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NURSING STUDENTS' LEARNING IN HIGH FIDELITY SIMULATION: AN ETHNOGRAPHIC STUDY

by

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Dedication

I would like to dedicate my dissertation to my family. To my husband Doug, and his children Chaizz, Justin and Tyler, you have my immense gratitude for knowing when I needed to take time to work on my research. To my parents Ed and Darlene who told everyone about the work that I was doing, and did so with pride. I cannot thank my family enough for your support and encouragement throughout my studies. It made the journey much easier.

Abstract

Understanding what happens to students' learning in high-fidelity simulation (HFS) is important as we build our knowledge around the use of HFS in nursing education. Research in the area of high-fidelity is emerging at a rapid pace, however much of the literature surrounds the area of self-efficacy and or that of outcomes related to the clinical skill performance in HFS. To date there has been little research that examines what happens in HFS that affects nursing students' learning. The purpose of this thesis was to look at the culture of learning in HFS in undergraduate nursing education. Specific areas that were explored were students' and instructors' views about: the use of HFS on student learning, what it is like to participate in HFS, and factors that either enhance or impair the simulated clinical experience. Using the ethnographic method, participant observations were conducted over a period of two academic terms. A convenience sample of 12 students and two clinical instructors were interviewed regarding their perspectives, and 20 instructors participated in one of two focus groups. The interviews and observations yielded rich data that was initially coded and then segmented to form themes. Member checks were conducted to ensure rigor. To triangulate data, four reflective journals were also used in this focused ethnographic study. The key findings were that students believed that the level of instructor involvement at critical points during HFS was important and instructors believed that their comfort level in teaching with HFS had an important influence on teaching and subsequently learning in HFS. Other factors that enhanced or

impaired the simulated clinical experience included realism, the ability to make mistakes in HFS and the specific roles assigned to students during HFS. An important limitation of the study was the possible bias that might have resulted from the researcher's extensive experience with HFS. A major implication for practice pertains to the preparation of faculty and students for HFS. How students' mistakes during HFS inform their clinical practicum is an important question to address in future research.

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CHAPTER ONE

INTRODUCTION

This dissertation is an ethnographic study that examines the perceptions and experiences of nursing students' learning in high-fidelity simulation (HFS). It is divided into seven chapters. Chapter One begins with an overview of simulation in nursing education and includes the purpose of the study, the research questions that are the foundation of the study and concludes with the significance of the study to nursing education. Chapter Two is a literature review that consists of the search strategies, and examines what constitutes simulation in health care education. This is followed by the history of simulation in nursing and includes implications for teaching and learning in nursing. The chapter ends with a review of the research that has been conducted in the areas of HFS thus far. Chapter Three is devoted to the research method and design of this ethnographic study. Chapter Four consists of the demographics of the participants, a description of the simulation activities, and a description of the environment where the study was conducted. Findings are presented in Chapter Five and Six, and finally, Chapter Seven consists of the discussion of findings, including the implications for teaching and learning in HFS, recommendations, and areas for further research.

There is a growing shortage of qualified clinical faculty and increasing competition for limited clinical placements for students in nursing undergraduate programs (Childs & Seeples, 2006; Landeen & Jeffries, 2008; Murray, Grant,

Howarth & Leigh, 2007). Further, with an increase in acuity of patients, there is considerable pressure to prepare students to be as ready as possible for their clinical practice rotations. Combined with heavy workloads of nurses and an increase in student numbers in nursing programs, it becomes difficult to provide students with meaningful clinical experiences and the mentorship that they require early in their nursing programs (Mole & McLaffery, 2004).

Innovative uses of technology such as simulation have resulted from a need to find alternative methods and means of augmenting clinical education for nursing students. High-fidelity simulation (HFS) with mannequins is a more recent and more sophisticated form of simulation (Issenberg, McGaghie, Petrusa, Gordon & Scalese, 2005). High-fidelity mannequins are used to simulate a variety of patient conditions around hypothetical clinical scenarios to assist with the development of clinical decision-making skills in nursing students. Teaching with HFS provides a way to increase safety and decrease errors, improve clinical judgment, and is useful for teaching and evaluating specific clinical skills (Bearnson &Wiker, 2005). While not meant to replace clinical exposure, simulation is normally used to provide students with experiences and opportunities that are not always available in clinical settings during their program.

Most nursing education programs across North America use simulation in what is typically known as a skills lab. The primary purpose of the skills lab is to provide students with an environment that contains equipment and resources that

support the acquisition of psychomotor skills in an artificially created environment (Infante, 1985). With simulation, the focus however is not solely on the acquisition of psychomotor skills, but the development of clinical reasoning and judgment skills (Benner, Sutphen, Leonard & Day, 2010). Rooms are furnished with a variety of equipment to mimic hospital wards. Static mannequins or task trainers would often serve as patients, and as equipment became more sophisticated, high fidelity mannequins replaced the static mannequins. In this artificial setting, students can practice a series of psychomotor skills and clinical judgment skills before implementing them with the patient population. Many nursing skills are difficult to learn from audio-visual or text resources alone, so the ability to practice, evaluate and improve these nursing skills is a necessary component of clinical skills acquisition (Tapler & Johnson-Russell, 2007). By providing these experiences, it assists with development of cognitive, psychomotor and affective competencies through trial and error (Murray et al., 2007). Further, simulation gives students opportunities to make mistakes in an artificial environment and develop some element of confidence and competence prior to entering practice settings (Murray et al., 2007).

Theory has a strong presence in most skills labs (DeYoung, 2009; Tapler & Johnson-Russell, 2007). Students are taught by instructors using various methods of instruction. Some programs include classroom discussion in the form of lectures while others may not have a lecture component and hold the class entirely in the labs as a self-directed activity. Regardless of the approach, the objectives are usually the same in that students learn the concepts and rationale

behind the nursing skills, rather than focus on proficiency in isolation of the concepts. Evidence-based practice is important in the laboratories as students need to have an understanding of the rationale behind why the skill is performed the way it is (Pravikoff, Tanner & Pierce, 2005) or why an intervention has been chosen. It is not enough that students can physically perform the skill or state what they would do. By understanding why something is done a particular way, students can better problem-solve when circumstances or the environment changes. Having a solid understanding of the evidence-based rationale provides the student with the tools and background to be flexible with skill implementation. This ability to be flexible is essential to the performance of psychomotor and cognitive skills.

Some of the benefits of simulation in nursing education have been well documented (Curtin & Dupuis, 2007). While several studies have been conducted that examine the effect of simulation on student learning outcomes (Alinier, Hunt, Gordon, & Harwood, 2006; Arnold, Johnson, Tucker, Malec, Henrickson& Dunn, 2009; Rosen, Salas, Silvestri, Wu &Lazzara, 2008), the factors that influence student learning in the simulation experience are not clear.

Study Purpose

The purpose of this study was to add to our knowledge and understanding about the use of high-fidelity simulation (HFS) in nursing education. The specific aim of this study was to explore the values and beliefs about HFS in a sample of students and faculty in an undergraduate nursing program.

Research Questions

The target population included instructors and students familiar with high-fidelity simulation (HFS). The specific research questions that were used to guide this study were:

1. What are students and instructors' views of the use of HFS on student learning?
2. What is it like to engage in simulated clinical experiences as a student?
3. What is it like to engage in simulated clinical experiences as an instructor?
4. What factors either enhance or impair the simulated clinical experience?

Significance of the Study

Much of the emerging literature in simulation use is focused on the outcomes of participants engaging in simulation. This includes performance outcomes evaluated by way of structured examinations, as well as looking as confidence levels after participating in simulation experiences. To my knowledge there are no previously published reports of studies that have examined student and instructors' perceptions about the HFS learning context. The results of this study unveil possible factors that mediate the outcomes of HFS. This represents important ground work for further qualitative and quantitative research to explore the influence of these factors on outcomes.

In summary, for my dissertation I will use an ethnographic study to explore the perceptions and experiences of both students and instructors as it

pertains to nursing students' learning in HFS. In this chapter, I have indicated the purpose of the study, the research question, and the significance of this study to nursing education. This qualitative study will help us understand what happens to student learning in HFS.

CHAPTER TWO

LITERATURE REVIEW

The literature review provides opportunity to discuss the background related to this research study. In this chapter, I begin with a description of the search strategies used to conduct the literature review, followed by considerations about what constitutes simulation, and by an overview of the history of simulation use in nursing and health care education. Literature regarding the implications of teaching and learning theory with respect to HFS is included, as well as literature on learning in the traditional skills laboratory. Finally, I discuss previous research in the area of simulation with a particular focus on definitions and the current gaps in knowledge.

Search Strategies

Conducting the literature review involved using several search engines and keywords. In order to ensure that the topic area was well covered, different aspects of high-fidelity simulation were also researched. This resulted in obtaining literature that spanned several disciplines, many decades, and a variety of perspectives.

Initially a broad search of English language studies was undertaken and included all areas of health care where high-fidelity simulations are conducted. The search was conducted using MEDLINE via PubMed, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Cochrane Collaboration databases. The search employed various combinations of the text

words simulat*, high-fidelity, clinical, teaching and learning, evaluat* and educat*. This search was conducted over an initial twelve month period of time and included monthly updated searches of the literature. The search was not restricted to any one particular health care profession and included literature in all areas of health care education.

This search resulted in the retrieval of hundreds of papers. A scan of these results assisted with further refining the search term and strategies for retrieval. All readings were initially assessed for inclusion by independent perusal of the title. Abstracts of the included studies were retrieved and assessed for applicability to this study. If the article was considered relevant to the research study, the full text of the article was retrieved. This process resulted in the retrieval and assessment of over one hundred articles.

In addition to articles, a search of the University Libraries book repository was conducted. While there were significantly fewer resources available in book format, there was a handful that included chapters related to simulation use or teaching in a laboratory setting. These were included in the literature review.

What Constitutes Simulation?

Simulation is defined as the act of assuming an appearance or effect with the intent to deceive (www.merriam-webster.com). In many instances the aim is to create a simulated scenario that is so realistic that it leads (or deceives) the learner into believing that it is real. In nursing education, simulation often refers to the use of high-fidelity mannequins that can mimic a variety of physiological

and physical functions of the human body. It also includes creating scenarios or a history that serves as a background on which to run the scenario. There are multiple types of simulations and simulators available. Typically, in nursing, simulations are categorized as either low-, mid-, or high-fidelity and while the word simulation is used, it frequently refers to the simulator. These are further discussed.

Low-Fidelity

Low-fidelity simulations are the more traditional types of simulation used in nursing education. These are commonly referred to as task-trainers and are non-computerized. As early as the 1940's, Grandma Chase could be seen making her appearance in many nursing programs (Heidgerken, 1946). Grandma Chase was a full-sized task trainer that was used to assist learners with practicing various psychomotor skills. This is just one type of task trainer. Some are comprised of very specific body parts, such as an arm, and are used to practice one type of skill (i.e. starting intravenous lines). These low-fidelity simulators are typically static mannequins that are used to practice or simulate very specific skills (Wilson, Shepherd, Kelly & Pitzner, 2005).

Mid-Fidelity

Mid-fidelity simulations include items that can simulate multiple skills using the same medium. This can include strategies such as using standardized patients, computer programs, or videogames (Alinier et al., 2006). Standardized patients are human actors who rehearse a script and present themselves as patients for learners to interview. Learners are able to practice their communication skills

in a dynamic way, as well as practice basic physical examination skills on healthy individuals. Since standardized patients are limited to a script and their actual current physical status, they are classified as mid-fidelity simulation experiences. Computer programs and video games are also mid-fidelity simulation experiences, primarily due to the fact that they are two-dimensional and are programmed for specific problems. As learners engage in mid-fidelity simulations, they generally employ a limited number of techniques and skills to participate in the simulation. For example, in using a computer program, the learner is not able to actually touch and feel the image that is presented on the screen. Similarly, in using standardized patients, students are usually only exposed to 'normal' physical examination findings and scripted histories. Regardless, mid-fidelity simulations are extremely valuable in teaching certain clinical skills and are employed extensively in nursing education programs.

High-Fidelity

High-fidelity simulators are computerized full-sized mannequins that can be programmed to present a wide variety of signs and symptoms congruent with the physiological responses to various diseases and treatments (Bradley, 2006). Over the past 10 years, high-fidelity simulators have become more widely used to teach clinical skills to nursing students because of their capacity. In addition to the actual mannequin, faculties and schools of nursing are creating simulation centres that house these mannequins (Rothbeg, 2008). In these centres, the space is typically designed to simulate a treatment room, hospital or community-like setting. A more realistic environment for the simulated patient is created through

simulating the typical sights, sounds and smells that are characteristic of different clinical settings.

History of Simulation

Simulations have been used for training purposes by a variety of disciplines for centuries. The military was among the first to use simulation to teach military strategies using war simulations. Pilots use simulation to learn how to operate aeroplanes. Chess and jousting are two "games" that are considered early forms of simulation (Bradley, 2006). While the use of simulations is widespread in several fields other than the military and aviation, the use of simulations in nursing education is not as common as what might be expected of a practice profession.

The purpose of simulation use in various settings is to prepare the participants for a particular situation that they may encounter (Ravert, 2008). The simulation environment provides learners with a way to practice their skills, assessments and interventions without harm coming to an actual patient. For example, in military simulations, the advantage of using simulations is that participants are able to carry out as many skills and manoeuvres as is required, while being in minimal risk of being killed during the simulation (Bradley, 2006). While it seems that the military has adopted the use of simulations as a viable and practical way to train their members, this has not been used to the same extent in health care education.

History of Simulation in Nursing

The history of simulation use in nursing education is short. It is only since the

1950s that we have seen any significant advancement in this area. Clinical skills, particularly psychomotor and problem solving skills are foundational to clinical nursing. How these skills are taught has only changed recently. In order to understand the changes related to teaching clinical skills in current day simulation centres, it is important to first understand how and why these changes occurred.

In the early part of the 1900s, students were used as an important component of the workforce and their role in hospitals provided them with the opportunity to learn their clinical skills while working directly with patients (Toman, 2005). The skills learned were often hospital specific. Often on night duty, students would be responsible for techniques such as cleaning needles, preparing poultices, and preparing dressing trays. Preparing and cleaning equipment was a common nursing task, and all students were required to keep meticulous notes on these skills (Toman, 2005).

In the 1920s, textbooks began to replace notes (Toman, 2005). Facilities were standardizing skills in response to the constantly changing novice workforce. By the 1950s, skills were becoming increasingly more complex and step-by-step instructions were developed for individual skills and techniques. As hospitals increased in numbers and size, so did the type of treatments that were conducted. Specially “trained” nurses were by then required to operate x-ray equipment and start intravenous infusions (Toman, 2005). As the complexity of the skills increased, the ability of students to learn these on the units became more difficult. Skills training learned through direct patient care began to be supplemented with

practice opportunities using early simulators. As previously mentioned, Grandma Chase was one of the early mannequins that allowed students to practice injections and other basic techniques (Heidgerken, 1946). Nursing students were therefore beginning to learn psychomotor skills in a simulated environment with simulated patients.

As the 1970s emerged, the technical skills required from nurses increasingly grew in number and complexity. With a greater reliance on technology in clinical settings, the skill set required of nurses has increased in complexity and number. The mannequins that were available changed and a greater number of task trainers became available (Bradley, 2006). The reliance on simulated settings for nursing students to practice their skills has increased. Although these simulators were very basic they provided opportunity for students to demonstrate at least a basic competence level before being allowed to practice these complex skills with patients.

A common motto that has been and continues to be applied to teaching many clinical skills is “see one, do one, teach one” (Henneman & Cunningham, 2005). This teaching approach has drawbacks for both students and patients. The quality of instruction determines the degree of patients’ risk for adverse outcomes at the hands of inexperienced practitioners (Henneman & Cunningham, 2005). Clinical skills and other psychomotor skills are key nursing activities and ones that have been part of nursing curricula since its inception (Johnson, 1994). As stated, prior to the 1950s most skills were taught in class but were practiced on the patients

themselves (Heidgerken, 1946). It was simply accepted as a method of teaching. While simulations were used for skills such as communication and interviewing skills, this was primarily done with "actors" or with peers who had scripts that they would follow. This has been used extensively in the area of mental health, and continues to be the most effective way to learn these skills. The "actors" were commonly known as standardized patients and are still used in medical and nursing education today (Bastable, 2003). The technology for anything more advanced was simply not available.

This description of the history of teaching skills in nursing education is not complete without a discussion regarding the history of technology in simulation. According to Bradley (2006), there have been three distinct movements in the development of simulations in the education of health professionals. Each movement and the advances that occurred during these movements are discussed here.

The first movement began in 1958 with the creation of the 'Resusci-Anne' mannequin by Asmund Laerdal. With the introduction of the 'Resusci-Anne' mannequin, there was a significant technical change in what could be simulated. Laerdal was a toymaker with a thorough knowledge of soft plastics and had previously created other simulation equipment such as imitation wounds for the military (Tjomsland & Baskett, 2002). The 'Resusci-Anne' mannequin was very well received in health care education, not only because of its realistic appearance and function, but also because of its affordability and thus accessibility. The

creation and availability of ‘Resusci-Anne’ sparked interest in the use of simulation in health care education among medical and nursing educators.

The second movement was marked by a surge in the availability of more technically advanced equipment. During the 1960s, the use of computers and technology was rapidly transforming industry broadly, and there was an increased ability to simulate situations. ‘Sim One,’ the human mannequin created by Abrahamson and Denson in the late 1960s, was considered a fairly sophisticated mannequin at that time (Bradley, 2006). It could breathe, had a heart beat, and could respond to intravenously administered drugs and gases. The ‘Sim One’ mannequin was a torso apparatus with separate computerized software and was primarily used in anaesthesia programs due, in large part, to its size and cost (Peteani, 2004). During this period, task trainers were developed in order to simulate one or two specific tasks. The creation of these mannequins is considered the foundation in the development of more modern day simulators (Bradley, 2006). Interestingly enough, the mannequins that are currently available are not entirely dissimilar from these first models. Even though computers became smaller and the mannequins were created with more functionality, it is only within the last three to five years that any real significant technological changes have occurred.

A greater deterrent for more widespread use of simulation mannequins during the 60s and 70s was the perceived value. Many believed that there were more effective ways to teach clinical skills (Gordon, 1974). In addition, while

some accepted simulation as a beneficial teaching tool, the mannequins were expensive and therefore inaccessible to the majority of education institutions. Research into using simulation as an approach to teaching and learning was in its germinal stage and very little was known about its benefits. While early research indicated the usefulness of simulations, the mannequins were expensive and could only deliver one or two scenarios without the need for re-programming. Considering the limits of the technology, the cost of the mannequin and the perceived nonessential use of simulators in health care education, simulation did not achieve the same sort of acceptance by health care educators as it did with the military. It was not until the late 1970s to early 1980s that the use of high-fidelity mannequins was seen as a valuable teaching tool in nursing and health care education (Rystedt & Lindstrom, 2001).

During the 1970s, nursing and medicine placed more emphasis and value on technology and critical care skills associated with technology (Toman, 2005). A key factor when discussing simulation is the importance that nursing placed on acquiring more advanced skills during that decade. Transfer or delegation of functions and skills from medicine to nursing was becoming common (Toman, 2005). There was a perceived sense of personal importance in advanced skill acquisition, and the use of simulations and other technology was emerging as a useful learning tool to achieve this. While accessibility was still an issue, technical advances had been made, and now interest in simulation as a teaching and learning approach was being expressed.

The third movement began in the 80s and continues partly to the present day. Changes in teaching methods were emerging as educators were recognizing the role of simulations in meeting the needs of students and other health care practitioners. Increasingly complex clinical skills were required and educators recognized how using simulators in teaching could help students master those skills. This movement had less to do with the technical advances and more to do with the evolution of educators' views.

With improvements in technology, more tasks and clinical skills could be simulated. There was also a significant reduction in the cost of simulation equipment making it more affordable. As simulators were becoming more widely used, more educators and researchers began to document their experiences with them. In these early stages of research, publications were largely narrative accounts of how simulators were used. With medical and nursing programs beginning to purchase and use simulation equipment more extensively, the next question to address was whether this technology actually helped prepare health care practitioners for practice.

In my view we are currently in a 4th movement of simulation use in health care education. The first and second movements focused on the creation of the simulators and primarily technological advances. This extended from about 1958 to the mid 1980s. The 1980s saw the beginning of the 3rd movement that included affordable high-fidelity simulators, and accompanying strategies related to teaching and learning in simulation use. In this 4th movement many schools and

faculties of nursing began developing simulation centres and using simulation in their curriculum (Wilford & Doyle, 2006). This movement has continued to the present day, and consists of advances in accessibility, as well as a surge in research evidence about its impact on teaching and learning.

Implications for Teaching and Learning

The predominant theoretical underpinnings guiding the use of simulation have changed over time. Initially simulation was largely used to teach psychomotor skills. Behaviourism was a popular theoretical model for teaching and learning when simulation was first introduced to nursing education. In behaviourism, the role of the teacher is to transmit knowledge and the learner is to passively receive it (Roblyer, 2003). That theory of teaching and learning was particularly compatible with teaching students psychomotor skills (Ironside, 2001). Technical advances in simulation increasingly lent to a teaching and learning approach that is more compatible with the contemporary theory of constructivism (Oliffe, 2002; Reilly & Spratt, 2001). The instructor does not tell the learner what to do in the simulation experience rather the learner is put into a scenario and is expected to draw from all their knowledge and resources in order to work through the simulation. Constructivists suggest that human learning is constructed and built on previous knowledge (Hoover, 1996) and that the role of the learners is to be an active creator of their own knowledge (Brandon & All, 2010). Constructivism is based on the concept that learners create their own meaning through interaction with the environment (Brandon & All, 2010; Parker & Myrick, 2009; Roblyer, 2003). Depending on the objective of the simulation experience, behaviourism

and constructivism can provide the basis for incorporating a simulation scenario into nursing curricula (Parker & Myrick, 2009). It is important to ensure that the purpose of introducing simulation into nursing education is clear.

Advocates of authentic learning place emphasis on developing conceptual knowledge in settings that reflect reality while actively engaging learners in 'real world' problem solving (Herrington & Herrington, 2006). HFS offers learning opportunities beyond merely practicing psychomotor skills. With attention to the structure of the HFS environment, students can practice their application of critical thinking skills. Learning is further enriched when the HFS experience is followed by an opportunity for debriefing and reflection on the experience (Dieckmann, Friis, Lippert & Østergaard, 2009; Dismukes, Gaba & Howard, 2006). It is this integration of teaching pedagogies and the increase in research conducted in these areas that have contributed significantly to the evolution of simulation use in nursing education.

According to Aldrich (2008), there is a difference between a simulation and educational simulation. Simulation is defined as a model of something and includes a predictive or diagnostic component. Educational simulation is defined as an experience that includes some simulation however the experience is to create transferable behaviours or perspectives. The goal in using HFS is not to only simulate individual psychomotor skills, rather to simulate an experience that allows the learner to learn from the experience and take these clinical skills into the practice setting.

Lab Teaching in Nursing

As mentioned earlier laboratories emerged in schools of nursing in the 1950s and became the space to learn and practice advanced skills in a safe environment. In the early years, the labs were equipped with low-fidelity simulators. The main purpose of these skills labs was acquisition of psychomotor skills and associated knowledge, and this continues to be the case (Tapler & Johnson-Russell, 2007). The challenge in teaching skills in recent years has been the increase in complexity of skills and the need to equip students with critical thinking and reasoning skills which promote students' application of evidence to support their decisions (DeYoung, 2009; Pravikoff et al., 2005).

As students progress through their skills courses, they are encouraged to practice psychomotor skills in an artificially created and controlled environment (Infante, 1985). Skills labs or courses typically begin with simple skills and progress to more complex ones. As the students progress through nursing programs, the complexity of the skill sets increase, as do the expectations of competence in performing the skills (Clarke, Davies &McNee, 2002). Through interactions with faculty and the awareness that this is the environment to make and learn from your mistakes, the skills lab provides learners with excellent opportunities to acquire the psychomotor skills necessary to function in the clinical environment.

