performance anxiety, fear, and disengagement as a result of the complex social processes involved in the common practices of group observation and peer critiquing of a student's scenario performance. Another key theme is the challenge for students to suspend their disbelief to engage the manikin on an interpersonal level; they may also do this as a defense mechanism because of their limited experience and capacity to handle either the technology or the inherent performance anxiety. This theme was further reflected in the students' reports of the unsettling effect when the manikin's voice suddenly changed from that of a patient to that of a prompter to cue the students. Introduction of noise and acuity were also issues that threatened the ability of the students to cognitively process the experience and maximize their learning during HPS-based clinical scenarios. All of these issues reveal the need for collaboration with or the presence of an expert (e.g., a tutor) as a support during the scenario, as well as a debriefing session to assimilate the expert's experience and frame of reference with regard to the scenario phenomenon. Some of my recommendations to counter these potential threats include specific strategies such as using the adaptive scaffolding of peer observation, using the scaffolding of signal and noise, fading the simulation tutor's support, leveling

acuity and interpersonal conflict to the level of the student, maintaining role authenticity (the voice of the 'patient' through the manikin), and previously preparing students for both the simulation environment and the upcoming scenario.

This paper is being prepared for submission: Parker, B. C. (2010). *The pedagogical ebb and flow of human patient simulation: Empowering through a process of fading support.* Manuscript in preparation.

Conclusion

This dissertation will contribute to the knowledge base of nursing faculty involved in developing and implementing HPS as a teaching/modality in undergraduate nursing curricula. I believe that the thematic conceptualization of the social-psychological process that has resulted from the development of ideas, knowledge, and meaning schemes throughout my doctoral program, as illustrated in Figure 1, will inform nursing-faculty decisions on the adoption of the sound pedagogical structures of simulation learning experiences. This process has increased my awareness of the complexities of the social process that is part of the group process inherent in the simulated learning environment. It is important to note that, through sustained dissemination, this dissertation has highlighted, and will continue to do so, the importance of social constructivist learning theory consideration in the use of immersive, reality-based, high-fidelity clinical simulation sessions. But perhaps its biggest contribution to the nursing literature is that this research will lead to a better understanding of the participants' own perceptions of the HPS-based clinical scenario experience and inform the

adoption of pedagogy and educational philosophy that best meets the needs and preferences of modern undergraduate nursing students. I hope that nurses and nurse educators will avail themselves of the findings to increase their awareness of their teaching practices pertaining to the use of HPS as a teaching-learning modality. Finally, I am confident that other researchers can use the substantive theory and critical analysis of the conceptual papers within this dissertation as a springboard to promote further inquiry to maximize the potential, both currently and in the future, of this powerful technology-based learning tool.

Rigor

To promote the rigor and subsequent generalizability of the findings from this dissertation study, it is pertinent to present an overview of the strategies that I utilized to ensure the credibility of my findings. I determined the rigor and trustworthiness of this study according to criteria that are typical of qualitative inquiry and grounded theory. Glaser (1978) cautioned that grounded theory does not fit within the traditional empirical-research notion of validity. Validity is connected to facts, and the goal of grounded theory is not facts, but conceptual themes or hypotheses derived from empirical data (Glaser, 1978). Chiovitti and Piran (2003) stated that trustworthiness in qualitative research is related to credibility, and Beck (1993) explained that the credibility of a qualitative study is judged by "how vivid and faithful the description of the phenomenon is" (p. 264) to the participants' experience. Therefore, I used two strategies to ensure the rigor and trustworthiness of this study (Chiovitti & Piran, 2003; Glaser, 1978):

(a) Glaser's four criteria for judging and improving the generalizability of

grounded theory: fit, work, relevance, and modifiability (Glaser, 1978; McCann & Clark, 2003); and (b) Chiovitti and Piran's criteria for qualitative research rigor: credibility, auditability, and fittingness.

Fit

Fit refers to the criterion that the categories and eventual theory must relate to and be derived directly from the data (Glaser, 1978; McCann & Clark, 2003). In the Data Analysis section in manuscript four, the detailed disclosure of the process of coding and memoing the data through constant comparison is evidence of the link between the central theme and the data. In manuscript four, the examples of pertinent codes for each level that show increasingly higher levels of abstraction in my conceptualizations are evidence of fit. Appendix B includes examples of coding lists from open to selective and then theoretical to demonstrate evidence of the development of theory to fit the data. I should note that I use the term *example* because the leveled coding in this study rarely took a linear route in that the substantive and theoretical memoing began from the initial open codes to the determination of saturation of the data, which is typical of the constant comparative process of grounded theory. I therefore found it a challenge to create thorough and prescriptive lists of codes for each level. In addition to the interview guides (Appendixes C and D), my handwritten fieldnotes include examples of my interview questions as they developed throughout the leveled coding. Others can also review both the clean and coded transcripts from the interviews. Finally, I created both written and voice-recorded memos and journals (operational and theoretical) that I have filed and retained in a secure location;

they further demonstrate my adherence to the data from this study. My goal was to stay true to the data and to accurately reflect the learning experience of undergraduate nursing students in a simulated clinical setting.

Work

The evaluation criterion of *work* refers to the concept that any theory that emerges from the data analysis and theoretical sampling process should directly interpret what is happening in the phenomenon under study (Glaser, 1978; McCann & Clark, 2003). This process requires that the researcher ensure that the categories of a theory fit the data and adhere to the coding process. Annells (1997) suggested judging grounded theory studies for simplicity and "explanatory power" (p. 127). To that end, apart from the aforementioned strategies in the Fit section, I reviewed the interview transcripts and the coding process many times with my supervisor (who has expertise and extensive experience in grounded theory) to ensure that the theory that I created not only directly interprets the data, but also demonstrates parsimony.

Relevance

To ensure relevance, researchers must focus on not imposing their preconceived ideas or theories on the phenomenon under study (McCann & Clark, 2003). According to Glaser (1978), *relevance* refers to the related notion that a theory must emerge directly from the participants' interpretations of the phenomenon. Strong adherence to the prescribed coding strategies and researcher journaling will help to ensure that outside influence on the data is minimal. Glaser (2002) also referred to relevance related to "grab" (p. 8). For grab to occur, the

conceptually formed theory must go beyond the academic interests of researchers to grab people's attention and sensitize them to the process unveiled in grounded theory studies (Glaser, 2002). Reading the study findings should evoke a sense of "know how" for the reader and a sense that the participants' stories are reflected in the derived theory (Glaser, 2002). This occurred because I followed the data-collection and analysis strategies outlined in manuscript 4 to ensure true emergence from the data. Another strategy that I utilized to ensure grab/to the participants' interpretations included extensive use of member checking, wherein I interviewed almost all of the interview participants (16) three times each not only to check for gaps in the data, but also to ensure that my analyses of the transcripts reflected their perceptions of their experience in HPS-based clinical scenarios. In addition, in the third interview I gave the participants an overview of the core variable and the underlying processes/of dynamic assessment and adaptive scaffolding. I should note that there was 100% agreement with the core variable of *fading support* voiced by these participants, although some debated some of the processes and strategies from the themes and subcategories as presented to them (e.g., scaffolding of peer observation/), which created an opportunity for me to search for negative cases and further saturate the data. Finally, during the course of this study I was able to make oral presentations of the preliminary findings from this study at two international and one local nursing conference, and although the study participants were rarely in the audience, the grab for the conference participants was noteworthy, especially for those with

prior experience with HPS in their educational programs as either educators or learners.

Modifiability

The developed theory must be abstract enough to be adaptable to or modifiable for other similar phenomena and adjustable or modifiable when the researcher is confronted with new relevant data (Glaser, 1978; McCann & Clark, 2003). I believe that I adhered to the coding process and the constant-comparison strategy, both literally and conceptually, which promoted higher levels of abstraction in the theory. I also made an effort to ensure that the categories and core variable accurately reflect the data, which requires a willingness to adjust and recode if necessary. Manuscript 4 includes an example of the use of negative case analysis in this study in which I re-sampled and flushed out some gaps in the data that resulted from a perceived negative case analysis. Another example of modifiability in this study is the emergence of the core variable and key categories. Readers will likely note that the participants chose to extensively explore and expand upon only two (possibly three) of the initial research questions (see manuscript four) in the data-collection process because the data led my analysis and subsequent sampling down a certain trajectory and away from preconceived areas of focus.

Credibility, Auditability, and Fittingness

Chiovitti and Piran (2003) suggested the use of three broad strategies to enhance rigor in a qualitative study, which I also considered for this study. The first is credibility: The researcher must accurately reflect the participants'

discourse and openly discuss his or her personal beliefs and views (Chiovitti & Piran, 2003). Checking the theory developed against the participants' meanings is one way to ensure accurate analysis, which can be accomplished by using the theoretical sampling strategy of seeking new data or participants to confirm or clarify conceptualizations. I used these strategies as well as member checking to ensure that the themes reflected the participants' perceptions of the phenomenon of HPS-based clinical scenarios.

The second strategy is the standard of auditability, which involves using and reporting the methods used to allow another researcher to reach conclusions similar to those from the original study (Chiovitti & Piran, 2003). In disseminating the findings, I took extensive steps to be organized and transparent in delineating the data-collection and -analysis strategies and in clearly defining sampling specifics throughout the study. This process is demonstrated to some degree in the appendices of this dissertation, but can also be found in the files (both electronic and hard copy) that I have secured as per university protocol. The files include not only the clean and 'dirty' transcripts from the interviews, but also extensive fieldnotes, theoretical memoing, and operational journaling to demonstrate transparency. Of particular pertinence is the structured organization of coding and thematic categories that I can make available to other researchers to view the development of my findings.

Finally, Chiovitti and Piran (2003) define *fittingness* as transferability, which indicates that the findings have meaning and can be extrapolated to other similar phenomena. Therefore I made extensive efforts not only to clearly outline

the sample, setting, and data-analysis strategies, but also to review the literature pertaining to emergent categories and incorporate it into the analysis (e.g. manuscript four). As Chiovitti and Piran noted, highlighting the links between the literature and the study findings increases the transferability or fittingness of the findings. Anecdotally, I wish to note the discussions with my supervisor with regard to the literature from education and nursing that is linked to the budding themes. After these discussions and subsequent literature reviews, I either incorporated or dropped theories from the literature, depending on their relevance to the emerging core variable.

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CHAPTER 2:

A CRITICAL EXAMINATION OF HIGH-FIDELITY HUMAN PATIENT SIMULATION WITHIN THE CONTEXT OF NURSING PEDAGOGY

Abstract

The use of high-fidelity human patient simulators (HPS) have been embraced by nursing education programs in the development of immersive clinical simulations despite the lack of research into a pedagogy or educational philosophy appropriate to guide this technology-based learning tool. In this article we explore this approach to clinical teaching through a critical examination of the application of behaviorist and constructivist pedagogy to high-fidelity scenario-based simulation sessions. Practical guidelines for developing simulation-based learning sessions that reflect both philosophical paradigms are provided. Consideration is also given to societal trends such as the digital revolution and the incoming millennial generation who represent the aptitude of the modern nursing student to utilize high-fidelity realistic and immersive simulation. Depending on the desired goal of simulator utilization, the nurse educator may want to draw on constructivism or behaviorism or a blend of both educational philosophies to best meet the needs of the adult learner.

The widespread integration of technology-based educational tools into nursing curricula is raising concerns that technology rather than sound philosophically-based pedagogy is informing nursing education (Day-Black & Watties-Daniels, 2006). One of the predominant technology-based tools being integrated into undergraduate nursing education is high-fidelity human patient simulators ([HPS] Hoffmann, O'Donnell, & Kim, 2007; Rhodes & Curran, 2005). Scenario-based HPS sessions are an exciting tool designed to incorporate realistic clinical situations in a safe environment that allows student nurses to develop cognitive schema around the clinical skills required in the modern complex and ever-changing healthcare system. Unfortunately, despite a growing list of nursing education programs embracing high-fidelity HPS, there is a lack of research into the educational philosophy that informs nursing pedagogy to guide the use of this technology-based educational tool (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999).

The purpose of this paper is to consider the predominant educational philosophies of behaviorism and constructivism that guide modern nursing pedagogy and explore how each philosophical perspective impacts high-fidelity HPS integration into nursing curricula. The authors will explore the trends in learning and technology as a base for discussing how nurse educators can strengthen their awareness of their own philosophical perspectives that impact the pedagogy of a scenario-based HPS program. Each paradigm will be discussed within the context of a simulation approach to clinical teaching and practical guidelines informing HPS-based learning sessions will be presented. The authors

contend that the proliferation of high-fidelity HPS utilization in nursing education calls more than ever for educators to possess a sound grasp of educational philosophy to inform nursing pedagogy and how that influences the use of technology-based educational tools.

High-Fidelity Human Patient Simulators

Prior to considering the impact of educational philosophy on HPS implementation, and owing to the many discrepancies in the definition of the terminology in the literature, the author will define what is meant by *human patient simulator* (*HPS*) and discuss considerations for utilizing this educational tool in undergraduate nursing education. High-fidelity HPS is a computer-controlled mannequin that mimics interaction with students in a controlled simulated clinical setting (Bearnson & Wiker, 2005). Bearnson and Wiker state that a high-fidelity HPS will respond to clinical interventions (e.g., medication administration, oxygen therapy) in a realistic way. The clinical setting is replicated via a simulated hospital room, and the mannequin is the "patient." The instructor has ultimate control of the HPS and the ability to guide clinical scenarios (e.g., cardiac arrest). The term *high-fidelity* refers not only to the level of technology built into the mannequin, but also to its ability to provide the learner with a highly realistic, "humanlike" clinical immersion session (Yaeger et al., 2004). Modern HPS mannequins are able to demonstrate physiological responses to programmed illness and nursing interventions. The more advanced models can, among many things, speak, breathe, and even perspire (METI, 2004).

Ultimately the aspects of realistic immersion and high technology inherent in the HPS blend nicely with the learning needs of the modern adult learner.

High-fidelity HPS and its advanced physiological features can be utilized in a variety of educational environments to enrich the learning experiences of the undergraduate nursing student. Student and faculty can avail of the benefits of simulation in both the classroom and the clinical setting. For example, Nehring, Ellis, and Lashley (2001) refer to the use of HPS in theory courses in which a mannequin aids in illustrating physical assessment techniques along with normal/shifts in the health continuum, pathophysiological principles, responses to medications, changes in health states, and responses to interventions. Portability is an issue with older HPS models, but recently developed wireless models allow the nurse educator much easier portability and classroom accessibility. For clinical courses nurse educators can utilize and develop scenarios based on realistic human patient situations (Nehring et al., 2001). This feature is vital because nursing education is fraught with challenges that make it increasingly difficult to expose student nurses to the diversity and acuity of clinical experiences required to maximize skill development and knowledge acquisition (Porter-O'Grady, 2001; Tanner, 2002, 2006). Through the use of HPS-based clinical scenarios, student nurses can be exposed to a variety of clinical experiences that are often not accessible in the increasingly stressed and complex modern healthcare environment. Nehring et al. (2001) summarize the benefits of incorporating an HPS-based clinical scenario into nursing curricula, including student nurses' ability to make mistakes in a safe setting, the demonstration of physiological

concepts that students may find challenging to grasp in a standard lecture or in readings, and students' ability to visualize physiological responses to medications and nursing interventions. Other benefits include improved decision making and critical thinking (Nehring et al., 2001), along with the perception of undergraduate nursing students' increased confidence and self-efficacy after they experience a simulated clinical scenario (Madorin & Iwasiw, 1999). Studies also demonstrate evidence that Objective Structured Clinical Examination (OSCE) scores improve for undergraduate nursing students who experience skills training in an HPS-based learning environment (Alinier, Hunt, & Gordon, 2004; Alinier, Hunt, Gordon, & Harwood, 2006). Finally, perhaps the most pertinent benefit is that students often perceive the skills and knowledge that they acquire during simulated clinical scenarios as readily transferable to the clinical area (Bremner, Aduddell, Bennett, & VanGeest, 2006; Feingold, Calaluce, & Kallen, 2004).

Although the incorporation of simulation into nursing curricula imparts many apparent benefits, the costs associated with the initial setup and maintenance of a simulation laboratory can often be a significant challenge to nursing programs. In keeping with the current market system, as with other aspects of adult education or like many technology-based learning tools, simulation is a costly endeavor. If we in nursing education are to benefit from this particular approach to teaching and to maximize its contribution to learning it would, therefore, behoove us not only to consider the benefits and costs of HPS utilization, but also to address the underlying pedagogical theory and philosophy that serve to inform this particular learning modality.

The Millennial Generation and Trends in Learning

The need to critically examine different teaching and learning approaches within the context of nursing pedagogy is important especially considering how the values and beliefs that underpin such approaches inform their introduction to the teaching and learning process. Indeed, the pedagogical process is rapidly changing because of the proliferation of technology (Koller, Harvey, & Magnotta, n.d.; Roblyer, 2003), and the incoming millennial-generation learners in postsecondary education who expect cutting-edge technology to be integrated into their educational programs (Bassendowski, 2007). This familiarity has impacted general preferences for the creation of learning experiences.

Millennial generation nursing students require pedagogy based on collaboration, familiarity with the process of learning, an increased participation in their own learning, and increasingly realistic immersion (Skiba, 2007). Bassendowski (2007) states that this generation prefers learning experiences that incorporate teamwork. Their fondness for collaboration helps student nurses to engage and function within an increasingly complicated healthcare environment (Bassendowski, 2007). Also, technology has increased the complexity of life in general, shifting society away from the traditional philosophy of skills learning to "learning to learn" (Dede, 2005, p. 10). The digital revolution has shifted the layperson from a traditional spectator role to a participatory role in media dissemination (Koller et al., n.d.), and modern learners are now familiar with and prefer creating and disseminating their own ideas and knowledge.

Day-Black and Watties-Daniels (2006) ascertains that technology has had and will continue to have a profound effect on the student-teacher relationship and on the processes of disseminating information. The millennial generation experiences this impact in the process of knowledge construction (Day-Black & Watties-Daniels, 2006; Dede, 2005; Skiba, 2007). Millennial learners, through their familiarity and comfort with Web-based interaction and virtual environments, have developed a preference for immersion as a learning methodology (Skiba, 2007). Dede argues that the emerging generations will construct their knowledge through mediated immersion. The concept of mediated immersion brings to light the possible contributions of HPS-based clinical nursing scenarios in meeting the educational needs of the modern adult learner.

Educational Philosophy and High-Fidelity Simulation

As noted previously, forces such as the proliferation of technology, the digital revolution, and the millennial generation will inevitably alter nursing pedagogy. Depending on the desired learning outcomes, effective implementation of high-fidelity HPS requires an awareness of the learning principles garnered from the different philosophical paradigms or educational theories of behaviorism and constructivism, both of which have had a major influence on curriculum development in nursing. Scenario-based HPS is a powerful tool if properly utilized, but it is merely a tool, requiring knowledge of pedagogical principles for proper implementation (Shovein, Huston, Fox, & Damazo, 2005).

Behaviorist-Based Simulation

Behaviorist philosophy has historically formed the underpinnings of nursing pedagogy (Bevis, 1993; Ironside, 2001; Romyn, 2001). Behaviorism emanates from empiricism and centers on the concept that laws govern human behavior (Cohen, 1999). Theorists believe that the environment shapes behavior, that others determine behavior, that it is independent of the individual, and that it can be manipulated to produce desirable actions (Cohen, 1999; Dabbagh & Bannan-Ritland, 2005; Roblyer, 2003). Cohen states that internal thought processes are not considered in behaviorism, which therefore leads to the theory that behavior must be observed. In behaviorist pedagogy the human mind is perceived as a memory bank for accumulated knowledge (Grunwald & Corsbie-Massay, 2006). Individuals learn through the responses of others to their behavior that lead to satisfying results (Cohen, 1999), and the repetition of these satisfying results causes learning (Cohen, 1999; Grunwald & Corsbie-Massay, 2006). Without repetition the knowledge developed erodes from the memory bank and is eventually lost (Grunwald & Corsbie-Massay, 2006). For the behaviorist, the role of the instructor is to transmit knowledge and the role of the learner is to be a passive recipient of this transmission (Roblyer, 2003). Finally, Ironside (2001) notes that traditional nursing education has relied on designated outcomes, acontextual knowledge, and the ultimate goal of amassing knowledge.