Effective skills laboratories facilitate student learning by providing an environment in which students can practice psychomotor skills. Various teaching and learning modes are used however the overriding objective is to create a space

where theory and practice come together. Demonstrations, videos, guided practice, and performance evaluations are all commonplace in skills labs (DeYoung, 2009), and serve to assist in making the link between theory and practice. In this setting, learners are able to apply the concepts that they have learned in class and to apply them in a practice-like setting.

In this environment, many psychomotor and clinical skills are practiced, however cannot be perfected. Students can practice their skills endlessly in the skills lab however they need the opportunity to practice these in a more complex environment. Returning to Aldrich's statement, the traditional skills lab can be compared to a simulation, not necessarily an educational simulation. While both the simulation and educational simulation are conducted with the intent to teach the learner, simulation is the act of simulating a skill and an educational simulation is the experience of the simulation. If the goal is to have mastery of clinical skills, the skills lab must go beyond focusing on solely the psychomotor skills (simulation) and incorporate other aspects of the clinical picture (education simulation). Psychomotor skills are part of clinical skills, just as simulation is part of the educational simulation. The significant difference is that the individual psychomotor skill is not the priority rather the entire experience is explored to provide the learner with a rich and full experience.

The traditional skills laboratory is typically seen as a point of departure for many high-fidelity simulation laboratories. As many skills became more complex, learners were required to think beyond the mechanics of the skills and begin to incorporate these into a larger picture. As high-fidelity simulators

became more affordable and realistic, these began to make their way into schools and faculties of nursing as the next generation of skills labs. Traditional skills labs continue to have a significant role in nursing curricula. The bigger challenge is to be aware of the difference between simulation and educational simulation and to use each lab to its' potential.

Research on Simulation in Nursing

Research in high-fidelity simulation is still in its' germinal stage. Although several health care disciplines have conducted research in the area of HFS, the majority has been conducted by nursing and medicine. The majority of the research has examined the effect of simulation on learners' clinical skills competence, self-efficacy and confidence levels.

Simulation Use and Clinical Skills Performance

Most study results have shown that using simulations compared to other education and training methods results in equivalent or greater improvement in participants' clinical skills performance and greater ability to transfer learning to new situations. Kardong-Edgren, Anderson & Michaels (2007) conducted a pre-test post-test design study with 14 nursing students who were randomly assigned to one of three groups: 1) a control group attended a 15-minute lecture only; 2) one intervention group attended a 15-minute lecture and a 15-minute static mannequin simulation experience and 3) a second intervention group attended a 15-minute lecture and a 15-minute HFS activity. The results of this pilot study showed no statistically significant differences in student performance between

teaching method assigned, although trends indicated that there was better performance in both the static mannequin and HFS group compared to the lecture only group. The researchers suggested that their lack of significant findings were due to their small sample size and differences in the duration of instruction and training between teaching methods.

Owen, Mugford, Follows & Plummer (2006) also used a pre-test post-test design however each group's participation was for the same duration of instruction and training. Using 61 trainee medical officers, participants were randomized into either a group that had computer screen-based training (CSBT) and practice on simple task-trainers, a group with CSBT and whole-body patient simulator, or a group with CSBT and simulators in 'full-mission' simulation. While no differences were found between the first two groups, the 'full-mission' simulator group was better able to transfer skills learned to manage one type of medical emergency to managing a new emergency not previously encountered.

Using an Objective Structured Clinical Examination (OSCE) to measure performance, Alinier, Hunt & Gordon (2004) randomly assigned 120 second year nursing students into either a control group or an experimental group. The control group had their initial OSCE followed by a questionnaire to measure their confidence and a second OSCE was administered six months later. The experimental group had their first OSCE followed by two simulation sessions conducted during a six month period, and then completed a confidence questionnaire and a second OSCE. The experimental group showed a greater

improvement in performance than the control group. An important possible explanation for this finding was that the experimental group had two additional educational sessions during the six month period while the control group was inactive.

Other studies that have assessed specific skill acquisition were similarly conducted have shown mixed results. Curran, Aziz, O'Young & Bessell (2004) found that there was no significant difference in neonatal resuscitation skills between each of two groups of 30 medical residents who were assigned to either a high-fidelity simulation group or a video instruction group. Corbridge, Robinson, Tiffen & Corbridge (2010) compared knowledge acquisition between two methods of teaching the principles of mechanical ventilation to advanced practice nursing students. They conducted a pre-test post-test study and randomly assigned a sample of 20 students to either HFS, or an online PowerPoint presentation. Both groups were found to have a significant improvement in knowledge scores with no significant group differences. Similarly, other studies comparing HFS with modeling (Leflore, Anderson, Michael & Anderson, 2007) and HFS with case study teaching approach (Scherer, Bruce & Runkawatt, 2007) showed no group differences on knowledge scores but significantly greater satisfaction with the HFS method.

Hauber, Cormier & Whyte (2010), conducted a quasi-experimental pilot study to determine the relationship between nursing students' clinical ability to prioritize their actions and the associated cognitions and physiologic outcomes of

care using HFS. The sample was comprised of 15 students who were in their third semester of a five-semester baccalaureate program. Students' ability to apply knowledge during HFS was explored. For example, a student statement such as "I am going to apply oxygen," was coded as a procedural or task related activity, whereas a student statement such as "He is very wet. I think I need to hurry and give the Lasix," was coded as a cognitive process underlying the participant's actions (Hauber et al., 2010). The authors then compared the students' performance with their grades in two particular classes; a fundamentals course that focuses on mastery of procedural skills and another adult health course that focuses on knowledge relevant to patient care. They found that students who did well in the procedural task orientated courses did not necessarily excel in scenarios requiring them to make complex decisions while prioritizing the care required to stabilize an acutely ill patient. Students who scored higher compared to students who scored lower on the knowledge oriented course achieved better physiological outcomes in the experimental scenario. While the authors acknowledged their study limitations, they concluded that HFS is a useful means of training and evaluating students' ability to apply knowledge to inform decisions in clinical scenarios.

While there were several studies that showed no difference between the simulation and 'traditional' teaching modalities on teaching outcomes (Curran et al., 2004; Kardong-Edgren, Anderson & Michaels , 2007; Owen et al., 2006; Scherer et al., 2007), there were no studies that showed knowledge outcomes were lower for participants assigned to HFS teaching compared to traditional teaching

strategies. It has been determined that simulation technology is a practical and successful model to use in teaching a variety of skills, including both psychomotor and clinical reasoning skills (Issenberg & Scalese, 2007).

Some researchers suggest that the failure to find significant differences between traditional teaching modalities and HFS may be due in part to the tools used to measure outcomes. Many of the instruments used to measure performance in the clinical setting have been adapted for use in the simulation setting (Alinier, Hunt & Gordon, 2004; Clark, 2006). There has been growing interest in the need to develop and test simulation specific evaluation tools (Hoffmann, O'Donnell, & Kim, 2007; Lasater, 2007a). In a recent review article Kardong –Edgren and her colleagues (2010) summarized the psychometric properties of 22 evaluation instruments for HFS. The HFS specific instruments measure outcomes that assess one or more of the following domains: cognitive domains, psychomotor outcomes, affective outcomes, interdisciplinary outcomes, and development outcomes. To date the reliability and validity evidence for these instruments is limited. Additional studies using the available instruments in multi-site studies are needed to add to the instrument reliability and validity evidence.

Another possible reason for a failure to find significantly greater student performance associated with HFS includes methodological issues. Schwid, Rooke, Michalowski & Ross (2001) identified that they were using the human patient simulator (HPS) as both the intervention and the evaluation and listed this

as a limitation of their study. In addition to this limitation, others have suggested that a lack of significant findings might be due to the participants' lack of familiarity with HPS (Alinier et al., 2004; Wayne, Butter, Siddall, Fudala, Lindquist, Feinglass, Wade, & McGaghie, 2005). A number of researchers have addressed this issue by giving the control group an orientation to the HPS prior to engaging in the simulation to ensure that it was their clinical performance and not their familiarity with the HPS that was being evaluated (Girzadas, Clay, Caris, Rzechula & Harwood, 2007; Leflore et al.,2007). The earlier studies have primarily examined whether HFS does or does not improve clinical skills performance, whereas the more recent studies are examining the larger issue of learning in the context of HFS.

Simulation Use and Confidence/Perceived Value

Several studies described above have shown students to be significantly more satisfied with learning experience when assigned to HFS compared to a power point presentation (Corbridge et al., 2010), modeling behavior (Leflore et al., 2007) or case study (Scherer et al., 2007). Alinier et al. (2006) conducted a pre-test post-test design study with 99 second year diploma nursing students. They randomly assigned students either to a control group in which participants received the standard approach to teaching or to an experimental group in which participants were exposed to simulation. No differences were found between the groups on their OSCE performance or their mean test scores however, the control group reported significantly more stress and less confidence than the simulation

group.

Coiffi, Purcal & Arundell (2005), conducted a post-test design with 36 graduate diploma nurses. Participants were randomly assigned to one of two groups, an experimental group or a control group in which they received two simulation sessions or two lectures respectively. Confidence levels were higher among members of the experimental group with an effect size of 0.1. Feingold and her colleagues (2004) examined the perceptions of students and faculty about HFS. Of 97 baccalaureate nursing students in their sample, half of the students believed that the skills learned in HFS were transferable to the clinical setting, and the majority found the HFS valuable and realistic. By contrast, all four of the faculty members who participated indicated that they believed the skills learned in HFS were transferable to the clinical setting.

Jamison, Hovancsek, Clochesy & Bolton (2006) conducted a pilot study in which they evaluated the use of HFS in teaching intravenous cannulation. This exploratory pre-test post-test design was conducted as part of a three year multi-site, multi-method and multi-phased study to examine the use of HFS in nursing education. They assigned 19 nursing to students to either a simulation group or a mannequin arm group. The authors found a significant improvement in the pre-test scores of the simulation group compared to the mannequin arm group, with results of the skills checklist correlating modestly with the post-test scores. The participants were asked to rank the importance of five different educational

strategies used in simulation. The educational strategies of collaboration and diverse ways of learning received the highest ratings.

In another study that addressed student's knowledge and confidence in managing a cardiac event, Scherer et al. (2007) randomly assigned 23 advanced practice nursing students to either a control or experimental group and gave the participants a pre- and post-test on knowledge and confidence. The control group received case study presentations on cardiac events and the experimental group participated in simulations related to the same cardiac events. There was no statistically significant difference between the groups on their knowledge test scores, however the simulation group reported significantly higher confidence scores. The authors recommended that perhaps they should have had a third group who received neither intervention. They also identified the lack of the use of OSCE's to evaluate the students and the lack of validity evidence of their testing instrument as study limitations.

More recently, Blum, Borglund & Parcells (2010) conducted a quasi-experimental study of the relationship between simulation and student self-confidence and clinical competence with 53 baccalaureate nursing students. Students were enrolled in either a traditional or simulation-enhanced laboratory during their first clinical rotation. Using the Lasater Clinical Judgment Rubric, the authors hypothesized that students would report greater self-confidence with HFS. However, they found that self-confidence and competence increased regardless of group assignment. Guhde (2011) had similar results when she

conducted a comparative study with HFS measuring student's perceptions of the learning effectiveness of two different levels of assignments (simple vs. complex). She exposed 134 students to a four-hour lecture, a two hour simulation laboratory experience, and 12 hours of clinical. Students were given assignments for each of these interventions. Students were also asked to complete three separate surveys that were developed by faculty and were based on the Nursing Education Simulation Framework by Jeffries (2006). The surveys were designed to measure critical thinking, assessment, and learner satisfaction with the teaching method. No significant differences were found on any of the three variables or the total test score. Using an open-ended question, students were directed to report what they considered to be the most useful or meaningful things learned from the scenarios. Many students responded that the simulations should be used in all courses. The author recommended that further research be conducted to assess cognitive and behavioural changes that occur in simulation in addition to student perceptions. This would provide additional information regarding the effects that simulation has on student's learning.

Self-efficacy beliefs have diverse effects on the psychosocial functioning of the health care practitioner. They can determine whether coping behaviors will be initiated, how much effort will be expended, and how long effort will be sustained in the face of obstacles and aversive experiences. They can also affect vulnerability to emotional distress and depression (Bandura, 1997). When considering health care professionals and students, it is important to think about the environment in which they practice. Health care institutions are stressful and

require practitioners to remain focused under difficult situations. Identifying the relationship between self-confidence scores and clinical skills performance is an important focus for research on the effect of simulations.

In summary, to date researchers have predominantly examined students perceptions of the impact of HFS on self-efficacy, confidence levels, knowledge, and clinical performance (Alinier et al., 2006; Bearnson & Wiker, 2005; Childs & Seeples, 2006; Coiffi et al., 2005; Haskvitz & Koop, 2004; Jeffries, 2006; Mole & McLafferty, 2004; Scherer et al., 2007). The results of the review of the literature suggest simulation may have a positive impact on confidence as well as the ability to perform clinical skills. The question that is still outstanding is what component of HFS has created this change. No studies addressed or evaluated what exactly happens to student learning while engaging in a high-fidelity simulation, which was the impetus for this research study. Without understanding what happens during HFS, it is difficult to understand what, if any, impact HFS has on student learning and the outcomes discovered in those studies.

CHAPTER THREE

RESEARCH METHOD

In this chapter the study design, sampling and setting of the project, recruitment and procedures are described. Then the procedures for data collection, data analysis and rigor are presented. Finally, the ethical implications relevant to the study are raised.

Study Design

A focused ethnography was used to address the purpose of this study: to explore the values and beliefs about HFS in a sample of students and faculty in an undergraduate nursing program. Focused ethnography is derived from ethnography, a method that originated in anthropology. Ethnography as a method is primarily concerned with the art and science of describing a culture or group (Fetterman, 1998). The object of ethnographic research is to discover the cultural knowledge that people hold in their minds, how it is employed in social interaction, and the consequences of this employment (Spindler & Spindler, 1992). In a focused ethnography the researchers focus on a distinct problem within a specific context among a small group of people (Morse, 1987) while retaining the characteristics of traditional ethnographic inquiries (Roper & Shapira, 2000). Since the sub-culture of interest in this study was nursing student and faculty experiences in a specific learning situation (HFS) within the broader

context of the undergraduate program, a focused ethnography was deemed an appropriate research method.

Sample and Setting

The target population for this study was third year nursing students and instructors involved with HFS at a large Western Canadian University. At the time of this study, in this facility students were exposed to simulation scenarios using high-fidelity mannequins only in their second and third year of their undergraduate program. Since I had two years of experience in this setting as an instructor using simulation in undergraduate teaching, extensive field work to immerse me into the culture of simulation was not required.

Procedures

Ethics approval was obtained from the appropriate review boards at the University of Alberta and from the institution where the study was conducted. The approval certificate from the University of Alberta is included as Appendix A. Administrative approval was obtained from the Dean responsible for the undergraduate program where the study was conducted. In the fall term of 2009, all instructors involved with 3rd year HFS were invited to participate in the study. They were sent a letter of invitation using both electronic as well as regular departmental mail (Appendix B). The content of these communications were identical. Those interested in participating in the study were directed to contact me by telephone or by electronic mail. I met interested participants to discuss the study, address any of their questions, and obtain written informed consent from

those wanting to continue (Appendix C & D). All instructors who agreed to participate in the study were asked to take part in one of the following two activities: (1) allow me to observe the instructor during an HFS activity and then take part in an interview about the HFS activity (Appendix E) or (2) participate in a tape-recorded semi-structured focus group (Appendix F, G & H).

Also in the fall term of 2009, using electronic mail, all 3rd year students were sent an invitation to take part in this study (Appendix I). Interested students were directed to contact me electronically or by telephone to arrange a meeting to hear more about the study. At the time of the meeting I discussed the study, addressed any questions, and obtained written informed consent from those wanting to continue (Appendix J & K). Within 48 hours after an observed HFS activity I individually contacted each volunteer to arrange a face-to-face meeting at a mutually agreed time and place. I then conducted a semi-structured tape recorded interview using an interview guide (Appendix L). Demographic information was also obtained from all participants for descriptive purposes (Appendix M & N).

All HFS included realistic materials and equipment to represent a task or experience that were typical of nursing care settings. It included a computerized mannequin in a simulated hospital environment. The mannequin was controlled by an operator who was stationed beside the mannequin and who worked closely with the clinical instructor. Each group was involved with one of four scenarios. All high-fidelity simulation ended with a debriefing session during which the

instructor and students discussed the simulation experience. During each HFS event I observed the students, the clinical instructors and, the simulator operator. Soon after my observations, field notes and voice recordings were made to capture my reflections on my observations of students and instructors.

At the time of the study, I was a faculty member teaching in the second year and coordinating HFS for second and third year nursing students at the study setting. I recruited third year nursing students for this study to limit the influence that my position of power would have on students' openness during the interviews. My role as the coordinator of the simulation centre did not include evaluation for any of our third year undergraduate students. Also, to limit coercion in the recruitment process, the electronic letters of invitation were sent by a staff member who was independent of the research study.

Data Preparation and Analysis

The main purpose of data analysis in this ethnographic study was to categorize and make sense of research data collected regarding nursing students' learning in HFS. In this research study, I obtained data from the participant observations during the HFS, from interviews of key informants, from instructors who have participated in the focus group, and from the reflective journals. I transcribed all audio recordings as soon as possible after an event was recorded. Pseudonyms were used to replace names to protect the identity of the participants. Data analysis began as soon as transcripts were available. By initially categorizing the data in the transcripts, I looked for themes and patterns. I coded the field

notes and interviews, and then sorted through these codes to identify patterns and themes using steps described by Roper & Shapira (2000). Upon sorting through the codes, I generalized and made memos on the information collected.

Coding involved my reading each transcript line by line and assigning descriptive labels to segments or "chunks" of words, sentences, or paragraphs (Miles & Huberman, 1994). As I read line by line each transcript, I looked for similarities in the words. These were initially colour-coded to visually represent the topic being discussed. Once a few of the earlier transcripts had been completed and colours began repeating themselves, I then assigned broad categories to the colours. These broad categories were later separated into their respective colours and their own word documents for additional coding and collapsing of some of the early themes. I repeatedly went back and forth between interviews as new interviews were conducted and new observations were made to identify outliers, revisit the categories and, either edit or create new ones. Further, to facilitate my interpretation of the data, throughout data collection and analyses I used my reflective journal comprised of field notes recorded in a note book and in an audio tape file. Once the data were coded, they were sorted into smaller sets of data. From this iterative process of data collection and analysis, patterns and themes emerged (Miles & Huberman, 1994). Data collection ended when it was determined that no new information was found from additional interviews.

In addition to the use of an iterative approach to data collection and interpretation using different data sources (transcripts and field notes) and the use

of data saturation to determine sample size, I used several other strategies recommended by Lincoln & Guba (1985) to ensure rigor. In 1981, Guba and Lincoln replaced the quantitative terms of reliability and validity with the concept of trustworthiness. In describing trustworthiness, Guba and Lincoln used the indicators of credibility, dependability, confirmability, and transferability. Many ethnographers have followed the methods of Lincoln and Guba (Wolf, 2007), and I chose to follow the same.

Credibility is the term that Lincoln and Guba relate to the quantitative term of internal validity (Lincoln & Guba, 1985). Credibility is achieved by recognizing that there are multiple realities and the emphasis is on reporting the various perspectives as clearly as possible. In this study, the perspectives of the students and the instructors were described, as was content from the field notes that described the researchers' perspective. In addition to collecting data in the form of semi-structured interviews, focus groups, field notes, and student reflective journals, member checks were conducted to ensure that the interpretation of the perspectives was indeed representative of what the participants experienced or believed. In presenting multiple perspectives of the same experience by reflecting on the field notes and transcribed interviews, credibility was attended to.

Dependability is the term that replaces the quantitative term reliability (Lincoln & Guba, 1985). In order to attend to dependability, my co-supervisors were involved from the early stages and were privy to the raw data and early

coding that was being conducted. As experts in research methods, they were involved in all stages and the audit trails that I created were open to them for scrutiny. The data were constantly sent back and forth during the data analysis period to establish dependability.

Confirmability (neutrality) replaces the quantitative term objectivity. Confirmability is achieved through prolonged contact with members or prolonged periods of observation. In this research study, I observed 11 simulation experiences, each taking approximately four to six hours in length to complete. I also took copious amounts of field notes during my observations to ensure that items would not be forgotten after the observations. I interviewed 11 students with each interview lasting approximately 30-45 minutes. Four students were asked to come back for additional interviews. Two instructors were individually interviewed, and two focus groups were held with the instructors. I continually reflected on the interviews, my observations, and my impressions of the data. My impressions and reflections are found in Chapter Seven and are supported with other research in similar areas.

Transferability (applicability) replaces the quantitative term external validity. This criterion is used to determine whether the findings can be applied in other settings or with other groups (Lincoln & Guba, 1985). The co-supervisors of this study are in another province and did not teach at the institution where the study was conducted. As the data were presented to them, they continuously reviewed and reflected on the data and would comment on the study. They both

have knowledge of teaching nursing students at the undergraduate level and provided valuable critique. In describing these unique experiences as well as providing a rich description of the environment in which this study took place, it is anticipated that the readers of this thesis can also determine dependability of the study.

Rigor of this study was maintained by attending to credibility, dependability, confirmability, and transferability before and during the data collection periods, as well as during the data analysis period. It is thought that through the evaluation of the research and by using these indices during evaluation, trustworthiness of the research can be determined. In maintaining trustworthiness of the study, rigor is supported.

Ethical Considerations

Only students in their 3rd year of their undergraduate nursing program were invited to participate in order to limit the influence that my position might have on student interviews. With respect to the clinical instructors, the fact that I was in no position of hiring or disciplining the instructors limited the influence of power or coercion on their study participation.

In the consent letter, students and faculty were informed that there were no risks associated with their participation in the research study and at no point would either their participation or withdrawal from the study have any impact on their grades or employment with the University respectively. There were no

direct benefits to the student or faculty member for their participation in this study, however their participation could benefit the faculty in general as well as the simulation community as this research yields a better understanding of what occurs with student learning as they participate in HFS activities.

As the students and faculty were directly observed during their simulation experience, they were not anonymous to me. There was a possibility that I may have taught some of the students in previous years and most instructors were familiar to me. All participants were anonymous to the co-supervisors. While the students and faculty are known to me, at no time were their names used in any documentation related to this research study. Any activity that occurred during the simulation or any comments made during the interviews were kept anonymous in the documentation and are not traceable back to the participant. The participants were not compensated. The students and faculty participated in the simulation experience as part of their clinical course, which was scheduled into their clinical rotations. The interviews were voluntary and scheduled at a time that was convenient to the students and faculty.

Participation in this study was entirely voluntary and participants were able to withdraw at any time during the research study. They also had the right to refuse to answer any questions. Consent was obtained from the participants in writing and was given to them prior to their scheduled simulation experience. The consent forms will be kept in a locked cabinet for seven years in my office

along with all other data collected from this study. A copy of the data will also be kept by one of the co-supervisors in Edmonton.

In summary, I described the study design, the sampling and setting of the study, and the recruitment participants to the study. I also described how rigor was maintained throughout the entire study from conception to the final writing of the findings. Any ethical implications were addressed. These items lay the foundation for the study and are kept at the forefront not only as the study is designed, but also as the data are collected and analyzed.

CHAPTER FOUR

POPULATION AND SAMPLE

In this chapter, I describe the demographic characteristics of the students and instructors who participated in the research study. In order to provide the reader with relevant details about the context of the study, the environment in which HFS occurs and the scenarios are described.

Sample Demographics

At the time of the study, the Faculty of Nursing at this large Western Canadian University admitted about 240 undergraduate students each academic year. Students were admitted to the Faculty following a first year of general studies during which time they completed required courses to be eligible for admission into the second year of the nursing program. Approximately 230-260 students were in the third year of the nursing program at the time of the study. This variation in student numbers is due to attrition, students repeating courses, or students leaving or returning to the program for personal reasons. In the fourth year of the program, students from a partner community college are integrated with the 240 existing students, for a total of approximately 350 students in that year. About 350 undergraduate nursing students graduate from this nursing program each year.

The focus of the nursing program at the time of the study was on specific practice areas throughout the curriculum. In the second year, students focused on

maternal/child health, families or individuals in the community, and long-term care. In the third year, the focus was on medical/surgical nursing and the clinical placements took place solely in the hospital setting. The students' focus in the fourth year was on mental health and palliative care, both in institutions and in the community. There was also a community nursing course with a clinical component that took place in the fourth year. Upon completion of the program, students entered a 3-month senior clinical placement in a practice setting of their choosing. This research study included third year undergraduate nursing students who were in a medical and/or surgical clinical placement. Students could take their clinical in either their fall or winter term. The research took place in the simulation centre. At the time of the study, students were only scheduled a simulation activity that was associated with their clinical course.

The Students

A total of 258 students were extended an invitation to participate in the study. These students were in either a medical or a surgical clinical course when they participated in the study. The students typically took the theory course associated with the clinical course concurrently with their clinical practice. For example, they took a theory course in medical nursing concurrently with the clinical course in the medical areas. Also in third year, students were likely to be registered in a psychomotor skills course, a research methods course, an ethics course, and an elective course if not already completed. On average third year students took 29 credit hours of course work.

Out of 258 students who were sent an electronic invitation to participate in the research, a total of 12 students expressed an interest. All but one of the 12 students who expressed an interest in the study, arranged to meet with me to hear more about the study, agreed to participate and signed a consent form. Mid-way through the study, four additional students provided me with their reflective journals which described how they felt about their simulation experience. Following a discussion with my supervisors, it was agreed that these journals could be included as additional data for the study. Students were asked to formally consent to the inclusion of their reflective journals however their demographic data was not collected due to my oversight.

Of the 11 students, five (45%) were between 18-22 years of age, two (18%) were between 23-26 years of age, and four (36%) were over 27 years of age. Two of the 11 participants were male (18%) and nine of the 11 were female (82%). These demographics were consistent with the general population of nursing students at this University at the time of the study.

Students were also asked if they held a previous degree, or if they had any previous health care experience. Both of these questions were asked to determine what, if any, differences there might be in student responses in simulation, based on previous experience or knowledge. Only two students held a completed previous degree, none of which were in health related fields. Almost half of the participants (n=5) had previous health care experience in a variety of capacities,

one as a practical nurse, one as a paramedic, and three as health care aides. The demographic characteristics of the students are summarized in Table 1.

Table 1
Student Participant Demographic Data

Age in years			Gender		Completed Previous Degree	Previous Health Care Experience
	f	%	Female	Male		
18-22	5	45	5	0	0	1
23-26	2	18	1	1	0	1
≥ 27	4	36	3	1	2	3

The Clinical Instructors

The clinical instructors who teach in either the medicine or surgical clinical courses were approached to participate in the study. They were asked to participate either in a focus group, or to agree to an individual interview. There were a total of 38 instructors who were approached, all of whom were scheduled to participate in HFS during the time the study was conducted. Two agreed to participate in individual interviews, and 20 agreed to participate in a focus group. For ease of organization and to reach the largest number of participants, the focus groups were held during an already scheduled instructor meeting. All but two instructors completed a demographic questionnaire that was administered at the

end of the focus group. The two who did not submit this had to leave the focus group about 10 minutes early.

Out of the 18 who responded, four were under 40 years of age (22%), six were between 41-45 years of age (33%), five between 46-50 years of age (28%), and the remaining three were over 50 years of age (17%). Nearly half (45%) of the instructors were 46 years or older, while over half (55%) of the instructors were 45 years or younger. Of the 18 who submitted their demographic data sheet, all were female. One of the two instructors who had to leave the focus group prior to its end was male. Therefore, out of the 20 who participated, 95% were female and 5% were male. This is consistent with the sessional instructor demographic data at this University. At this University, all nursing clinical instructors are sessional faculty. In order to become a clinical instructor, the individual must have a minimum of a bachelor degree and demonstrate expertise in a clinical area.

One instructor had 0-5 years of nursing experience (5%), two had between 11-15 years of nursing experience (11%), five had 16-20 of nursing experience (28%), three had 21-25 years of nursing experience (17%), and the remaining seven had over 25 years of nursing experience (39%). Two-thirds of the instructors had less than 5 years of teaching experience (n=12). Three had 6-10 years of teaching experience (17%), and three had 11-15 years of teaching experience (17%). It was found that 30% of the ten instructors with more than 20 years of nursing experience had less than 5 years of teaching experience. The remaining instructors who had more than 20 years teaching experience had

between 6-15 years of teaching experience (20%), with the majority having between 11-15 years of teaching experience (50%). The instructors were not asked about their highest level of education, however all clinical instructors must have a minimum of a bachelor degree as a condition of their employment. A summary of the demographic characteristics of the instructor participants is presented in Table 2.

Table 2
Clinical Instructor Focus Group Demographic Data

Age in years			Years of Nursing Experience					Years of Teaching Experience		
	f	%	0-5	11-15	16-20	21-25	>25	0-5	6-10	11-15
<40	4	22	0	2	2	0	0	4	0	0
41-45	6	33	1	0	2	3	0	5	0	1
46-50	5	28	0	0	1	0	4	2	2	1
>50	3	17	0	0	0	0	3	1	1	1

The two faculty members Rose and Sylvia (pseudonyms), who agreed to participate in an interview, were also requested to complete the same demographic data sheet. Both instructors were between 41-45 years of age and both were female. Both also had between 21-25 years of nursing experience. One had less than 5 years of teaching experience, while the other had between 6-10 years of teaching experience.

Another relevant piece of contextual information about the instructors was that at the beginning of the term, all instructors were invited to participate in an orientation session aimed at teaching them how to facilitate simulation. One of the recommendations included in this session is for them to take a step back and let the students "run" the simulation. This recommendation came from the concern that some instructors were using a more didactic than interactive approach to facilitating simulation. For example, some used the time set aside for simulation to provide a lecture about the pathophysiology relevant to the scenario assigned to the simulation. Student evaluations indicated that this was an ineffective use of simulation time. Although I refined the instructor orientation session in 2007 in my role as the simulation coordinator, simulation clinicians conducted the orientation sessions.

Description of the Simulation Centre

The simulation centre at this University opened in 2006 after several years of planning and construction. The space was formerly a cubicle space for clinical instructors, however was seldom used by this group. The simulation centre is a large, modern space that was designed specifically for simulation experiences. Details such as lighting, supply carts, hospital beds, whiteboards, and medication carts are found in this space. It is approximately 1500 square feet, with an adjacent room that is another 120 square feet. This adjacent room was annexed and converted into a community simulation environment. The community environment is similar to a living room in a private residence with a one-way

mirror that allows viewing from an adjoining room. This room is used for community simulation experiences, and was not part of the research study.

This study took place in the larger area of the simulation centre. The space is a large room with three distinct areas. On one side of the room, separated by a half-wall is a labour and delivery type setting. This area has a labour bed, a head wall unit, a monitor cart, a coach chair (sleeper), a basinet, an isolette, an infant warmer, and a cart for items such as a baby scale and diapers. There is a full-size labour mannequin and a baby mannequin that can be delivered. There are also three other baby mannequins that can be used for post-delivery care. On the wall are pictures, and in the corner is floor lamp. Other items include an exercise ball and items to act as a focal point during delivery. This space is used to help students understand and use supportive measures for the family in labour, and was not part of the research study.

Separating this space from the remaining two-thirds of the room is a desk. This desk was designed to be the nurse's desk and has the charts for the simulated patients, as well as blank forms that students may need. Additional resources such as textbooks and institutional policy and procedure manuals are located there.

The remaining two-thirds of the space is dedicated to an adult high-fidelity human patient simulator and a pediatric high-fidelity human patient simulator. Both of these areas were used for the research study. These two mannequins also each have a large black box that serves as the computer processing unit and an air

compressor which controls several of the mannequin's features. The compressor cycles and can be quite loud when it cycles on in the room. This noise is generally 5-10 seconds per 2-3 minutes that the mannequin is on. The following was noted in my field notes:

> Pediatric simulation started at 0930h. Consists of five students and one clinical instructor. Gerontology group also in lab. That group has one instructor and eight students. Very noisy in lab. Two compressors going at the same time. (November 12, 2009)

The purpose of including this observation is to provide the reader with a sense of the sights and sounds experienced in the study environment. Further discussion regarding the students' and instructors' perceptions of the environment is included in the coming chapters.

At the head of the bed for each mannequin is a large shelving unit. On top of this shelf is the monitor for the mannequin, as well as the main computer that controls the mannequin. A remote computer located on the desk. The computer at the head of the mannequin is usually used to control the simulator. There are options of having a remote control computer however during this study, the computer on the headwall was used to control the mannequin. This computer is visible to students and has specific information regarding the scenario as a resource to students. The simulator operator has to approach the computer at the head of the bed in order to adjust the clinical data presented to students using the mannequin. Above the shelf and on the wall are suction and oxygen faceplates. These are non-functioning however they are still used by the students to practice setting up this type of equipment.

A curtain separates both the adult and pediatric mannequins. There is sufficient room for a group of 4-8 students to gather around each bed. Along the half wall are a large supply cart and a medication cart that are used by all students who are engaged in a simulation experience. There is a drawer in the medication cart allocated for each mannequin. All the materials on the supply cart are available for all students engaged in HFS in the area. Any medication that is ordered is included in the medication cart and there are stock medications as well as narcotics that are part of the medication cart. None of these medications are real and are items such as candies or placebo medications available from manufacturers of imitation medications for education purposes. There is also a small table in the room that instructors use as a training station for skills such as IV starts.

Adjoining to this large room is a small office space for the simulation clinician/operator. This individual sets up the mannequin and associated moulage, stocks the medication and supply cart, runs the high-fidelity simulator and troubleshoots any problems that may occur during the day. She is responsible for all simulations that occur in the centre, although she does not teach students directly she serves as a resource for the clinical instructors. There are never more than two simulations occurring at the same time.

Description of the Scenarios

While there are many scenarios that are used in this simulation centre, only the ones that were used during the research will be described. As stated

earlier, students who were in their third year of studies were invited to participate. These students take either a medical and/or a surgical nursing course in this year. This is also the year that students learn about pediatric nursing and have the option of taking a pediatric nursing clinical course. Due to limited pediatric placements, only students with an expressed interest in that placement are randomly chosen to participate in a pediatric clinical experience. The remaining students are assigned to an adult clinical unit. The simulation scenarios that the students participate in are representative of these clinical courses. Of note, all scenarios involve adult males as the mannequins themselves are more male-like in appearance and have been difficult to turn into realistic female mannequins.

The medical nursing course includes an adult scenario called "Gastrointestinal Bleed Related to Aspirin Abuse." The background of this scenario includes an adult male patient in his 70's who presents to the hospital with pain in his abdomen. The students meet the patient after he is admitted to the medical unit. At the time of admission, the patient is noted to have coffee ground emesis. The patient's blood work results show he has a low hemoglobin count. At this point, students are required to contact a health care provider to relay this information. Two units of packed red blood cells are ordered for this patient. The students need to care for this individual and administer any medications or treatments required. If the students have their simulation experience early in the year, the scenario ends at this point as this is all they have prepared for in their course work to date. Later in the term, students are exposed to a more complex version of this scenario in which the patient has a febrile non-hemolytic reaction

to the blood following its administration. The students must recognize this complication and deal with it accordingly. The students call this scenario simply "GI bleed."

There are two pediatric medical simulation scenarios that are used however all the students who participated in the study who were assigned to a pediatric simulation participated in the same scenario. There is one pediatric scenario entitled "Renal Dysfunction: Glomerulonephritis Secondary to Streptococcus Infection" and another titled "Acute Asthma Exacerbation." All of the students who participated in a pediatric simulation in the study were part of the "Acute Asthma Exacerbation" scenario.

The "Asthma" scenario, as the students call it, has two parts. In the early term version of this scenario, a 7-year-old boy experiencing an exacerbation of asthma is brought to an emergency department by his mother, accompanied with a younger sister. The students are required to assess the boy and communicate their findings to a health care provider. They are then directed to administer any medications or treatments that were ordered, and perform a follow-up assessment once the interventions have been performed. The patient is discharged and the students are expected to provide discharge teaching. In the late term version of the asthma scenario, the students see the same 7-year-old boy return to emergency, this time accompanied by a 14-year-old babysitter. The mother had to go to work, as she could not afford to take any time off. The babysitter tells the students that the mother left the babysitter with instructions about how to use

inhalers, but the babysitter was confused and did not know what to do. She tried to call the mother at work but was unable to reach her. The boy's condition has now worsened and the students have to deal with a medical emergency that has legal and ethical implications associated with the absence of a legal guardian. At the end of this scenario, the mother is contacted and the student is required to inform her about the need to admit her son to the pediatric intensive care unit. The students are required to provide a report to the receiving nurse.

The surgical nursing course has one adult and one pediatric scenario. Similar to the medical scenarios, the scenarios become increasingly more difficult as the term progresses. The adult scenario is titled "Pre-Operative Cholecystectomy" which the students call "Pre-Op Chole." This scenario begins with a man in his 60's who presents to the hospital with right-sided flank pain. The students meet the patient when he is admitted to the surgical unit. The students must provide all pre-operative care and prepare the patient for the operating room. Despite a reported allergy to penicillin, the patient is prescribed piperacillin. The students are required to recognize the relationship between these two drugs, point out their concerns and administer any revised medication or interventions that are subsequently ordered. The scenario ends when the students have completed all of their assessments and interventions, and have sent the patient off to the operating room.

In the later term version of the "Pre-Op Chole" as the students are preparing to send the patient to the operating room, the patient becomes febrile

and starts to develop other signs of septic shock. Students are required to recognize the emergency of the situation and respond accordingly in order to avoid a fatal outcome. If the students intervene and contact the health care provider, the patient is stabilized and is subsequently sent to the operating room.

The pediatric surgical scenario is entitled “Septic Appendectomy.” The students simply call this one the “Appy” scenario. In this scenario, a 9-year-old pediatric male patient is admitted to the hospital for abdominal pain, which is later determined to be a ruptured appendix requiring surgical intervention. The students meet the patient after his surgery and are responsible for his post-operative care. The patient is from a northern remote community and his parents are staying with some family while the patient is recovering. The parents speak minimal English. Students need to manage the physical care of the patient, but must also attend to the family and the discharge planning. The late term version of this scenario includes changes to the history that are related to the determinants of health. For example, in the early version, the family will have adequate housing, but in the later term version, they are living in a crowded house with poor heating and an unreliable water supply. The students are expected to address these issues in discharge planning and follow-up care of the patient.

Students generally receive basic information about each scenario one week prior to their scheduled simulation. Prior to entering the simulation centre, students meet with their instructor to discuss their understanding about each scenario. When students first enter the centre, they are greeted by the simulation

clinician who goes through a head-to-toe examination of the mannequin. The head-to-toe exam is to familiarize or re-familiarize the students to the mannequin features. Once this is completed, some clinical instructors then assign roles to the students, while others will allow the students to self-assign or have all students participate as a group without formally assigning any roles. Some instructors will then have another brief discussion with the group about what their roles might entail, while others may not. Once the students are ready, the instructor formally tells the students that the scenario begins.

Summary

In this chapter, I have presented the demographic information of the key informants for this study. These were the students enrolled in the third year of their University nursing program and who were taking a third year clinical course, and the clinical instructors who facilitate their simulation experiences. This chapter also described the physical environment where the simulation activities took place, including the role of the simulation clinical as the staff member who works in the simulation centre. A description of the scenarios that the students participated in was also provided to give the reader an understanding of what the students are expected to do when they participate in a simulation experience.

CHAPTER FIVE

FINDINGS: THE STUDENTS' EXPERIENCES AND PERCEPTIONS

The focus of this research was to explore the perceptions and experiences of student learning in high-fidelity simulation. In this chapter I present the results of the analysis of the data from the student interviews that were conducted. Five themes emerged from the data analysis; the Balancing Act; We All Make Mistakes; I Don't Think We're in Kansas Anymore; Playing Nice in the Simulation Sandbox; and Doing Something. In this chapter each of the five themes are described with supporting excerpts from the transcripts of students' interviews or reflective journals. Pseudonyms were used to protect students' identities. The source of data (interview or journal) for each student is presented in Table 3.

Table 3: Student participants

Name of Participant (pseudonym)	Category of participation
Alice	Interview
Bernice	Interview
Carol	Interview
Darlene	Interview
Esther	Interview
Gertie	Interview
Harriet	Interview
Ivan	Interview
John	Interview

Kim	Interview
Louise	Interview
Mark	Journal submission
Nancy	Journal submission
Olive	Journal submission
Paula	Journal submission

Balancing Act

Instructors facilitated HFS in a different manner, which meant that not all of the students had the same learning experience. Student responses to the question "what does your instructor do in simulation that affects your learning" were placed into two categories: what the instructor did and what the student wanted. These were further separated into subcategories to capture specific details from their responses: instructor stood back, instructor available for assistance, needed more instructor involvement, and wanted less instructor involvement. The instructors engaged in a type of balancing act that largely depended on a number of variables. This is further discussed in depth in Chapter 6, however in this chapter, the student experiences and perceptions of what the balancing act meant to their learning is described below.

What the Instructor Did

While guidelines were provided, instructors were allowed to facilitate the simulation based on their perceptions of students' needs and level of ability. This

resulted in varying degrees of instructor involvement during the simulation. This was noted in the field notes:

> Instructor quite involved in simulation. During break, instructor approaches researcher and says she enjoys taking advantage of all simulation has to offer and that she has a hard time "stepping back." This is consistent with other groups, students only having one day of clinical so far (October 6, 2009)

This varying degree of involvement was what the student participants reflected upon. The comments ranged from the instructor standing back during the simulation, the instructor being available for questions during the simulation, and the instructor being directly involved in the actual simulation activity.

Instructor stood back. Recall, one of the recommendations directed to the instructors during their orientation was for them to take a step back and let the students run the simulation. It appears that some instructors took the recommendation to 'stand back' quite literally and stood in the corner of the room and interacted minimally with the student groups. Once they completed the pre-simulation activities described in Chapter 4, they let the students begin the scenario and stood beside the simulation clinician who was operating the computer. The students were expected to problem solve and work through the scenario by responding to any physiological changes. Some students such as Bernice and Harriet found this to be an effective facilitating technique and appreciated the learning that came from this. Bernice stated:

> I liked that the (instructor) kind of stood back a bit and let us figure it out. Let us make some wrong assumptions and work from there. It gives you a chance to correct yourself, which was good. I really like that.

Bernice liked being left alone to figure things out. Harriet found that when the instructor took a step back, it let the students be the drivers in the simulation. Similar to what Bernice believed, Harriet said that she thought she had "more of a dominant role" in simulation when her instructor stood back.

Bernice also found that having the instructor step back not only lets the students figure things out on their own, but that this also allowed the students to learn with less pressure from the instructor. The independence that came with having the instructor step back from the simulation experience facilitated her learning. What the instructor's 'stepping back' meant to students' learning was illustrated by Bernice's comment:

> You are more independent in sim lab so you get to find out what you're actually capable of whereas when you're in clinical, at this point we are constantly supervised when we are doing anything so there is, it almost makes you second guess yourself because you're always looking over your shoulder, looking for that nod.

It appeared that students found that having the instructor take a step back from being directly involved in the simulation was beneficial as this required the students to think for themselves and to function without having someone closely observing all of their assessments and interventions. There were times however when this was not what the students wanted. Harriet expressed this quite nicely when she said:

> I guess it was a double-edged sword because in a sense she didn't take part at all, which is good because then the five of us could figure out what was going on. But in a sense when we were really struggling and the patient was crashing, you know she wasn't there to help us so we don't know… no one was able to tell us what to do so you kinda felt a little helpless.

Another student echoed these feelings when asked about instructor involvement in her simulation experience. Esther voiced that she actually became frustrated with the lack of instructor involvement in her simulation.

> …I was like OK, I think we really need to call the physician and she (the instructor) was playing the role of the physician and she wouldn't really say anything and I'm trying to read her body language and I'm like, well, are you allowed to come in and she didn't really do anything so then I'm like, clearly we're not phoning the physician but then I'm like, but this person is dying here and I'm like, I don't know. I was frustrated about that.

For Esther, having the instructor step back led to a frustrating experience that did not enhance her learning in simulation.

Some students felt that they were able to learn with less pressure and were able to figure out the situation on their own when the instructor stepped back. They found this to be a preferred way to learn, however there were times when students seemed to need the instructor to 'step in'. While they might learn with the instructor stepping back, the double-edged sword that Harriet talked about was something students noticed as having both a positive and negative influence on their learning in HFS. Having the instructor stand back removed the pressure and allowed students to think on their own, however when they thought they needed help, there was minimal assistance available. The degree of student learning seemed to be influenced by the instructor's ability to effectively balance her/his

participation in terms of stepping back and stepping in. The experiences that the students had involving the instructor in HFS meant the difference between a positive or frustrating experience.

Instructor available for assistance. In the middle of the continuum of having the instructor removed from the simulation or involved in the experience is having the instructor step back however being still available for assistance when needed. This is the middle of the continuum between stepping out and stepping in. The difference between having the instructor completely step back or step back but remain available is that, while the instructor is still expected to remain on the periphery of the simulation experience, they appropriately jump in when they find that students need help or when students are requesting assistance. This is part of the balancing act that instructors engaged in, and it can be difficult to know when to step in and provide assistance. Some instructors were better at recognizing this moment than others however, the students seemed to be aware of when this was needed. As previously noted, Bernice said that she liked having the instructor step back as it allowed her to see what she can do on her own. In that same interview, Bernice also said that she:

> …would kind of like to see how it would work in that situation with two students and with, like maybe an instructor in the room but not involved, like just watching. And you're just figuring it out. And if you had a question, have someone who could answer it but who wouldn't be involved unless you had a question.

The student wanted to be independent but wanted to have the instructor available as well. This is a statement echoed by several other students in their interviews.

Ivan and Kim both supported this interpretation when they said that they wanted their instructor to step back but point out errors as they arose, or to provide direction as needed. The words of Ivan illustrate this well:

> I think what helped me more was sometimes she would throw a direction at us when we weren't really kind of following. Well not really following but she would put us back on track, just throw some direction at us and then you know like she would ask questions or you know, she would suggest something so I think that's where she helped the most.

Ivan found that this technique was helpful to his learning, and offered some explanation as to why he thinks his instructor was providing direction during his simulation experience. He feels that a beneficial feature of simulation is that instructors are more open to questions in this environment:

> I think they're more open in sim lab than they are in clinical… so I think maybe in sim lab you can ask as many questions as you want, you can ask for as much direction as you need because I think it's just simulation and students might take that into consideration.

The student believed that the instructors were more likely to provide assistance during a simulated experience as opposed to the clinical setting.

Kim had a similar experience with her instructor and found that having the instructor available was helpful to her learning. She would also like more of this type of facilitation. According to Kim, instructors jumped in depending on what the students learning needs:

> Yeah, they just kinda sit there and watch you try and figure it out, but one thing I guess I would like, or like more is when the instructor would pipe in and let us know when we're doing it properly, like we don't necessarily always know but just from whatever clinical experiences we had… just to

> know that we take the right step, to let us know so that way we can try and figure out what the right way is.

From this statement, it appeared that Kim had an instructor who "piped in" to let her know how she was doing, and that this was a valuable experience for the student. It helped the students stay on track with the scenario. This was a statement that was heard repeatedly throughout many interviews. Ivan summed this sub-section up nicely with the following statement:

> I actually appreciated our instructor, like the way she involved herself. Like she kind of stepped back at the right times and other times, she put herself in there when she knew we were needing the assistance. I just found that she, well my instructor, she's been through a few sim labs, so she knows how they run through it. So it was really helpful to have her come in at certain times.

The balancing act continued as students discovered what and how they wanted the instructor to assist them during HFS. The students expressed opinions about what they believed the instructor should be doing and these beliefs are what influenced their perception of what happens when the instructor participates in the experience with them.