Conventional behaviorist pedagogy, however, is increasingly less prominent within the discipline of nursing (Bevis, 1993; Ironside, 2001; Romyn, 2001). Interpretive learner-centric pedagogies based on feminist,

phenomenological, and humanist philosophies (among others) are perceived to be an alternative to meeting the learning needs of the modern nursing student (Ironside, 2001). Despite this philosophical shift, many nursing scholars contend that the Tyler model of behaviorism still has a role in psychomotor clinical skill acquisition (Ironside, 2001; Romyn, 2001). Even Bevis (as cited in Romyn, 2001), a renowned critic of traditional behaviorist-based nursing pedagogy, admits that "there is nothing inherently wrong with Tylerian behaviorism and [Bevis] acknowledges its applicability to technical aspects of nursing" (p. 3).

Other disciplines including education have deemed behaviorist pedagogy necessary for skill acquisition and learning in the sciences (Roblyer, 2003; Tomei, 2005). Medical educators also regard behaviorist educational methods as well suited to psychomotor skill acquisition (Grunwald & Corsbie-Massay, 2006). Roblyer discusses the rationale for the effectiveness of behaviorist pedagogy in psychomotor skill acquisition and draws on the work of Gagne and Bloom in referring to the concept of automaticity of skills. Automaticity of skills' theory stipulates that some vital skills are better learned with little conscious effort, which can assist the learner in retaining and then rapidly recalling basic facts, rules, and skills (Roblyer, 2003). Critics argue, however, that behaviorist pedagogy's passive-learner role limits the ability to engage students in developing problem solving skills and skills in viewing contextually broader concepts (Roblyer, 2003), yet it may be this limited conscious effort or rote learning that allows student nurses to automatically recall vital technical skills and clinical concepts.

Behaviorist-Based Guidelines for HPS Utilization

Basic guidelines for developing high-fidelity HPS sessions with the goal of psychomotor skill acquisition or rote learning of factual knowledge must consider behaviorist philosophy. Tomei (2005) advises avoidance of extraneous information by focusing on just the target skill or concept being taught within the high-fidelity simulation environment. There may be a tendency, in an effort to create a realistic clinical environment, to provide realistic yet gratuitous environmental distractions that are present in the everyday healthcare setting. When the goal is, however, the acquisition of psychomotor skills and factual knowledge, there is a risk in overwhelming the students' cognitive load and hindering their ability to process and retain the target knowledge (Grunwald & Corsbie-Massay, 2006). Nurse educators need to consider the complexity of a scenario with the end goal of factual knowledge or skills learning. For example, if the goal of a simulation session is to help students to practice and retain the skill of IV medication administration, it is important to avoid scenarios that introduce extraneous interpersonal information or complicating medical illnesses for the "simulated" patient, thereby allowing student nurses to focus solely on the skill of IV medication administration.

Other considerations in developing HPS sessions with behaviorist underpinnings include repetition, classroom supplementation, and modular learning. Roblyer (2003) describes the concept of drill and practice in skill acquisition. It can be a useful strategy for nurse educators to require nursing students to practice the basic target skill with a focus on repetition until they

develop cognitive schema for easy recall. Repetition of the target skill then requires prompt instructor feedback on the learner's actions. Tomei (2005) advocates that behaviorism calls for immediate feedback and reinforcement to change behavior. Regular and prompt feedback is required in the HPS-based simulation setting to help students to fill in the blanks in the cognitive schema that they have developed around the clinical skill. Tomei also notes evidence in the literature that supplementing simulation exercises with in-class instruction improves the acquisition of skills. Providing theoretical knowledge prior to the practice of a clinical skill in a simulated clinical setting allows for proper cognitive structuring of the desired information. Modular learning of programmed instruction needs also to be considered (Tomei, 2005). It is often advantageous to divide the knowledge or skills into small chunks or modules (Grunwald & Corsbie-Massay, 2006; Tomei, 2005). This approach provides the student with small chunks of information to incorporate and thereby avoids the risk of overwhelming the cognitive processes (Grunwald & Corsbie-Massay, 2006; Tomei, 2005). Modules used within HPS sessions can also incorporate more learner-centric pedagogy.

It may be useful to afford students the freedom to organize the modules from which they practice in the simulation setting. This process would involve creating different modules, each one focused on a specific psychomotor skill (e.g., intravenous medication administration), that could be organized into a personal schedule to accommodate each particular student's learning preferences. A clinical group of four to five students would typify the average simulated clinical

session. Owing to the fact that it would be impractical for most programs to accommodate individual student access to the simulation lab, the student group would ,in turn, be required to agree upon the organization of the modules. Despite this limitation, however, small clinical group decisions regarding modular organization would still provide a learner-centric focus than instructor dictated modular schedules.

Constructivist-Based Simulation

A constructivist approach to teaching and learning is based on the concept that learners create their own meaning through interaction with the environment (Cohen, 1999; Dabbagh & Bannan-Ritland, 2005). For the constructivist, learning is constructed knowledge (Roblyer, 2003; Tomei, 2005; Yilmaz, 2008), and knowledge is viewed as a symbolic construct in the learner's mind (Tomei, 2005). Compared to behaviorism, constructivist pedagogy argues that knowledge transmission is not inertly passed from teacher to learner but, rather, is created by individual learners, or in some cases groups of learners (e.g., HPS-based clinical scenarios), by processing experiences and interactions with their environment (Maclellan & Soden, 2004; Peters, 2000; Yilmaz, 2008). Roblyer states that the constructivist shapes knowledge from everything and connects personal attitude and aptitude to previous constructed knowledge. For new learning to occur, knowledge must be integrated into the learner's existing cognitive schema (Gillani, 2003; Grunwald & Corsbie-Massay, 2006; Yilmaz, 2008), which occurs largely as a result of conflict. Building on Piaget's concepts, constructivists see conflict with what the learner already knows as a vital component of the learning

process (Cohen, 1999; Gillani, 2003; Yilmaz, 2008). This causes cognitive imbalance, and the learner creates a question, which leads to an inner quest to restore balance to the inner cognitive structure (Cohen, 1999). The inner conflict relies heavily on the learner's reflection to create new knowledge (Grunwald & Corsbie-Massay, 2006; Peters, 2000; Yilmaz, 2008), with the ultimate result that knowledge is unique to each person (Roblyer, 2003). This serves to counteract the behaviorist's notion of an ultimate truth or reality.

Tomei (2005) explains that the literature encourages the use of constructivist learning environments in technology-based learning such as HPS simulation. Dabbagh and Bannan-Ritland (2005) view simulation as a type of exploratory or inquiry-based learning and describe a high-fidelity HPS session, when it is closely aligned with constructivism principles, as experiential and inquiry based and as supporting generative learning. Proper structure of the scenario can allow learners to develop their own hypotheses and, by responding to their own actions, reconfigure their cognitive schema (Dabbagh & Bannan-Ritland, 2005). If it is designed appropriately, HPS-based scenario sessions can reach the higher cognitive domain levels through the use of poorly structured problem-solving scenarios (Dabbagh & Bannan-Ritland, 2005). This process ultimately leads to active learning, which allows students to create their own learning objectives and goals. Constructivist pedagogy considers learning "more of a process of making links and connections than of working through someone else's way of developing thought" (Collis; as cited in Docherty, Hoy, Topp, & Trinder, 2005, p. 532).

Constructivist-Based Guidelines for HPS Utilization

Magee (2006) notes that true constructivist-based pedagogy presents inherent challenges to the design of simulation experiences. Constructivism removes the notion that an educator can create well-structured learning sessions that result in all of the participants garnering the same knowledge (Magee, 2006). Truly learner-centric instruction that allows complete autonomy on the part of the learner may not be realistic in developing HPS clinical scenarios. The goal instead is to develop instructor-facilitated learning experiences. Wilson (as cited in Magee, 2006) notes that the goal of constructivist-based simulation is to provide a facilitated problem-solving scenario and give students access to a variety of information resources. Therefore constructivist-based clinical scenarios should direct student nurses toward a specific learning objective, yet afford them the freedom to access information sources independently, think critically, and develop their own resolutions to the problem within. Magee suggests that although the focus of the learning activity is defined within this instructional design, the learner's path is not restricted to reaching the learning goals, which thereby maintains the principles of constructivism. This process will also assist students in developing clinical judgment skills and promote skills in seeking information. It may still be useful for the nurse educator, however, to allow student input into the development of simulation curriculum that focuses on students' perceptions of their learning needs. Ironside (2001) suggests that negotiated objectives (where possible) may be useful in promoting learner-centric instruction. Allowing student nurses input into the learning objectives that guide a

HPS-based clinical scenario may be feasible in some situations and should enhance the students' perceptions of autonomy, thereby adhering to constructivist educational principles. A balance should be sought between instructor-facilitated HPS-based scenarios that still strive to promote learner-centric design.

Besides problem-solving and clinical-judgment skill development, high-fidelity HPS scenarios can be designed to support skill development in teamwork and collaboration. One of the benefits of simulated learning environments is the encouragement of group collaboration in the problem-solving process (Cohen, 1999; Dabbagh and Bannan-Ritland, 2005). Although students can experience clinical simulation in nursing education on an individual level, small groups are usually the norm. Dabbagh and Bannan-Ritland (2005) caution that poorly structured problem-solving scenarios encourage social negotiation. This can result in collaborative learning and the development of group-process skills (Dabbagh and Bannan-Ritland, 2005). The role of the nursing instructor as facilitator should be maintained during group collaboration. Students often value expert intervention within the group problem-solving process (Cohen, 1999). Vygotsky (as cited in Cohen, 1999) argues that social interactions facilitated by experts help to mediate the exchange between new information and the learner's existing cognitive schema. The instructor works to create mental conflict within learners and thereby challenges their level of understanding (Cohen, 1999; Dabbagh & Bannan-Ritland, 2005).

Conclusion

Nursing education has embraced technology-based learning as a tool designed not only to improve instruction, but also to meet the learning needs of the incoming generation of nursing students. High-fidelity scenario-based HPS utilization is one of the predominant technology tools incorporated into nursing curriculum, yet little research has been conducted to develop a guiding philosophy (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). Although research is vital to the development of a body of evidence to lead practice, nurse educators must also familiarize themselves with the appropriate pedagogical utilization of simulation. As noted above, depending on the objective of the learning session, behaviorism and constructivism can both provide a basis for the incorporation of HPS scenarios into nursing curricula. Behaviorist-based simulation is considered more effective in the development of psychomotor skills and rote learning of factual knowledge (Roblyer, 2003; Tomei, 2005). Conversely, constructivist-based simulation is deemed more valuable in developing clinical judgment skills, problem-solving, collaboration, and group process (Dabbagh & Bannan-Ritland, 2005). Yet there is evidence to show that nurse educators should consider a blend of the philosophies in developing simulation-based curricula (Docherty et al., 2005; Roblyer, 2003; Weyenberg, 1998). Whether informed by constructivism, behaviorism, or a blend of philosophical constructs, pedagogy serves to enlighten our thinking related to nursing-education strategies such as the HPS-based simulated clinical scenario. Dewey (1938) cautioned that curriculum developed without a sound philosophical foundation leaves educators at the mercy of the

latest educational and technological fads without any depth of thought as to why it is appropriate, relevant or even pertinent to the teaching and learning process. Consideration of educational philosophy, theory and pedagogy are required to ensure that the nurse educator maximizes the potential benefits of human patient simulation for the modern nursing student.

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CHAPTER 3:

TRANSFORMATIVE LEARNING AS CONTEXT FOR HUMAN PATIENT SIMULATION

Abstract

Nurse educators are charged with the responsibility of empowering novice nurses to become autonomous thinkers with the capacity to cope with the many challenges of modern day practice. Human patient simulation is a powerful technology-based learning tool ideally suited for the application of emancipatory pedagogies that aid in the transformation of individual meaning schemes. Transformative learning theory provides educators with the tools to empower students to challenge their preconceived beliefs, assumptions, and values and socialize them appropriately to thrive in modern day clinical practice. The purpose of this paper is to critically analyze the role of clinical scenarios using human patient simulation in promoting transformative learning events in undergraduate nursing education. The authors focus on the role of debriefing in the promotion of the critical reflection and social discourse that is integral to the transformative learning process and the implementation of scenarios that provide students with disorientating dilemmas for perspective transformation.

Human patient simulation (HPS) has been adopted in nursing education programs because of its ability to provide undergraduate baccalaureate nursing students with immersive, reality-based clinical experiences (Bearnson & Wiker, 2005; Yeager et al., 2004). Simulated clinical scenarios are developed to utilize the technology inherent in the high-fidelity simulated mannequins designed to mimic human physiological responses to illnesses, trauma, and nursing interventions (Bearnson & Wiker, 2005; Yeager et al., 2004). Although a growing body of evidence has validated the use of this technology-based learning tool, further research and critical analysis are needed to promote the most effective application of HPS in nursing education (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999).

As Dewey (1938) noted, without proper reflection on our underlying values and beliefs about teaching and learning, we leave the education of our students to the whim of every educational trend that comes our way. Thus we need to be diligent in analyzing and contextualizing the role that educational theory and philosophy play in our pedagogical practices to understand the impact of the adaptation of learning tools such as HPS on our students and ultimately on their professional practice (Shovein, Huston, Fox, & Damazo, 2005).

One of the responsibilities of nursing education is to help adult learners develop knowledge applicable to practice. As educators we are charged with the challenge of socializing students into the profession of nursing and providing them with opportunities to acquire the requisite knowledge and cognitive processes to practice in an increasingly complex healthcare environment (Brennan

& McSherry, 2007; Lindeman, 2000). To guide students in this cognitive transformation it is incumbent on educators to continuously critique the curriculum and the educational practices that contribute to student socialization and their knowledge development and skills in preparation for patient care. HPS is a powerful tool, but it is only a tool (Shovein et al., 2005).

Cranton and King (2003) note that *both knowledge and knowledge of teaching* can be emancipatory. In other words, if HPS is deemed to be a valid tool in nursing education, it is important that we critically analyze our educational practices and reflect on not only *how* they work, but also *why* they work (Cranton, 1996). If a goal is to transform our students into professionals with the cognitive ability, skills, and knowledge to practice in today's healthcare environment, it is important that we assess the tools we utilize to assist students in this transformation. HPS is one such tool that potentially provides students with complex learning environments that, when properly designed, can reflect a reality-based clinical environment that leads to transformative learning.

The purpose of this paper is to critically analyze the role of HPS-based clinical scenarios play in contributing to transformative learning for student nurses who are preparing to enter practice in today's healthcare setting. From this perspective, the authors will: a) review transformative learning theory as espoused by Mezirow (1994, 1995); and b) discuss the basic process of transformative learning and the role that critical reflection plays in the promotion of autonomous thinking in adult learners. This process will be followed by a discussion regarding the role of simulation in promoting transformative learning in our pedagogical

practices. In particular, the authors will explore the importance of the debriefing phase of the simulation learning experience in encouraging critical reflection, a key consideration in adult-learning and transformative-learning theory.

High-Fidelity Human Patient Simulation

Because of the various definitions of HPS in the healthcare literature, it is important to define *high-fidelity HPS* as it is conceptualized throughout this paper. Bearnson and Wiker (2005) describe HPS as a computer-controlled mannequin designed to provide practitioners with human-like responses to nursing interventions such as medication administration, catheterization, and oxygen therapy (among others). The mannequin is designed to appear human the functions of which are controlled by the instructor via a computer, which allows him/her to direct scenarios that mimic illness and trauma via interactive physiological systems such as cardiovascular, respiratory, and neurological (among others). High-fidelity implies that these mannequins are technologically advanced and able to, among many things, speak, breathe, and perspire (Medical Education Technologies, Inc., 2004). With properly designed surroundings that replicate a hospital room, the goal is to provide students with a reality-based immersive clinical experience (Yeager et al., 2004).

Prior to engagement in the scenario, some form of orientation usually occurs (Rhodes & Curran, 2005). This process may include providing students with specific learning objectives to increase their familiarity with the physiological conditions encountered in the scenario and/or time to spend with the HPS mannequin to decrease the stress of interacting with this high-fidelity

educational tool. Students are engaged in a predesigned clinical scenario in groups often comprised of four to five students who assume different roles in the treatment team (Rhodes & Curran, 2005). Examples of possible treatment-team roles include the recorder, the primary nurse, and alternate care providers (Rhodes & Curran, 2005). Once the scenario is completed, the protocol requires students and a facilitator to engage in a debriefing mode to allow them an opportunity to dialogue on their perceptions of their performance, problem-solve decisions that they have made, and share in a supportive evaluation process, all of which will assist them to reinforce the learning and knowledge development that has occurred (Rhodes & Curran, 2005). Rhodes and Curran suggest that the faculty member should function primarily as a facilitator throughout the debriefing process. Throughout the simulation learning experience it is important to ensure the promotion of student autonomy and empowerment thereby affording them the opportunity to develop knowledge that is relevant to their own perceived learning needs.

Transformative Learning Theory

Transformative learning derives from the premise that the today's adult learner needs to develop the ability to become an independent autonomous thinker (Imel, 1998; Mezirow, 1997). The authors contend that an HPS-based clinical scenario with its constructivist pedagogical underpinnings that foster interpretive, generative learning (Dabbagh & Bannan-Ritland, 2005; Magee, 2006) is ideally suited to promote transformative learning. Mezirow is considered the creator and predominant scholar regarding the theory of transformative learning (Imel, 1998;

Whitelaw, Sears, & Campbell, 2004). His conceptualization of transformative learning theory reflects three central themes that include the role of experience, rational discourse, and critical reflection in knowledge development for the adult learner (Imel, 1998). Transformative learning theory has many conceptualizations, but for the purposes of this paper the authors focus on transformative learning theory as espoused by Mezirow. This classical version provides a foundation for a critical analysis of the role of HPS-based clinical scenario debriefing in transforming cognitive schema, including beliefs and attitudes that enable the student nurse to function in the complexity of today's healthcare context.

Mezirow's transformative learning theory has developed into "a comprehensive and complex description of how learners construe, validate, and reformulate the meaning of their experience" (p. 22). Cranton and King (2003) note that at the heart of transformative learning is the basic concept that learners develop their understanding of the world through experiences. They then develop habits of the mind in which they expect that what happened once will invariably happen again (Cranton & King, 2003; Mezirow, 1994). This process is in essence a frame of reference for a particular experience that is developed through an uncritical lens that allows individuals to create values, assumptions, and beliefs about a particular phenomenon with minimal thought or cognitive processing (Cranton & King, 2003). Mezirow (1994) refers to this frame of reference as a *meaning scheme*, which is comprised of "constellations of concepts, beliefs, judgments, and feelings which shape a particular interpretation" (p. 223). True

learning occurs when individuals are faced with a crisis or major transitional experience, to which Mezirow (1995) refers as a "disorientating dilemma" that challenges and alters their rudimentary frames of reference (p. 50). Although Mezirow notes that, for some, the transformation occurs through a gradual accumulation of related experiences that progressively alter individual meaning schemes, the end result is similar: the transformation of meaning schemes that affect how individuals interpret and interact with the world.

Perspective Transformation

The essence of transformative learning theory is that learners alter their meaning schemes or frames of reference and use their new perspective when they subsequently engage with the world (Whitelaw et al., 2004). Cranton and King (2003) cited Mezirow and Associates (2000) in noting that transformative learning occurs when learners confront the disorientating dilemma and critically appraise the previous frame of reference about the phenomenon or experience in question. True constructive learning occurs when this appraisal transforms our perspective or habit of the mind into an alternative way of interacting with the world (Cranton & King, 2003). Mezirow (1994) uses the term *perspective transformation* to describe the process of changing an individual's meaning structures or frames of reference in the face of a disorientating dilemma.

> Perspective transformation begins when we encounter when we encounter experiences, often in an emotionally charged situation that fail to fit our expectations and consequently lack meaning for us, or we encounter and anomaly that cannot be given coherence either by learning within existing schemes or by learning new schemes. (Mezirow, 1991, p. 94)

Culture, together with previous experiences, forms the aforementioned frames of reference, which ultimately impacts how individuals relate to and interpret the world (Imel, 1998). The impact of culture and society on the development of meaning structures in transformative learning theory reflects a relation to emancipatory and critical pedagogies that philosophers such as Freire (1974/2000) and Dewey (1916/2005) espoused. Both Freire and Dewey viewed education as a medium for social change that involves personal evolution and development (Dewey, 1916/2005; Freire, 1974/2000; Purdy, 1997). Learning has the potential for personal evolution and transformation to push the adult learner to the level of an autonomous and empowered thinker (Imel, 1998; Mezirow, 1995).