Instructors directly involved. At the other end of the continuum of instructor involvement was when an instructor directly participated in the simulation experience. There were several ways that this took place, however in this research study, it was observed that when instructors directly participated in HFS, it was either in a role that provided no direction or guidance regarding care (for e.g., family member) or more commonly they simply stopped the simulation related activity and began to use a didactic approach to teach. Instructors who

were in roles such as a physician or another health care provider were not considered to be directly involved, rather were seen as being available for assistance. In those roles, the instructors generally stood back and inserted themselves in the scenario as a health care provider and provided direction to the students and the simulation.

A minority of instructors were directly involved in the simulation in this sample. A total of three instructors from the eleven that were observed conducted simulation in this manner. Students who had instructors who were directly involved in their simulation experience had comments regarding how this experience affected their learning in HFS. Esther found that when the instructor was directly involved in the role of the patient, the instructor was unable to facilitate the experience effectively as she was unable to observe the entire simulation as it unfolded. This led to problems with communication at critical points in the scenario:

> … or like you know when I'm talking to the doll as the patient and discussing you know, how are you doing and blah blahblah and she's (the instructor) maybe watching someone else and I'm making up answers that they're giving me and then later she's saying like "oh my gosh, they can't breathe" and I'm like, they were just talking to me.

The instructor gave themselves the role of being the voice of the patient as well as being the clinical instructor who reviewed skills with students. In putting herself into active roles in the simulation experience, this instructor was unable to step in and step back appropriately. Esther found this to be problematic during the simulation:

> But I think maybe we just should have had more clarification about what her, like you know if she's coming in as a physician then she needs to tell us that she's definitely not coming in unless we specifically say this or that so…

Esther was frustrated with the lack of communication during the scenario, however thought that if there were more clarification of the role of the instructor, any negative effects on student learning could be minimized. This was consistent with what was observed with other instructors.

Confusion regarding what exactly the instructor was supposed to be doing in the simulation was a concern for Harriet as well. This student found that the confusion impaired the simulation experience for her. In this case, the instructor had assumed the patient role in the scenario but left that role intermittently to facilitate other parts of the simulation such as supervising skills. Harriet expressed her frustration as follows:

> Yeah, actually I think last year we had somebody play the role of the mannequin (patient) and then so if you had a question they would know the answer so I think that was one frustrating thing for my group, we didn't know what was going on and then sometimes our instructor would have the answer and be like, oh yes, by the way he's turning blue, and you're like what? When did that happen?

Gertie had a similar experience and believed that having the instructor in any type of role other than the instructor meant that they needed to be organized and have a plan. While there was no indication that the instructor did not have a plan, the students reported that the instructor was not able to attend to everything at once:

> I think it was hard because she was trying to read the information and trying to follow along so it was hard to come up with the information and pay attention to everything that was going on – that probably detracted from the scenario in some sense...

According to the students, the experience of having the instructor directly involved meant that the instructor was not able to help them when needed. This led to disjointed and ineffective communication from the instructor which detracted from the learning experience.

Another student found that having the instructor directly involved in a role that does not provide direction regarding care created a distraction for them. Having the instructor present and visible meant that the student looked to the instructor for cues and prompts. Gertie experienced the following problem during the simulation:

> They're (the instructor) supposed to step back and let you learn. They're the ones with the piece of paper in their hands to maybe, like you're more trying to guess…. And I found myself trying to look for clues outside, like from the person who is running the computer and the person with the piece of paper, you know looking for clues or additional information...

The instructor was involved in a role that limited her ability to provide direction, and Gertie did not know how to navigate through the simulation experience. Gertie was distracted and was not fully engaged in the simulation experience. This seemed to be a significant problem for Gertie as later in the interview, she brought this up again and stated that the purpose of simulation for her was to "get the information and to be able to use it." When the instructor was in a role that limited her ability to provide direction, she found that she was unable to obtain the

necessary information for the simulation learning experience to unfold satisfactorily.

From the student comments and statements, having the instructor directly involved in the simulation experience had implications for student learning, for a variety of reasons. The experience of having the instructor directly involved in the simulation meant that the instructor was not always free to guide the simulation. For the students, this meant that they were either left to glean what they could on their own or look for other cues to guide them. This frequently left students frustrated, distracted and confused.

What the Students Wanted

Students were also asked the question "what would be the perfect simulation and why?" Several responses were provided that are discussed throughout this chapter. One of these comments was what students would like to have had their instructor do during the simulation experience that they believe would enhance their learning. Just as there was a range of what the instructor did, there was a range of what the students want. Balancing the needs and wants again depended on several factors which are described below.

Needed more instructor involvement. Students described their need for more instructor availability for their assistance. This was often dependent on where the students were in the academic term. More instructor assistance seemed to be needed early in the term when students were less likely to be familiar with

all of the psychomotor skills required for the simulation. Similar to their clinical placements, if the students were assigned to a patient who required an intervention that the student was not familiar with, the student was expected to review the skill and to seek assistance appropriately. This was also an expectation of the simulation experience. According to Carol, there were disparities between what the students knew and what the instructors thought the students knew:

> Yeah, I guess that she (the instructor) thought that we would know what to do and we would just go in there and do our thing but she had to guide us through the whole thing. Like, we haven't even set up IV's yet so it was like, very basic stuff, and she didn't realize that she would have to teach us so much.

When Carol was prompted further about what this meant for her learning in simulation, she continued:

> Well, last year I had my sim lab like mid- or end of November and like, we knew what to do. So it's interesting because last year things went smoother because we had the skills, and this year it was more run by my instructor because we didn't have those skills yet.

Harriet echoed this sentiment when she said, "they're like, fix the person but you don't know how." At the early point in the term, the students felt uncertain regarding their abilities and wanted the instructor to be more involved and help guide them through their simulation experience.

According to several students, they wanted the instructor more involved so that the instructor could provide direction to the scenario. Often the students felt like they were "helpless" as they participated, mainly because they felt as though they needed help and there was none to be found. Returning to the statement

made by Harriet, she earlier described how she liked it when the instructor stepped back, but called this a “double-edged sword” as there were times when she would also have liked the instructor to be more involved. She found the experience difficult at times because on the one hand, the students wanted to be independent, but on the other, they needed direction at key times in the simulation.

In addition to feelings of helplessness, when the students were left with no direction, Esther repeatedly stated that she felt frustrated with the lack of involvement from her instructor. This student wanted more direction and answers to her questions. Esther also felt that her “efforts were not being recognized” when the instructor failed to participate in the simulation at critical points. While the instructor was in the role of the physician, she was not participating in any meaningful way from some students’ perspectives. This situation was noted in the field notes:

> Students asking instructor questions. Instructor reading notes. Giving orders for inhalants, shortness of breath. Students still asking more questions. (November 12, 2009)

Esther continued to voice her need for more instructor involvement as it related to receiving direction relevant to the simulation. She asked about colour, diaphoresis, as well as other symptoms that would indicate a change in the patient’s status in the scenario. The instructor was following the list of orders that were part of her materials and did not stray from this list and did not provide the answers to the student’s questions. According to the student, when the instructor

was not involved in any significant way and did nothing more than provide health care provider orders, they lacked vital information about the patient's status. There was no one "manning the station." This is what led to her significant frustration with the situation:

> … well….just if we were giving medication and if we were giving oxygen, you expect to see some sort of change and I don't know, maybe it's just like someone needs to man the station a little more or our instructor needs to respond when we're like, nothing's happening, is this right? And we have a physician, I mean like one or the other really needed to happen and to have neither was frustrating.

The student continued to voice the reason for wanting more instructor involvement:

> I think there is a point to give some, you know, a few hints or help, I mean we are still students. And I think maybe just, I mean if it looks like we are trying to get something, like clarify, clarification, communication.

Esther needed cues and information from the instructor but none were forthcoming. She believed that students needed some direction from time to time. After further probing about what she thought would enhance the simulation experience, Esther offered the following:

> Hmm… I would like someone who, if we have questions and we've discussed amongst ourselves and we're still unsure, would be willing without kind of looking at us like why don't you know or like they're dying, you need to do something, and it's like yeah, we know so can you help us out here.

Whether it is the need for assistance with psychomotor skills, or the need for information about the patient's status, students recognized that assistance from the instructor was required to make the most of the simulation experience. As Esther

suggested, when no direction was given, students were left to fill in the blanks for themselves, which was not always how the scenario played out. "And then it's also what's happening that detracts from what we think should be happening." These incongruities detracted from the simulation experience.

Wanted less instructor involvement. Some students suggested that the need for the instructor's involvement in the simulation experience depended on where the students were in the term. As Carol discovered, if the instructor was less involved and did not intervene to help, the students had to demonstrate their capabilities:

> Umm… well I think if they were less involved we really would have to show more about what we know skills wise. Umm… well I would probably try to make the instructor as uninvolved as possible… we could just go through it on our own. I think that would be more interesting.

This student did not see the need for more instructor involvement or assistance, even though this particular student had her simulation experience early in the term. Carol was the only student in her clinical group who deciphered from the assigned preparatory work what skills she might be expected to perform during her simulation. She then prepared herself by reading the required readings and watching the skills videos. This student was very well prepared for simulation.

Other students wanted the instructor to be involved, but in a limited way. For Bernice, the ideal simulation experience occurred when students were independently involved in a simulation with an instructor available for questions:

> I would kind of like to see how it would work in that situation with two students and with, like maybe an instructor in the room but not involved, like just watching. And you're just figuring it out. And if you had a question, have someone who could answer it but who wouldn't be involved unless you had a question.

John agreed with this format and provided some insight as to why this would be a preferred method for him:

> I think their (clinical instructor) role would be basically observing and correcting if you're doing stuff that is life threatening to the patient, not just jumping in all the time, I think we should be allowed to make mistakes and then probably in the debriefing we would discuss you did this wrong, you did that wrong, you need to do that better. So basically to observe and take notes of who did what, who didn't do what, who was supposed to do this, who did it wrong and stuff like that. And bring it up to us. I think that would be good to point out to people that they could have been doing this, they should have been doing that instead of… yeah… instead of not. So the instructor should be overall supervising and taking notes and as I said, if it's life threatening and we're going to kill the patient now, and then you jump in and say, no you don't do that, that patient is going to die. Taking a step back and observing.

Other students agreed that this would be a means to enhance their simulation experience, and pointed out that it was more than simply having the instructor jump in if they noticed significant issues. Gertie believed having the instructor available for questions was important, but she suggested that students did not always know which questions to ask. Some questions were related to the limitations of the mannequin and the environment itself. According to Gertie:

> It was kind of like a 3 dimensional thing but you only saw 2 dimensions. If your patient was turning blue, you wouldn't notice that unless you asked the right questions so at times I found it difficult to find the right questions to ask in order to get the right information back.

While they wanted the instructor to be less involved in the simulation, they still believed that someone needed to guide the experience. Guiding is more than jumping in when students appear to struggle, but also to provide information that students may not be able to find on their own.

Summary

Students wanted more instructor involvement to assist with filling in the gaps in their knowledge, but also wanted the opportunity to work through things on their own and "show what they know." They believed that having an instructor who was not directly involved in the simulation was ideal, and they appreciated having someone who was available to answer questions as they arose. Students also wanted someone to direct the simulation, which includes providing information that they may or may not realize that they need, such as changes to the environment or the mannequin.

We All Make Mistakes

Students saw making mistakes as a way to assist them in their learning and believed that this was an important advantage of simulation over other teaching and learning activities. Regardless of the type of mistakes made, all students stated that they were relieved that the mistakes occurred in the simulation lab as opposed to the clinical setting. They stated that if mistakes were to be made, the place to do it is in the simulation centre.

Now is the Time to Make Mistakes

Students preferred not to make mistakes in the first place. Most students prepared for simulation by practicing the anticipated skills and or completing their assigned preparatory readings. Some students were quite distressed by making mistakes. From the field notes "one student was getting frustrated with her small mistakes and voiced it during debriefing" (February 10, 2010).

Some informants said that being permitted to make mistakes helped with their learning. Alice, Bernice, Carol, and Darlene all said that they appreciated the learning opportunities that came from making mistakes, and that if they were going to make mistakes, they wanted to make them on a mannequin, not on a living person. According to Darlene, students did not have to worry about making mistakes in simulation as much as they might in the clinical setting:

> …the fact is that with a doll, say I had gone over all these patient scenarios, you don't have to worry about the patient feeling uncomfortable that you're talking and asking all these questions. And that would be the time to make a mistake, not with the patient. So that part is good that you can do a mock stuff without worrying about doing any harm.

Students believed that since no harm could come to a living patient, this is the time to make their mistakes. Some students believed that learning from mistakes should be an intentional component of simulation learning. According to Alice, she believed that she should be able to make all sorts of mistakes:

> But I think the other thing too is to just let the person go and make all sorts of mistakes, you know kill the patient, whatever, not a big deal because you can just say "you just killed that person because you didn't do this" I

> mean you're not going to forget. For me anyway, that's a good learning experience. And then you think, oh wait a minute, when I did it that time, that time it was wrong, you know that's how you remember the wrong approach versus the right approach.

She sees the fact that the mannequin is not real as an opportunity to explore options when providing care to the simulated patient. In the clinical setting, this type of exploration is simply not possible, so students wanted to see what would happen if they proceeded with the decisions and interventions that they believed were appropriate. Carol stated that she would like to see what can happen:

> Umm… just to actually have a patient that you can't really harm that we can all just try, you know, put a possible scenario in the lab and see what happens.

Bernice had similar feelings about learning from mistakes in simulation:

> I would have the patient totally crash and let the students try to figure out what is going on. That would be, I don't know, because it's not stressful, it's not real, so to have the patient go completely downhill just to see what you could do, just to see what you could figure out, just like something really challenging like that. I would love that.

When Bernice was asked about why she would "love that" and what she means by "not real," she offered the following:

> It was kind of nice because you're not going to hurt someone, you have a little more leeway and it's not as stressful and it makes more sense because you can learn it when you're not stressed out. And like, we never played with the IV pumps before so to stand there in clinical when your patient is looking at you like you're an idiot isn't great but in,(simulation), because the dummy can't tell you or give you questioning looks, you can figure out the stuff that you need to figure out.

In being “not real,” the student said that she can think through the situation without the added stress of having the living patient watching you or the threat of harming the patient. The fact that the mannequin is not “real” did not impair the experience, but rather enhanced it in this situation.

Learning From Your Mistakes

Students believed that the simulation centre was the place to make mistakes, however it was important to learn from these mistakes. Simply making a mistake did not translate into learning. In the first part of this section, students talked about being able to make mistakes and being provided challenging opportunities where mistakes are more likely to happen. In this section, informants talked about learning from mistakes that have been made.

Bernice spoke earlier about wanting to be challenged in a scenario and that because it was not “real,” mistakes could be made. When asked about what she learned from this, she provided the following:

> I liked that the instructor kind of stood back a bit and let us figure it out. Let us make some wrong assumptions and work from there. It gives you a chance to correct yourself, which was good, I really like that.

Being able to make mistakes was more than just trying different options, but learning from errors that the student made. In letting the students work through problems, they were learning from the mistakes. Carol spoke about an error that she made during her simulation and what she learned from it:

> Yeah, and make mistakes, but that's kind of the place to do it. And you really learn from it. I mean I made a mistake in my lab, and like I learned from it because I grabbed a 50 ml IV bag instead of 100 ml bag and then we were like, oh, maybe we shouldn't just read the label on the basket but actually read the bag, like but at the time it was like, okay, let's all learn from this.

Several other informants agreed that learning from their mistakes was a valuable experience to have in HFS. Darlene believed that being allowed to try different approaches helped with her learning and said, "I think it's more to just sort of test myself to see what I can come up with on my own." Likewise, Bernice shared this belief when she stated that they were "more independent in sim lab so you get to find out what you're actually capable." In exploring options without the fear that their mistakes could be harmful to patients, students were learning through their own actions.

John, a student with previous health care experience suggested that after students covered a certain amount of class content, they should then be exposed to a more challenging simulation experience:

> Me personally, I think having covered a certain amount of work, a certain amount of skills, we should be tested on that but without preparation. It gives you time to make mistakes, and then you understand why you did what you did and then it reinforces so that way in the future you know you'll never make this mistake again. You'll never do this. But when I get time to prep, I can go and learn that with this patient, we do this, this, and this, and I could come back and regurgitate it for you […].

This student believed that by being asked to prepare for a specific simulation experience, he was simply "regurgitating" his prepared materials as opposed to genuinely learning what to do in the clinical setting. John further said that

mistakes were not only a way to learn, but that being comfortable with making mistakes, essentially being comfortable with taking chances was something that students should do in all classes, not just simulation. The student believed that this would help significantly with learning:

> I think that's the best way you learn, you remember stuff by making mistakes. I think we are learning now, so we are entitled to make mistakes. I think that's one of the things that people in the classroom, in class, in clinical, in everything, they are so afraid of making mistakes, so afraid of talking, so afraid of saying the wrong things, that they don't. And then they make it in the wrong setting. So when they should have said something in class, they don't, or in sim lab, and then you go to clinical, and you make the mistake. Cause you never asked, you never said nothing, you were afraid. I think mistakes is part of learning and especially in a learning environment, we should be allowed to make mistakes and we should be corrected and understand why…yeah.

John finished his statements on making mistakes by saying that instructors should also encourage students to make mistakes by providing them with multiple scenarios and from refraining from jumping in when mistakes are initially made. The student said that there are times to correct the mistakes, and that this might actually not occur until the end of the scenario when debriefing the simulation takes place:

> I think their (instructor) role would be basically observing and correcting if you're doing stuff that is life threatening to the patient, not just jumping in all the time, I think we should be allowed to make mistakes and then probably in the debriefing we would discuss you did this wrong, you did that wrong, you need to do that better. And have more than one scenario set up so that way we know we did this wrong this time, next scenario we'll brush up on what we did wrong and stuff. So basically to observe and take notes of who did what, who didn't do what, who was supposed to do this, who did it wrong and stuff like that. And bring it up to us.

> Sometimes they (the students) don't even realize that they're standing there doing nothing. They think they're so involved and then you realize that you did nothing for a whole 30 minutes with this patient. You didn't do nothing or some people run without their heads so you just, you're looking like you're doing stuff but they're doing nothing. I think that would be good to point out to people that they could have been doing this, they should have been doing that instead of… yeah… instead of not.

It is clear from these statements that this informant believed that being able to learn from their mistakes was a valuable learning tool and one that should be encouraged in all classes.

Interestingly enough, all of the reflective journals that were submitted indicated the same desire to learn from mistake made in simulation. Mark, Nancy, Olive and Paula all said that their experiences in simulation that involved making mistakes were significant events for them. Paula described how her groups' inability to decide what to do led to the death of the mannequin and said, "I learned more in that hour than all sim labs combined." According to Olive, she prepared for simulation however when things did not go as planned, her group struggled. She said that she had "so many things going through my mind that I wasn't able to come up with a coherence decision." As a result of mistakes that were made in HFS, Nancy believed that she "learned a lot more than I expected." Mark reflected on why he believed errors were made and he finished reflecting on this learning experience with what he hoped to take away from it:

> Despite the death of our patient, thankfully in a controlled environment, I learned the importance of communicating with one another in an effective, concise manner, the need to stay calm and work through the situation…. When I next encounter this situation I can only hope that I will respond a lot quicker….

Learning from their mistakes was a valuable experience for these students, one significant enough to be the topic of their reflective journal.

Summary

While students preferred not to make mistakes, they believed that if a mistake occurred, that it was better that it occurred in a simulation as opposed to a clinical setting. They valued the opportunity to test themselves and see what they did or did not know. The ideal place to do this was in the simulation centre where no harm could occur. Many students believed that learning from their mistakes enhanced their learning during simulation experiences.

I Don't Think We're in Kansas Anymore

In the 1939 classic movie *The Wizard of Oz,* the main character Dorothy finds herself in a strange environment when her house lands after a tornado. When Dorothy and her dog Toto exit the house, the people she sees remind her of her family and friends from home. Yet there is a lot that is unfamiliar and strange. Upon recognizing that there is something different with the environment, Dorothy says to her dog Toto "I don't think we're in Kansas anymore." This is not dissimilar to simulation, where the students have their peers with them, however the environments that they find themselves in can be unfamiliar or strange. Simulation centres are fairly new environments for students and instructors alike. Most are familiar with a traditional skills lab, a lecture room, as well as the clinical setting, and simulation centres are supposedly a combination

of all of these environments. They attempt to mimic the practice setting in both the physical structure as well as the high-fidelity mannequins that act as patients in these environments. When students were asked "How does simulation compare with any other way that is used to help you learn (other classes or activities)?" most of the responses applied to either the physical environment of the simulation centre, or in this case, the lay of the land, as well as the high-fidelity mannequin that was used. This section explores these responses.

The Lay of the Land

Student who participated in this study engaged in simulation activities in the centre in both their 2nd and 3rd year of academic study. As part of their simulation experience, students were given a scenario to work through in this simulated hospital setting. They were exposed to a different environment than they would typically find in either the classroom, a traditional skills lab, or in the clinical setting. Features of the simulation environment could enhance or impair the simulation learning experience.

At the head of the bed were pieces of equipment that were associated with the computerized human patient simulator. One piece was the computer that operated the mannequin, and another was the monitor that displayed the vital signs of the mannequin. The display cycled every five seconds and could the amount of information was controlled by the instructor. In these scenarios, all vital signs with the exception of blood pressure were displayed on the monitor. Blood pressures were initially to be obtained directly from the mannequin, and

subsequent readings could be obtained from the. These two pieces of equipment were unique to the HFS environment. According Carol, if manually obtaining a blood pressure was difficult to perform, alternative means for gathering that vital sign was useful:

> No, well, like you could take his blood pressure but it was hard to hear. And because it was up on the screen and people tended to just look up on the screen.

While students were encouraged to obtain the blood pressure directly from the mannequin, if the information was already available on a screen, the students were not likely to take it manually. It is important to note that students learned how to take vital signs manually in the 2nd year of their program and had ample opportunity to practice these skills by the time they reached their 3rd year. Carol compared the HFS environment to the clinical setting:

> I just think that when we have something like that, I mean we have this screen up with his vitals, and well, in a real hospital setting, you can have the blood pressure cuff on the client all the time and it will just let you know, so if we just had a monitor, that's all we need really I think. Just to tell us, well we, just to tell us the vitals if they want it to be like, oh this person is going into this kind of crisis then we can kind of recognize it from the vitals.

It seemed that having this type of equipment in the room enhanced the simulation experience as it allowed students to work with the information. Since they were comfortable with skills such as vital signs at that point, they wanted the information to be posted on the monitor.

On the other hand the visible presence of the equipment and the equipment operator seemed to be a distraction in the HFS learning environment for some

students. This equipment and the operator reduced opportunities for student learning by providing students with clues about the solutions to problems and or by limiting the realistic characteristics of the setting. Esther's comments illustrate this concern about the HFS environment:

> Yeah, it (the computer) was also a little distracting. Like I feel that if it was more hidden or remote or something then we would actually be able to prove that we were checking all the time, which we were. And then it was like you only checked because you saw that they went to the computer, and it's like but I was checking all the other times anyway.

Harriet further supported this point:

> And the aspect that I didn't really like so much are, like it's hard, because it is a simulation sometimes it's hard to relate it to, or to keep remembering that this is a real event, that we are supposed to pretend it's real. It's distracting when you know or when you see somebody on the computer and you're like oh, the heart rate has changed and you don't have to check it you know… so in that sense it's kind of unrealistic…
>
> Not distracting in the sense, but it was more that you see somebody going to the computer and you know that they've done something.
>
> Yeah, it's like we should be checking our vitals again or we should be doing all this again because you know that somebody's at the computer. So maybe if that was set up in a different room, or set-up outside of the room, I don't know. The surprise isn't there.

Gertie also found the HFS environment to be problematic:

> And I found myself trying to look for clues outside, like from the person who is running the computer and the person with the piece of paper, you know looking for clues or additional information, because I want more information.

In addition to the visibility of the operator and control monitor, lack of attention to the location of teaching aides limited the realism of the HFS environment. Ivan commented:

> The only thing that I found that didn't help this time was we were doing a blood transfusion for (the mannequin) and the arm and the blood was on the other side of the room and I was just, I mean even our instructor said that it was just the way they had it set up this time, like it if was beside the patient, kinda feel like it is more enclosed together.

At times other groups of students were present in other areas of the simulation centre. According to Esther, having these other groups in the centre was distracting:

> … it was a little distracting having the group there, I mean they were there for the first part, yeah, I mean part of you goes like we should be really good because we all a year older so we can't suck, the pressure is on. And part of it is you're just curious like oh really, was I really that clueless or like you know, so it is distracting that way. And yeah it was a bit distracting.

Observations captured in my field notes further indicated how the HFS environment distracted students:

> Student looking at computer. Asks researcher if they can play with the features of the mannequin after they see "convulsions." Researcher smiles but does not respond. Now two students are looking at the computer that lists mannequin features. One says to the other "later we are going to make him convulse." (September 10, 2009).

Limitations of the technology also reduced the reality of the HFS environment. For example, Louise began with a discussion regarding the basic features of the mannequin when she said "it would good if there was somebody kind of in charge of his voiding, and that sort of thing, if he couldn't do it on his own." Likewise, Esther discussed the difficulty of not having information that would typically be visible:

> …for example, like is the patient cyanotic or is there diaphoresis, you know, remembering to ask about all the things that you would notice normally…umm...that was a little frustrating.

The lack of realism resonated strongly with the informants. Some students looked around the HFS environment for clues about the mannequin's status. They were told that the simulation experience should be similar to the clinical experience. Differences between what the students expected and what they experienced in the HFS environment caused concern. Esther used the example of the monitor at the head of the bed as being one such example:

> Like, especially when another student or the instructor is saying "well, why aren't you doing this or why aren't you doing that" and you're like, I thought we had a cardiac monitor or whatever already hooked up you know, so then you just kind of have issues I guess with being more with communication.

Similarly, Harriet described her difficulty with pretending the HFS setting represents reality:

> And the aspect that I didn't really like so much are, like it's hard to, because it is a simulation sometimes it's hard to relate to it, or to keep remembering that this is a real event that we are supposed to pretend is real.

Although some students found the HFS setting was unrealistic others reported the valuable learning opportunities that the HFS setting offered. When asked "how useful is simulation to your learning?" Harriet responded as follows:

> Umm… personally I do enjoy them. There are so many different aspects that you can't get in the hospital versus the aspects that you can't get in your lectures. So I think in a sense it's nice because you, you're in a safe environment and you have your colleagues there to work with you, I really like that aspect of it.… and it's actually even seeing cases that I wouldn't

> see on my rotation so it's kind of good to have a different experience. That's what I like.

Louise also provided suggestions on how to set up the HFS environment to enhance the simulation experience:

> I mean, it looks kind of like a hospital and I don't know what else you would do to….. And actually, one thing that's coming to me now is that it might be nice if he had a kardex in his chart, if that's kind of a standard thing. Because we don't really know like, it could be that he just came in, or if he's been there for a while, does he have an IV started or what, what's it running at, that type of thing. Or we can make a kardex for him, just by looking at the orders.

Upon probing this notion of a realistic environment and what this did for the conduct of students in simulation, Louise added:

> …because we're told to treat it like a clinical situation, so even when we had things to discuss with each other, we're not to do it at the bedside.

This group of students treated it as any traditional clinical environment.

The lay of the land in the simulation centre is not entirely dissimilar to that of the traditional skills lab. Those labs have low-fidelity mannequins and task trainers that are housed in hospital-like environments. In view of this, students were asked "how is learning in simulation different or similar to your learning in other lab activities (i.e. psychomotor skills lab)?" Gertie said that because the two environments were similar, sometimes she found herself looking for information in the same way that she would in a skills lab. She compared learning in skills lab and in the simulation centre:

> Whereas in a scenario, sim situation, they are trying to get you to come up with what you're looking for. We were definitely looking for things to be handed to us, we were looking for the information from all over the place, instead of, it never occurred to me that we might have the answer.

Allow Me To Introduce "Jake"

The simulation centre is home to a human patient simulator that is commonly known as "Jake." This is a name that is used to address any static or high-fidelity mannequin at this University. Each individual scenario has patient names that are associated with them, however students rarely refer to the patient name unless they are doing their rights of medication administration, or other skills that require patient identification. Irrespective of what they call the mannequin, it is this piece of equipment that has been considered the central piece in creating the simulation centre. With so much emphasis on what this simulator can do, students cannot comment on their simulation experience without commenting on the simulator itself. As was the case with the new learning environment, being exposed to the human patient simulator was also a new experience for the students. In this section, students' thoughts on the simulator as a teaching tool are explored.

Many informants began by making the comparison between what they were accustomed to with the static mannequins in the skills lab to the human patient simulator in the simulation centre. Bernice stated:

> The same in that you are actually in there, your hands are doing something, but, whereas in skills, you just have a dummy that just lays there and does nothing, so it's kind of nice to get the feedback from the… machines because Jake can respond in sim lab. And in sim lab, it's one

> big scenario but in skills lab it's just little chunks and you don't really get to see the big picture.

Comparing simulation to skills lab assisted the student in recognizing what, if any, differences existed between teaching and learning with a low-fidelity mannequin versus a high-fidelity human patient simulator.

This comparison also meant that students compared what they did with "Jake" in simulation with what they did with the static mannequins in skills labs. While they compared the technology, they also compared the use of the technology in simulation and whether this affected the learning experience. For some students, the kind of mannequin they used in simulation was not that important. As Carol commented:

> Hmm… well, for our specific scenario, it could have been Jake from skills lab. Yes. I guess especially because, I don't know, we didn't actually use Jake much. I know that he can have like different heart sounds and stuff but we didn't really listen to that. In retrospect maybe we should have.

Students compared the high-fidelity simulator with their skills static mannequin and determined that if they did not use the additional unique features of the simulator, perhaps this was not the tool to use. Alice agreed with these statements and summarized this by saying:

> I guess the bottom line I found the technology side didn't really change anything, I mean even if it was just a regular lab mannequin we would have had the same experience.
>
> I mean, I didn't think that having the technology enhanced the learning process really. But it was a great experience, I really learned a lot.

Several students valued using "Jake" to assist them with their clinical assessments. As Ivan found, performing these assessments on a simulator helped prepare him for patient care:

> I think it gives you a guideline of what you should be expecting I guess when you're assessing a patient like that. I guess listening to the heart sounds, chest sounds, bowel sounds….I guess it can give you a better idea of what to expect. I mean you can listen on Jake and you refer back to it in clinical, you can say oh yeah, this is what I should be expecting to hear on my patient. It gives you sort of guidelines too, you know, like you shouldn't be hearing these sounds here, or you know, stuff like that. I guess for me, it just gives me more like, it's like a prep, you know, if I get to do it on Jake so then when I do it on my patient it just relates that much better.

Likewise, Harriet appreciated hearing both normal and abnormal sounds to assist with her learning. This was a new experience for her:

> Well, they were talking about… when we went over the normal sounds versus the abnormal sounds, I believe ######(simulation instructor) was saying that they were quite accurate, like the wheeze and the crackles, so I think that was good because the only experience… that I ever heard listening to a wheeze and a crackle was last year in health assessment and that was in one of our videos. So again getting familiarity with those sounds.

Other students found this teaching tool helpful as well in honing their assessment skills. Kim appreciated that the heart, lung and bowel sounds were specific and that there was no guesswork in determining what or where the sounds were heard.

> …we listened to the abnormal sounds, and stuff like that is really helpful because we don't always hear it. And to have it blatantly laid out and have us be able to, yeah that's what it sounds like. Obviously it's a little louder than it probably would be, but it's good because we don't always get to see, or to listen or hear that so that stuff I find helpful. Doing vital signs and stuff, I think we did that a lot and it's just kind of routine, so it's

> just like practice, but that's never a problem. But then again, you get to do manual BP's this term which we didn't do at all in clinical…. But that's always good to practice so. But yeah, it was good because he kinda changes, you can change his blood pressure, or his heart rate, whatever and then to actually say hey, this is what I have and it's right or no, you're completely off and you can tell whether they're just faking it or not…

Similarly, Darlene found that learning with a simulated mannequin was more beneficial than learning assessment skills directly with actual patients:

> …but like when you hear adventitious sounds or something so when you go into real life, and then also the fact is that with a doll, say I had gone over all these patient scenarios, you don' t have to worry about the patient feeling uncomfortable that you're talking and asking all these questions.

In summary, "Jake" was seen as an effective teaching tool with regards to assessment skills, however high-fidelity human patient simulators are able to do much more than facilitate health assessment skills. While this is a feature, it is only one part of what students can do while in simulation. Simulation is intended to assist with learning similar to the clinical setting and include problem solving and clinical reasoning. John had insight regarding his experiences with the human patient simulator:

> I think it's very important, all those features. Umm…makes it like it's real life, although it's not real life, but it bring more energy to the scenario when it, you could listen to lung sounds now, from clear and now you hear crackles on it, you know something's going wrong and it heightens your experience. While it's not a real person, but it heightens the experience that this person is going down, that this person is…yes. So having all those things and the, even the loud sound from the compressor, and you can't hear when you do the blood pressure. I would suggest for that, probably you could put that on the other side of the wall, but it's…I'm not sure if you'll get that at the hospital, but in terms of that much noise and stuff, but not that much, but it also helps you to fine tune what you need to

> listen to and some people had to do the blood pressures over and over until they get accustomed to what they're actually listening to as opposed to the sound. Or probably even timing, time it when to listen to the sound when the compressor is on and off so. I think all those features on the mannequin helps a lot, it really really puts more into the sessions.

This student found that all the facets of the simulator assisted with his learning, right down to the sound of the compressors. While not intended to be part of the learning experience, this student found that listening to a blood pressure over a compressor was akin to listening to a blood pressure in a noisy hospital setting.

Kim and Harriet commented on the ability to change the physiological characteristics of the mannequin helped with their problem solving skills. According to Kim:

> I think I mentioned this earlier that I found this really helpful compared to last year, like just Jake's stages changed, he wasn't constantly at the same level and we were providing almost like comfort care, that's what we did last year. I found that throwing in different kind of twists, with the shock and stuff like that, like that I would like. Something different within the scenario….umm…. kind of change the situation so you can adapt to it that way. And then you can kind of work through it and figure out what your next step would be.

Likewise Harriet found that simulation with the mannequin was more than simply assessment skills:

> …sim is helpful because it kinda progresses the situation whereas skills it's like here's the situation…But with sim you kinda had to so some more digging to figure out, you know, this is the stage that we're in now, but as you progress to the next stage, what are you going to do with our skills that we know.

In addition to the useful features described, participants also pointed out the features lacking in the mannequin. Similar to the concerns about the HFS environment, students wanted more realism with regards to the mannequin.

Although the mannequin could provide verbal feedback, this feature was not always used. For some students the lack of interaction they had with the mannequin was an important limitation of the HFS experience. As Esther stated:

> …if someone was really just you know more like a person I suppose… umm… and you know, I'm not sure if they could do that with us, but if you had someone talking, you could talk with the patient, I think that would be helpful. I mean, we learn the whole way along, talk to you patient or interact with the family in PICU or I mean peds, and then to just kinda go in and look is not as good so…

Gertie also reported the importance of receiving verbal responses from the mannequin to enhance learning in the HFS setting. According to her observations:

> That's something that I've been thinking about since last week. I think, in second year with the mannequin when somebody was playing the role of the mannequin, I found that interaction, and I felt that did make a difference in learning. And I found that the role playing was interesting especially if you get to be the patient, you know get to say what the, or challenging the other students, or get to say what you're feeling instead of you know, asking the mother or whoever is playing that role what is going on.

Bernice added that having someone speak for the mannequin "reminds you that he is still there."

Another informant found it quite difficult when this feature was not used during her simulation. According to Harriet, when the patient did not verbally respond, she was unable to complete her assessment. More specifically she said:

> But then sim is hard because you don't have any response from your patient, like verbal response so you can't ask about pain, you can't ask about umm… are you feeling any discomfort, or if there are changes to the body system, and then in clinical you can assess these things….
>
> Yeah, actually I think last year we had somebody play the role of the mannequin and then so if you had a question they would know the answer so I think that was one frustrating thing for my group, we didn't know what was going on …

It appeared that having "Jake" speak throughout the scenario not only added to the realism of the simulation, but also assisted the students with understanding the progression of the scenario. When this feature was not used, students were frustrated and were left guessing what was happening to the mannequin.

More significantly, the students experienced issues regarding realism as it related to other aspects of "Jake." While some information could be obtained through speaking with the mannequin, students found that other assessment data that typically could be observed in a real patient was lacking in the mannequin due to its technical limitations. This included clinical signs such as sweating or changes in skin colour. When this data was missing or not provided by the instructor in a timely fashion, students found the HFS learning experience exasperating, confusing or less than optimal. Harriet provided the following observations:

> …and then sometimes our instructor would have the answer and be like, oh yes, by the way he's turning blue, and you're like what, when did that happen? So I think, again, if the mannequin yeah, if it could talk and let us know or give us a more of an assessment, give us more facts.

This continued to be problematic for other students as well. Esther had similar comments:

> …. if we were giving medication and if we were giving oxygen, you expect to see some sort of change and I don't know, maybe it's just like someone needs to man the station a little more or our instructor needs to respond when we're like, nothing's happening, is this right?
>
> I think it kinda just detracts from the whole learning experience. Because you're supposed to be kinda interacting with the scenario and when you've been trying to interact and it hasn't really interacted back and then suddenly you know, something totally different is happening. It doesn't jive.

Gertie believed that the reason for this is because they, including the instructor, were expecting "Jake" to be three-dimensional, whereas given the mannequin features, they really only saw two dimensions.

If the mannequin could not perform certain functions, students looked elsewhere for this information. It was important for them to receive information about the mannequin's status to know whether or not their nursing interventions were appropriate or effective. As Louise commented, they needed this information in order to get a better idea of what was happening:

> I don't always think the mannequin responds to our actions, so there's no kind of immediate response. So that's a little bit difficult sometimes to get a clear picture about what is going on.

Esther added:

> Well I mean obviously when you do interventions in clinical, you expect to see something happening, and when it's delayed or when it's kind of, if it's really not what you're learning in theory, not that everything that you learn in theory necessarily happens right away, but like, you know you're trying to bronchodilate someone and they're still crashing and

> you're like what am I learning? Is what I'm doing effective, or is it not effective. Cause if it doesn't work then it's not effective. But if that's what you really do in the real world, then you're not really learning that.

John further supported this point:

> ….the person who was doing the different lung sounds, breath sounds, was changing the mannequin, different functions, she was not there all the time. So some of the times when we did certain interventions, call for an order or x-ray or something, I think something needed to change (on the mannequin). Tell us if there's any change based on the treatment that we did. What intervention and, that was a little sore spot for me because we had to be calling the person each time, to change, to keep changing. That person should be there and listening and, they have instructions to give you know, the lung sounds is supposed to get better or worse, and that wasn't there. So having to stop and call the person and ask, is there any change? ….no I didn't enjoy that at all.

Some students suggested that the technical features of "Jake" could be better applied to their HFS learning experience. As Esther explains, perhaps the instructors did not take full advantage of the features of the mannequin:

> But umm…. I don't know, it was a little helpful but I feel that like there's probably a lot more that you can do with those dolls than what we were doing so I don't know, maybe we didn't take the full advantage.

Harriet provided the following observations:

> … it's good again when we're listening to the crackles and the wheezes, it's good for that. But I didn't find it very helpful where, like a the doll has the dots, which is helpful so you know where to listen to, but it's not realistic because there's not going to be dots on a person to say listen here, this is the best place to listen to. And then even the blood pressure and the heart, like we all know how to take blood pressures but it was really difficult on the doll to take the blood pressures, and I think and the pulses were really easy to find so I think in a sense like, I really do like sim lab, but we were saying in a sense it's kinda like the faculty spent all this money and they want us to use it. And that's how they're justifying

> spending all this money by oh, let's have a sim lab day. So it's good that we are playing with technology but I think it could be a lot better, but I don't know how.

Other students thought they needed to be hyper-vigilant in the HFS environment. As Gertie found:

> I was second guessing, that's for sure. Especially, well I guess I was kind of waiting to be tricked, you know that the technology was going to change and you weren't going to notice so I felt like I had to be extra special or careful and check even more but, I didn't notice changes as easily. Like when the scenario, towards the end, if we hadn't remembered to check we probably wouldn't have noticed that things were resolving.

When everything fell into place, when the instructor was on board, when students were permitted to work with one another, when students discovered how their knowledge translated into practice, this was a positive experience for students. As Paula indicated in her journal, this came together for her in one particular simulation experience:

> I try not to be negative, and to always see what I can learn from every experience, but to be perfectly honest, I have always found sim lab to be…fake. I never understood why we needed a million dollar doll to help us simulate scenarios (I don't know how much he cost, but I know he was expensive). I just always thought that more would be accomplished by having an in depth group discussion about different case studies. There was just too much pretending! That all changed in today's lab.

This student continued to describe what happened in simulation that day, and that the group "killed" the mannequin. In responding to a simulation involving rapidly changing health status, the students were asked to work together and help the patient. Paula ended the experience by saying that she "learned more in that hour

than all sim labs combined." When it was done properly and realism was attended to, simulation was a positive learning experience for students.

Some students suggested wanted more HFS experience. Gertie found simulation useful to her learning and added that "I think if you used it even more, it probably would help you more." This student wanted more practice with "Jake." Ivan enjoyed working with "Jake" as he felt that it "helped me because then I can practice on a dummy before I do it on a real person." The simulator provided them with practical experience prior to entering clinical. While these experiences are important, they do not attend to what high-fidelity simulation professes to encourage, and that is to assist with clinical reasoning.

"Jake" has unique features that needed to be explained to the users, both faculty and students prior to use. "Jake" also has technical limitations which also needed to be explained prior to beginning the simulation. In the end, "Jake" is still a computerized mannequin that requires an operator. The HFS learning experience is optimal when the operator compensates for the technical limitations of the mannequin to ensure information that is available in the real world is available to the students.

Summary

Important issues that detracted from the HFS learning experience included instructors' lack of attention to creating a realistic environment and compensating for the technical limitations of the mannequin by providing students with timely

information about the mannequin's status. They needed more information, and often felt that this information was being obtained from other sources such as the presence of computer equipment and simulation faculty. These sources were not intended to be the main source of information for the progression of the scenario. As students were getting the lay of the land in the simulation centre, they took this all in, good, bad or otherwise. As they worked with the mannequin, they looked for responses they believed should be there.

Playing Nice in the Simulation Sandbox

Engaging in simulation activities is generally a group experience. Students were placed with others in a simulation environment and usually given a brief description of what their role was during the HFS. In this section I discuss the experiences students had in playing with others in the simulation sandbox. The sandbox analogy comes from the notion that people should collaborate and work together to accomplish a mutual goal. Students discussed what it was like working with others, what the numbers in their group meant for the simulation experience, and what their experience was like in their assigned role in simulation.

Working as a Team

Working in simulation offered new experiences for students. In the classroom, they often worked independently, and in skills labs, they were in groups of no more than three students. In the clinical setting, students usually

care for their assigned patients independently of other students. In a simulation setting, there was usually a group of three to seven students caring for the same patient. Each student had a different role and was required to work together to help "Jake." From the field notes, it was noted that in clinical, students had one to three patients and they were responsible for attending to all of their patients needs. During the simulation experience, each student was required to play a specific role of the nurse, and during debriefing all the roles of the nurse were discussed together (February 11, 2010). Harriet echoed this belief in saying the following:

> I think that was one of the best parts that I liked about sim was – in clinical we all have our different patients and we kinda ask each other questions but we can't really relate to them and help because you don't know their patient history but now we all have the same patient, we all know their history and you can chat things over and then you kinda hear things that you wouldn't think of, that somebody else thought of… that's one of the really benefits about sim lab was the group work about it.

As students worked together in the simulation sandbox, they were provided with various learning experiences. A key benefit was learning to work in a team and getting feedback from peers. Kim commented:

> Yeah, and then too, they can see if you're doing a skill properly or not and you can talk out loud and say this is what I'm doing and if it's not right, they can tell you or if it is, like good job or whatever. Where as in the skills lab, you ask if you need help but you could be doing it wrong anyway. Like you could think that you're doing it right but you're doing it completely wrong.

Working with others was helpful with psychomotor skills acquisition. While learning skills was important to students, the larger benefit was being able to talk things over with their peers. This included skills, assessments, interventions, and

establishing priorities. Louise stated that the students worked together as a group immediately from the start of the simulation:

> Like, first we go over it together, we go over the questions and that as a group. And we answer those so that we're all on the same page. But then once we get in to see the patient and do our assessments and vital signs and all that stuff, then we kind of group together for about 2 minutes to come up with a plan, like who's doing meds and at what time.

Bernice found, this included working together throughout the scenario:

> And taking breaks in the middle to figure it out is really nice and when you can talk over your patient about what is going on without scaring them was really nice.

Carol had the same experience in being able to ask questions immediately without feeling that the patient was listening and watching her.

> I don't know, it's a good experience and you can communicate with everyone and ask lots of questions at the same time and not look like a fool in front of your actual live patient. So yeah, it's good, it's fun. It's good because it allows the group to not like, crowd in on the patient and do everything at once. It makes us work together as a team.

Being able to communicate with each other during simulation was a common benefit mentioned. Students found it helpful to check their thoughts and ideas with each other, to receive confirmation for their actions or additional suggestions about how to proceed. Louise, Gertie and Ivan all provided opinions on how this worked for them during simulation. Louise began with the following:

> Because we go through the different options of what we could be doing and what we usually end up doing is by consensus or really thinking through it. And if it's wrong, well then it's wrong.

Students felt comfortable with making group decisions, whether the decisions were right or wrong. Gertie added that when students worked together, more was accomplished working in this fashion:

> I think we were all trying to defer to each other, which kind of worked out good because everything got done.

While Ivan added that in working together, additional or alternative suggestions were made and that students learned from each other in these situations:

> I think it helps, yeah, cause then you get feedback from other people right? Somebody will throw something in that you weren't thinking of at the time, or you will say something and they weren't thinking about that so….

When the scenario was more challenging, students decided together when additional help was needed from an instructor. As Ivan stated, helping each other and receiving help from the instructors or other peers was valued:

> With your instructors too and other students they can like you know help, give you direction. You know students can help with input and stuff like that so when you're practicing those kinds of skills together and then you bring what you learned to the hospital….

Carol also found it helpful to be able to ask questions to both her peers and instructor:

> To your instructor and to other students. Like just questions like why are we doing this to our patient would be kind of weird to say in front of your patient.

According to John, talking with peers was a valuable experience, and a necessary skill for nursing. John discussed how communicating with peers in simulation was important preparation for clinical practice:

> I think it's a good thing because in a real setting you'll have more than one person there or two people there and it gives you a chance to open up and experience and give your part in what's going on. And that's one thing that nursing, to me, that nursing is lacking, that talking out, people actually participating in that, and getting involved in stuff. So when you go to the clinical setting, you see the same things that's done here, so in the clinical setting, nurses are doing the same thing, either not saying anything or very quiet about it. Not helping as much as they're supposed to, not challenging the doctors on some of the orders and stuff and to me, it's a bad outlook for nursing in the future, you know, I actually have second thoughts, I'm thinking about is this what I want because I will get in lots of trouble out there. Lots of good trouble.

Being comfortable enough to ask questions of your peers, or providing and receiving feedback required that a certain relationship was established between students. Some informants discussed how the group dynamics affected them during HFS. Bernice began with stating that having a good relationship with her peers was important for her learning:

> No one has any issues with anyone else and when you can get along, it makes learning way easier too because you're willing to talk to everybody and ask everybody questions.