During learning, students acquire new information, which they then interpret using their existing meaning structures. This process can suddenly or, in some instances, gradually transform perspectives into new ways of interpreting phenomenon; impact values, beliefs, and previously held assumptions; and lead to true transformative learning (Imel, 1998). Mezirow (1994, 1978) believes that perspective transformation occurs through a rational process that begins with an experience of the disorientating dilemma, followed by self-examination and assessment of assumptions, connection with others who are experiencing similar transformations, discovery of new ways of interpreting meaning, the creation and trial of a new plan of action, and, finally, the building of confidence towards reintegration into the world reinforced with a new perspective (Cranton, 1994; Imel, 1998; Mezirow, 1995). This process leads to knowledge acquisition, during

which individuals critically examine their beliefs, assumptions, and values surrounding a particular situation (Whitelaw et al., 2004).

Critical Reflection

The key for Mezirow is that individuals faced with disorientating dilemmas use critical reflection to alter their frames of reference and thereby alter the way they interpret and interact with others (Cranton, 1996; Mezirow, 1998; Whitelaw et al., 2004). Assumptions, beliefs, and values that form our frames of reference can be predicated on "epistemological, logical, ethical, psychological, ideological, social, cultural, economic, political, ecological, scientific, spiritual, or pertain to other aspects of experience" (Mezirow, 1998, p. 186). Individuals use three basic methods to interpret experiences through critical reflection: content reflection, process reflection, and premise reflection (Cranton, 1996; Cranton & King, 2003; Mezirow, 1991). Analysis of the content or information presented through interaction with others who are experiencing a particular phenomenon is often followed by process reflection, in which analysis is centered on the strategies used for problem solving instead of content. Finally, premise reflection involves a process of analyzing the relevance of the assumptions, values, and beliefs that underlie the problem (Cranton, 1996; Cranton & King, 2003; Mezirow, 1991). Personal transformation occurs when individuals critique the premises on which they interpret and engage a phenomenon (Mezirow, 1998). This form of reflection involves questioning the problem itself rather than merely focusing on the content or process involved in a potential learning experience (Cranton & King, 2003). Eventually, through the impact of the disorientating

dilemma, individuals become enlightened on their rudimentary or potentially narrow frames of reference.

Through the process of engaging in a social learning process with their peers in a simulated clinical setting, student nurses may encounter challenges to their beliefs, values, and assumptions that disorientate their habits of the mind. Discourse and the testing of meaning in a group in a simulated clinical setting, followed by the debriefing process, will, we hope, help students to open up their assumptions to critique. Similar to the principles of constructivist pedagogy (Cohen, 1999; Gillani, 2003; Yilmaz, 2008), learners seek to restore homeostasis in their thinking, but in doing so transform their frames of reference and thus how they create meaning in relating to the world and those around them. Appropriately developed HPS-based simulated clinical scenarios have the potential to present student nurses with Mezirow's (1995) disorientating dilemmas, which can potentially empower them to transform their learning and their frame of reference for engaging the world and their patients. Technology itself or more specifically, technology-based learning tools such as HPS can in their own way expose student nurses to disorientating dilemma. As Whitelaw et al. (2004) states, "The incorporation of instructional technology into teaching practice increases complexity in an already complex environment and introduces a realm of expertise apart from the subject matter" (p. 13), which results in conditions that can trigger the transformation of frames of reference. Although technology-based learning tools such as HPS are an adaptable resource to facilitate the transformation of perspective, according to transformative learning theory, the

social learning process requires a focus on communication and discourse to foster perspective change.

Social Discourse

Many scholars have contended that learning is most effective if it is embedded in social discourse and group experience (Glaser, 1991; Whitelaw et al., 2004). For Mezirow (1998), true transformative learning requires dialogue and discourse "to understand the meaning of what is being communicated" (p. 188) and to filter this communication through our frames of reference. Discourse involves presenting and assessing evidence and beliefs in an attempt to find understanding and agreement, which leads to insights into a disorientating dilemma (p. 196). Social discourse with groups of learners is required to validate and incorporate learning (Mezirow, 1998). The development of enlightened frames of reference requires validation through a broader range of insight than the individual possesses (p. 197). Cranton (1994) notes that transformation requires considerable discussion with others to confirm new perspectives. The community in which individuals interact is influential in providing powerful norms and cultural influence.

For nurse educators, contextual settings and complex learning environments can support social discourse and the development of autonomous knowledge and meaning. Whitelaw et al. (2004) argue that authentic contextual problem solving through social discourse exposes learners to cognitive demands similar to those required to contend with real-life situations. In fostering social discourse, educators can facilitate transformative learning by creating

environments that cultivate trusting, caring relationships among students (Imel, 1998). Imel cited Loughlin (1993) in noting that this process helps unite teachers and students in creating a learning community that is unified trying to make meaning of a shared learning experience. When using the term unified, it should be remembered that learners share responsibility for the quality of the learning experience in facilitating transformative learning (Imel, 1998). By considering transformational learning theory, nurse educators can decide whether to encourage blind socialization of new nurses into the culturally influenced 'norms' and instructor-centric knowledge or promote critical reflection and the development of autonomous meaning and knowledge (Cranton & King, 2003). Do we as nurse educators want to encourage students to blindly follow the culture of nursing or empower them to develop new frames of reference and thereby transform the way that nurses interact with the world? When such an approach emanates from a constructivist pedagogy, simulation-based curricula in nursing education has the potential to empower students toward transformative learning by incorporating learner-centric principles in the simulated clinical, which leads to the transformative discourse of the debriefing process.

Through a Contextual Lens

Mezirow (1991) presents a set of goals for educators to consider in promoting transformative learning through the development of autonomous learning skills and in promoting learning relationships with other peers who are also experiencing a simulated clinical. These include aiding the student in performing individual learning-needs assessment; encouraging students to define

and evaluate their own learning goals; promoting learning experiences that oblige students to make choices during the interaction in a group setting, thereby fostering adoption of the perspectives of others; promoting a problem-solving approach, including collaborative action and a focus on connection between personal and public issues; promoting a mutually supportive learning environment with regular feedback (noncompetitive judgment); and, finally, using teaching/learning techniques that encourage modeling through the experiential and participatory engagement of learners (Mezirow, 1991). These goals are designed to increasingly remove the students' dependence on the teacher for guidance in creating knowledge and meaning of their world. They also reflect constructivist and emancipatory pedagogical learning principles that form the foundation of the generative learner-centric teaching tool of HPS-based clinical scenarios.

Perspective Transformation Through Simulation

HPS-based simulated clinical nursing education has the potential to promote transformative learning and lead to a metamorphosis of students' preconceived meaning schemes. One of its major benefits is that it allows students to engage in social interactions and hone their psychomotor skills without threatening the life of a live patient (Leigh & Hurst, 2008; Perkins, 2007). Schoening, Sittner, and Todd (2006) note that this fact helps most students to relax and increase their confidence in performing clinical skills during a simulated clinical experience.

Kolb's (1984) experiential learning theory may also be considered, in the promotion of transformative learning through HPS (Dow, 2008; Perkins, 2007). Through the use of HPS-based scenarios, students are exposed to concrete experience, which is followed with reflective observation (i.e., debriefing). Reflection is then processed into abstract conceptualization, and new theories or hypotheses are tested through active experimentation (Dow, 2008; Kolb, 1984; Perkins, 2007) during the simulated clinical scenario and the debriefing session that follows. This involves inductive process steps similar to those involved in Mezirow's (1978) perspective transformation. By engaging in this reflective process students are able to test their new action plans for the clinical setting (Cranton, 1994; Imel, 1998; Mezirow, 1995). Although the actual simulated clinical scenario has the potential to generate perspective transformation, debriefing, and the reflective process within regarding best practices typify an activity that can alter student nurses' meaning schemes.

Debriefing

The role of debriefing in enabling transformation of meaning schemes is important to consider in analyzing the role of HPS-based simulation in nursing education. With regard to adult learning principles, debriefing is undoubtedly the most important pedagogical aspect of the simulated clinical scenario. The literature highlights the notion that quality debriefing experience takes predominance over the actual simulation scenario itself and that, without it, learning is jeopardized (Leigh & Hurst, 2008; Seropian, 2003). Debriefing encourages students to reflect on their learning experience and integrate new

cognitive learning from HPS-based simulated clinical scenarios (Seropian, Brown, Gavilanes, & Driggers, 2004). Lasater (2007) concludes that students value meaningful collaboration with each other both prior to, during, and after a simulated scenario; but, in particular, debriefing seems to provide the necessary reframing indicative of transformative learning. Lasater also cites Brookfield (1986), who notes that adult learners often value peer learning groups who provide peer support for students during the process of challenging their meaning schemes. Seropian et al. (2004) corroborate this notion and stress the usefulness of peer observations in the critical reflection process during the debriefing of a simulation experience. Values, beliefs, and assumptions can be challenged and tested more readily by groups of individuals who are "engaged in a similar quest" (Brookfield, 1986, p. 153).

The critical reflection process intrinsic to Mezirow's (1978) perspective transformation plays a key role in simulation debriefing (Lasater, 2007). Debriefing sessions that encourage the analysis of problems occurring during the clinical scenario serve to engage learners in reassessing the *how* and *why* or problem solving indicative of Mezirow's process of perspective transformation (Lasater, 2007). This process in essence supports learners in developing a reflective practice in which they emphasize reflection both during action and after action is undertaken, which in turn leads to the ultimate goal of reconceptualization (Bradley & Postlethwaite, 2003). Bradley & Postlethwaite (2003) posit that it is vital that educators utilize educational theory in guiding students toward self-reflective practice. Critical reflection imbued with theory and

turned inwards on educators aids not only our understanding of how students might act differently after perspective transformation through the debriefing phase of simulation but also, and most importantly, how students might think differently during the next simulated clinical scenario (Bradley & Postlethwaite, 2003). Transformative learning theory with a foundation in critical reflection has the potential to guide nurse educators in the creation of powerful learning experiences that can transform student assumptions, values, and beliefs about the world and nursing practice.

Simulation and Debriefing: Maximizing Transformative Learning

Imel (1998) explains that perspective transformation is promoted by creating a trusting, supportive learning environment to facilitate social discourse. A supportive and caring session is vital to the debriefing phase of a simulated clinical scenario (Leigh & Hurst, 2008; Seropian, 2003). Depending on the scenario, stress levels can be high following an emotional or complex experience, and Seropian advises educators to draw on a combination of self and peer evaluation in a nonjudgmental manner, which helps to defuse the stress and promote collaborative learning. It is also important to allow sufficient time for trust to develop with regard to the practice of debriefing because both faculty and students may not trust the process at first (Leigh & Hurst, 2008; Seropian, 2003). If the goal is to foster transformation of student values, beliefs, and assumptions after a particularly stressful scenario, it is important that the facilitator not rush the process or dominate the social discourse. To do so would hinder the students in moving beyond the level of Mezirow's content reflection (Cranton, 1996; Cranton

& King, 2003; Mezirow, 1991), and they might stagnate in lower levels of abstraction, thereby preventing true perspective transformation. Seropian (2003) agrees when arguing that students learn best when they are able to create meaning from self-analysis and discussion with others.

For Leigh and Hurst (2008), another key consideration is the provision of feedback in which the facilitator addresses mistakes in a nonjudgmental manner to facilitate problem solving. It is important not to delay the debriefing postscenario because research has shown that students value timely feedback on simulation performance (Rhodes & Curran, 2005). Playback of a videotape of the student's performance in the simulated clinical setting is particularly useful during debriefing in that it further facilitates self and peer evaluation (Rhodes & Curran, 2005) which not only leads to dialogue on what was done during the simulated scenario, but also answers the why questions behind actions (Leigh & Hurst, 2008). Feedback in this manner promotes reflective learning for both student and faculty that can lead to the higher levels of abstraction indicative of premise reflection in Mezirow's (1978) perspective transformation theory. At some stage it is important to allow the students to direct the trajectory of the simulation process, which in turn empowers and promotes a student-centric focus that authentically reflects the emancipatory and constructivist pedagogy that is desirable for today's learner. With time and experience, students can not only learn from each other in creating collaborative social meanings/knowledge, but also eventually learn to debrief each other (Fanning & Gaba, 2007). This approach capitalizes on the potential of HPS-based clinical scenarios to empower

the learner, which reflects the goal of autonomous thinking in transformative learning theory (Cranton & King, 2003; Mezirow, 1997).

The qualitative studies of Lasater (2007) and Smith-Stoner and Hand (2008) demonstrate the value of debriefing in promoting transformative learning. Lasater highlights the notion that students value peer evaluation and the ideas presented during the reflective process that is inherent in debriefing. Students feel that debriefing promotes flexibility in their thinking and allows them to recognize each other's strengths (Lasater, 2007). Allowing students to assume different roles during the HPS-based clinical scenario is also important in that some participants value the ability to "step back and think more about what I would have done" (Lasater, 2007, p. 274) in a more supportive role (i.e., not the primary nurse role).

Smith-Stoner and Hand (2008) utilize a stressful medication-error simulation as the disorientating dilemma to push students into transforming their perspective. The debriefing is considered essential to allow the student nurses to make the connection between their experiences during the simulated clinical scenario and those in the actual world of professional practice (Smith-Stoner & Hand, 2008). Participant feedback reveals that reflective dialogue in the debriefing process leads to evidence of perspective transformation through the demonstration of a deep level of emotional involvement. Student nurses report feeling emotion and passion for their role of nurse, which appears to create a sense of connectedness as a group of learners. Through the stress of the scenario and the subsequent debriefing process, the participants stated that they felt a transformation of their roles as both a student and a beginning practitioner (Smith-

Stoner & Hand, 2008). These studies add credence to the authors' assertion that high-fidelity HPS-based clinical scenarios in conjunction with the reflective practice of debriefing enable transformative learning for nursing students.

Smith-Stoner and Hand (2008) give an excellent example of the ability to develop simulated clinical experiences that promote a disorientating dilemma. Human patient–based scenarios can be created that foster a stressful, emotionally charged learning atmosphere for nursing students. Ethical or moral dilemmas can be incorporated that create Mezirow's (1994, 1997) notion of a crisis in confronting narrow or immature frames of reference. Because the instructors ultimately control the physiological responses of the high-fidelity HPS mannequin, they have the ability to allow the 'patient' to decompensate in response to the students' interventions. This further challenges the students and provides fodder for critical analysis in the subsequent debriefing section.

Concern for educators may be raised when they are under the pressure of creating a crisis or a major transitional experience that is capable of altering perspectives during a simulated scenario. Nursing curriculum can be utilized to provide students with a series of HPS-based scenario exposures with the goal of creating incremental, compounding challenges to their meaning schemes. Mezirow argues that it is possible for transformation to occur through the gradual accumulation of related experiences (Imel, 1998; Mezirow, 1995). Educators should not feel pressured to always create high-stress or overly emotionally charged scenarios, especially during students' initial exposure to HPS-based simulated clinical scenarios. For perspective transformation to occur, a key

component of social discourse and critical reflection is the development of trust (Imel, 1998). Allowing sufficient time and repetitive opportunities to debrief promotes trust in the process (Leigh & Hurst, 2008; Seropian, 2003), which ultimately helps to create collaborative learning communities. Because technology is itself potentially stressful and disorientating to the meaning schemes for adult learners (Whitelaw et al., 2004), it may be worthwhile to focus on simply experiencing simulation, along with debriefing, to build confidence and familiarity prior to engaging students with possible traumatic, stressful, and emotion-inducing, complex clinical scenarios. Technology-based learning tools may be unsettling to the rudimentary meaning schemes of new nursing students. This creates the need to promote incremental perspective transformation prior to the exposure of extreme disorientating dilemmas within an HPS-based scenario. When students are more experienced and comfortable with the simulated learning environment, they will likely be better able to handle the major transitional experiences brought on by high-stress or emotional scenarios.

Conclusion

In nursing education, HPS-based simulated clinical scenarios are a valuable tool designed to provide students with an immersive level of clinical experience prior to practice in the increasingly complex reality of the healthcare environment (Bearnson & Wiker, 2005; Yeager et al., 2004). Unfortunately, little research has been undertaken to analyze the pedagogy underlying this powerful technology-based educational tool (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). If a goal of nursing education is the socialization of graduates into

the professional role of nurse (Lindeman, 2000), then methods that encourage students to critically reflect on their own assumptions, beliefs, and values that affect how they interpret and interact with the world are needed. Transformative learning theory has the potential to assist students in altering their particular frames of reference (Cranton & King, 2003; Imel, 1998; Mezirow, 1994). HPS-based clinical scenarios offer students the requisite opportunities to be exposed to disorientating transitional experiences during the scenario and the critical reflection and social discourse that accompany the debriefing process. For more senior nursing students with prior simulation experience, simulated clinical scenarios can be developed that provide emotionally charged experiences that lead to more sudden alterations of the learner's frame of reference; or in the case of novice nursing students, the challenge of technology that the HPS poses and simple role experience without the complexity of an emotion-charged event can lead to incremental, gradual change in perspective. Regardless of the seniority of the student, it is important to promote critical reflection and social discourse to enable students to develop peer-evaluation skills and collaborative, student-driven learning communities. With an understanding of transformative learning theory, nurse educators can maximize the flexibility and alterability of the HPS-based clinical scenario process to empower students to become autonomous thinkers who are able to contend with the complexities of today's healthcare environment.

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CHAPTER 4:

THE GROUNDED THEORY METHOD:

DECONSTRUCTION AND RECONSTRUCTION IN A

HUMAN PATIENT SIMULATION CONTEXT

Abstract

Certain modes of qualitative inquiry, such as grounded theory, can serve to uncover the abstract processes and broad conceptual themes influencing the personal experiences of undergraduate nursing students encountering simulated clinical scenario utilizing human patient simulators (HPS). To date insufficient research has been conducted to uncover the basic social-psychological processes encountered by students as they engage in a HPS-based clinical scenario. The authors assert that HPS-based learning experiences are in reality social endeavors that serve as a platform for social discourse among learning groups within the simulated environment and therefore lead to the creation of socially negotiated knowledge and meanings relevant to the adult learner. To understand how grounded theory is suited to deriving answers to these questions, an analysis of the theoretical and philosophical foundations of grounded theory is undertaken. This analysis includes discussion of not only the basic principles of grounded theory, but also the theoretical, epistemological, and ontological concepts that form the basis of this qualitative mode of inquiry. This critical analysis concludes with a discussion of specific considerations to be reflected upon by researchers when applying the inductively derived method of grounded theory in uncovering the social processes that occur within HPS-based clinical scenarios. It is the

authors' belief that through conceptualization of the nursing student's personal experiences, nurse educators can strengthen the body of knowledge informing the proper integration of pedagogy in developing high-fidelity simulation-based curriculum.

With a focus on the social aspects of human interaction (MacDonald, 2001; Neil, 2006), the inductive qualitative research method of grounded theory is ideally suited to inquiry into the little known aspects of the simulation phenomenon that lie outside the scientific paradigm. Research into human patient simulator (HPS) based nursing education has been limited (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). Although the amount of inquiry into this technology-based learning tool is growing (Bremner, Aduddell, Bennett, & VanGeest, 2006; Childs & Sepples, 2006; Feingold, Calaluce, & Kallen, 2004; Goolsby, 2001; Madorin & Iwasiw, 1999), little or no research has occurred to investigate the social processes and pedagogical principles that underlie the student engagement in a simulated clinical scenario (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). HPS is an effective educational tool particularly suited to emancipatory or constructivist pedagogy, yet it's perceived effectiveness should not circumvent the need to generate theory to aid the incorporation of simulation into undergraduate nursing curricula. Many perceive technology, like science, as neutral or value free (Jeon, 2004; Schumacher & Gortner, 1999), yet the authors contend that HPS-based simulated clinical learning sessions are subjective, value-laden social endeavors that lead to the collaborative creation of knowledge and meaning for student nurses who are engaging in this learning activity. Unfortunately, the majority of the simulation research to date has resided primarily in the scientific paradigm (Bradley & Postlethwaite, 2003), which in turn risks devaluing the subjective voices of our students (Robinson, Robinson, & Davies, 1996). As Wuest (2007) notes,

grounded theory is well suited as a research method when little is known about the situation of interest. We believe that there is a need to develop a theoretical perspective with regard to the process involved when nursing students engage in a high-fidelity simulated clinical scenario. This perspective will be useful in making decisions on the appropriate application of nursing pedagogy and educational theory in developing future simulated clinical activities.