Similarly, Louise found that getting along with other group members was important and imagined what it would have been like if they had not gotten along:

> I think it's important to get along and to listen to each other. I think we had a good group like that. I can imagine how one or two people can take it over, and even if the rest of the group didn't agree, they would just go ahead with whatever they were going to do.

Being able to work together was valued by students and helped with understanding what was happening in the simulation. Harriet and John found it helpful to listen to other peers. Harriet stated:

> ...but I personally find that it's helpful because then you can hear other people's opinions too. Yeah, group dynamics are really important. So I think in a sense it's nice because you, you're in a safe environment and you have your colleagues there to work with you, I really like that aspect of it.

Similarly John added:

> I think umm….the different roles we play, each one had one particular, but it would sort of overlap at times when we were helping each other.

The notion of helping each other, listening to each other, and feeling that it is a safe environment were all the result of students feeling comfortable with their peers and respectful of what they might add to the simulation. Louise added that she enjoyed working with her peers and provided an example of teamwork:

> I like having that opportunity. If somebody has a better or different plan than mine, it's good to see why so that they can usually justify it, and if they can't, we pick the one that makes sense.

Ivan described another experience of teamwork being used during preparation for the simulation:

> …we checked the scenarios, and what we did for our clinical group is we divided everything, like just to make it easier on everyone. Like the questions and the scenarios. I think there were two scenarios posted this year and like, we didn't do the peds one, we did the adult one. And yeah, like our groups said like who wants to do question 1 to 4 and so forth and all that. So we prepared for that, like information regarding the scenario like meds and you know, everything you need to know for that.

Similarly, Bernice's group divided the preparation work amongst group members:

> We did the prep as a group and we split it up the parts so then we just, just to make it a little easier. We reviewed each other's information.

Working together as a team and being able to talk to each other made the students feel more comfortable in their simulation and helped with the amount of work involved.

Students also began to share roles during their simulation experience as they became more comfortable and familiar with each other. Each student knew what they needed to do and helped each other out as they went along. Esther believed that they engaged in "collective thinking" when they worked together as a group and added that she felt more responsible for her peers actions when they worked together:

> I think when everyone is working together for the same, like for all kinds of roles, then you feel like you should be a part of kind of different planning instead of just letting someone do it by themselves.

This student spoke enthusiastically as she continued explaining how they were all responsible for the simulation activities:

> And for us at least, we had a really good team dynamic and so it wasn't so much that you are the one who does this, and you are the one who does that, like you don't have a chance to talk about it. This time we were really able to chat about it, we were able to decide what's this priority, have you done this, have you done that. So we were kind of responsible for all areas, even if we divided it up amongst ourselves. I thought that was helpful because you got to see more holistically what was going on. I mean you still watched other people do other stuff, because you weren't doing everything, but…..although my instructor told me that that doesn't work sometimes if you have groups where some people won't do anything and some people take over, but it works for some groups.

When students were able to get along and respected each other's contributions to the simulation, this made for a better simulation experience. Students valued the contributions of their peers.

This was not always the case. Alice provided an account of her experience of when someone in her group dominated the question-answer period without group consultation or discussion during a simulation She noticed some students had no opportunity for input:

> But you always get someone who always knows everything. I mean there are a lot of smart students in this faculty. But I think when you ask a general question to the entire group, and one person knows everything, which is really good for them, then you don't always have enough time to stop and think. I think that there was one person in particular in our group who answers all the questions and she knows them really fast, so, not even so much for me because I think that I did answer a few questions, right or wrong, at least I got a chance to answer. But there were a few other students in the group that didn't say a thing and I think that's because, you know, you don't get a chance to process.

Harriet also commented that when personalities were different within a group, experiences changed for the members. She believed that some members had better or poorer experiences than others because of it:

> Yeah, because there are some people who are more dominant, who know the answer a little bit quicker than the other, so they kind of, they get the experience, or a better experience I would say.

The informant continued this discussion and believed that this may be just the personality of the group member and that not everyone may be comfortable with answering in a group and "being singled out." Harriet offered that perhaps "they don't know the answer" whereas Carol thought it might be the personal comfort

level of a student acting in a leadership role. Carol believed that putting people in roles they were not comfortable with also resulted in a poor simulation experience:

> …I think people should start out where they feel comfortable because in our group, the head nurse, or nurse number one or whatever, I don't think she was very comfortable with her role at first like just being the number one nurse is very overwhelming for her and like, I think maybe it should kind of be not chosen for us. Because I think people would feel better if they were like yep, I know what I'm doing here, instead of ahhh I don't want to call the doctor on the walkie-talkie and stuff like that.

Bernice had similar comments regarding her experiences:

> We didn't really stick to our roles, not at all. I was supposed to be the secondary nurse, but the girl that she (the instructor) put as the primary nurse absolutely hates taking any kind of control, so I kind of looked at her when we got in there and then when she didn't say anything or do anything I just started.

Other students found that perhaps the reason that some students did not want to participate had more to do with attitudes than either knowledge or comfort level. Ivan commented that students who did not want to participate and saw simulation as a "waste of time" were not helping the simulation experience and that less focus should be on these individuals. He believed that you will have people who will want to participate and those who will not, and that the focus should be on those who want to participate:

> I think, umm….students who take the lead roles, those ones definitely help. Like some people who might not want to participate, like they think it's a waste of time, I'm not saying they'll bring the group down, like I think when it comes time they'll probably have to you know, step up and play the role too but I think as far as dynamics you'll probably have both

> those people regardless so I think if you focus more on some of the leaders you know, people who provide direction to the students, you know, they can kinda get the group going. They are the ones to get everybody into it…

When prompted to describe how having both of these types of individuals in simulation affected his learning in simulation, Ivan continued:

> Yeah, I don't think it really affects me personally, I try to, I don't know if I try to lead but I really don't just not participate so I'm somewhere in the middle. I mean I like to get involved too, so for me personally, it wouldn't affect me, if somebody or the next person beside me really wasn't, or didn't want to be here, didn't want to do it. It wouldn't bother me too much, I'm still in it for my personal gain so…

Students enjoyed working as teams and learning from each other, however if there were individual students who did not wish to participate, students saw that as their personal choice and moved along without them.

Some students appreciated working in teams but preferred to work on their own. Bernice would have liked to have had the opportunity to see how she would have done on her own:

> I think it would have been interesting to see how it could have worked. Because doing it that way (as a group), everyone was one collective group and you didn't really get to see what *you* could do.

Darlene also would have liked to have been alone in the simulation:

> I kinda, umm, I like theory a lot but when it comes to hands-on stuff, I like to kinda do everything myself… I saw things but, I don't know if time would allow but I would have kinda preferred, actually preferred to do the whole thing myself. Even though I know it is a team and that's simulation but it's just, I think that's just how I learn, especially with skills I like to

> do something over and over, because I'm more worried about making, like I yeah, I want to make sure that I really know it.

This participant continued by saying that while getting information from her peers was helpful, she did not necessarily see this as benefiting her learning:

> It's not that I don't like working in a team, I think it's a really good skill. It's just for learning – when I'm trying to practice and stuff like that, when there is a group around me, they are actually giving you a lot of the answers, which is helpful too but it doesn't really test you to see what you actually know.

Students saw benefits to both working together as a team as well as individually in HFS. The relationships that students formed with their peers, both in clinical and in simulation had an influence on the other. Gertie offered that when they knew each other and each other's personalities, this made their simulation experience easier to get moving:

> We've been together for 5 or 6 weeks so it was long enough and we knew each other well enough to know each other's comfort zones a little bit. So in that sense I think things started to fall into place in a good way.

Other students valued the relationships with each other and how it enhanced the learning experience, as Bernice experienced:

> No, no one has any issues with anyone else and when you can get along, it makes learning way easier too because you're willing to talk to everybody and ask everybody questions.

Finally, Gertie believed that playing together in the simulation sandbox meant that the work of caring for "Jake" was complete and that working as a team in HFS had implications for their relationships in the clinical setting:

> I think we were all trying to defer to each other, which kind of worked out good because everything got done. We were trying…. There were no small jobs, we were trying to do everything that needed to be done, so in that sense I think…. And I wondered at the time actually if somebody should be in charge but….. it felt good to have that. I think it changed for us too because going to the ward the next day, I think it changed our dynamics a little bit, like it made us feel more like a team.

How Many is Too Many?

There is no known ideal number of students that is optimal for HFS. The students who participated in this research study were in groups that ranged from three to seven participants. In this study, two student participants were in groups of three as they participated in HFS, and the remaining nine participants were in groups of six. None of these student participants were in the same HFS groups as other student participants who were interviewed.

Group size was often discussed as it related to their learning experience. Kim and Ivan were the two students who were part of the smaller groups and offered the following opinion on their group size:

> Umm, it went better than last year because we got split up into two groups so instead of 6 or 8 of us trying to all do it, there were three of us who worked through it that way, so I think it went really well. (Kim)

> The group size was better when it was smaller, umm…. the group size was honestly a huge difference just because when you have that many people working on it (mannequin), like last year it was kinda a different scenario. This year we were all nurses, last year people had an observer role and they would actually watch three of us do everything so I didn't find that very helpful. (Kim)

Ivan also suggested that having a smaller group enhanced his simulation experience in terms of communication with other students and the instructor:

> …so you're not having six students all at once trying to focus. By having three and three, and you can then discuss and figure it out. Like a nicer way.
>
> I think like, communication, I think everybody was a lot more open just as a smaller group, people aren't as shy maybe. Even if they might say the wrong answer, they'll feel a little more comfortable because it's… or fewer people.

…like when it was us three, she (instructor) seemed to step like, was more into giving us direction. She was more interactive when it was just us three.

However, while Ivan preferred the smaller group size, he did not believe a larger group was altogether problematic. The student believed that the smaller group meant that students felt more comfortable discussing the scenario and that the instructor was more attentive to them, but that the larger group was fine as well:

> I don't mind it both ways. Either six or three, I don't find it crowded, I don't feel pressure, three people works nice if you're having a group discussion, less voices I guess.

Other students who were part of a larger group believed they were disadvantaged because of it. They felt that they missed out on some experiences and would have preferred to have been in a smaller group. Alice is one such student:

> …there were only five (students). So six would have been even worse. I think it would have been better if you could have done… I mean, someone got to do the NG tube, I go to do the catheter, which was, you know, that was great, but everything was just so helpful. Everything was great review but it would have been good if everyone got the opportunity to do everything *in the scenario*.

Bernice and Louise also preferred smaller groups. Both of these students found that the larger group detracted from the simulation experience. According to Bernice, the following would be her ideal simulation experience:

> I would kind of like to see how it would work in that situation with two students and with, like maybe (an instructor) in the room but not involved, like just watching. And you're just figuring it out. And if you had a question, have someone who could answer it but who wouldn't be involved unless you had a question.

Louise believed that if this was to be treated as a clinical day, students were expected to do something. This was challenging in the larger group:

> I think most, if anything that would have kept from learning is the amount of people in our group. I think most of us were running around trying to do the same things. Because I think all of us were thinking that if this were a real clinical day, what would we be doing. But everyone is trying to do the same thing.

While large groups of students were seen as impairing the simulation experience, John found that given the right circumstances, perhaps having large groups of students was a realistic experience:

> …because you see in a hospital setting, somebody codes or something happens, you see six, 15, 20 doctors, you don't know where they come from, and I guess if you rotate roles and that somebody has to take note of all that's going on. When you start to see how many people you really have actually jump into do skills. It's not, well six it's probably three or two would actually be hands on treating the patient so six is a reasonable number to you know, conduct a scenario like that. Nothing more than that though.

Again, there was a balancing act of how many students is too many in a simulation experience. Most students agreed that they preferred a smaller group and that this would enhance their learning. However, as John indicated, it is not only how many students you have participating in simulation, but also what their roles are during the experience.

Ensemble Cast

As students participated in simulation, they were assigned a variety of roles. These roles were often selected by the instructor just prior to beginning the simulation experience. While there were numerous roles available, the more commonly used roles were the primary nurse, secondary nurse, documentation nurse, medication/treatment nurse, family member and observer. The instructor typically played themselves as well as the physician. The students expressed opinions about which roles were more valued than others and how this contributed to their learning. For the most part, students found that the roles they were assigned often depended on the number of students in the simulation. For example, if there were a large group of students, more would have to be in an observational or supporting role. Students were asked to reflect on all roles that they played. As noted by Ivan:

> Yeah, I find that when we do the six, there's maybe one or two that have to take the observational roles. I've never done the observation but yeah, documentation. I thought that was a vital role.

Even though the documentation nurse did not provide direct care to "Jake," some students such as Kim and Ivan saw this as an active role. They considered the role of the documentation nurse as someone who was actively participating, but also someone who could step back and watch the scenario from a role other than the direct care provider. They considered the role of observer as someone who strictly observed the simulation. Any other role, whether it was the documentation nurse or a family member, was a supportive role, which students

considered to be an active role as opposed to simply observing the simulation. Ivan considered the role of the documentation nurse as a valuable learning experience in terms of learning about organization, planning, thinking how you might do things differently and seeing the bigger picture:

> Umm..well when I did the documentation, I could see what other students were doing and could see their organization, I guess, you know their planning and all that kind of stuff. I just found it difficult to document everything as quick as they were doing things, I guess trying to keep up and you know, but that develops over time right. But I didn't really say much because I think my role was just to make sure there was proper documentation. I remember they were doing the IV and checking for, because our case was sepsis I think. They were trying to get everything done as fast as they could without making mistakes. You know organizing and planning kind of comes in. I had a good view when something's going on.
>
> …because you're watching your peers do something so you're thinking about how you would maybe do something differently. And you can get the bigger picture sometimes when you're, or if you're given like the med nurse role, you're just really focused on the meds, I find.

Kim agreed with Ivan's statements and added that she learned "more by observing and asking questions." Kim and Ivan believed they learned by watching others who were in more active roles than when assigned to a supporting role. By contrast, other students such as Esther did not find that she learned as much in a supportive role:

> For someone like me, I learn to keep quiet. Well, I mean I'm generally someone who knows what's going on and can direct stuff like that, so to have to kind of watch people fumble around, you kind of go, OK, yeah, you may know but it's hard to do it, it's hard to do it in front of an audience so you just have to let people make their own mistakes sometimes.

Bernice and Carol had similar concerns about the value of the observer role. Bernice believed that "it would have been painful to stick to […] the observer or the wife role" and Carol stated:

> I started off just putting vital signs on the wall, on the board, and I was okay with that at first and then it kind of got a little bit boring because you're just watching other people do things that they weren't sure how to do yet. And then I was the number one nurse so I set up an IV. Yeah, it was good. I liked it better being the nurse than just being the bystander.

In summary, students saw the role of the observer as being a passive role that most preferred not to be assigned. While many students considered a supportive role as being a more active role than the observer role, most students thought the most helpful role for their learning was the active role of the primary or secondary nurse.

Other supporting roles such as being a family member were frequently discussed by participants. Harriet and Louise had similar comments regarding being the family member or the "wife" in their simulation experiences. Both found that while they were in these roles, they did not necessarily adhere to that supportive role. According to Harriet, she was a "bad wife" because she found herself doing more "nursing stuff" and deviating from her assigned role. She believed that it was important "to not be worried about being the wife" and to pay attention to "what my classmates were doing." Louise also deviated from her role as the wife, but offered an explanation for this:

> It helped because I had the option of playing the wife but in the end, it's still a clinical day so I'm still expected to perform for my instructor so a

> lot of it, I kind of deviated from the wife after a bit and only went back a couple of times to say something. But most of the other time I spent looking over the charts and ended up doing a lot of the documentation…

Louise felt that she needed to "perform" for her instructor and believed that this could not be done in her supporting role.

The students view about the benefit of specific roles depended on group dynamics. As mentioned earlier, Esther did not value the role of the observer in her more recent simulation experience, but when asked about other experiences, she became lively and provided an example of a learning experience that was helpful to her:

> OK, that was by far my favourite. And we didn't have specific roles, we were all the nurse. And for us at least, we had a really good team dynamic and so it wasn't so much that you are the one who does this, and you are the one who does that, like you don't have a chance to talk about it. This time we were really able to chat about it, we were able to decide what's this […] priority, have you done this, have you done that. So we were kind of responsible for all areas, even if we divided it up amongst ourselves. I thought that was helpful because you got to see more holistically what was going on. I mean you still watched other people do other stuff, because you weren't doing everything.

Having flexibility in the roles was important to Kim. She found that others who were in observer roles could jump in as a nurse when it was needed but that in her role as a physician, she was limited with what she could do.

> And I think I was the physician, but like really, what can I do there and they would ask me and I was like, I don't know.

Some students believed that some roles were not appropriate for students. Louise offered that rather than have a student play the physician, this role was better suited for the instructor:

> I liked when the instructor was the patient and the doctor because I've had it before when one of us is the doctor and we just have no idea what to order, or what to do and why. I thought it was good in our simulation, this last one, where she (instructor) threw in a couple of mistakes, things that weren't quite right. So it was good to catch those. Like it was ordered, an antibiotic to which the patient was allergic, or was really tired and ordered the wrong thing, so we had to call them back sort of thing.

All students thought the role of the nurse was the most beneficial to student learning Kim believed that when students were in the role of the nurse and were able to confer with their peers about the plan of care, that this was the best possible experience for their learning. Harriet summed up her experience as follows:

> I think at the beginning they always say that this is a clinical day so if you see something, don't stick to your role if there is something else to do. Kind of encouraged to do it, but still up to you. And also I feel like since it is still a clinical day, I'm expected to take part in that instead of just showing off my acting skills.

While playing roles was nice, they were in the simulation centre to learn and felt that the most valued role in simulation was that of the nurse. The other roles could be considered the supporting cast, and students wanted to play the lead.

Summary

Playing in the simulation sandbox provided the students with a unique learning experience. Students discovered that they needed to work as a team in

simulation, and most of them valued being able to talk to their peers during simulation. They found that group dynamics had a role to play as well, but students still preferred to be accountable for their own simulation experience, regardless of what others did during simulation. The sandbox could only hold so many people until the learning experience was perceived as being diminished. Students described what works best in terms of their activities and that of others when they are playing together. There is a balancing act between a number of factors.

Doing Something

Throughout the interviews and observations, students described the need to be doing something in their simulation experience. While students were in simulation, they needed to be busy and needed to do something. As Gertie said to her fellow students during their simulation experience, "we didn't come here for nothing to happen." (November 12, 2009). That being said, doing something took on different meanings. For some, it meant doing something to prepare for the simulation. For others, doing something happened during the simulation experience either in the form of practicing their clinical skills or in the form of helping them to think like a nurse. 'Doing something' included taking part in their debriefing sessions which marked the completion of any given simulation experience

Be Prepared

In order to prepare for the simulation experience, students were provided with basic information regarding their scenario. This information was similar to what the students would see with their actual patients in the clinical setting. They were given a brief history and some related medications to review. They were also given some prompting questions to ensure that they were ready to care for "Jake" the next day. Most instructors reviewed these preparation materials prior to beginning the simulation.

Students approached this preparation in a variety of ways. Bernice and her clinical group "split it up the parts just to make it a little easier." Each student reviewed the other's information and they found that this method "definitely helps." Ivan and his clinical group also prepared in this manner and relied on each other to provide useful information for the simulation.

Alice, Esther, Louise and Carol prepared individually by answering the questions provided to them. Carol said that she prepared for simulation just as she would with any other client:

> And so we had some questions and did our usual focused assessments that we do in 3rd year…Just to prep ourselves like we would for any client. So we pretended like Jake was like a real person and we did the whole like all the nursing care plans and everything. It was a lot of prep work and it helped you know the scenario before you went in but it was still unpredictable like you didn't really know what you would be doing.

Louise added that preparing for simulation gave the students an "idea what's coming." She continued by saying that "it's better to go in there with an idea of

what you're doing and be corrected, rather than go in green and you really don't know." Being prepared for simulation contributed to the learning experience.

For students such as Esther and Ivan, preparing meant going through the information and creating a concept map of what might be happening in simulation. The focus was on the disease process and nursing interventions that may be required. For other students like Carol, they also saw a need to prepare their psychomotor skills. Carol said that she watched the skills videos that were available and commented on how helpful these were. Further, Carol thought that if she had not done this, she would have been "totally clued out" in simulation. The issue of being comfortable with psychomotor skills in simulation came out repeatedly as students talked about being prepared. Many students including Carol, John and Gertie felt that without these psychomotor skills, the simulation experience was impaired. Carol commented:

> I wouldn't say that we were unprepared like but we didn't have all the skills that we would be using in the sim lab so it was a lot of hands on learning.

Two students (Carol, John) thought that some instructors made inappropriate assumptions about students' previous learning experiences :

> I guess she (instructor) thought that we would know what to do and we would just go in there and do our thing but she had to guide us through the whole thing. Like, we haven't even set up IV's yet so it was like, very basic stuff, and she didn't realize that she would have to teach us so much… (Carol)

Some students suggested that too much time was spent in HFS learning psychomotor skills that were required for the simulation scenario but had not been

previously learned. This meant that less time was available for other activities that were part of the simulation experience. While Carol appreciated the opportunity to perform psychomotor skills, she added that "there are just some things in retrospect that you wish you got to do, like starting IV's. But I wouldn't have known how because I didn't prep for that anyways." Psychomotor skills were important to students, however being prepared for these prior to starting simulation was what students saw as contributing to a valuable learning experience as explained by Harriet:

> I just wish that we kind of knew the skills beforehand. That's it. Any kind of client situation would be fine as long as you know what we have to do. More than just having seen someone else do it before. It just ends up making you feel like you know less if you don't have those skills beforehand.

She continued and said that the instructor could then just point out their errors rather than teach the entire skill. "I think it should be just putting those skills into practice rather than going and seeing it for the very first time."

Students wanted to learn in simulation and looked for opportunities to do so. In being prepared for simulation, both with the disease etiology and psychomotor skills, students such as Harriet believed they could then fully participate in simulation and relied on the instructor for direction only:

> I think I learn if I see it first, read about it a bit, and maybe if I see someone else do it, like in the skills lab and then put it into reality, like for Jake or for in the sim lab. Like, I have to read about it, see it, and then do it, and then have someone point out things to help me do it better. And I kinda think the sim lab should be like, the last part of that of me doing it

> and then like being corrected and helped out rather than just starting at the very beginning and never having seen it before.

This was what Harriet believed would be her ideal simulation lab. She wanted to prepare for the simulation and to use the simulation experience to reinforce her learning.

Many students indicated that the reason they needed to prepare their psychomotor skills as well was due to the fact that during their simulation experience, they were called on to perform psychomotor skills prior to learning it in the skills lab setting. According to Bernice, there "just wasn't enough background knowledge" and so students spent time doing things they believed could have been learned in the skills lab as opposed to simulation. Carol compared simulation experiences, one where she knew the skills associated with the scenario and the other where she did not:

> Well, last year I had my sim lab like mid- or end of November and like, we knew what to do. So it's interesting because last year things went smoother because we had the skills, and this year it was more run by my instructor because we didn't have those skills yet.

Without the skills beforehand, students relied on the instructor for direction. This was not seen as a practical way to spend time in the simulation experience.

The timing of their simulation impacted their preparedness for their clinical. The reason students completed their pre-simulation preparatory work was to be ready to "do something" during the simulation experience. Students such as Ivan believed that it would have been more beneficial for students to have the simulation experience early in the term so that they could apply that learning

to their clinical. "I think my main concern would be to try and have sim lab at the beginning. I'm not sure if you might be able, but would it make more sense to have the simulation and then have clinical."

By contrast John believed the opposite would enhance his learning. He wanted his simulation experience at the end of the term once he had completed his skills and theory courses. He also did not want to know the scenario ahead of time, as he believed that this would emphasize memorization of content. Regardless of when students wanted simulation in the term, students valued the preparation involved in the simulation experience. They found that this experience helped prepare them not only for simulation but also for clinical. When asked about her simulation and the preparation involved, Alice said that she "thought it was good" and that she "definitely learned a lot. The prep was good – it forces you to learn about disease process." Ivan valued the role that simulation played in preparing him for clinical and said the following:

> Like, a lot of other people that I talk to, they always say the same thing, they say that we think sim lab should be done at the beginning and then like, simulation preparing for clinical… but it would probably help a lot better I think it you made everybody go to sim right at the beginning and then they go into clinical. Cause then they can always refer and go back to their simulation right. And then for some groups, like my group had to do it at the end, like it still helps but you can't really bring it back to clinical with us.