Owing to the wide variety of definitions for human patient simulation in the literature, and prior to the more detailed consideration of the role of grounded theory in simulation research, it is first necessary to explicate, albeit briefly, the pedagogical application of HPS in nursing education. Bearnson and Wiker (2005) note that a high-fidelity HPS is an interactive computer-controlled mannequin that will respond to nursing interventions such as medication administration and oxygen supplementation in a lifelike manner. For the purpose of this manuscript, *HPS* refers to a high-fidelity simulator that is designed to provide a level reflective of an immersive clinical environment (Yaeger et al., 2004). A typical nursing program simulation lab is designed to replicate a hospital room with a high-fidelity computer-driven mannequin that the instructor controls, the purpose of which is to respond to student interventions. A common example is Medical Education Technologies, Inc.'s (2004) high-fidelity HPS that is able, for example, to blink, breathe, and speak. Students are able to assess many parameters such as the heartbeat and pulses. HPS provides humanlike responses via interactive physiological systems such as cardiovascular, respiratory, and neurological (among others), and nursing interventions such as "CPR, intravenous medication,

intubation, ventilation, and catheterization" (p. 3). Through the use of specially designed software, instructors control and run scenarios in which students practice interventions in a safe environment. These scenarios are usually videotaped, which allows the students and instructors to review their actions and responses during the debriefing session. Debriefing should immediately follow the scenario and is considered a key component of the learning process to promote reflection and build confidence in nursing students (Yaeger et al., 2004). From this description, it becomes apparent that the HPS can be a highly technical teaching-learning environment, consequently it is behooves us to transcend the limitations of the science-technology paradigm so that we can begin to mitigate a purely rational approach to pedagogy.

What follows is a deconstruction of the various aspects of grounded theory that render it ideally suited as a research method for conceptualizing the experiences of today's nursing student who is participating in an HPS-based clinical scenario. Because we are unaware of any literature relating grounded theory and high-fidelity HPS, this discussion takes the format of a critical analysis or deconstruction of the method which will begin with an outline of grounded theory along with a discussion of its epistemological and ontological foundations as they relate to the use of technology-based learning tools such as HPS in nursing education. This process will include a discussion of the influence of symbolic interactionism and social constructivism on grounded theory. Finally, the authors consider aspects of social processes inherent within high-fidelity simulation as

they relate to grounded theory that ultimately call for a refocusing of HPS-based research methodology.

Grounded Theory in a Simulation Research Context

Grounded theory is a qualitative research method that utilizes insight gained through the direct observation of a phenomenon (e.g., simulated clinical experience) to develop theory (Glaser & Strauss, 1967). At its heart is a systematic yet flexible process of procedures to produce inductively derived mid-range theory about a particular experience or social phenomenon (Charmaz, 2006; Strauss & Corbin, 1990). Inductively derived theory indicates that grounded theory method is based on conceptualization that is directly linked to the data rather than on testing a predetermined hypothesis as is typical of most other research methods (B. Glaser, 1978; Strauss & Corbin, 1990). In other words, a hypothesis will emerge from a constant and careful analysis of the data from observation and participants' descriptions. The goal is theory that is grounded in personalized accounts of an experience (Charmaz, 2006), which serves to make the thematic conceptualizations of a pattern of behavior pertinent to those involved (B. Glaser, 1978, 2005). Milliken and Schreiber (2001) explain that in grounded theory, "the researcher's job is to investigate the socially constructed meanings that form the participants' realities and the behaviors that flow from those meanings" (p. 180). The grounded theorist's goal is to defer to those with true expertise on a phenomenon—individuals who have experienced the phenomenon. To truly capture the experience of students who engage in

simulation, researchers must defer to the expertise of these students to be able to derive data that truly reflect their reality.

Clarke (2003) further corroborates this theory in stating that grounded theory is focused on uncovering basic social processes in the data derived from the participants' actions with the phenomenon of concern, which occurs through the abstract analysis of ongoing data derived from the phenomenon: "Around these basic process are then constellated the particular distinctive conditions, strategies, actions, and practices engaged in by human and nonhuman actors involved with/in the process and their consequences" (p. 558). The analysis of ongoing action or data incorporation led Clarke to view grounded theory as an action-orientated research method. Clarke's emphasis on the role of both human and nonhuman actors also emphasizes the role of nonhuman aspects of HPS-based simulated scenarios, such as the simulator itself, in the social construction of meaning and knowledge. In simulation it is important to develop conceptualizations of the entire social process that involve both human and nonhuman factors.

Wuest (2007) notes that grounded theory is appropriate when little is known about a particular phenomenon or when the theory that has already been developed does not appropriately explain the process that is occurring within the same phenomenon. It is also a pertinent research framework if the goal is to capture human behavior in a social process context (B. Glaser, 1978; Glaser & Strauss, 1967; Wuest, 2007). For the purpose of simulation research, grounded theory is particularly relevant to the social processes and social discourse that

occur in the group work during a scenario and the debriefing session after a scenario. Wuest further validates the method's applicability to simulation research: "Human behavior related to health issues, developmental transitions, and situational challenges is well suited to grounded theory research in nursing" (p. 244). Although there is apparent relevance to HPS-based inquiry the authors have always found it disconcerting to consider the call from grounded theory to analyze 'problems' that are relevant to the participants (Charmaz, 2006; B. Glaser, 1978). The majority of the simulation research to date has examined, often through quantitative ratings, students' HPS-based learning session evaluations in which the majority of the participants rated simulation positively (Bremner et al., 2006; Childs & Sepples, 2006; Feingold et al., 2004; Goolsby, 2001; Madorin & Iwasiw, 1999). This begs the question, where is the 'problem' for the participants? Fortunately, this is a deductively derived way of viewing the phenomenon in question and runs counter to the inductively derived theory that results from grounded theory methods. Crooks (2001) corroborates by cautioning researchers not to predetermine the problem or process. Are researchers truly allowing theory to inductively emerge if they assume that they know what is wrong prior to initiating the data collection? As simulation researchers, we need to allow the data to determine the problems or social processes through the emergence of themes that emerge directly from the data (Crooks, 2001).

Symbolic Interactionism and HPS

Grounded theory as a research method is formed from the theory of symbolic interactionism (Jeon, 2004; Klunklin & Greenwood, 2006; Wuest 2007).

Blumer (1969) is considered one of the creators of symbolic interactionism; he proposed that people's actions towards a phenomenon or object are guided by the socially created meanings that they impart to them. Meaning is derived from social interaction and modified through each individual's interpretation (Blumer, 1969). People create linguistic symbols for objects through social interaction with other individuals in their social groups, thereby creating shared meanings (Blumer, 1969; Klunklin & Greenwood, 2006; LaRossa & Reitzes, 1993). These symbols direct responses, prompting people to adjust their behavior based on the socially determined meanings of symbols, which results in an internalization of attitudes, beliefs, and assumptions about the wider community around them (Klunklin & Greenwood, 2006). For the symbolic interactionist, objects themselves have no intrinsic meaning and become symbols only when a social group assigns meaning to them (Klunklin & Greenwood, 2006). This leads us to the notion that people create their own meanings, knowledge, and reality in the world in which they live through social discourse. Wuest states, "People actively shape the worlds that they live in through the process of symbolic interaction and that life is characterized by variability, complexity, change, and process" (p. 241). Through communication with others, an individual's world becomes comprised of unique meanings and symbols that are continually in a state of flux due to the complexities of human interactions (Blumer, 1969). This is in part because social interaction pushes individuals to continually determine how others interpret their actions, which results in pressure to alter our responses, knowledge, and meaning schemes (Klunklin & Greenwood, 2006). Throughout the HPS-based learning

process, student nurses are engaged in discourse that continually reconstructs their personal meaning schemes, leading to changes in how they both interpret and integrate knowledge relevant to practice.

Jeon (2004) argues that grounded theory does not fit research questions designed to predict, control, and measure by testing already existing theories or cause-effect relationships. Similar to grounded theory, symbolic interactionism calls for an examination of the processes to gain an understanding of the "knowing how" aspect of the way that an individual acts in a particular situation (p. 250). This relates well to the abstract theoretical conceptualization of a phenomenon (Jeon, 2004; Klunklin & Greenwood, 2006). Grounded theory and symbolic interactionism both aspire to creating an understanding of the complexities of experiencing a phenomenon from the perspective of the individuals themselves rather than to determining objective truth outside of their experience (Jeon, 2004). It is impossible to understand the world or the person outside of their interpretation of the phenomena because of the constant alterations that social interaction with others causes (Jeon, 2004). This ultimately leads to the conclusion that research needs to involve observation and analysis of the perspectives of individuals and social groups in their natural world. Grounded theory research is designed to key in on these aforementioned complex social processes and shared meanings derived therein (Jeon, 2004; Klunklin & Greenwood, 2006). The authors believe that conceptualizing the personal experiences of student nurses who engage in the social processes of an HPS-based

clinical scenario is appropriate if educators desire to gain a sufficient understanding of this learning tool to guide the application of proper pedagogy.

Symbolic Interactionism and Social Constructionism: The Connection

The authors assert that both symbolic interactionism and social constructivism influence not only research methods of grounded theory, but also HPS-based simulation education in nursing. With regard to the concepts and components that make up both social constructionism and symbolic interactionism, it possible to see connections between the two sociological theories. Buechler (2000) sees modern social constructivism as a renewal of symbolic interactionism and the key premise of symbolic interactionism as reflected in social constructivism. Both theories espouse the concept of socially created meanings/symbols that develop through social discourse. Buechler states, "Whether construed as meanings, interpretations, definitions, or identities, symbols are central to the communication process and interaction networks that comprise society" (p. 40). These concepts link the two theories at a foundational level (Buechler, 2000). It is therefore relevant to consider both social constructionism and symbolic interactionism as pertinent to the socially derived meanings and knowledge that student groups who engage in a simulated clinical experience create.

Social Constructionism and HPS

Kvale (1996) argues that modern conceptions of reality are focused on the social construction of knowledge rather than on traditional views of reality that consider knowledge a mirror of reality. This leads to a focus on language and

construction of a reality that reflects a perspective grounded in a local socially created context (Kvale, 1996). Social constructionism's "focus is on the interpretation and negotiation of meaning of the social world" (p. 41). Gergen (1999) counters by stating that social constructionism in reality does not remove the objectivity of truth seen in science but, rather, attempts to alter how we view truth. Gergen further suggests that it is impossible to disregard the notion that all attempts at depicting reality are clouded by personal motivations, assumptions, and beliefs. White (2004) corroborates Gergen's opinion by noting the influence of culture on the nature of reality: Even if there is an objective reality, humans will always use their own linguistic symbols to interpret the nature of this reality. Therefore, the authors believe that the social constructivist view renders the argument on ontology pointless. If humans are always interpreting their reality through a socially constructed lens, then it is impossible to gain access and view the nonhuman world to determine truth and reality (Rorty, 1991; as cited in White, 2004). Regardless of an individual's ontological views, in social constructionism knowledge is created from the perspective of that individual and is validated through practice and mutual discourse (Kvale, 1996). In essence, knowledge is created by and reflects the ability of the learner to perform certain actions successfully (Kvale, 1996). For the learner, knowledge is created through action and conversation (Kvale, 1996). This presents an interesting treatise on human patient simulation in nursing education as a modality to create knowledge through social construction. HPS-based simulated clinical scenarios are both action- and practice-based, which allows students to negotiate their way through a

scenario via social discourse while utilizing previously learned clinical skills and theoretical knowledge. Debriefing then provides an outlet for critical reflection and builds linguistic perspectives on meaning and knowledge that are relevant to the learners.

Because social constructionism is often linked to grounded theory (Clarke, 2003), it is important to further analyze social constructionism's theoretical components to better understand the connection between grounded theory and high-fidelity simulation-based nursing education. Like symbolic interactionism, social constructionism considers language a vital component of all knowledge production because it ascribes meaning to objects in our society (Gergen, 1999; Massad, 2003). White (2004) argues that if humans did not attach meanings to phenomena or objects through social discourse, any action taken with regard to them would be random and unfocused. Social communities have the ability to ascribe meaning to items through the influence of discourse, consensus, and culture (White, 2004). Robinson et al. (1996) contends that the technology used in nursing reflects the culture and linguistics of the profession of nursing. The authors also argue that the technology-based learning tools used in undergraduate nursing education reflect the institutional culture of nursing education and pedagogical practices, but high-fidelity-based simulation education requires research to uncover the social processes that guide knowledge creation within. Without inductively deriving these social processes imbedded within HPS-based clinical scenarios, it is pointless to determine the best pedagogy to develop simulation curriculum. In essence, nurse educators would be blindly following a

learning trend with little insight into whether it is meeting the learning needs of the neomodern adult learner. Robinson et al., regarded science—ergo technology—as amenable to social construction like any other paradigm. Another important consideration is the belief that technology imposes new social interactions on individuals (Robinson et al., 1996). Therefore technology-based learning tools appear to be amenable to social construction, which logically leads to the applicability of grounded theory's analysis methods that focus on the socially created meanings or symbols of social constructionism. Nurse educators should recognize the urgency to determine the underlying forces that envelop nursing's educational practices such as human patient simulation.

Social Discourse in Simulation Education

Because grounded theory is designed to analyze social processes and the social creation of knowledge (B. Glaser, 1978; Glaser & Strauss, 1967), it is important to consider social discourse and its role in the HPS-based simulated clinical learning environment. The role of social discourse in a group learning session is key to the maximization of learning and the formation of knowledge in the learner's cognitive schema (R. Glaser, 1991; Whitelaw, Sears, & Campbell, 2004). Whitelaw et al., ascertains that learning in a group relies on communication, which leads to the development of shared understanding, collaborative learning through social experience, and problem solving.

From the field of transformative learning theory comes significant discussion on the benefits of social discourse as a form of learning and knowledge development. For adult learners the benefits of discussing and validating ideas,

knowledge, meaning, and assumptions in a group setting with peers are immense (Cranton, 1994; Mezirow, 1998). The development of a learning community allows students to present ideas for validation by the larger group, which is vital to the social construction of knowledge (Mezirow, 1998). In essence, students present ideas and insights that others in the group then cognitively process by acting as a type of filter that may or may not confirm the students' originally created meanings and ideas (Cranton, 1994; Mezirow, 1998). This helps to solidify the creation of new knowledge and social meanings relevant to the learners and their peers and thereby empowers them to become autonomous thinkers.

HPS-based clinical scenarios have the benefit of allowing students to challenge their beliefs, assumptions, skills, and interpersonal knowledge in a safer less threatening environment as compared to the real clinical setting. Human patient simulation allows social discourse and hence the creation of knowledge without risking human lives (Leigh & Hurst, 2008; Perkins, 2007). Students are able to work as a team to problem-solve nursing care dilemmas and plan interventions while constantly validating and evaluating each individual's contributions (or lack thereof) to the experiential learning process embedded in a properly designed simulated clinical environment. A key element in the typical HPS-based clinical learning session that promotes social discourse and the creation of relevant knowledge for student nurses is the cognitive stress of participating in this process along with the subsequent debriefing session that should follow participation in a scenario.

Whitelaw et al. (2004) argues that through social dialogue and interpersonal interaction during complex learning experiences, it is possible to create cognitive strain similar to that experienced in related 'real' experiences. Murphy et al. (2004) found that medical students who performed a real cardiac resuscitation on a live patient exhibited heart rate markers similar to those that occurred when they performed cardiac resuscitation on an HPS. This provides some evidence that HPS-based simulation has the potential to offer the participants a high level of reality-based complex clinical immersion and cause cognitive strain. Complex learning environments have the potential to transform students and move them from relying on external authority to becoming an internal authority (Keegan, 2000; as cited in Whitelaw et al., 2004). The use of simulation can empower students, make them autonomous thinkers, and create meanings through peer-driven discourse. Whitelaw et al., states that interaction within a group engages students in social discourse and leads to the development of a knowledge community and a professional culture. Socialization into the profession of nursing is a key task of nursing education programs (Lindeman, 2000), and the authors assert that HPS-based clinical scenarios can aid in this socialization process. This requires further research to uncover the social processes that provide insight into how to maximize the potential of high-fidelity-based simulation in nursing education.

Re-conceptualizing Human Patient Simulation Research

High-fidelity HPS is a learning tool that by its very nature appears related to the science-technology paradigm, but the authors contend that there is a vital

need to refocus HPS-based research away from the historical domination of the scientific inquiry as noted by Bradley & Postlethwaite (2003) or risk devaluing the voice of the adult learners that nursing education serves. This is particularly pertinent due to the increasing rate of adoption of simulation into nursing curriculum (Day-Black & Watties-Daniels, 2006), the difficulties of the modern healthcare environment to support the clinical training model of traditional nursing education (Tanner, 2002, 2006), and the apparent connections between the simulated clinical experience, symbolic interactionism and social construction of knowledge. Pedagogy is a rapidly changing and evolving construct due to the proliferation of technology (Koller, Harvey, & Magnotta, n.d.; Roblyer, 2003). It is also vital to consider the learning preferences and perspectives of the incoming millennial generation, which comprises the bulk of students entering nursing programs. These students have a high level of comfort with technology and expect it to be utilized in their learning experiences (Bassendowski, 2007). Skiba (2007) ascertains that the modern adult learner desires learning based on collaboration, autonomy, and immersion in reality-based experiences. Learners prefer not only collaborative learning, but also the opportunity to create their own knowledge and meaning schemes (Koller et al., n.d.). Dede (2005) contends that future generations will focus on mediated immersion to help them to construct relevant knowledge. It is obvious that properly designed HPS-based simulated clinical scenarios can play a significant role for millennial-generation nursing students. Experiencing a high-fidelity simulated clinical scenario will help students to work as a team, problem-solve through consensus building, and,

through the debriefing process, critically reflect on their performance, thereby cementing knowledge and altering their beliefs, values, and assumptions about nursing care (Cranton & King, 2003; Mezirow, 1994). These issues highlight the need for inquiry into the social processes behind simulated clinical experiences that involve a high-fidelity HPS to build simulation curriculum based on the most effective use of sound pedagogy and educational philosophy.

Considerations for Simulation Research

The challenge arises in comparing grounded theory to theoretical, philosophical, or research paradigms because it does not fit well with others. B. Glaser (1998) explains that grounded theory does not require any change in the researcher's philosophy or views on epistemology and ontology. Because grounded theory calls for thematic analysis from the perspective of the participant, it does not come encumbered with any ideological paradigm. Attempts have been made to outline the different ontological stances of Glaser's, Strauss and Corbin's (1990), or Charmaz's (2006) versions of grounded theory. For example Annells (1996) states that in grounded theory the "social and natural worlds have differing realities, but . . . both forms of reality are probabilistically apprehensible" (p. 382). Charmaz outlines the differing forms of ontology that dominate theoretical analysis of grounded theory. These include B. Glaser's grounded theory, which espouses the ideology that reality or true meaning exists in data; Strauss and Corbin's version, which espouses a reality based on an enacted truth; the version of Charmaz herself, which espouses a constructivist-based grounded theory that considers reality as a constructed "interpretive

portrayal of the studied world, not an exact picture" (p. 10). Although it may be useful to understand the ontological underpinnings of grounded theory methodology, Milliken and Schreiber (2001) state that with regard to grounded theory, "People can find support for it in any ontology they wish" (p. 44). This concept is simplistic and at the same time empowering in its approach. The power of grounded theory is that it fits any theoretical stance that researchers choose because the basic method is structured with the epistemological idea in mind that the participant is the expert (Milliken & Schreiber, 2001). Investigation is designed to uncover the socially constructed meanings of the participant's own reality (Milliken & Schreiber, 2001). Although the authors believe that it is still necessary for researchers to be cognizant of their epistemological and ontological stance, it is encouraging to know that grounded theory imposes no preconceived trajectory on the theoretical outcomes derived from data.

Blumer (1969) presents an argument that seems to call for a research method such as grounded theory when he noted that research into the social world not only focuses on the direct analysis of intimate accounts of the phenomenon, but also requires in-depth abstract analysis: "[The] research scholar who engages in direct examination should aim at casting his problems in a theoretical form, at unearthing generic relations, at sharpening the connotative reference of his concepts and at formulating theoretical compositions" (p. 42). Blumer contends that scientific analysis is inadequate in the study of social phenomena because it forces data into preconceived or synthetic frameworks that bind and restrict the analysis by limiting the study to two distinct variables with a specific relationship

between them. With regard to any social phenomenon, is it realistic to limit or restrict inquiry in this way? How many social phenomena like the one that occurs within an HPS-based clinical scenario group's interactions and debriefing are as simplistic as to allow easy condensing into two or three or even four definable variables? Johnson (1999) argues that nursing care is a social construct and that difficulty arises in trying to apply scientific research and statistics to the extremely complex interpersonal phenomena of nursing care. The authors contend that the immersive reality-based nursing care imbedded within simulation, as in real nursing care, is also a social construct. During the group process of simulation, factors such as teamwork, group dynamics, team roles, and so on result in a complex, interwoven experience that is not easily defined.

It may be useful to consider other research paradigms that use methods of analysis similar in some respects to grounded theory, such as phenomenology or discourse analysis (Starks & Trinidad, 2007). Phenomenology calls for the analysis of intimate accounts of individuals' embodied experience to gain meaning from each person's account (Starks & Trinidad, 2007); yet, Blumer's (1969) argument holds sway in that, to gain insight into the complexities of socially negotiated knowledge or, more specifically, the social processes within the simulation learning experience, research needs to at least start at the level of generic, theoretical relations. If the goal of inquiry is to gain insight that is general enough to allow nurse educators the opportunity to maximize the application of sound pedagogy in structuring simulation-based experiences that best meet the needs of the modern adult learner, then it is obvious that the thematic analysis of

grounded theory has a role to play. Thematic analysis of data collected from observation and participants' accounts, unencumbered by ideology or empirically structured frameworks, will allow broad conceptualization that truly reflects the lived experiences of student nurses who are engaged in a simulated clinical environment. Abstract themes that are generalizable to the majority of nursing education simulation settings will be the most effective in allowing educators to relate the research to the integration of sound pedagogical practices that truly embody the learning needs of the neomodern nursing student.

Conclusion

With a foundation in the theoretical constructs of social constructionism and symbolic interactionism, grounded theory provides the researcher with a methodology free of the burden of ideology and preconceived frameworks that are characteristic of many other forms of inquiry (B. Glaser, 1998; Milliken & Schreiber, 2001). This will foster research to conceptually analyze the lived experiences of students who engage in an HPS-based simulated clinical scenario. Through the development of the abstract thematic analysis that is a feature of grounded theory (Charmaz, 2006; B. Glaser, 1978; Strauss & Corbin, 1990), it is possible to offer nurse educators a mid-range theory on simulation that facilitates consideration of proper pedagogy in creating simulation curriculum in undergraduate nursing programs. With the proliferation of technology in nursing education, further research is required to guide pedagogy and curriculum development. Human patient simulation has the potential to provide an immersive reality-based clinical learning experience that fits the preferences of the modern

nursing student. Unfortunately, nursing education has embraced this technology-based learning tool with little investigation of the processes that it uses to promote nursing students' knowledge, skill, and meaning development (Day-Black & Watties-Daniels, 2006). Through the aforementioned critical analysis of social constructionism and symbolic interactionism, it is possible to visualize the role of social discourse and socially created knowledge in the simulated clinical environment. The high-fidelity HPS-based simulated clinical scenario has the potential to promote social dialogue and group processes and influence the socialization of novice nursing students. Through the use of grounded theory, the authors call for research to create a substantive theory that will not only impact the application of sound educational theory and philosophy when creating HPS-base clinical scenarios, but also help to form a foundation for future studies, which Morse (2001) argues is a common application of the theory that arises from this inductive research method.

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CHAPTER 5:

THE PEDAGOGICAL EBB AND FLOW OF HUMAN PATIENT SIMULATION: EMPOWERING THROUGH A PROCESS OF FADING SUPPORT

Abstract

The use of the high fidelity human patient simulator (HPS) based clinical scenario in undergraduate nursing education is a powerful learning tool well suited to modern nursing students' preference for immersive construction of knowledge through the provision of contextually rich reality-based practice and social discourse. To date there has been little indication of research into the social processes in which students engage in a simulated clinical session. The purpose of this study was to explore the social-psychological processes that occur within HPS-based clinical scenarios that inform nurse educators in their choice of pedagogical practices when they structure and implement this technology-based learning tool. Grounded theory method was used to study sampled students and faculty from a Western Canadian baccalaureate nursing program. The data collection consisted of semistructured interviews, supplemented by secondary data from the observation of participants as they engaged in HPS-based clinical scenarios, fieldnotes, analytical and operational memos, and journaling. The process of leveled coding generated a substantive theory that has the potential to enable educators to empower students through the use of fading support, a twofold process comprised of adaptive scaffolding and dynamic assessment that challenges students to realistically self-regulate and transform their frame of

reference for nursing practice, while at the same time limiting the threats that traditional HPS-based curriculum can impose.

High-fidelity human patient simulation (HPS) is a technology-based learning tool that is undergoing increased utilization on an international level in undergraduate nursing programs (Harder, 2010; Murry, Grant, Howarth, Leigh, 2008; Nehring, 2008). Many scholars view it as a tool that helps students to augment the acquisition of clinical skills by providing a contextual reality-based learning environment (Cant & Cooper, 2009; Cooper & Taqueti, 2007; Day-Black & Watties-Daniels, 2006). Through the creation of HPS-based clinical scenarios in an immersive environment designed to reflect clinical reality, nurse educators are potentially able to provide undergraduate nursing students with a learning experience that replicates key facets of a real clinical environment (Bearnson & Wiker, 2005; Hovancsek, 2007; Yeager et al., 2004). Properly designed simulated scenarios are deemed to provide many possible benefits, the predominant of which is that they enable learners to problem-solve and implement interventions in a safe environment without exposing live patients to risk (Fowler-Durham & Alden, 2007). Undergraduate nursing students are therefore able to test their knowledge, frames of reference, and meaning schemes regarding patient care issues and interventions without threat to the actual patient. This process is particularly beneficial for the neomodern or millennial generation of adult learners who are currently enrolled in entry-to-practice nursing educational programs. Bassendowski (2007) states that today's students expect educators to draw on high-fidelity technologies to develop curricula. Immersive reality-based learning experiences such as simulation appeal to learners who prefer nonlinear thinking and desire active participation in knowledge construction (Harder, 2010;

Pardue, Tagliareni, Valiga, Davison-Price, & Orehowsky, 2005). Furthermore, Kraidy (2002) argues that today's students are ill suited for passive learning activities such as didactic lectures and have a better capacity for the creation of their own knowledge and ideas. The millennial generation maximizes the active creation of knowledge by collaborating with others in a reality-based immersive learning environment (Bassendowski, 2007; Dede, 2005; Skiba, 2007). Therefore, HPS-based clinical scenarios with a foundation in exploratory learning and constructivist pedagogy are well suited to meeting the aforementioned learning needs of neomodern nursing students (Parker & Myrick, 2009).

Despite the apparent benefits of incorporating HPS-based learning experiences into undergraduate nursing programs, limited research is available to educators to help them to incorporate sound pedagogical practices that are best designed to meet the needs of modern adult learners (Cant & Cooper, 2009; Cooper & Taqueti, 2007; Day-Black & Watties-Daniels, 2006; Kaakinen & Arwood, 2009; Ravert, 2002; Rourke, Schmidt, & Garga, 2010). As a result of the proliferation of simulation laboratories in nursing educational programs, there is no doubt that HPS-based clinical scenarios are having a profound effect on nursing pedagogy (Hoffman, O'Donnell, & Kim, 2007; Rhodes & Curran, 2005); yet nursing educators continue to bemoan the lack of evidence to support proper application of this powerful technology-based learning tool (Cooper & Taqueti, 2007; Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). As far back as 1992 Gaba stated, "No industry in which human lives depend on the skilled performance of responsible operators has waited for unequivocal proof of the

benefits of simulation before embracing it" (p. 494). Unfortunately, the current state of knowledge affirms this premise that nursing has embraced simulation without sufficient validation of its effectiveness and, most importantly, without waiting for sufficient inquiry into the processes that occur in a HPS-based clinical scenario to better inform the application of pedagogical practices.

Key Concept: High-Fidelity Human Patient Simulator

For the purpose of this study it is necessary to define *High-fidelity HPS* since it encompasses a variety of definitions in the healthcare education literature. Bearnson and Wiker (2005), for example, describe HPS as a computer-controlled mannequin designed to provide practitioners with human-like responses to nursing interventions such as medication administration, catheterization, and oxygen therapy (among others). The mannequin is designed to look human and to respond in a human like manner, responses which are controlled by an instructor via a computer, which in turn allows him or her to direct scenarios that mimic illness and trauma via interactive physiological systems such as cardiovascular, respiratory, and neurological (among others). *High-fidelity* implies that these mannequins are technologically advanced and able to, among many things, speak, breathe, and perspire (METI, 2004). With properly designed surroundings that replicate a hospital room, the goal is to provide students with a reality-based immersive clinical experience (Yaeger et al., 2004).

Significance of the Study

It is the contention of the researcher that undergraduate nursing students' participation in an HPS-based clinical scenario is a social endeavor that conforms

to the millennial learner's preference for immersive, reality-based, and collaborative construction of knowledge and meaning. High-fidelity simulation appears to provide students with an active learning session that utilizes social discourse processes that ultimately lead to the creation of socially derived meanings (Lasater, 2007; Leigh & Hurst, 2008; Perkins, 2007). This social construction of knowledge and its inherent linguistic symbols are then incorporated into individual frames of reference surrounding nursing practice. Unfortunately, research undertaken to analyze the social and psychological process in which the students engage when they participate in an HPS-based clinical scenario is lacking (Day-Black & Watties-Daniels, 2006; Mallow & Gilji, 1999). It is paramount, therefore, that nurses contextualize the social-psychological process that occurs within simulation-based learning experiences to better inform the application of pedagogy in HPS-based curricula that best meets the needs of modern adult learners.

Purpose of the Study

The purpose of this study was to explore the social-psychological process that occurs within HPS-based clinical scenarios to inform nurse educators on their choice of pedagogy in developing simulation-based learning experiences that are relevant to modern nursing students. More specifically, the objectives of this study were as follows: (a) to gain insight into the social-psychological process involved in educating undergraduate nursing students using HPS as a teaching/learning modality; (b) to determine how educational theory/pedagogy guides nursing faculty in using HPS-based simulated clinical scenarios and, more

specifically, how it is integrated into the development and implementation of simulated clinical scenarios; and (c) to acquire an understanding of how HPS should best be structured to respond to the learning needs of neomodern adult learners.

Current State of Knowledge

The current state of knowledge on the use of HPS-base clinical scenarios in undergraduate nursing education can be channeled into two predominant areas of focus, the first of which is the perceptions of key stakeholders (e.g., students and faculty) of the efficacy of this technology-based learning tool (Bremner, Aduddell, Bennett, & VanGeest, 2006; Childs & Sepples, 2006; Feingold, Calaluce, & Kallen, 2004; Foster, Sheriff, & Cheney, 2008; Goolsby, 2001; Lasater, 2007; Madorin & Iwasiw, 1999; Smith-Stoner & Hand, 2008). Studies in other healthcare disciplines—primarily medical education—have revealed similar positive perceptions of the use of HPS in training students (Bray, Schwartz, Weeks, & Kardong-Edgen, 2009; Cleave-Hogg & Morgan, 2002; Fernandez, Parker, Kalus, Miller, & Compton, 2007; Murray, Good, Gravenstein, Van Oostrom, & Brasfield, 2002; Treadwell & Grobler, 2001). The second area of focus is empirical evidence of improved knowledge retention and/or improved performance of clinical skills as a result of exposure to HPS-based clinical scenarios (Alinier, Hunt, & Gordon, 2004; Alinier, Hunt, Gordon, & Harwood, 2006; Brannan, White, & Bezanson, 2008; Elfrink, Kirkpatrick, Nininger, & Schubert, 2010; Kruglikova, Grantcharov, Drewes, & Funch-Jensen, 2010). Studies in nonnursing healthcare disciplines on HPS-based clinical preparation

also indicate moderate evidence of the potential for improved knowledge retention and clinical performance (Cioffi, Purcal, & Arundell, 2005; Kruglikova et al., 2010; Ravert, 2002; Seybert, Kobulinsky, & McKaveney, 2008; Steadman et al., 2006). In a summative sense, the analyses of the literature that Cant and Cooper (2009), Leigh (2008), Ravert (2002), and Harder (2010) reviewed have corroborated the notion of 'moderate evidence' that simulations improve clinical skills, performance, and perceptions of confidence.

Ravert (2002) conducted an integrative review of studies that focused on measuring skills and knowledge acquisition as a result of student exposure to HPS-based scenarios in both nursing and allied health disciplines. Although Ravert's findings indicate that the majority of the studies revealed a positive effect on skill and/or knowledge acquisition after high-fidelity simulation exposure, it should be noted that only nine studies met both the inclusion criteria and were deemed of sufficient quality to be retained. Harder's (2010) systematic literature review also provides evidence of HPS's positive impact on skill acquisition in nursing and related healthcare disciplines. Harder notes that the majority of the 23 studies that she reviewed showed increased skill acquisition with the use of performance testing (e.g., OSCEs, pre- and post-testing, or a combination of the two). Conversely, Cant and Cooper (2009) report in their systematic review of quantitative studies that compared simulation to other educational strategies in nursing education that only half of the 12 studies that met the inclusion criteria showed gains in knowledge, critical thinking, satisfaction, or confidence compared to the control groups. Unfortunately, Harder argues that the

lack of formal evaluation tools designed specifically for simulation evaluation casts doubt on whether any of the authors of the studies reviewed were able to objectively appraise the effects of simulation on clinical-skill acquisition. Ravert corroborates that the studies she reviewed were also lacking a reliable and valid evaluation instrument. Finally, Leigh (2008) further substantiates these concerns in noting that the research on the effect of HPS exposure on students' self-efficacy and confidence is limited because of concerns with rigor such as sample size and that more research is required to provide strong evidence of simulation's effectiveness in increasing student nurses' confidence. Although a growing body of research has shown moderate evidence that exposure to HPS-based scenarios has a positive effect on learners' knowledge and skills acquisition and perceptions of self-efficacy, there is a lack of strong, conclusive studies from which educators can draw generalizations to guide simulation curriculum development.

It is my contention that although the current state of knowledge has limitations, the research conducted to date has validated the use of HPS-based clinical scenarios in nursing education. Unfortunately, there is still little evidence of analysis of the social-psychological process that occurs that in turn could provide a theoretical framework for nurse educators to inform pedagogically sound simulation curricula. Rourke et al. (2010) explore the use of theory-based research to analyze high-fidelity simulation in nursing education and note that the majority of research in this field shows evidence of little or no guidance from theory. Polit and Beck (2007) highlight the importance of theoretical guidance in their definition of theory as "an abstract generalization that presents a systematic

explanation about relationships among phenomena" (p. 734). This raises concerns about the usefulness of nursing's current knowledge of simulation utilization in undergraduate education because the vast majority of studies lack a cognitive, social, or biological explanation to justify a hypothesis (Rourke et al., 2010). Kaakinen and Arwood (2009) further corroborate this argument in noting that between 2000 and 2007, analyses of the literature that referred to learning theory in designing simulation curriculum for nursing education showed that a small minority of articles referred to any sort of learning theory. I argue that, without a theoretical foundation for future inquiry on HPS-based clinical scenarios, it is difficult to define meaning schemes that can be extrapolated to other similar phenomena. Theoretical frameworks are necessary to create an orderly scheme from data to allow researchers to move beyond the superficial to the identification of processes embedded in a particular phenomenon (Rourke et al., 2010). For nurse educators who espouse a constructivist view of knowledge development, a theoretical foundation for building a body of knowledge is paramount. Blumer (1969) explains that research must begin at the level of theory to foster an understanding of the complexities of socially negotiated knowledge. If the current state of knowledge is too focused on being merely descriptive (Rourke et al., 2010) or residing in the scientific paradigm (Bradley & Postlethwaite, 2003), is unable to demonstrate external validity (Harder, 2010; Leigh, 2008; Ravert, 2002), or lacks a theoretical foundation (Kaakinen & Arwood, 2009; Rourke et al., 2010), then there is a need to engage in further modes of inquiry to contribute to a knowledge base from which nurse educators can draw to inform

fundamentally sound pedagogical decisions regarding the development of simulation-based curriculum in nursing education.

Assumptions

It is the assumption of this researcher that immersive, situationally focused high-fidelity HPS-based clinical scenarios offer students the complexity, diversity, and quality necessary in a learning experience to foster the development of clinical competence. However, because hospital-based education is becoming increasingly challenged in providing students with these required qualities to ensure proper skill and knowledge acquisition (Porter-O'Grady, 2001; Tanner, 2002, 2006), it is important to develop situationally focused high-fidelity simulated clinical experiences using an HPS. I believe that an appropriately designed HPS-based clinical scenario can play a major role in offering students the requisite combination of complexity and reflection of clinical reality to promote cognitive development, critical thinking, and/or clinical skill acquisition.

Research Questions

The primary question that guided this study was: What is the social-psychological process involved in using HPS as a teaching/learning modality to educate undergraduate nursing students? Intrinsic to this question were the following:

1. How does educational theory/pedagogy guide the faculty in using HPS as a teaching/modality?
2. According to the participants, how is HPS best structured to respond to the learning needs of the neomodern adult learner?

3. What is the process used to integrate educational theory/pedagogy into the development and implementation of clinical scenarios for HPS-based teaching/?

Research Design

Given the lack of externally valid research in the area of HPS usage in nursing education, we used a grounded theory method, specifically Glaserian, to explore the social-psychological process involved in using HPS as a teaching/learning modality to educate undergraduate nursing students. Wuest (2007) notes that grounded theory is a useful research strategy when little is known about the phenomenon under inquiry. For the purpose of exploring HPS-based clinical scenarios, Wuest and Stern (1990) consider this method valuable to identify and conceptualize formerly unidentified variables. Glaser's (1978) focus on conceptualizations is better suited to this particular chosen area of inquiry because of the lack of research to date on the social-psychological process involved in the simulation teaching/learning experience. Glaser's approach to grounded theory is less structured and therefore more flexible than Strauss and Corbin's (1998) method. Because there is insufficient research to guide the application of pedagogy in HPS-based nursing education (Cant & Cooper, 2009; Cooper & Taqueti, 2007; Day-Black & Watties-Daniels, 2006; Kaakinen & Arwood, 2009; Ravert, 2002; Rourke et al., 2010), the higher level of abstraction and conceptualization that are characteristic of Glaserian grounded theory lent itself better to the creation of a foundational mid-range theory to assist nurse

educators in making evidence-informed decisions on the use of pedagogy in simulation-based nursing education.

Data Collection

Before initiating the study, permission was acquired from the Vice-Dean and the Simulation Laboratory Coordinator of a Bachelor of Science in Nursing (BScN) program in a degree-granting academic institution in a large urban area in Western Canada. The same institution's ethics' review committee also granted ethical approval. The data collection involved semistructured interviews supplemented by observation sessions in which cohorts of undergraduate nursing students engaged in HPS-based simulated clinical scenarios. Other forms of data collection included field notes, analytical and operational memos, and journaling. Demographic data were collected from the participants prior to conducting the semistructured interviews. All participants signed a consent form (Appendix E) to indicate their awareness of their rights as participants in this study. I recruited 16 interview participants (see Appendix C for the information sheet) and conducted a total of 45 interviews, all 45 of which were transcribed verbatim. Of the 16 participants, 5 were faculty members with prior experience as HPS-based clinical scenario facilitators, and 11 were BScN students with prior experience in HPS-based clinical scenarios as part of their formal education program. The majority of the interviews ranged from 30 to 60 minutes in length; the longest extended over 65 minutes, and one of the final interviews took only 9 minutes. Fourteen of the 16 interview participants were interviewed three times, one participant twice, and another participant only once. The use of leveled coding inherent in the grounded

theory process served as a guide in helping to determine the number of interviews required to reach data saturation. The observation sessions involved another 28 fourth-year BScN students and two faculty members who actively participated in simulated clinical scenarios that lasted from three to four hours. Initially, to conduct the interviews, either a student interview guide was used (Appendix C) or a faculty interview guide (Appendix D) that contained open-ended questions; these guides were designed as beginning guides only to ensure systematic data collection at the start and were subsequently revised as data and the thematic categories emerged. Secondary data was also acquired from the observation sessions by using an observation guide (Appendix F) to focus on relevant phenomena when the live HPS-based clinical scenarios were viewed. Finally, the researcher either recorded and transcribed or handwrote fieldnotes to enhance future data analysis throughout the data-collection process and supplemented the fieldnotes with journals and operational memos in which I recorded my personal reflections which in turn provided contextual depth during the analysis of the data.