He valued the simulation experience and the way it prepared him for clinical, however if it occurred too late in the term, he then questioned how he could bring this experience to the clinical setting when the clinical rotation was ending.

Preparing for simulation in this case was for simulation only, not simulation and clinical.

Practice Makes Perfect

In doing something during the simulation experience, informants discussed the merit of being able to practice in the simulation centre. Practicing skills and practicing problem solving were two significant activities for students. In this section, students discussed what they need in order to be able to practice and enhance the simulation experience.

Darlene, Alice and Bernice enjoyed practicing their psychomotor skills, however they wanted more time themselves with the mannequin. Referring to her psychomotor skills, Darlene wanted to "really know how to do it." Bernice found it "boring" when watching other students perform skills and Alice emphasized her desire to perform all of the skills in the context of the scenario:

> […] Everything was great review but it would have been good if everyone got the opportunity to do everything *in the scenario.* Like here is your patient, his temperature is up, what are you going to do, I mean really thinking on your feet, because that's the situation that we are going to be in. I would appreciate more of those kinds of experiences.

She continued to say that while she can learn by watching other people, she believed that "just more hands-on practice would be more beneficial" and that "if we would have been able to do that 4 or 5 times as well, that would have been huge."

Practicing skills was more than doing the task. Bernice reported that the reason that practicing her skills in simulation was beneficial to her was because of the greater opportunity for feedback in simulation compared to a traditional skills lab:

> The same in that you are actually in there, your hands are doing something, whereas in skills, you just have a dummy that just lays there and does nothing, so it's kind of nice to get the feedback from the… machines because Jake can respond in sim lab. And in sim lab, it's one big scenario but in skills lab it's just little chunks and you don't really get to see the big picture.

According to this student, practicing in simulation was clearly not the same as practicing in skills lab. The context of the simulation scenario provided something for her that the skills lab did not. Congruent with Bernice's view, Kim stated:

> ….. well skills lab you're given straight direction, like we're going to learn about this today. So you go and do it. And simulation is a whole bunch of different things at once which is I guess more realistic.

Students stated repeatedly that they wanted to be able to practice in simulation prior to going into the clinical setting. Carol wanted to be challenged with an acute scenario and be allowed to "figure out what is going on."Alice commented that she thought simulation was "a great learning experience before actually going into the field." Bernice appreciated the skills practice and said that "it's nice to do that before you have a human being." She continued and said that she needed to practice in order for something to make sense to her:

> And so simulation is really important and skills lab is really important. Reading it in a book makes no sense, but if you give me the equipment and let me play with it, I can make sense of it. I just need do something, so I really like sim for that.

Students valued the opportunity to practice their skills in simulation prior to going to the clinical setting. This was valued more than practicing skills in a skills lab, primarily because of the context that simulation provided.

Psychomotor skills were not the only thing that students wanted to practice. Several students said that they found it beneficial to practice their assessment skills while in simulation. Again, the context of simulation was an important factor in their learning. Gertie found that the repeated practice was beneficial:

> […] and I think if you used it even more, it probably would help you more. […] Especially things like breath sounds, it's awesome to have the technology available to show you what you are looking for, or practice how to describe what you're hearing.

Harriet also found the practice in simulation beneficial and indicated that being able to listen to abnormal sounds in a "safe environment" helped with her learning:

> … when we went over the normal sounds versus the abnormal sounds, I believe (the simulation instructor) was saying that they were quite accurate, like the wheeze and the crackles, so I think that was good because the only experience… that I ever heard listening to a wheeze and a crackle was last year in health assessment and that was in one of our videos. So again, getting familiarity with those sounds… again just getting a safer environment to practice in….

Students continued to describe how the practicing they did in simulation affected their experiences in clinical practice. Gertie and Ivan both valued the practice time in simulation and described how this helped them in clinical. Ivan said he benefited from being able to "take it into the hospital" and Gertie had a similar experience:

> When you get to clinical, you know that you've done this part before. You realize that you know this is how to mix the ventolin, this is how you prepare the nebulizer, finding the oxygen…those pieces connect easier because you've done them before.

Harriet continued and said that the reason practice in simulation was beneficial was because it was the "phase" between classroom and clinical:

> I think it helps like it's kinda like the in-between phase. First lecture and then we go into skills, and then there's sim and then there's clinical. So I think it's a nice in between… you get to practice your skills […] And applying it in clinical is also a repetitive action, so that helps too.

Bernice suggests that HFS provides students with a broader opportunity to practice skills than found in the clinical setting:

> I like it. Because it's a valuable experience that you will take to clinical without interrupting like other class time when you need the lecture, and you probably do more things, more skills in the sim lab than you would in a normal clinical day, so it's a wider learning experience.

There is a common idiom that says that practice makes perfect, and students found that practicing their clinical skills in a simulated setting helped with honing these skills before going into the clinical setting.

The result of doing something in simulation was that students believed they were able to "think like a nurse." They prepared for HFS, they practiced in HFS, all to be able to feel more comfortable in an actual practice setting. Students were able to look to each other for guidance and tested their knowledge and skills in simulation, which were additional benefits. With preparation under her belt, Bernice felt she was ready for her simulation experience:

> When they give you the scenario you know to go in and do your assessments and start figuring things out. It was just more useful because you could actually think a little bit like a nurse instead of a student who has no clue of what is going on.

This transition between knowing parts here and there, and putting them together in a simulation setting was important to students.

Bringing everything together helped students think of the nursing care required for "Jake." According to Louise, simulation was "kind of taking into account everything that's going on and making priorities for your care." As students came up with a plan of care, they could then see how the plan worked in a simulation setting and, as Louise stated, "show me where I'm strong in my thinking and where I lagged a little bit." These experiences were helpful to students as they began to make the transition from student to graduate nurse.

It's a Wrap

At the end of each simulation session, students gathered with their instructor to debrief on their experience. These debriefing sessions were confidential and students were encouraged to talk about their thoughts and

feelings about the learning experience, knowing that these discussions would not be part of their formal evaluation or discussed outside of the group. As such, I did not observe the debriefing sessions, rather asked students how they thought the debriefing sessions assisted with their learning in high-fidelity simulation.

Students said that they began by talking about what happened in simulation and discussed things that they might have done differently. Both Louise and Kim said that it was how their sessions were conducted, and Kim added that when debriefing involved two smaller groups coming together to discuss their different experiences, the discussion was richer:

> … we kinda went through what the changes were in the patient and kinda what we did, cause there were two different groups and we could see the differences, like the second group killed him. And we kinda had a little bit of a laugh, but at the same time, understanding why it happened.

Understanding why things happened in simulation was an important aspect of simulation. This was what tied the experience together. Esther found her debriefing session to be similar to her experiences with the post-conference in the clinical setting:

> I think it's a good idea, I mean we have it at the end of every week normally, for clinical, we always have them on Fridays. So when we did sim we debriefed both clinical and sim. I think it helps us identify which areas were helpful and which areas weren't as helpful.

Similarly, Ivan commented:

> I find it helpful, like we get to discuss and then go through your thoughts and feelings for the day, well actually the last two days. Yeah like it give us a chance to raise concerns, like our instructor would point out the

> positive things she'd seen us do, or anything that we need to work on. Like just good constructive feedback, things like that.

Having the opportunity to both give and receive feedback was helpful to student learning and enhanced the simulation experience. Students wanted to discuss their performance as a group, as well as their individual performance. In order to learn, they wanted feedback from the instructor to point them in a direction. Equally as important to them was to be able to provide their own perspective of what happened and to explain why they did what they did. This was illustrated by Louise's comments:

> It's nice to debrief and then if something did go wrong in your sim lab, then you have a chance to tell your instructor too so, if you're going to be evaluated on your performance, then it's kind of nice to have the opportunity to speak for yourself afterwards.

While students were not formally evaluated in simulation at this University, they still use this opportunity to discuss their performance and to learn from the experience. As the students wrap up their simulation experience in the form of a debriefing session, they were able to talk about their preparation, their roles, the opportunities to practice, and to tell the instructor what this all meant to them. They were looking for feedback from their instructor, but they were also able to reflect on their participation in the experience and to self-evaluate their performance.

Summary

The theme of doing something in simulation was an important one for students. This theme pertained to their own personal preparation and performance

in simulation. It was important for students to talk about how preparing for simulation and practicing in simulation provided for a positive learning experience. During a debriefing session, students were able to tie together all of the parts of their simulation experience and to make sense of it as a whole. Each student had different learning needs and came with different backgrounds and experiences. In wrapping up the simulation experience, they were able to individualize the learning that took place and believed it was important learning that they could transfer into the clinical setting.

Concluding Remarks

Narratives of the participants revealed that the entire simulation experience is a balancing act in itself. Students discussed what they believe enhanced or impaired their learning in HFS, and while themes emerged, there often were polarizing ends that were discovered. This was seen in several of the themes.

The role that the instructor played in simulation sets the tone for the experience that the students would have. What the students wanted and what the instructor did were not always congruent. Students wanted the instructor to take a step back and let them work it out on their own. They wanted the instructor to step back, but not too much. Having the instructor available for questions was important for student learning and helped keep the simulation on track. The instructor had to be careful however not to be too involved as students then found that they were no longer engaged and that this was a class like all others. Having

the instructor too involved did not make the best use of the simulation experience. Deciding when to be involved, when to provide assistance, and when to simply step back was a balancing act for instructors.

Students unanimously believed that making mistakes was a learning opportunity that enhanced the simulation experience. In being allowed to make mistakes in an environment with simulated patients, students did not have the same concerns as they did when caring for actual patients. Being able to challenge themselves in terms of their knowledge and skills was valuable to the students and they strongly believed that if they were going to make mistakes, the simulation lab was the place to do it. While all students agreed that they believed that simulation was the place to make mistakes, they also said that this was related to how the individual instructor conducted the simulation. When making mistakes because they were not provided enough information, some students became frustrated and disengaged from the simulation. This was not a positive experience. Conversely, if the instructor planned the experience and assisted the students at key times, any mistakes the students made were seen as legitimate mistakes that assisted with their learning. All mistakes were not treated equally.

Much of what students wanted including, the involvement of the instructor and the ability to learn from mistakes depended on the characteristics of the scenario and how realistic the setting and the mannequin appeared to be. Students were told to treat the simulation experience as they would any other clinical day, and they expected the environment to be as realistic as possible. The

equipment needed to resemble what they would see in the clinical setting, and the mannequin needed to respond to their interventions. Someone needed to be the voice of the mannequin and this meant that someone needed to be paying attention to what was happening. The realism depended heavily on how the instructor participated and prepared for the simulation. If the instructor did not provide students with timely information that reflected changes in the mannequin's status and that compensated for the technical limitations of the mannequin, the students experience tended to be frustrating.

When all the students, instructors, simulation technician and "Jake" were ready, they all needed to be ready to work together for a common goal. In working together in the proverbial sandbox, students identified teamwork as an important part of the experience. They saw immense value in being able to talk to each other and respected each other's opinion. Being able to work together was a key feature of simulation, however there was a limit. Students believed that while they enjoyed working together, if there were too many people involved, students could not participate in satisfying manner. They agreed that they learned in all assigned roles, however if they wanted to be test their skills and knowledge, this was best accomplished through active roles such as the role of the nurse, the documentation nurse or a family member. This was considered to be a clinical day and students wanted to be actually doing something.

Doing something to students meant a variety of things. It included everything from their preparation prior to the beginning of simulation, the

practicing they did during simulation, and the debriefing done at the end of the simulation. They all agreed that without preparation, it would have been difficult to go through the simulation. They wanted to be able to practice their clinical skills, which was not limited to psychomotor skills. They believed that simulation was an opportunity to practice psychomotor skills, to make linkages with theory and to prepare them for their application of theory and skills in the clinical setting. In wrapping up the simulation session, this was their opportunity to talk about their experiences, to get feedback from the instructor, and to explain why they chose to do what they did. Students valued being able to have that discussion.

These concluding remarks provide an overview of what was presented in this chapter. It summarizes the themes that students revealed in my observations, interviews and their reflective journals. This represents the students' perceptions of what happens to student learning in HFS. In the next chapter of this dissertation, the instructors' perceptions and experiences of what happens to student learning in high-fidelity simulation is discussed.

CHAPTER SIX

FINDINGS: THE INSTRUCTORS' EXPERIENCES AND PERCEPTIONS

In this chapter I present the analysis of the instructors' experiences and perceptions of student learning in high-fidelity simulation. The data includes results from individual interviews with two faculty members, as well as the information gathered during two focus groups. The themes that emerged from the data analysis are: Stepping In/Stepping Out, Tricks of the Trade, But How Realistic Is It?, and Instructor Confidence.

In Stepping In/Stepping Out, the instructors talked about their role in simulation and how they either stood back and let the students work on their own, or they stepped in to work with the students. How this affected the student during simulation is described. Instructors often had teaching techniques that they liked to use during simulation and these are discussed in Tricks of the Trade. This section presents the majority of what instructors believed they did that affected students learning in high-fidelity simulation. Realism also emerged as a theme and is explored in the section But How Realistic Is It? Instructors often discussed their own comfort level in teaching with simulation, which is presented in the section Instructor Confidence.

Pseudonyms were used for the individual faculty interviews. The two individuals that were interviewed will be called Rose and Sylvia. As there were a total of 20 focus group participants, they were also given pseudonyms. These are indicated in the Table 4.

Table 4: Instructor participants

Name of Participant (pseudonym)	Category of Participant
Rose	Individual interview
Sylvia	Individual interview
Amy	Focus group
Bev	Focus group
Eve	Focus group
Fay	Focus group
Joy	Focus group
Meg	Focus group
Pam	Focus group
Deb	Focus group
Mia	Focus group
Ava	Focus group
Kate	Focus group
Lily	Focus group
Cora	Focus group
Iris	Focus group
Ruby	Focus group
Jill	Focus group
Tara	Focus group
Jane	Focus group
Sue	Focus group

Stepping In/Stepping Out

As part of regular faculty education, instructors were given the opportunity to attend an education session at the beginning of the term on how to facilitate simulation. One of the strategies presented was to step back and let the students problem solve on their own during the simulation event. As described in Chapter 5, the students perceived that the strategies were interpreted differently among the instructors. Instructors also commented on their involvement during simulation

and why they chose to either let the students ‘dance solo’, or ‘to cut in’ and assist the students during simulation.

Initially, Sylvia stated that before deciding whether to let the students go on their own or to be involved, several factors needed to be taken into account. These factors included the attitudes of the students and the perceptions the instructor had of the student group. Sylvia stated:

> I think there’s a little bit of intuitiveness with the teaching aspect of it. Kinda like having an intuition like, is this a really bright group of students, or is this an enthusiastic get-going kind of student, or are they a little bit more reserved or a bit timid […]. And you do have to factor that in a little bit. And I think that will kind of determine how I go about interacting with them, or the amount of interaction I have with them.

According to Sylvia, it was the personalities of the students that initially determined whether she got involved with the simulation or not. She stated that it was intuitiveness as to whether they needed help or not. For Sylvia, every group was different and there was no one correct way to facilitate the experience. Sometimes she would step in, and sometimes she would step back. In this section, how instructors determined when they believed either strategy was appropriate and how they thought their amount of participation helped the students with their learning in HFS is presented.

The Solo Dance

Many instructors believed that stepping back and letting the students work alone was beneficial to their learning. Others believed that they were supposed to stand completely away from the simulation and let whatever come that may.

Instructors that took a step back discovered that allowing students to work on their own had a variety of consequences. For Rose, this meant that she had to make a conscious effort to step back and found that in some instances her students were not ready for this:

> Umm…it was sort of like the blind leading the blind and I tried, but they say that you're supposed to step back, so that's what I was trying to do, and (the simulation technician) had shown them what they were supposed to be looking at, you know the procedure manuals, on the wall, and they totally ignored […] and this time we did a transfusion reaction, which we hadn't had before. And they didn't clue in at all. It took a long time. […] and the other student was giving them hints and stuff but it just wasn't clicking.

Rose watched as her students struggled throughout the simulation while some students offered clues, the simulation was not successful. Rose continued by stating that there were times during the simulation where she had to "bite her tongue" and that if there was anything she would have done differently during the simulation it would have been to "restrain herself more." Rose believed that stepping back was beneficial to the students' learning in high-fidelity simulation, even when she saw that the students were struggling. This instructor let the students work things out on their own even when it looked like "it isn't clicking."

By contrast Sylvia believed that stepping back was helpful to the students, given certain circumstances. As we saw earlier, Sylvia believed that student attitudes influenced whether she let the students dance solo or not. She also believed that the scheduling of simulation in the term had an impact on whether she was involved or not:

> Whereas even if it's the end, still being fall term, if it's the end of the fall term, I can back off a little bit more because they have had some of that skills, and some of that critical thinking. They've been through that in the clinical area already. Of course if you're in the winter term, they've already had some of that [surgical course] under their belt, they're not so green umm…..I would say that I back off even more at that point. And if it's the end of the winter term, like this last one was, it was right at the end of our rotation, it's just….go for it. And I think they enjoyed it, they appreciated it.

For Sylvia, if the students were further along in their program, she had less involvement with them in simulation. She believed that this was the key factor in determining whether she stood back or not.

When in the issue of when to 'step in' was raised in the focus group, Bev said that while she attempted to step back and let the students work on their own, she needed to provide information to the students as the scenario progressed:

> I think at one point, well they wait on you and I'm always jumping in but saying that I'm going to sit, but then I'm telling them what colour or whatever and they still, they still forget to talk to the patient.

Bev believed that providing any sort of information to the students meant that she was jumping in. Pam also completely 'stood back' in the simulation and said that she received negative comments from her students when she did so:

> I haven't had, this is the first year I've had any kind of negative comments at all about sim lab, but this is the first year where I totally just backed off and just, they felt very disorganized, they didn't understand you know, why couldn't you participate in the group discussion. Umm…and in the previous sim lab, that's usually how I ran it. But this year, I didn't do that. I was told last year to completely back off so that's exactly what I did and it wasn't the same experience as I had previously and this was the first time I have ever had negative comments.

It seemed that some instructors were willing to try new strategies that were considered helpful to students learning, even if they did not agree with the new strategy and their previous approach was successful in the past.

Rose had a different approach when deciding if she was going to step back or not. Rose found that when she was in the practice setting, she was often watching her weaker students and lets the stronger students work more independently. In simulation, she wanted to provide her weaker students with more independence and structured her groups so that her weaker students held roles of responsibility. She then stood back and watched the experience unfold.

> Well, in simulation I have to step back. And I really tried to make that more of an effort this time. And the ones that are more knowledgeable, I kind of had to hold them back because I want my weaker students to be able to step up and move forward and be able to do more. On clinical, I'm all over the place watching them and really watching the ones that are weaker. The stronger ones, there's more knowledge, they are more confident and I can give them a little bit more free reign. In simulation lab, it's really different.

Whether she stood back or not had more to do with her individual students and how she wanted them to learn. She previously remarked that her weaker students struggled when she did this and that while her stronger students tried to help, this was not always successful. Rose based her decision to rationale for 'stand back' on how she believed it affected the students' learning in HFS.

Instructor Stepping In

Just as some instructor had reasons why they stood back, other instructors had reasons for 'stepping in'. Some instructors 'stepped in' to assist with student

learning, some stepped in to teach the students, and others stepped in to manage the group themselves. Whatever the reason, this section discusses why instructors stepped in during the simulation experience.

Earlier, Sylvia stated that she needed to make an effort to step out of the simulation experience and said that it was hard when the students were in simulation early in the term:

> Well, for instance, let's say if it's the first term of the fall term of 3rd year, the students are pretty green, they haven't had, especially if it's at the beginning of it, they haven't had a lot of clinical exposure, and they certainly haven't even gone through skills lab doing IV starts and NG tubes and stuff like that so…I have to be a little bit more hands on and interactive when they um….and talk them through things etcetera and it will tend to take longer.

Sylvia stepped in as it related to psychomotor skill performance. She believed that this was necessary when students were expected to perform a skill yet were not prepared because of the timing of other courses. I noticed that many instructors step in to teach new psychomotor skills during simulation, and the following is an excerpt from my field notes:

> While some students are looking up drug compatibilities, the instructor stops the action and asks the students to look up starting IV's. None have done it before and have not learned it in lab yet. There is a task trainer arm in the sim lab. Students are getting to practice this as the scenario requires the mannequin to have an IV (October 6, 2009).

As Sylvia stated and from what was observed, stepping in can be for various reasons; one of them being to help students with skills they have yet to learn. By

stepping in, the instructor helped the students with content that is part of the simulation activity.

Another reason instructors 'stepped in' was to support and guide the students as they worked through the simulation experience. Sylvia stated:

> Because they need a little bit of extra support to help guide them. I don't try, or I try very hard not to tell them what to do and I don't think I do, umm…but I can at least guide them, offer them some guiding questions, if I put the bug in them, they'll start to think it through, oh yeah, yeah, I should be doing this, yep, I should do this first because the morphine is going to make them nauseated, blah, blah, blah.

Similarly, Jane also 'stepped in' to guide students:

> ….and I don't always get that opportunity on the ward so, if I'm asking them questions whether it's through the microphone or just by being the [instructor] or the physician or whatever, I can see their minds moving as the states are changing and you don't always get that opportunity on the unit. And you can actually stop what's going on and then cue them a little bit and just see if that will help.

She continued by saying that this was why she enjoyed simulation and that while she said that she is "losing clinical time" in order to participate in simulation, given that she believed simulation helped with critical thinking, she continued to say that she "like[s] it for that" and that she would "hate to give that up as part of the experience."

Other instructors 'stepped in' to stop and teach their students. Some stepped in to teach specific psychomotor skills, while others stepped in to optimize the learning experience. Sylvia stated:

> I might kind of do little pauses in the middle and ask a few questions, facilitative questions. Where I don't actually say no, you shouldn't have done this, I say OK, you did this, I want you to think about it for a few minutes. Is there something you could have done differently? Or is there something that you wanted to do before that? So I think I interact more depending on where we're at.

Stepping in to provide cues or prompts to the students during simulation was an experience shared by others instructors as well. Ava said that she would occasionally step in to provide a hint to the students. She explained that if the students seemed to forget something in the scenario, she would "hint to them" by asking "if they are forgetting something" or if "there is something else" that they needed to do. While Ava used hinting to get the students to think about the scenario, Amy used hinting as a way to get the students back on track during the experience:

> And some, I mean they just fool around and they're wasting everybody's time. But yeah, this group, they needed a few hints and even then it was a little....iffy….but you know.

Both of these instructors used hinting as a way to step in and direct the simulation experience. Ava stepped in to provide prompts to the students, while Amy stepped in to direct the student activities during simulation.

Eve said she was "not a comfortable person with silence" and that stepping back was a form of silence to her. She also did not want to step back as she "didn't see how that [could] work." She believed that ultimately the students learned more if she 'stepped in':

> […] and in saying all this, I know it's my nerves, but they've all gone quite well, but what's ended up happening is that I've done a lot of teaching in the lab, and I think to myself, oh well, at least they learned lots of things and they've discussed tons, but I think I talk too much, as you can see as I'm talking now.. […] At the end, and when we get to the debriefing, I don't know what to talk about because at that point, I feel that I've already talked too much. Does that make sense?

In reviewing my field notes, the following was noted when these teaching moments occurred:

> More teaching about chest x-rays. More teaching about fluids and electrolytes. Students standing around in a circle while answering instructor. They are moving from side to side, arms crossed. One goes and finds a chair. (October 13, 2009).

From my observations, it appeared to be like a lecture in a corner of the room and the students found it tiring to stand through this. The students answered when asked but many did not seem to be actively engaged in the experience.