After the initial round of interviews, I proceeded to identify categories that required direct questioning that would enable me to develop descriptions for theory development. This process often took the form of member checking in which I invited the participants to determine whether my analysis of their meaning reflected their perceptions of their participation in HPS-based clinical scenarios. This step was necessary to ensure that I obtained accurate accounts of their perceptions to enhance the credibility of the data and the subsequent

emerging core variable (Goulding, 1998; Riley, 1996). Milliken and Schreiber (2001) explain that in grounded theory "the researcher's job is to investigate the socially constructed meanings that form the participants' realities and the behaviors that flow from those meanings" (p. 180). These meanings are then conceptualized to form a theory that is 'grounded' in the participants' localized accounts and experiences (Charmaz, 2005). Therefore, grounded theory defers to the expertise of the participants who have experience in the simulated clinical environment. This act of deferring to the participants' assessment of the data analysis was vital to ensure that the risk of devaluing their voices in the research process was avoided, which is particularly pertinent if the phenomenon under inquiry has an epistemological foundation in the social construction of knowledge.

Data Analysis

Coding is considered the primary analytical procedure in a grounded theory study (Walker & Myrick, 2006); it is "an iterative, inductive, yet reductive process that organizes data, from which the researcher can then construct themes, essences, descriptions, and theories" (p. 549). Coding is accomplished by defragmenting the data and comparing and labeling newly created categories that are useful in the data analysis (Glaser, 1978; Walker & Myrick, 2006). The basic process in grounded theory includes open coding, selective coding, and theoretical coding. The aim of creating codes from the data and constantly comparing them with the data is to generate categories that lead to the emergence of a core variable that will provide insight into the process involved in using the HPS-based

clinical scenario experience as a teaching modality for undergraduate nursing students (Glaser, 1978; Schreiber, 2001).

Substantive Coding

Analysis in a grounded theory study comprising two phases, substantive and theoretical coding (Glaser, 1978; Walker & Myrick, 2006). Substantive coding further includes the sub-phases of open and selective coding. The data analysis begins with the process of open coding, in which the researcher compares data line by line (Schreiber, 2001). Glaser advocates line-by-line immersion and the process of "running the data open" (p. 56) to allow them to be coded in multiple ways to construct conceptually dense categories. The researcher then compares these conceptual categories to new data as they are transcribed (Walker & Myrick, 2006) and, in conjunction, memos the theoretical ideas that emerge from this constant comparison immersion process (Walker & Myrick, 2006). During this study I extracted data fragments, stories, or individual words from the nursing students' and faculty members' descriptions of the simulation experience that I deemed to have significant individual meaning and then analyzed the patterns in the data as part of the conceptualization process (McCann & Clark, 2003c). Originally, I generated a total of 1,575 open codes, including, for example, "linking experience with ability to focus," "scaring off the poor 1st years," "voice of God," "pushing a linear fashion," and "conforming to everything." Through the process of selective and theoretical coding, I eventually conceptualized these open codes into 38 codes that directly contributed to the themes and core variable that emerged from this study.

In the second subphase of selective coding I then categorized the data. Following Glaser's (1978) coding method, I selectively coded around the previously mentioned emergent theory or core variable (Walker & Myrick, 2006). This process involved analyzing codes against previous open codes and condensing them into higher-level concepts or categories (Schreiber, 2001). Schreiber designates this process as the second level of coding, but I was actually required to begin selective coding almost immediately and concurrently with the open coding. As soon as I gathered and transcribed the new data, I constantly compared them to the existing codes to reach a level of abstraction that I could repetitively check against other data (Schreiber, 2001). Through this constant iterative process I determined the gaps in the data, which then channeled the subsequent interviews and sampling. Examples of selective codes that emerged from this process included "implicit evaluation," "hierarchal observation," "leveling of expectations," "crawling before you walk," and "talking to the wall."

Theoretical Coding

During Glaser's (1978) second main level of coding, theoretical coding, I analyzed the relationships among the substantive codes or categories to form conceptualizations of a possible theory or central theme (Schreiber, 2001; Walker & Myrick, 2006). As new data emerged from the theoretical sampling, I clustered them into the various substantive categories according to fit. Examples of some of the key substantive categories from this study included "assimilating experts' frame of reference," "authenticity of roles," "presence as support," "building trust," "leveling noise," and "performing in the fishbowl." Flexibility was needed

at this point in the analysis process to adjust the central theme as dictated by the data. A key example from this study occurred when I further analyzed the stress and anxiety that resulted from peer observation and critique in the debriefing process. A theme appeared to emerge of complete withdrawal of peer observation at the level of learners because of their rudimentary frames of reference and low confidence levels. Through further sampling and member checking, I determined that the analysis did not fit the data, and I altered this particular aspect of the process. This flexibility contributed to a core variable or emerging theory that echoed the relationships between and among the substantive codes (McCann & Clark, 2003a). This final theory needed to be conceptually dense, yet simple, and to reflect links among all of the previous levels of codes and categories (McCann & Clark, 2003a).

During this study I constantly made notes and documented ideas, questions, feelings to reflect their internal dialogue (McCann & Clark, 2003a). Strauss and Corbin (1998) describe memoing as "the researcher's record of analysis, thoughts, interpretations, questions, and directions for further data collection" (p. 110). I commenced writing memos as soon as the study began, even in the planning stages, as a record of my ideas and interpretations during the study's evolutionary process (Schreiber, 2001). An example of a question that I asked in the memos as I collected the data was, "Is the capacity to handle peer feedback connected to confidence, experience, and/or knowledge?" For the purpose of recording memos and journaling, I also created files that I kept separate from the specific data-analysis documents. Finally, I used diagrams to

illustrate emerging theories and relationships among the categories. Schreiber explains that diagrams promote conceptualization and often allow the researcher to discover gaps in the data.

Rigor

Chiovitti and Piran (2003) state that trustworthiness in qualitative research is related to credibility, and Beck (1993) argues that the credibility of a qualitative study is judged by "how vivid and faithful the description of the phenomenon is" (p. 264) to the participants' experience. I, therefore, used two sets of criteria to enhance the rigor and trustworthiness of this study (Chiovitti & Piran, 2003; Glaser, 1978). The first set is Glaser's four criteria for judging and improving the generalizability of grounded theory: fit, work, relevance, and modifiability (Glaser, 1978; McCann & Clark, 2003b); the second is Chiovitti and Piran's criteria for qualitative research rigor: credibility, auditability, and fittingness. Throughout this study I took specific actions to ensure that I followed these criteria to maintain the rigor of the study.

Findings and Discussion:

Empowering Through Fading Support

In this study I discovered a multidimensional social-psychological process that occurred during the use of a high-fidelity HPS-based clinical scenario as a teaching/learning modality to educate undergraduate baccalaureate nursing students. I labeled this process *empowering through fading support*, which I have illustrated in the theoretical diagram, Figure 1. For the purpose of this study, *fading support* indicates a process that involves dynamic assessment or adaptive

scaffolding as a foundation for the social construction of knowledge inherent in the simulated clinical environment. Lajoie (2005) uses the term *adaptive scaffolding* to refer to an evolution of the practice of scaffolding that is most closely connected with Vygotsky's (1978) social learning theory, which asserts that learning occurs within a zone of proximal development (ZPD). Lantoff (2009) defines the ZPD as the difference between what learners can accomplish independently and what they can accomplish with assistance. Vygotsky further defines the ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (p. 86). Scaffolding enters into play when someone more competent at completing the task (e.g., a teacher) supports learners within their ZPD. The teacher begins by supporting the aspects of a task or activity that are outside the learners' current capacities, which in turn frees them to focus on aspects of the task or activity that are within their current scope of knowledge, understanding, and meaning schemes (Stone, 1998). This support, or scaffold, is only temporary, and the teacher gradually removes it as the learners begin to take control of the learning experience (Stone, 1998). Therefore, the term *fading support* is best understood as a process of gradual withdrawal of support or assistance as the students move from the beginning phase where others regulate their learning to the final phase of self-regulation (Hadwin, Wozney, & Pontin, 2005; Lajoie, 2005). Through the process of dynamic assessment and adaptive

scaffolding, learners will eventually develop more sophisticated meaning schemes surrounding skills and knowledge (Hadwin et al., 2005).

The term *dynamic assessment* refers to the need for the teacher to actively assess the learners' ZPDs as the learning session unfolds and decide when to scaffold (support) or fade (withdraw support; Lajoie, 2005; Lajoie & Lesgold, 1992). Lantoff (2009) corroborates this concept in referring to dynamic assessment as the dialectical blending of instruction and assessment. In other words, in using formative assessment during a simulated learning session, the nurse educator can adapt the scaffolding of support to best meet the needs of individual students. Key to this theory is the concept that scaffolding must be seen as fluid in nature, fading in and out, which thereby avoids the overuse of rigid objectives (Hadwin et al., 2005; Lajoie, 2005; Stone, 1998). In accordance with the process of fading support highlighted in this study, I argue for the need to bring learner-centric adaptive scaffolding into a dialectical blend of instruction and assessment when student nurses are engaged in an HPS-based clinical scenario. Exposing adult learners to challenging learning activities within their ZPDs through the use of learning tools such as simulation helps them to reformulate meaning schemes around the knowledge and skills that are necessary for them to eventually perform as independent practitioners in the modern healthcare environment.

The thematic analysis of the findings from this study is reflected not only in Vygotsky's (1978) social learning theory and the interrelated evolutionary concepts of adaptive scaffolding and dynamic assessment, but also in the concept

of perspective transformation from Mezirow's (1994, 1995) transformative learning theory. At the heart of transformative learning theory is the concept that learners develop habits of the mind (understandings and meanings) through experiences (Cranton & King, 2003; Mezirow, 1994). These habits of the mind form a rudimentary frame of reference or meaning scheme surrounding a phenomenon that lead individuals to think that this phenomenon will invariably occur in the same way again (Cranton & King, 2003; Mezirow, 1994). According to Mezirow, a frame of reference incorporates a "constellation of concepts, beliefs, judgments, and feelings which shape a particular interpretation" (p. 223). Mezirow (1995) explains that learning occurs when these rudimentary frames of reference are upset and reformulated through learning experiences or "disorientating dilemmas" (p. 50) that challenge our values, assumptions, and beliefs within this frame of reference. Similar to constructivist learning theory, transformative learning occurs when students critically reflect on their meaning schemes that are upset by this disorientating dilemma, which leads to the transformation of their perspectives on the phenomenon (Cranton & King, 2003). This perspective transformation alters how they will contend with and interact with the same phenomenon during subsequent exposures (Cranton & King, 2003; Imel, 1998).

In engaging technology-based learning tools such as HPS-based clinical scenarios, new students often face a new threat to their meaning schemes, albeit one that has the potential to aid in the transformation of perspectives and knowledge to make them adaptable to the modern healthcare environment. The

data from this study reveal that at times throughout the process the participants reported the risk of feeling threatened, of being cognitively overwhelmed, and at times also of being disengaged when they were exposed to high-fidelity simulation experiences that hampered the potential for learning. The following analysis of the substantive categories that emerged from the study illustrates the core variable of *empowering through fading support*.

Performing in the Fishbowl

The theme of performing in the fishbowl refers to a complex social process within the simulated clinical environment that requires students to submit to peer observation while they 'perform' during the HPS-based clinical scenario, with the goal of facilitating feedback and fostering peer filtering of knowledge in the subsequent debriefing session. Interestingly, the act of being observed by a cohort of fellow students as they participate in a scenario often appears to evoke feelings of fear, stage fright, and an implicit sense of judgment. As one student reported:

> When I think of the word simulation and that experience, a big word that comes to my mind is fear, anxiety, performance anxiety. . . . The tension in the room is—you can feel it. . . . I have tried to break the tension by reminding us as a group that, Hey, we're not being graded, blah, blah, blah, blah, blah; but it has had little effect on the wall of fear. (SN4)

Another student discussed feelings of anxiety and judgment related to the typical observation setup of audiovisual equipment and one-way mirrors:

> The only time you ever see a one-way mirror is in jail or, you know, when you're under intense scrutiny. It brings to mind TV where someone's being interrogated, and I think having your classmates watch you on screen, it's not useful at all; it just makes people self-conscious. (SN6)

Another student described his or her discomfort with peer observation:

> In first year especially, when there was that level of discomfort with having our peers watch us, you really weren't thinking in there. You pretty much freeze up; you're there, you're hearing, but you're not listening. You're just concerned with getting out of that room. (SN8)

Of particular note is the phrase "in first year," which implies an inherent need to build capacity through experience and repeated exposure to be able to handle the peer filtering of knowledge inherent in the observation and debriefing processes. A student further corroborated this notion:

> Especially in those junior years, there's really no point getting peer feedback because you and your peers know nothing about that situation or that skill. And I think your ability to give feedback also progresses and builds through the course of the program. (SN6)

These feelings of fear, anxiety, and even intimidation related to performance anxiety are well corroborated throughout the literature (Cant & Cooper, 2009; Decarlo, Collingridge, Grant, & Ventre, 2008; Lasater, 2007; Lundberg, 2008). But acknowledging the vital role of social discourse in transformative learning (Parker & Myrick, 2010) and social learning theories, Tinsley and Lebak (2009) advocated for the use of collaboration when undertaking social filtering of peer knowledge. Feedback and evaluation in a group setting help to develop learners' capacity for critical reflection (Tinsley & Lebak, 2009). The data provided further evidence of the benefits of peer filtering of knowledge in the observation and debriefing processes, as one student noted:

> But what was really powerful learning . . . was from debriefing. So maybe being in a situation and panicking and being shell-shocked and not knowing what you're doing, and then being given the information does have value. It's the debriefing part that was really, really useful. (SN4)

Statements such as this one give credence to the role of disorientating dilemmas in the simulated clinical environment to facilitate the transformation of meaning perspectives (Mezirow, 1995; Parker & Myrick, 2010). Wells (2000), however, cautions educators that this transformation requires in the group process positive interactions amongst the peers. A student referred to debriefing and confirmed this perspective: "It increases your learning to hear the tutor's feedback, but . . . I'm a tough critic on myself, and it's nice to come out of those situations and hear that you did a lot of things right" (SN2). Unfortunately, the pressure appears unavoidable, as another student confirmed. In reference to the implicit nature of judgment within the observation and peer critique sessions of HPS-based clinical scenarios, that same student confirmed, "You're being ranked all the time when you're in school. No matter how you look at it, it's just the way it is."

This finding raises the question as to how to facilitate positive observations and debriefings within the framework of an HPS-based clinical scenario that both challenges and empowers new learners. One clue from this study is the statement of one student: "The experience is thin." *Thin* refers to the lack of experience in the simulation laboratory that leads to fear and the call from many participants for more exposure to simulation. In a second simulation session another student stressed the value of increased exposure: "I was probably more comfortable with my peers by that time because I'd known them for longer and was maybe just more confident in my ability to do the simulation. It didn't seem as daunting the second time around" (SN9). Statements such as this one left me

pondering the validity of scaffolding the observation/process by removing it altogether for more junior learners who have emerging knowledge and skills and incrementally increasing the exposure to observation and peer critique as they build confidence, experience, and knowledge throughout their nursing education program. One student highlighted the possibilities of scaffolding peer observation: "If you were initiated into it differently, if you weren't under scrutiny from the start . . . you'd be more comfortable with it and maybe be able to get more out of it as you became more independent" (SN6). In general though, the idea of removing peer observation from the initial simulation experiences met with skepticism from the participants, who supported the value of peer observation and social discourse despite the feelings of anxiety, fear, and judgment that they entailed for junior learners. A student's skepticism was obvious in the comment, "I am thinking not for first year. I am not sure how you would warm them up to it though" (SN8). In discussing a simulation session that involved observation by no peers other than the immediate scenario participants, another student highlighted the potential benefits of dynamic assessment and flexible structuring as a solution:

> Me and my peer went in, and we found that even within watching each other, we could have a lot of feedback for each other. And it was nonstressful because there was no peers watching us as well, only the evaluator, who also shared her piece. (SN7)

Dynamic assessment of individual learners' capacity to cope with the threat of having to perform in the fishbowl of a simulated clinical environment is crucial.

Finally, *developing trust and building relationships* with peers and teachers in the simulated environment was a significant theme throughout the

study. A student participant stressed the need for relationship and accountability amongst peers who are observing and offering critique:

> In sim lab . . . the people sitting in the room weren't your colleagues, right? It wasn't the feedback that you would receive from a colleague on the floor; they were someone that you worked with. It was, again, people watching you and scrutinizing. So to me there was not the accountability or the relationship that needs to be there to give that kind of feedback in a work setting. (SN6)

This same student reiterated this theme in discussing a preference for private feedback from a trusted teacher:

> Knowing that it's not going to be public feedback or it's not the voice feedback or it's not your classmates on your case, but it's someone you do know and trust and are accustomed to receiving feedback from I think would make a big difference. (SN6)

The data clearly indicate the need for trust and accountability of peers when students engage in the social discourse of peer observation and critique that are inherent in the high-fidelity simulated clinical scenario experience.

Suspending Disbelief

Another theme closely related to the challenge of performing in a fishbowl is the significant challenge to students of suspending their disbelief when they engage with a high-fidelity simulated mannequin. For the students this finding was a consistent theme that was typified in statements such as "It's creepy looking; it really is. And it's got this silly wig and the blinking of the eyes. Those eyes! I think it's kind of creepy" (SN10). The students also noted the challenge of engaging the mannequin on a human level: "You're not actually getting the whole artificial patient" (SN3); one argued that simulation can be a "quasi-real experience" (SN4). For some students this experience raised the issue of their

inability to look past the mannequin's mechanical (i.e., physiological) limitations as a defense mechanism to avoid engaging with it on a subhuman level because of their feelings of insecurity about their knowledge and frames of reference with regard to both the mannequin and the application of their skills within a clinical scenario. As one faculty member stated, "Those who have no self-confidence in their own knowledge level have a tendency to fall backward and say, 'It's okay. You go right ahead, and I'll just observe'" (FAC1). Another faculty member spoke about the choice of some students to disengage the suspension of their disbelief:

> I suppose that is their way of coping with the artificialness of the situation. . . . It's plastic. They are uncomfortable with talking to that simulated patient. Some students do it very well, and those that can't dispel that disbelief will talk to the mirror or talk to the air but not directly to the patient because they are having difficulty. (FAC2)

The concept of this kind of disengagement in the learning process can often be related to learners' underdeveloped capacity to cognitively process disorientating dilemmas. Ellis (2007) explains that if education is "ill-timed and out of synchrony with development, it can be confusing; it can be easily forgotten; it can be dissociated from usage; . . . it can be unmotivating" (p. 91). It was interesting in observing the students who participated in HPS-based clinical scenarios that they would often talk directly to the one-way mirror rather than to the mannequin, which was channeling the 'patient's' voice. As one student described, "There is something about that one-way mirror" (SN6). This phenomenon was especially prevalent when the technician used the mannequin/patient's voice to cue or prompt the students; it is believed to be a

factor in feelings of disengagement and the interrelated inability to suspend disbelief.

The students repeatedly found the simple act of cueing or prompting through the voice of the mannequin/patient that often occurs during a clinical scenario disconcerting and connected to a strong desire to maintain the authenticity of the roles within the simulation laboratory. One student stated:

> Of course the location where the voice is coming from, not being the mannequin and all, that is a bit off-putting; but also when the voice changes from being the patient to trying to push you in a different direction than where you're going kind of makes you very confused, think you're missing something major. (SN5)

It was apparent that the shift in channeling from the mannequin/patient's voice to directions or cueing further compromised the social learning environment inherent in HPS-based clinical scenarios. Another student commented:

> It is a little embarrassing. Even though it's just a mannequin and it is the same voice, but to have that person say, "Oh, well, maybe you should check my IV rate," . . . it'd be better if it came from a voice separate and apart from the patient voice, I think. (SN4)

Another student corroborated this statement, which illustrates that certain forms of facilitation can detract from the nonlinear exploratory learning potential of an HPS-based education session:

> The one thing that would always get me is that she would prompt me before I had the chance to try and figure things out myself. So it felt like—pardon my language—but it felt like she thought I was stupid and didn't know anything. (SN7)

Maintaining authentic roles within the simulated learning environment is paramount not only to the process of suspending disbelief, but also to engaging

adult learners. The perceived authenticity of the learning experience is key to maximizing the learning benefits of simulation (Hotchkiss, Biddle, & Fallacaro, 2002). Turkle (2007) refers to the potential for robots (e.g., HPS) to be "relational artifacts" that can potentially create the sense of being in a relationship: "Their ability to inspire relationship is not based on their intelligence or consciousness but on their ability to push certain Darwinian buttons in people . . . that make people respond as though they were in a relationship" (p. 2). It may be feasible that high-fidelity simulators have the potential to push buttons in nursing students and thereby create a sense of relation that can be threatened when scenario facilitators shift roles.

Conversely, many of the study's participants still supported the vital role of facilitators in prompting and cueing, which they felt could gradually fade away as the students develop confidence in their knowledge and frames of reference:

> Instead of me just standing there having no idea what is going on, maybe if I'm further in my program where I should know more—but I feel like right now I feel the prompting is kind of helpful. . . . If you don't know what else is going on, . . . you kind of get flustered, and the prompting puts you back on track. (SN11)

It was important to the participants that the prompting emanate from a role player who would provide assistance in the simulated scenario (e.g., the clinical instructor). As one faculty member noted, "If we want to go with this idea of authentic learning experiences, then we have to minimize the amount of guidance the operator gives as the patient, . . . making sure they stay in the voice of the patient" (FAC3). Maintaining the authenticity of the roles (e.g., patient, clinical

instructor, etc.) is a key factor in exploratory learning to avoid disrupting or cognitively overwhelming adult learners.

Scaffolding Signal and Noise

In structuring an HPS-based clinical scenario, educators often imbue the experience with the 'realities' of the clinical environment to provide students with an accurately contextualized clinical experience in which to apply their burgeoning skills, knowledge, and meaning schemes before they enter the 'real' world. To this end, educators can introduce complexity and acuity into an experience, which we call "signal and noise." A faculty member explained:

> So signal is, in a first-year student you want them to be able to check vital signs; you want them to be comfortable learning that. And noise is the concept of throwing tons of things at them; like the patient is fidgeting, won't keep their arm still. You know, if you throw tons of noise at a first-year student, you're inhibiting the knowledge that can be gained. (FAC3)

Signals such as interpersonal complexity/conflict and increasing physiological acuity can quickly become noise that overwhelms junior learners and hampers their ability to cognitively process the noise if they lack the experience and confidence that indicate mature frames of reference with regard to a particular phenomenon. A student discussed the introduction of role players such as family members into a simulated clinical scenario:

> I found that I could explain things easier to the family because I was in fourth year and had gone through all the education prior to that. . . . I think had I been in year two and had a family member complicating the scenario, I think I would have been done for. (SN3)

With reference to the mannequin/patient's sudden change in acuity, another student stated, "We were supposed to go in and do a head to toe, do vitals,

and work together in a team; however, when we got into that room, and hearing that this person is cycling downward, I panicked" (SN4). These comments reflect the potential for HPS-based learning experiences to move beyond signal to noise that will overwhelm learners cognitively.

Luckin (2008) argues for the need to organize learning activities to prevent learners from becoming overwhelmed with uncertainty and thereby avoid overwhelming their capacity to cognitively process the experience into their frames of reference. The ability to facilitate an HPS-based clinical scenario that utilizes adaptive scaffolding attuned to the level of the learners ensures that they will work within their ZPDs and thus avoid disengagement or stress (Ellis, 2007). The data illustrates that interpersonal complexity and physiological acuity (signal and noise) can potentially be introduced into the simulated learning environment as long as the nursing students' developmental levels are taken into consideration. More junior learners (e.g., first- and second-year baccalaureate students) require simple scenarios, with little noise to overwhelm them and trigger insecurities about their knowledge and meaning schemes. For more senior learners (e.g., third- and fourth-year baccalaureate students), the introduction of higher levels of acuity and complexity is more likely to enrich their capacity for learning and skill development. One student argued for the scaffolding of signal and noise:

> I think that it's such a golden opportunity to do a process or to try a skill in a safe space, in a secure environment, that you really can build that confidence, because if you can't do it in an ideal world, how could you possibly ever do it in a noisy world or a busy world or a rushed world? (SN6)

Scaffolding the Expert's Presence

Students who participate in HPS-based simulated clinical scenarios yearn for the experts' assistance and contributions to their burgeoning knowledge and frames of reference with regard to clinical skills and interventions. One student noted:

> I hungered for more times with the tutor where you had like a partnership with learning, and I think the sim lab can do that if you have your tutor there and they can demonstrate what you know rather than leave you to guess all the time; to model, because they know we are the blind leading the blind in that room, right? (SN4)

This statement is typical of the thematic trend throughout the data that the participants strongly preferred student collaboration with experienced tutors who are able to bring the contextual expertise that they have drawn from the realities of the clinical environment. Collaboration or guidance from perceived clinical experts decreases the anxiety and stress of performing in the fishbowl of peer-observed simulated scenarios:

> I think it would be lovely to have that friendly face there. . . . Yeah, I still do, because there are times in that room as a student when we flounder; we don't have a clue what to do. . . . In those moments of sheer panic, if you can look at a friendly face like a tutor that you had good rapport with, then I think it would make it less sterile. (SN4)

For the researcher, statements such as these move the concept beyond the realm of junior learners' mere desire for guidance to desire to perhaps borrow and eventually assimilate an expert's frame of reference. This inclination is perhaps a result of their need to shelter themselves during the scenario performance by considering the expert's knowledge, skills, and overall frame of reference a form

of intellectual support for their own rudimentary frames of reference and lack of confidence. One student commented:

> The tutor's input is valuable because she or he has all this experience behind them, and we don't necessarily have the eyes to see what a good clinical experience is. We are still building our knowledge base, and we tend to miss things. (SN7)

Lave and Wenger (2002) underline the importance of the relationship between experienced and inexperienced practitioners: "Learners inevitably participate in communities of practitioners and . . . the mastery of knowledge and skills requires newcomers to move towards full participation in the sociocultural practices of a community" (p. 56). This process requires that experts engage learners and build their capacity to become full participants in a practice community (Lave & Wenger, 2002). Strengthening the relationships between simulation facilitators, nursing students, and their peers in a community of learners is a primary factor in empowering students to reformulate their frame of reference within the HPS-based simulated clinical environment.

To empower the students' move from newcomers to full participants, skilled simulation facilitators must be willing to engage in dynamic assessment and active involvement in the learning experience. This perspective is highlighted in a faculty member's statement about the need for expertise and practice experience in collaborating with students:

> [It] does create an environment where they feel like "I can trust the process." But if we don't share our expertise, I think the students have a sense of insecurity about "Does she know what she is doing?" . . . I think they get a sense of, it's the blind leading the blind. (FAC4)

Colby and Atkinson (2004) ascertain that, to build capacity within learners' ZPDs, meanings must be negotiated with more capable individuals. Kneebone (2005) concurs that an expert's assistance is required to facilitate the internalization of knowledge through simulation. Some scholars, however, have cautioned that educators should actively assess the needs of learners and in turn individualize the fading of support to avoid damaging the learning process (Kneebone, 2005; Lave & Wenger, 2002).

Although the desire for expert collaboration with students in the scenario itself andthe expert guidance in the subsequent debriefing session was strong, clearly there was a call for adaptive scaffolding of the instructors' contributions in all facets of the HPS-based clinical scenario facilitation. One student highlighted this need:

> I think the instructor definitely has a leadership role. We need someone as a facilitator definitely. I think students also can be respected in that we know how we best learn as well. So I think if the tutor picks a plan of action, I think that's good. But they need to be responsive to the ideas of the students. (SN7)

Another student endorsed the concept of fading support:

> As you become a more senior student you become more confident in your own abilities, in your assessment skills. Then you definitely do not feel like you need your tutor there. You should actually feel like you don't want her there to give you a chance to think things through. (SN8)

This statement illustrates Vygotsky's (as cited in Wells, 2000) concept of egocentric speech, which Wells defines as the shifting from one's sense of self from other-control to self-control, in which one uses social discourse and the group's filtering of knowledge to increase their orientation to their own responses

and frames of reference. Wells states, "Attempting to make sense with and for others, . . . we make sense for ourselves" (p. 6). Self-control ultimately requires dynamic assessment, which thereby creates the ebb and flow of the expert's support and presence. A faculty participant discussed individualized assessment of adult learners' needs in a simulated clinical environment: "Sometimes it's just easier to address the issues and their lack of confidence and get them feeling like they can move forward and then step away again" (FAC3). A student also addressed this concept of dynamic assessment and its relevance to the realities of nursing practice:

> I think it should be pushed in the beginning that there is always someone to ask if you doubt yourself. . . . It's the reality of nursing: If you have a question about something, you probably shouldn't go ahead on your own. (SN2)

HPS-based clinical scenarios are a prime environment in which to facilitate the perspective transformation from other-control (teacher-centric) to self-control (learner-centric) through the development of social communities of practice.

Scaffolding Expectations of the Learner

Lantoff (2009) cautions that "it makes little sense to talk of acquisition unless one intends to use what one has acquired, and it makes even less sense to talk of using something that one has not yet been acquired" (p. 356). In other words, education is effective only if students are developmentally ready to learn (Lantoff, 2009). Key to that process of empowering through fading support in HPS-based clinical scenarios is the need for nurse educators to scaffold their expectations of learners. According to a student participant:

> I'd say that in theory what sim could accomplish is that you go through the motions, go through the purpose, go through the thinking, without pressure of having a living, breathing human right in front of you. But, unfortunately, there are all these other pressures associated with sim itself that kind of overshadow it. (SN6)

Overshadowing this study is the need for educators to facilitate simulation learning experiences by targeting nursing students' ZPDs and thereby increasing the learners' capacity for the simulated scenario based on an assessment of their developmental levels and frames of reference. With regard to simulation, one student noted, "I think the students find it stressful enough already if you try to make them move beyond what they've been taught. Yeah, it's overwhelming" (SN5). Unfortunately, the risk for long-term traumatization in the high-fidelity simulated clinical environment that results from insufficient assessment of the learners' needs is realistic, and in discussing the practice of exposing learns to high acuity (e.g., a code), a faculty member explained that senior nursing students are

> better equipped because they've had so many experiences and simulation by that point. But if you threw them in and gave them as their first experience that one? I think you'd lose them forever. I don't think you'd ever get them back to being receptive and open to simulation as a learning strategy. . . . If we wound the spirit, how can you learn? (FAC1)

Another faculty member's comment on the utilization of adaptive scaffolding validated the role of personal experience and the current frame of reference in enhancing nursing students' learning through simulation: "We have to start where the students are at. We think it confirms for them the purpose of the experience, and it validates that, yes, they can contribute, or they have something to bring to the situation" (FAC2). The thematic analysis also demonstrated the

related importance of prior preparation and orientation in helping undergraduate nursing students to develop meaning schemes and the subsequent capacity for learning in high-fidelity simulated clinical environments.

Orientation and prior preparation are key activities highlighted in the data that augment the students' capacity to engage effectively in the simulated clinical scenario and the inherent peer-observation process. The students typically referred to being "freaked out" or "put on the spot" (SN10), and one student commented further that she

> didn't feel prepared in first year. Being thrown in there was scary. And . . . you were just given the scenario or the problem as you get in, so you didn't have time to plan how you would deal with the situation. So that was mostly why I felt like I just wanted to get out. (SN8)

Conversely, the students considered receiving information prior to an upcoming scenario a "confidence booster" (SN7) because it gave them an opportunity to research and increase their knowledge of pathophysiology and nursing interventions. They also considered blending their previous knowledge from laboratory experiences, theoretical knowledge, and clinical practice key to maximizing their learning in the simulated clinical environment. Stone (1998) confirms that, for successful scaffolding to occur, learners must have some level of prior knowledge of the task.

Faculty may cite the rationale that limited prior preparation before students enter a simulated patient's room reflects the realities of clinical practice for many nurses whose patients undergo sudden and unexpected changes in acuity or condition. However, one faculty participant observed:

> I think as tutors we have to get over dwelling on the fact that we want simulation to replicate the practice experience, as real of an experience as we can make it. But the reality is, it's a lab. It's all about looking at students' actions and trying to get at their underlying frames and assumptions. (FAC3)

A student hinted at the need for faculty to scaffold their expectations according to the level of each student:

> I also think judgment plays a large role in a lot of it, that people involved in creating the simulation realize that this is something to help the students rather than put pressure on them to be perfect at the beginning. (SN7)

The need to use dynamic assessment and adaptive scaffolding to allow students to prepare their meaning schemes for a particular scenario is vital to enhancing their relevant knowledge and skill acquisition. The ebb and flow of this process requires that faculty be able to tolerate ambiguity and flexibility in structuring learning experiences within their students' ZPDs (Colby & Atkinson, 2004).

Scaffolding Within the Facilitator's ZPD

Considering the need for adaptive scaffolding that emerged from the data, simulation curriculum developers would be negligent if they did not consider facilitators' own frames of reference with regard to mediating HPS-based clinical scenarios. As noted previously, the process of learning, especially in a practice environment, requires a relationship or interchange of knowledge and meaning schemes between both the expert and the learner (Lave & Wenger, 2002). This process requires that educators have knowledge of learning theory and process that is best suited to simulation. They must be aware of their own ability to assess learners' needs and their own capacity for ambiguity and flexibility in structuring

high-fidelity simulated learning experiences. One faculty participant stated, "The tutors need to have some leveling up in terms of how they are able to do the observation or the questioning. . . . Maybe we should look at leveling the tutors as well with their own skill" (FAC4). Challenging the familiar rationale that limited resources are responsible in part for the problems with the process associated with simulation-based nursing curriculum, another faculty participant argued, "Perhaps resources can be looked at a little bit broadly in terms of the skill of the tutor and the comfort level of the tutor with simulation experience" (FAC2). Self-awareness and knowledge of learning theory are key factors in the development of pedagogically sound HPS-based clinical scenario curricula.

In reference to pedagogy in simulation, Kaakinen and Arwood (2009) call for educators to shift from traditional simulation delivery models based on a teaching paradigm to those based on a learning paradigm. Most high-fidelity simulated clinical scenarios are facilitated based on the behaviorist principles of structured objectives and goals. Kaakinen and Arwood support the development of a foundational learning theory in simulation to guide nursing students through changing their skills, knowledge, and dispositions. The move beyond reliance on behaviorist pedagogy is reflected in a statement from a student on the nursing process and the structuring of predetermined objectives for the scenario:

> I guess the preconceived notion or the expectation of the student is that "I'm going to walk in there and do my assessment, and I need to find something, and then I need to treat it, and that is how I'm going to get out of there." It's kind of like, "What's the quickest way to get out of here?" And that is kind of like a puzzle. (SN3)

These pedagogical principles are also reflected in a faculty participant's statement: "I think, as facilitators of the experience, we assist students to understand the potential for their learning. . . . And in our debriefing, . . . we need to stop focusing on particular tasks and getting things right, as opposed to learning" (FAC3). Adaptive scaffolding or dynamic assessment may be the foundation for the development of sound pedagogy suited to high-fidelity undergraduate simulation and the modern adult learner.

With regard to the tendency of simulation facilitators to fragment nursing students' scenario participation into segments (e.g., one pair of students works on the assessment, another pair works on the interventions, etc.), the data reveal that allowing students to engage in all of the phases of the nursing process during a simulated scenario further boosts learning. One student commented:

> I think simulation's real value is kind of going through the motions, and the motions being the nursing process, until it becomes more intuitive. . . . I think it could help you gain confidence in the process. And by splitting the process up, then it really—maybe I'm really great at collecting data, but do I know what to do about it? Or maybe I can assess that a clinical situation is changing; great; what does that mean? And so, yeah, I definitely think if it is going to be beneficial, you have to see it from start to finish. (SN6)

If educators facilitate student engagement in the entire nursing process during a scenario, they open up further possibilities for dynamic assessment relevant to individual learners' needs. One student suggested, "I think if you gave students more opportunity to do it as a whole process with a teacher, you could really individualize it" (SN6). Despite the challenge of limited resource, educators need to allow students to move through the stages of assessment, planning, and implementation of nursing interventions before they enter the evaluative phase of

debriefing. Many scholars contend that simulation has the potential to engage the millennial generation of learners through nonlinear exploratory learning constructs (Harder, 2010; Parker & Myrick, 2009; Pardue et al., 2006). This potential requires that simulation developers and facilitators be open to ambiguity in the simulation process. HPS-based clinical scenarios give educators a potential tool to enhance knowledge and transform perspectives that is well suited to modern adults' preference for experiential exploratory learning processes.

Negative Case Analysis

Schreiber (2001) notes the validity of paying particular attention to negative cases that arise because it challenges the researcher to develop a more precise level of understanding and abstraction when he or she conceptualizes the phenomenon. For data to be considered in the context of a negative case requires that prevailing themes be countered, which ultimately forces the researcher to seek new depths of analysis such as recoding and additional sampling to ensure that the core categories are truly reflective of the participants' perspectives. In this study, a good example of a negative case was a student participant who seemed to lack the fear or anxiety associated with being observed and critiqued by his or her peers when engaging in a simulated scenario. I thus felt the need to question the student on this perception that he or she was experiencing little or no performance anxiety in the HPS-based clinical scenario, and the student responded, "I guess it doesn't bother me as much. I used to do theatre and performing in the past, so maybe I'm a little more comfortable, I guess, performing" (SN10). This exemplar served to confirm the aforementioned core variable of "performing in the

fishbowl," a situation in which students need a developed frame of reference to better handle the threat to most participants of peer observation and filtering of knowledge. This student was able to draw upon his or her previous experiences with public speaking and performing in front of others to overcome the stress that the other participants were experiences. Upon further questioning with regard to less-experienced students' capacity to handle peer observation and critique, the student stated, "Oh, for sure the situation is stressful, but then you've got peers and instructors watching behind the little tinted two-way glass" (SN10). This statement served to illustrate the students' awareness of some level of fear and anxiety that they experiences not only for themselves, but also for their fellow students when they performed in HPS-based scenarios. This student related it to the relevance of being observed and critiqued by others:

> I think in nursing it's kind of an important thing to learn. Nurses always have to be taking criticism and feedback and knowing how to give it, so I think it's important to start. Probably the more comfortable you become with that, the better off you'll probably end up. (SN10)

Not only do students gain practical skills from the observation and debriefing sessions common to most simulation curricula, but they also benefit from the increased exposure that increases their confidence from their frame of reference with regard to the phenomenon in question. Ultimately, the further use of sampling and focused questions corroborated and helped to saturate this core variable, as this particular student demonstrated when she used her prior experiences and meaning schemes to overcome much of the stress and anxiety associated with the peer filtering of knowledge in an HPS-based clinical learning environment.

Implications and Recommendations

This study has the potential to inform the knowledge base of nursing faculty involved in developing and implementing HPS as a teaching/learning modality in undergraduate nursing education. Several key concepts have been identified that reveal the processes that occur within a high-fidelity simulated clinical scenario. *First*, it was found that the act of peers' observing and critiquing an individual's scenario performance can overwhelm novice learners cognitively. There is a risk of severely hampering learning in a high-fidelity simulated practice environment until nursing students gain more experience and confidence. This confidence empowers them to better contend with peer filtering of knowledge that is inherent in the observation/ process. *Second*, the challenge to students to suspend the disbelief that is ubiquitous in HPS-based learning sessions is also related to the need to build capacity through experience and the maturation of their frames of reference. Key evidence that supports this concept involves the possible utilization of disbelief as a defense mechanism when learners are confronted with the threat of observation and performance anxiety. A strong desire for the authenticity of roles within the simulation environment, especially as related to the unsettling effect of prompting or cueing through the 'patient' (i.e., the mannequin's voice), is further evidence of the potential threat to meaning schemes and constructive perspective transformation. *Third*, the intentional introduction of noise (e.g., interpersonal conflict and/or physiological changes in acuity) can also overwhelm students who lack the experience and confidence to integrate the knowledge and skills embedded in the scenario. *Fourth*, there is a

need to assimilate or have access to an expert's frame of reference through collaboration and the presence of the instructor during the scenario and the subsequent debriefing session to decrease the threat of observation, the mannequin's limitations, and the introduction of signal and noise. *Finally*, there is a need that simulation facilitators be self-aware, critically reflexive, and able to tolerate ambiguity of individualized HPS-based clinical scenarios. This reflexivity necessitates that faculty be knowledgeable about learning theories and pedagogical practices that maximize the potential of this technology-based learning tool.

The key focus of any recommendations based on the findings of this study need to involve the practices of adaptive scaffolding and dynamic assessment. Blended into the process of fading support, these two practices can empower both the simulation facilitator and, more importantly, the nursing student to enhance their knowledge relevant to the reframing of their individual meaning schemes. Educators need to consider simulation as a reciprocal relationship that leads to socially constructed knowledge that is applicable to the realities of modern clinical practice. Maximizing the contextual learning potential of HPS-based clinical scenarios in undergraduate nursing education requires efforts to engage students within their individual ZPD. Therefore, the educator must ensure that the delivery of simulation sessions is flexible and adaptable to the learning needs of the students. Strategies for this goal include the adaptive scaffolding of peer observation, the introduction of signal and noise, experts' support, acuity and interpersonal conflict, and prior preparation.

Specific strategies include the gradual or ‘soft’ introduction of peer observation and critique. Novice learners (e.g., those in the first or second year of a baccalaureate program) with limited simulation exposure and rudimentary frames of reference with regard to practice knowledge and skills may best be served by simulated scenarios that are simple in design. This simplicity includes limiting the number of peer observers; for example, allowing only the scenario participants and the faculty member to offer debriefing feedback during the initial simulation sessions. Subsequent simulation sessions could entail a process of gradually involving more peers in the critique process as the students increase their capacity to handle the stress involved. Simplicity also implies the need to begin the students’ introduction to simulation with scenarios that involve low levels of signal and noise. As students gain clinical experience and increased theoretical knowledge throughout the program, they will likely benefit from gradual exposure to increasingly complex scenarios that involve progressively more noise (i.e., physiological changes in acuity and condition; interpersonal conflict) to challenge their burgeoning meaning schemes.

The development of trust in relationships amongst learners and educators is also key. Whenever possible, consideration should be given to maintaining the consistency of the cohort groups in an effort to build familiarity and trust amongst group members. While aware of the logistical difficulties that this request can create in the administration of simulation-based curriculum, I would challenge educators to consider the benefits of developing trust among the members of a learning community.

Another consideration that may serve to enhance both relevance and trust in groups of students engaged in HPS-based learning sessions is the use of clinical instructors as simulation facilitators. Faculty members who are intimately aware of the clinical experiences and subsequent learning needs of students prior to structuring a simulated scenario can offer valuable insight and help to develop objectives to maximize the social construction of personally relevant knowledge and skills that are applicable to the realities of clinical practice.

Other strategies include increasing students' exposure to HPS-based clinical scenarios to assist in the maturation of meaning schemes and confidence required to overcome disbelief and perceived threats and thereby maximize the experiential learning. Unfortunately, as Brown and Chronister (2009) caution, merely increasing the amount of simulation exposure will not automatically improve learning. Simulation facilitation must also be based on the application of appropriate teaching strategies and theory. This approach requires that faculty members themselves be well orientated to high-fidelity simulation and thereby able to develop meaning schemes that are well-informed by suitable learning theories and pedagogical constructs.

In relation to this strategy is the importance of offering sufficient student orientation (preferably tactile, or 'hands-on,' orientation) and allowing students time for prior preparation (i.e., to gain knowledge on the upcoming scenario). The data show that prior preparation is likely to decrease the lack of confidence and insecurity about their personal knowledge base that is characteristic of many junior learners (e.g., in their first or second year). The capacity to handle the

imposed ambiguity and uncertainty that reflect the realities of clinical practice will likely increase as the students progress through their educational program.

Limitations

Limitations regarding the findings of this study are as follows: First, my ability to analytically conceptualize the aforementioned interrelated phenomena can always be an issue (Glaser, 1978). Second, personal bias on my part is also a factor that may unavoidably cloud the findings. For example, my epistemological beliefs about the social construction of knowledge may sway the interpretation of those who hold different beliefs on knowledge acquisition. However, grounded theory to some extent limits this bias because it is designed to analyze the participants' perspectives and thus increase the likelihood that the findings will be unencumbered by the researcher's ideological stance (Glaser, 1998; Milliken & Schreiber, 2001). Finally, the primary mode of data collection was interviews, which thus raises questions about the participants' representations of their perspectives of the process. Grounded theory mechanisms such as leveled coding, purposive sampling, and member checking were used to promote rigor and aid in circumventing these limitations.

Conclusion

From this study a viable mid-range theory on the social-psychological processes involved in using HPS-based clinical scenarios as a teaching/learning modality in undergraduate nursing education has emerged. Contextual conceptualization of the participants' realities regarding the phenomenon of high-fidelity simulated scenarios has revealed how the process of fading support or the

ebb and flow of adaptive scaffolding can provide nurse educators with a framework to develop curriculum and implement scenarios that are best suited to the learning needs and preferences of modern nursing students. Vital to this framework is the role of dynamic assessment in the use of this technology-based learning tool. Without formative assessment and the inherent development of reciprocal learning partnerships amongst the students and educators, we risk propagating the inherent threats that traditional simulated clinical sessions can impose on learners' esteem, confidence, and frames of reference. It is evident that faculty members who are responsible for the facilitation of high fidelity HPS-based simulated clinical scenarios must look beyond structured scaffolding and overreliance on predetermined objectives to best meet the learning needs of today's undergraduate nursing students. This process requires that educators be willing to both embrace ambiguity in the learning sessions and challenge their meaning schemes with regard to the effects of limited resources on pedagogical practices. To this end, critical reflectivity must be a cornerstone of the structuring of the framework for the implementation of HPS-based clinical scenarios that enhance the knowledge and skills of modern adult learners relevant to the realities of modern clinical practice. In conjunction with this reflexivity is the need for further analysis of the social processes that occur within a high fidelity simulated learning environment. Morse (2001) indicates that the inductively derived theories that emerge from grounded theory can often become springboards for future studies. I hope that the substantive theory that emerged from this study will help to form the groundwork for other studies that draw from both inductive and

deductive methodologies and thereby build a body of knowledge well suited to inform our pedagogical choices as nurse educators in HPS-based clinical scenarios.

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APPENDIX A: LETTER OF INVITATION TO PARTICIPATE IN INTERVIEWS

Student and Faculty Information Sheet

Research Project: Using Human Patient Simulators as a Teaching/Learning Modality in Undergraduate Nursing Education

Investigator:	Co-Investigator:
Brian Parker, RN, RPN, BScN, PhD (c)	Florence Myrick, RN, BN, MScN, PhD
Faculty of Nursing 3rd Floor Clinical Sciences Building University of Alberta Edmonton, AB T6G 2G3 Email: bcparker@ualberta.ca Phone: (403) 783-7873 (work)	Professor and Associate Dean, Teaching Faculty of Nursing 3rd Floor Clinical Sciences Building University of Alberta Edmonton, AB T6G 2G3 flo.myrick@ualberta.ca Phone: (780) 492-0251

Invitation to Participate and Study Purpose

As an undergraduate nursing student or faculty member, we are inviting you to participate in a qualitative research study that aims to investigate how nursing students interact and experience a human patient simulator based clinical scenario. The main goal is to explore how you and your peers collectively experience and develop knowledge and skills in a simulated clinical environment.

Voluntary Participation

If you choose to participate, your participation is completely voluntary, and you can withdraw from participating at any time during the study. Until such time as we, the researchers, begin to disseminate the study findings, we will delete any information that you have passed on to us if requested, and it will no longer be included in the study. Also, you will be free to refuse to answer any questions or discuss any topics that you do not wish to, and you can request to have the digital voice recorder turned off at any time during an interview.

Please feel free to contact the University of Alberta's Health Research Ethics Board (HREB) at 780-492-0302 if you have further questions regarding your rights as a potential participant in this research study.

Participating in the Study

If you decide to participate, we will ask you to take part in a 1-hour individual interview with one of us researchers (most likely me) after your participation in a simulated experience that is a normal part of your undergraduate program. We will also ask you to participate in a brief follow-up interview at a later date in the fall term. The interview(s) will take place at a time and location that is convenient for both of us. The possible subsequent interview will be shorter and last from 20 to 30 minutes. We will tape-record all interviews and transcribe the discussion for analysis. To protect your identity, only we will know your name, and we will code the tape-recorded interviews with a number.

After the initial interview we might need to contact you briefly to clarify or expound on a topic that we have already discussed. This will also ensure that we are correctly capturing your feedback. This part of the study, if needed, is also completely voluntary, and you do not have to take part in this follow-up to be able to participate in the initial interview.

There is also a chance that I will observe you while you participate in the simulated clinical scenario that is part of your undergraduate nursing course at the University of Alberta. My goal during the observation of your group's participation in a simulated clinical scenario is to collect observation data to supplement the data collected during the interviews. As an observer, I will not interfere in your experience in any way and will merely collect notes on the process that is occurring during your time in the simulated clinical scenario. To observe your group, we will require signed consent from all simulation scenario participants, including those who do not participate in the interviews.

Confidentiality

Your participation is completely voluntary and confidential. No other faculty member from your program will know that you are participating in this study unless you choose to share that information. All information that you provide will be kept confidential, and only Dr. Myrick and I as the two principal investigators will share this information for the purpose of analyzing the findings. All tape recordings, transcriptions of your comments, and written notes that we collect from you will be locked in a safe that will be accessible only to Dr. Myrick and me as the investigators in this study.

Upon completion of the study, we will hold all tape recordings and documents with regard to your specific comments in the aforementioned safe for a minimum of five years in compliance with University of Alberta Research Policy. After five years, we will shred all documents or destroy those that have been saved electronically (e.g., compact disc). Because we also intend to publish and distribute the findings, it is possible that some specific comments that you make will be incorporated into study reports, but your name and identifying information will not appear in any way.

Benefits and Risks

There will likely be no direct or immediate benefit to you from participating in this study, but your participation will be beneficial in that it will help nurse educators to develop and improve the simulation learning experiences for other nursing students.

Based on the literature regarding this type of research, there are no foreseeable risks to you from participating in this study. We are conducting this study for the purpose of increasing knowledge and improving the understanding of nursing students' general experience of a simulated clinical experience, and your participation will in no way impact your academic progress in the nursing program. Conversely, if you choose not to participate in this study or to withdraw your consent to participate at any time during the study, your academic standing will not be affected.

We anticipate that there will be no financial cost to you as a result of participating in this study. If it is required, we can make a parking voucher made available to you on the day of your interview(s).

Please contact either Dr. Myrick or me for any questions or concerns that you may have about participation in this study. Thank you for your time and consideration.

Sincerely,

Brian Parker, RN, RPN, BScN, PhD (c)

APPENDIX B: EXAMPLES OF CODING LISTS

OPEN CODING EXAMPLE:

Open Codes for SN 4, Interview #1 (partial list)

1. Experiencing anxiety
2. Not being able to look beyond fear
3. Analyzing self and peers is anxiety provoking
4. Stating little orientation
5. Doing "a lot" of reading prior
6. Connecting orientation with increased expectations
7. Waiting in the trenches
8. Sensing tension is palpable
9. "not being graded, blah blah blah blah"
10. Crying because of anxiety
11. "wall of fear"
12. Awareness of being watched
13. Downgrading value of peer observation
14. Valuing imposed direction in observation
15. Not paying attention
16. Cross conversing
    - Lack of structure leading to disconnection with observation
17. Fundamentally boring to observe others
18. Contributing to disconnection through room layout
19. Seeing self as less concerned with peer judgement
20. Viewing observation by experts as threatening
    - Judgement through observation is implicit
21. Feeling sim is judgemental despite direction otherwise
22. Relating to personal angst
23. Panicking over complexity
24. "Cycling downward" with panic
25. Fumbling around without direction from tutors
26. Relating cold environment to performance
27. Foreign environment
28. Feeling unrealistic expectations
29. Relaxing through support
30. Demeaning to cue through manikins voice
31. Considering possible link to reality
32. Arguing sim can be a "quasi-real experience"
33. Teaching scope and what not to do
    - Critical thinking
34. Wanting repetition of experience
    - Drill and practice
35. Thinking fear decreased with more frequency
    - "experience is thin" (sim happens so infrequently)

36. “Wall of fear”
37. Equating “wall of fear” to “stage fright”
38. Seeing instructor role as supportive not judgemental
39. Wanting rapport with tutor
40. Offering suggestions
41. Loving instructor collaboration
42. Comforting through nudging
43. Proposing gradual guidance removal process
44. Initial experience is draining
45. Wanting time to process after

SELECTIVE CODING EXAMPLE LIST:

- Leveling of expectations +++++++
    - Need Prior preparation ++++++
    - Lacking orientation ++++
- Maintain instructor control/guidance +++++
- Leveling noise and complexity ++++
- In the fish bowl ++++; Cognitive overload
    - Hierarchal observation +++ (Passive)
- Integration of lab/theory/clinical +++++
- Reinforces/validates knowledge +++; Creates frame of reference ++
    - Problem solving ++++; Critical reflexivity +++
    - Skills assessment focus +++
- Time constraints ++++
    - Lack time to get to nursing process ++++
- Suspending disbelief ++++
    - Challenge to look beyond the machine ++++ To human connection
    - Audio affects disbelief +++ (also engagement and learning)
    - Talking to the wall (observation session issue)
    - Accent distracting++
    - Interjection/prompting mix (Conduit for guidance/sense of judgment)
    - Validate/address limitations +++ Be transparent ++
- Learner lead debriefing ++; Expert input +++++; Peer feedback as reinforcing +++++
- Evaluation implicit +++
- Role for learning Teamwork ++++
    - Socialize to role + Role confusion + Stick to student role ++
- Tutor support
    - Safety net of tutor +++; Level independence though +++
- Flexibility to find own solution ++++; Over structure fragments learning Lack of relevance++

- Stress
    - Intense performance anxiety ++
    - Pressure to do "normal" ++ - Slave to structure
- Debriefing
    - Affective domain 1st +; Critical reflexivity +++
- Lack of engagement as defense mechanism
- Conversely Downplaying stress of technology; threat of observation
        - Linked to exposure and frame of reference
- Role
- Safety and trust
    - Support/safety/camaraderie with peers +
    - Increased comfort with challenging self as becomes more senior student (Leveling)
    - Mistakes okay ++
- Need teaching/pedagogy knowledge
    - Choice leads to relevance
    - Fallacy of student centric sim
        - Crawl before you walk (leveling)
    - Increase faculty knowledge of learning theories ++
- Observation process
    - Need structure = leads to engagement
    - Benefits: Route for peer validation & Instructor support
- Repeat exposure +; Drill and practice ++; "Experience is thin"
    - Time constraints add to superficiality of debriefing process
- Potential ++
    - Diverse exposure + Nsg process – clinical relevance +++
        - Learning to prioritize; Confidence
- Leveling observation and peer feedback

THEORETICAL CODING LIST:

- Levelling/scaffolding
    - Guiding to maturation of frame of reference (FOR)
        - Overcoming fear/anxiety through FOR maturation
        - Prior experience framing meaning scheme (ability to handle)
        - Giving direction to mature FOR
            - **Authenticity of roles** (communicating through a persona)
                - Lacking FOR to handle prompting (change in persona)

- Eventually placing responsibility back on learner as FOR matures
- Building/reframing FOR through **exposure/familiarity/time**
  - Using **formative feedback**
  - Critical reflectivity (debriefing)
  - Needing entire nursing process
    - Tying it all together (lab/clinical/theory)

- ***levelling EXPERT's input** (**assimilating FOR**)
  - Presence as support (levelling of same)
  - Levelling support/**collaboration** in room
    - Relevant to clinical level
    - Leads to individualization (see p. 33 Cranton & King)
  - Assimilating expert's FOR in debriefing
- Levelling observation
  - **Building TRUST**/relationships (Creating group identity)
  - **Levelling peer filtering (**building capacity (SN 8))
    - start with 1 or 2 peers of student's choice (SN 7, SN 8)
- Levelling teaching engagement
  - Skilled facilitators of social discourse
    - Tutor needing mature FOR (consider level of tutors)
- **Levelling expectations** for student knowledge level
  - Flexibility of levelling (softening)
- Levelling signal and noise (Need for noise?)
  - Incremental disorientating dilemmas

APPENDIX C: INTERVIEW GUIDE: NURSING STUDENTS

These questions will be utilized as a guide in the first interview with nursing students to provide systematic data collection for all participants. Because it is not possible to determine in advance what successive interviews will include, subsequent interviews will be used to obtain explanations from interviewees regarding areas that need further clarification. Theses identified areas will further direct questioning, which will provide a more complete description for theory development.

1. How would you describe the simulated clinical scenario?

2. How would you say that you learn from the simulated clinical scenario? In other words, how would you describe the process that you go through when you are participating in the simulated clinical scenario?

3. How do your fellow nursing students influence your learning during a simulated clinical scenario?

4. What are you learning in a simulated clinical scenario that you think will help you in the clinical setting?

5. What specifically are you learning in a simulated clinical scenario that will help you be a nurse?

6. How does the faculty assist your learning throughout the simulated clinical scenario?

APPENDIX D: INTERVIEW GUIDE: FACULTY MEMBERS

These questions will be utilized as a guide in the first interview with nursing students to provide systematic data collection for all participants. Because it is not possible to determine in advance what successive interviews will include, subsequent interviews will be used to obtain explanations from interviewees regarding areas that need further clarification. Theses identified areas will further direct questioning, which will provide a more complete description for theory development.

1. Tell me about your role as a facilitator in a human patient simulation based clinical scenario?

2. How would you describe the process that you go through during the facilitation of the simulated clinical experience for undergraduate nursing students?

3. Is there anything that you do in particular in the planning, implementation and evaluation of a simulation-based clinical scenario for nursing students?

4. What teaching/learning/educational theories do you utilize/incorporate when planning, implementing and evaluating a simulation-based clinical scenario or nursing students?

5. How do you think an undergraduate nursing student learns in a simulation-based clinical scenario?

6. What kinds of knowledge and skills do you think are important for the students to gain during a simulation-based clinical scenario?

7. What do you believe is essential for undergraduate nursing students to learn in a technology-based learning environment?

8. What role does social discourse/interaction play when developing skills and knowledge in a simulated clinical scenario?

APPENDIX E: CONSENT FORM TO PARTICIPATE IN STUDY

Title of Project: Using Human Patient Simulators as a Teaching/Learning Modality in Undergraduate Nursing Education

Investigator:
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Phone: (780) 492-0251
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The following is to be completed by the study participants:

Do you understand that you have been asked to be in a research study?	Yes	No
Have you received a copy of the attached information sheet?	Yes	No
Have you had an opportunity to ask questions and discuss the study?	Yes	No
Do you understand that you are free to refuse to participate or withdraw from the study at any time without giving a reason?	Yes	No
Has the issue of confidentiality been explained to you?	Yes	No
Do you consent to being interviewed?	Yes	No
Do you consent to being audio-taped when interviewed?	Yes	No
Do you consent to being observed in the simulation lab engaging in a simulated clinical experience?	Yes	No
Do you agree to have your data reviewed at a later date?	Yes	No
Do you understand who will have access to your information and comments made during your interview(s)	Yes	No
This study was explained to me by:_____ Date:_____		

I agree to participate in this study.

_____	_____	_____
Signature of participant	Printed Name	Date

I believe the person signing this consent form understands what is involved in this study and voluntarily agrees to participate.

_____	_____	_____
Signature of investigator	Printed Name	Date

***A copy of this consent form must be given to the subjects.**

APPENDIX F: OBSERVATION GUIDE

Faculty members and students will be observed during a high-fidelity simulator based clinical scenario. The length of time observing will depend on length of the simulated scenario. It is estimated that a minimum of two scenarios will be observed. The observations will be guided by the following questions:

1. What is the basic structure and organization unfolding during the HPS-based clinical scenario?

2. What educational theory/pedagogy principles are observable during a simulated clinical scenario?

3. How does social interaction and discourse occur amongst nursing students during a simulated clinical scenario and afterwards during the debriefing process?

4. What resources are available to the faculty member facilitating the learning experience?

5. How does the simulation facilitator interact with the nursing students?

6. How do nursing students interact with their peers during the scenario and the subsequent debriefing session?

7. What is the atmosphere or climate of the setting like?