Summary

Stepping in or stepping out is a theme that emerged both from the student and instructor interviews. With the instructors, the solo dance was determined for the most part by the students. While some instructors completely left the students alone, most talked about a time and place when each was appropriate. Stepping back was something that happened when the students had more experience in the clinical setting or when the instructor wanted to see how a particular student would respond to a situation. However, for the majority of instructors, stepping in and stepping out was a sort of dance that they did throughout the entire simulation experience. Just as some stepped out, others stepped in to the point of removing

the students from the mannequin bedside and teaching a class in the simulation centre. Somewhere in the middle was where the majority of the instructors found themselves; stepping in and stepping out as the circumstances necessitated. As Sylvia noted, in the practice setting, you cannot always step back, but in simulation, this was an option for instructors:

> […] in clinical you reach a point where you have to, you *have* to intervene before someone harms the patient. Whereas in simulation lab, I don't have to do that. I can actually let them harm the patient and see the consequences of what they've done.

It is the belief of instructors such as Sylvia, Ava and Jane that having the ability to step in or step out in simulation helped with student learning. It was a dance that was not easy to learn.

Tricks of the Trade

During the interviews and focus groups, participants were asked a similar question. From the interview guide of the individual instructors interview questions; "How do you think your teaching in simulation affects student learning in simulation?" and from the interview guide of the focus group questions; "Do you think that your role or how you conduct a simulation has any effect on student learning during simulation?" Both of these questions yielded large amounts of discussion and instructors described several things that they did during simulation that they believed helped students. Most instructors described what they did even when the question was not asked, and the conversation often turned to what the

instructors did to help students. This was a topic that the instructors were interested in discussing.

Getting Them Ready

Just as students thought it was important to be prepared for simulation, the instructors also saw this as a beneficial way to help students in HFS. As the students indicated in Chapter 5, instructors asked the students to prepare for their simulation just as they would if it were a clinical day. At this institution, students completed a standard form called a Focused Assessment for each patient they were assigned in clinical. The instructors said that they had their students complete one of these as well for their simulation patient. Some examples of items found on this form included information related to pathophysiology of the disease that led to hospitalization, medications, teaching required, and psychosocial issues.

Instructors such as Rose and Sylvia agreed that this was what they had students complete prior to their simulation experience. They also said that that the preparation was key to ensuring that simulation ran smoothly. According to Rose, it made the difference between knowing what to do and having the "blind leading the blind." Rose found it difficult when her students had not prepared for things such as psychomotor skills and then tried using these during simulation. Rose did not step in, and other students tried to provide hints to their peers with minimal success. Rose told her students to prepare for simulation as they would

for clinical, which she said meant to be ready for any skills that the student may encounter.

Similarly, Sylvia told her students to prepare for simulation as they would if it were a clinical day:

> Um..I have them do exactly what I expect them to do as if it were a clinical day. So depending on where they are in the term […] they're still expected to do drug cards, disease entity cards, um….come up with nursing diagnoses and interventions.

Sylvia continued by saying that she checked the students' preparation prior to starting the simulation to ensure that everyone was ready:

> Yes. I check with them and we usually meet half an hour before the sim lab opens up and I check to make sure that the work is done. And I kind of open the door for, if anybody has any questions. And sometimes if I see something that's kind of lacking in the prep work, I kind of address that at that point […] So if this were a real patient, this is the expectation, this is what we can think is going on with the patient, what we might anticipate is going to happen with this patient if interventions aren't taken.

This instructor also later stated that she "makes her expectations very clear" and that it has rarely occurred that her students were not adequately prepared. According to Sylvia, the students were prepared for their simulation experience and she checked their preparedness just as she would prior to going into the clinical setting.

Being prepared for simulation was important to the instructors and most used the same forms for clinical as they do for simulation. The instructors checked this preparation prior to entering the simulation to ensure that the

students were ready for their experience. In general, the instructors believed that the students were ready for their simulation experience prior to beginning it.

The Roles That People Play

In simulation, instructors often put students into different roles from one another. As they had groups of students, the instructors tried to keep them all occupied during the simulation experience. Putting students in roles had consequences and involved more than just picking a name out of a hat. During the focus groups and individual interviews, instructors said that it was a challenge to decide how best to assign roles to the students, and that this decision was based on several factors. In this section I describe the instructors' views about assigning students to roles and how these roles impacted student learning in simulation.

Rose used her assessment of each student's performance when deciding each student's role. She tried to assign the weaker students to the more active roles and the stronger students to the supportive roles such as that of a family member:

> Yeah, I actually had them be the wife of the patient and just ask questions lots, and then you know, so that way my hope is that by asking them all these questions, then the weaker students can think about what they're going to answer and tell what they know and then everybody else can put pieces in and hopefully something clicks.

Rose believed that this enabled students to "help each other out" and that this was her primary reason for structuring groups this way. Rose said that this could be difficult to do depending on when in the term simulation occurred. For example,

if simulation occurred early in the term, she did not yet know her students and was still "trying to figure out my students." So while she had a method to assigning the roles, it could not always be applied.

Iris had similar opinions in that she believed that the timing of the simulation affected how she was going to run the scenario. Unlike Rose, Iris liked having simulation early in the term. Iris found that when she was able to see her students in simulation early in the term, this helped her with what she did with her students subsequently in the clinical setting. Iris said that she was able to see her students in simulation and that this gave her an idea of how they might act in the clinical setting with their patients.

> So you put them on the spot a little bit, like you know, I want you guys to do the Foley, put the NG, like little things skills wise. I was able to see, and I was able to use that in later weeks in real clinical to make sure that they had that exposure because I knew that they were a little bit on the lax there. […] Like if we had it at the beginning, I think that would be great. Cause then you can see them all as a group, and kind of, not make presumptions about how you think they are going to do, but just see who I would like to spend a little more time with.

In my field notes, it was documented that this instructor had all the students in the role of the nurse and did not assign any one particular student to be in charge of the simulation scenario.

> Return from break. Went through feeding tube through IV pump together. Have not started simulation again. Students still trying to get IV going. One student sitting on bed of mannequin. Discussion about feeling uncomfortable when "pump issues" come up in front of client (October 6, 2009).

This continued for the next hour of the simulation experience. Iris preferred early simulation experiences and had all students participate in the scenario. She used the simulation experience as a tool to help her assess her students' skills to inform her about which students she might need to spend more time with in the clinical setting. She did not use her early simulation experiences as learning experiences, rather used simulation as a pre-test to evaluate the skill level of her students.

Jane also liked having simulation early and also had all of her students in the role of the nurse. There was no one particular role that any of them played and she had them all work together and decide for themselves who would be doing what. During the focus group, Jane described the simulation as "an icebreaker" and that when she did this "they got to know each other and how they work together." She believed an early simulation experience "develops their teamwork skills." Similar to Iris, Jane liked having simulation early and did not use simulation for teaching or learning purposes. She used simulation to have the students get to know each other and to begin to work together as a team. In both of these situations, Iris and Jane did not assign roles to the students, rather told the students that everyone was a nurse and that all students were expected to be involved.

Other strategies used to decide on the roles for students in simulation were also demonstrated. In addition to assessing student performance, Rose liked to see how the group interacted with one another and she structured the roles with

this in mind. She monitored student interaction tried to draw in the students who were less involved:

> […] but in simulation there's more, closer contact, so you can tell who's friends with who and that's how you can tell who's standing off to the side….. having it in the middle of the session is a little more helpful for me because then I can hopefully drag them outside of that and get them more into the group .

Rose, Sylvia and Kate also made comments regarding the size of their groups and how this affected how they structured the simulation. They all said that larger groups of six or seven students made it more difficult to keep all students engaged in the simulation. Rose said that with larger groups, she needed to "make sure that they know what's going on and they can jump in" and Sylvia simply found it difficult to "manage six to seven students with one scenario and with one mannequin and to keep switching things up." She continued by saying that she preferred a group of no more than four students and that this allowed her to keep track of her students and keep them all engaged in the simulation.

Kate echoed these sentiments when she described the experience that she had with her group of students:

> Like I had one of my students give me feedback and he said that he felt completely disassociated from the sim lab, he felt he would have much rather, and this was his words, he would have much rather been with a real patient is what he said to me. He said that he just couldn't feel interested, or integrated in that. So I took the feedback from him and said OK. But I think part of the problem is, it was that there were six of them milling around this little pediatric mannequin.

With Kate's group of students, they were unable to actively participate in the scenario and felt "disassociated" from the simulation. The instructors believed that that these feeling had an effect on student learning, and this was something that many tried to attend to when they assigned roles to the group.

In order to accommodate the number of students, some instructors changed the roles of the student mid-way through the scenario. This was seen to be both beneficial and detrimental to student learning, depending on the instructor's focus. Sylvia said that while she changed the roles mid-way through the scenario, the students were not able to follow through with their interventions when she did this:

> […]I think it's also like a process of being able to see something through. Because sometimes when you're switching up the roles, umm…you'll have the student who didn't give the morphine and the gravol, they wouldn't think to ask if it's effective because they weren't the ones who gave it. Right, and we're always talking about evaluating our care.

Ruby also rotated roles during the simulation scenario however she did this at the natural breaks of the simulation. The scenario that Ruby facilitated is the surgical scenario described in Chapter 4, and this scenario included a transition point where the patient returned from the operating room. From my field notes, this transition occurred at what was considered a change of shift:

> Change of shift. Students changing roles. Need to give report to day shift. Students asking if they are all now brand new. Yes, they are new staff coming onto a brand new shift with the post-op patient (October 8, 2009)

This was when Ruby had her students change roles in the simulation. Ruby also commented that she assigned roles so that all of her students were exposed to as

many learning opportunities as possible, and that she often had them work in pairs. She said that one pair would be the primary nurse during the first state and then two new students would be the primary nurse for the second state. She continued this rotation until all states were complete, which was a total of four states for her scenario. Ruby said she does this to enable all students to participate as a primary nurse. Having students work in pairs in their roles was a common practice amongst many instructors. While the students were actually assigned a role, they had another peer to work alongside with them and check their work with each other. Meg did this with her group of students:

> Six was good, I found six was good because everyone has their little buddies. And what I was able to do is take two buddies and break them up so they can work together and they can decide what to do. The only thing that's difficult is that I wanted to watch the skill, the sterile field and all that fun stuff, but I couldn't see the med stuff going on all the time. So I was kinda running back and forth. But yeah, it was good, they normally wouldn't work together, so that was nice that they were able to work as a team and you know, cause it's not always easy not to be with your buddy.

Meg had them work together, and split the role of the nurse up into different skills that were required in the scenario. As she said, this meant that she could not see all that is going on, but expected this to happen. The experience of working together with a peer was what Meg considered important when assigning roles to her group of students.

The instructors all had reasons why they did or did not assigned roles during the simulation experience. For some it depended on the level of the student, for others it depended when in the term the simulation occurred. Some

instructors used role assignments to pre-test their students, and others used it as a way to get students to know each other better. Others use roles as a way to promote teamwork. All of these reasons or tricks of the trade that the instructors used were there to ultimately help students in the clinical setting. Each instructor had their own way to conduct simulation and this was reflected in most of what they do, including assigning roles to students. This will be further discussed in the following chapter.

Practicing Their Skills

Instructors frequently said that they believed that one of the things that they did in simulation that helped with student learning was allow the student to practice their psychomotor skills. Performing psychomotor skills was a part of most simulation experiences and the high fidelity mannequins that were available provided feedback once a skill was performed. Instructors had different ways of incorporating psychomotor skills into the simulation and had different beliefs on what this did for student learning.

Some instructors like Rose had the students attempt to figure out things on their own while in simulation. This meant that if a student needed to perform any psychomotor skills, they were expected to perform this, regardless of their knowledge of the skills. Rose liked to completely stand back from the simulation and watch the students problem solve through the skill:

> Skills yes, especially, we were trying to give blood, and trying to set up the blood, they hooked the first line up OK to the bag, but then decided

> that the second line needed to be that bag too. And they couldn't understand why. And poor [simulation technician], she was busy with the obstetrical (simulator) and she came and back and, what's wrong? So they were showing her and I just had to bite my tongue.

Rose expected her student to learn through the experiences they had and to work through these skills together. She wanted them to recognize that something needed to be done, that they needed to look up the skill, and that they needed to respond quickly to the situation independently. Rose found that this was not done during the simulation experience and subsequently this was discussed at length in the debriefing session. She said that she stressed the importance of using procedure manuals whenever they encountered something they were unfamiliar with. For Rose, it was important to have the students perform psychomotor skills independently during simulation, regardless of whether they were familiar with them or not. She believed that by having the students look up the skill and not having the instructor available to rely upon, that this helped them with their learning in HFS.

Fay also said that she liked to have students perform psychomotor skills that they may not be familiar with, however she believed that it was better for student learning if they were aware of which skills were required of them prior to starting the simulation. The students were responsible for preparing themselves for the skills and Fay suggested that this was not to be expected at the last minute. This was in response to her experiences with simulation in the past:

> I've also gotten feedback where they've said that they're not prepared enough. They don't get told what skills maybe they should brush up on

> and stuff and if they were told that stuff, it would make a big difference on how things flowed for them. And I thought you know, good point because they get very minimal right, about the whole thing. But if they were told read up on IV starts and read up on your Foleys, you know read up on NG tubes and how to insert them, then at least they're prepared.

Fay believed that the simulation experience would flow much better if students were more prepared for the psychomotor skills they were asked to perform. Even if these skills were previously learned in the traditional skills lab, it would still benefit the student to brush up on these if they had not previously performed them, or if it had been a while since they were exposed to the skill. Fay believed that it would benefit student learning to have them aware of what might be required of them before starting the simulation.

This is important for Bev as well. It was noticed during my observations that Bev gave her students a "crash course" in IV starts during the simulation (November 19, 2009). This required her to interrupt the simulation and bring the students over to a task trainer arm to show them how to insert an IV. According to Bev, neither she nor the students found this beneficial:

> Well this time I heard them complaining, well how are we going to start an IV if we've never really done one actually, even in skills lab. That was the big thing. Or I haven't done a Foley or I haven't done an NG you know…

Bev also believed that it would be beneficial to make the students aware of which skills they might be doing so that they could review these and prepare for the simulation experience.

Several instructors including Rose, Eve, Fay and Kate said that they liked to have all of their students practice the skill, even if only one student was

required to perform the skill in simulation. In these situations, the mannequin was used as a task trainer to practice psychomotor skills and these instructors believed that this practice time was beneficial for students. Rose had the following to say:

> […] Because I make them actually start two IV's. And the initial bloodwork and now they have to do a group and match. So they have to come and do it again. So that way everybody gets used to doing it. But they're all, you know, having to search for supplies, and that took them a while, and that kind of stuff.

Eve believed that teaching students skills during simulation was a good use of the time that they had in the simulation centre. She saw this as another way to keep the students involved in simulation:

> I don't mind teaching them all those skills because for me I'm like OK, at least we're using the time, because what if I get through this scenario and they're not interested and it's only been an hour and a half or two hours and they are like ohhhh, and then I get nervous so I think at least if I'm spending that time with them because I love teaching that stuff anyway, you know what I mean. I don't need to think that I'm always watching the clock, I'm not. I don't want to be the group that's done at too short of time because then people think well what have you done with your students.

These instructors all claimed that having the students practice their psychomotor skills in the simulation centre was a good learning experience. If the mannequin needed an IV started, all the students were given the opportunity to start an IV. In these situations, the high fidelity simulator was used as a task trainer for the instructor and their group of students. This was done either because the students were not familiar with the skill or because of the extra time that the group had available to them in the simulation centre. As Kate affirmed:

> With the adult chole, my students, every single one of them got to put an NG in, a couple of them got to do the Foley, we all did IV's on the extra arm […]

This was an important experience that she wanted her students to have. For Kate, having all students practice all of the skills was important to her.

Using simulation for practice was done in various ways for various reasons. While each simulation typically called for performance of psychomotor skills of some kind, some instructors took practicing skills beyond what was asked for in the simulation experience. Some instructors stopped the action and had all students practice the skill, while others believed that practicing skills made better use of their time in simulation. Whatever the means or the reason, these instructors believed that this was helping student learning in high fidelity simulation.

Challenging the Students

In order to create an experience that allowed the student to learn in high fidelity simulation, several instructors said that they liked to challenge the students during the experience. Challenging the students came in many forms. Some instructors increased the level of complexity of the scenario, while others allowed the student to go down a path that may not be the best on to take. Both of these techniques were used to challenge the student during the simulation and help them learn.

When Iris conducted simulation, she said that she often "interjected" as the simulation progressed and that this was in large part due to the differences that she perceived between simulation and clinical. According to Iris, the simulation patients were not as sick as the patients the students encountered in the clinical setting. In order to change this experience, Iris chose the simulation scenario that included a less stable patient and ran this one with her students:

> I have to admit that I didn't go in there with the best attitude, I wasn't sure because, yeah it would be great if we had a nice chole for a surgery, that would be ideal but on our acute units, they are very sick patients, so they've seen it all, so going (to simulation), it's almost like we're stepping back. So that was the first time and I learned from it, and then the second time, I created my, I did my own thing, kind of thing, cause I could just sit there and watch them do the scenario but I'm always interjecting so we turned it all around, we created a septic patient and did it totally different. And that, I really did like it […] so you put them on the spot a little bit […] I was able to see, and I was able to use that in later weeks in real clinical […].

By increasing the complexity of the scenario, not only did Iris enjoy the simulation, but she also found that she was able to use the experience that the students had and related it to the practice setting.

Tara and Jane were two other instructors who found that increasing the complexity of the scenario helped with student learning in simulation. Tara also believed that it was important to have fun as well as be challenged in HFS:

> In my group, they know that this is how they were at the beginning and this is where they can see their own growth. I'm going to sim lab at the very end, the last clinical day, so I want to make it as interesting as possible. Because we're going there, we're going to learn something, and we're also going to have some fun. And they like that part. So we're

> doing a pediatric appy….I always do adult nursing….so it's a challenge for me. And it will be a challenge for them. But they know more about peds than I do, and I want to make it as complex as possible, I want to see if they are going to kill the little pediatric guy. I want it as complex as possible. And I'm just going to stand back and they are going to go and do their thing.

Many instructors laughed at the comment regarding killing the pediatric patient, however the conversation continued surrounding increasing the complexity of the scenarios and other instructors agreed that this was an excellent learning opportunity for their students. As Jane added:

> One thing when you're talking about the complex thing, we did the scenario where we added the shock piece, where he went septic, and that was excellent as it really challenges their thinking. And they're ready for that when they're in this term.

For Jane, the increased complexity of the scenario created a challenging learning environment for the students, and was one that she found helped with student learning.

Providing a challenging learning environment also meant to some instructors that they let the students continue with the simulation even when the instructor could see that it was not progressing to a positive outcome for the patient. As Tara joked about killing the patient, Sue followed this statement and said that the purpose of allowing students to harm the patient was to allow them to see the consequences of their nursing actions:

> I mean, you can, in clinical you reach a point where you have to, you *have* to intervene before someone harms the patient. Whereas in simulation lab, I don't have to do that. I can actually let them harm the patient and see the

> consequences of what they've done. So, so in that aspect, it's a little bit different.

For Sue, these experiences were memorable and affected student learning in simulation. She continued that it was not only the understanding of the consequences that impacted student learning, but also the attachment that students had to 'Jake' and the realization that they were dealing with living beings in the clinical setting with potentially harmful consequences. Sue continued with the following statement:

> […] I mean they realize that it's a simulation, but they still have an emotional attachment that this could have been a real person, and if I were in a real clinical situation, so…….But I think that it's a good thing. Letting them develop their own ideas and their own flow. Cause you can really let them go wild with their critical thinking. So have them think it through, what they think the priorities should be, and then literally through trial and error, they're discovering what works and what doesn't and they're learning by that process.

Mia agreed that this type of experience was helpful to student learning and said that in simulation, there was a sort of safety net that was in place and that student who may not feel comfortable making decisions in clinical were more apt to do so in simulation. In Mia's words, she said that the students "feel like they have that safety net" and that students "particularly those that are not as assertive" felt as though they could do it. Many instructors agreed with Mia and Sue and said that they found this to be a powerful learning experience for most of their students. Sue said that her students told her that while they had fun, when they made a mistake they thought "I'll never do that again." Sue believed that this was an important experience for them to have.

Challenging the students meant letting the students experience a complex scenario and to work through the situation. Complex scenarios do not mean full-code scenarios. The instructors considered complex scenarios something that students were not familiar with or had limited experience with. The instructors believed that these experiences helped with student learning and also made the simulation experiences enjoyable for both them and their students.

Debriefing

At the end of each simulation experience, instructors were provided with a space away from the simulation centre to debrief the student experiences in HFS. Some instructors called this post-conference and compared it to the time that the group spends at the end of the clinical day in the hospital setting. Whatever word they chose to use, the purpose of debriefing was discussed in terms of what this time did for student learning. This section represents that discussion.

Some instructors found that debriefing was an optimal time to compare the simulation experiences to clinical experiences. The instructors facilitated these discussions. Rose pointed out an experience that she had with her students in clinical and how this related to simulation. Her students completed GI bleed scenario and the subsequent week in clinical, some students were assigned to a patient with a GI bleed. Rose described the following example:

> Well, the week before, we had our simulation lab, and then we actually had a patient who just had a GI bleed and had all the treatment and the medications and stuff and was going home. And we did discharge teaching on what to look for and stuff at home and just from them

> researching and all that stuff, they are more knowledgeable in that area. And so, I had to ask them, because we talked about it at post-conference.

Rose continued by saying that in post-conference in clinical, they were able to make the links between what they prepared for and learned from simulation to what the students experienced in the clinical setting. She believed helping the students make these links between clinical and simulation in either the debriefing or post-conference settings helped the students with learning in high-fidelity simulation.

Debriefing time is used in a variety of ways. Amy used it to bring the simulation experience closer to clinical. Amy had the experience of having the mannequin die and she took this opportunity to link it to clinical practice. As she described it "I think it's good because we've had Jake die and they can't believe it. It just blows them back." Amy continued telling the focus group that this was a topic of much discussion in her debriefing session.

Other instructors took the debriefing time to include teaching opportunities that they forewent in the simulation experience. Cora used her debriefing time to teach concepts that were missed during simulation, such as pediatric dosage calculation. She gave the example of a time that this was missed during the simulation and told her students that "if you ever get a ped, you're going to fail…them" and then ensured that all her students were comfortable with this concept before they left for the day. Rather than interrupt the simulation, Cora left this teaching session for the debriefing session. Rose stated that previously she would step in and intervene in the simulation, however now she said that she

likes to step back and let the students work through the scenario themselves. She then brought up problems in debriefing:

> We talk about it (the simulation experience) in post-conference and I really had to stress using the procedure manuals and they didn't do that, and you know, every hospital is different, and if patient's are allergic to what they use, there has to be an alternative, you know that kind of thing. I mean, we talked about it in post-conference, but by then, it was pretty bad. And I said, there's a couple of big things that you guys didn't do, like procedure manual wise and stuff. Especially for the blood transfusion, and connecting the bags, it was pretty bad. And I said you know, these things can affect your performance on clinical, and you have to be able to do this. And they just kinda sat there, and didn't say much.

Rose said that she used the simulation experiences as examples of what they should or should not be doing in clinical. She took the opportunity to discuss these in the debriefing session.

Sylvia also used the debriefing session to discuss the problems experienced in simulation, however used a different approach. She said that she likes to have the students find out for themselves what they did wrong or right. She asked the students "how they thought it (simulation) went and what they could do to improve it." She thought this helped students tie their learning together at the end of simulation.

Debriefing is still a concept that many instructors expressed unfamiliarity with. Instructors such as Sylvia and Joy said that while they were comfortable with post-conference in clinical, debriefing was different as all the students cared for the same patient. As pointed out earlier, many instructors asked the students what went well, what did not go well, and what they would do differently next

time. This came up over and over again. Some tried to tie it to clinical as best as they could while others used the time as a teaching session. In the end, all instructors said that they believed debriefing time was necessary to wrap up what was learned during simulation that day and appreciated being given the time and space to do so.

Summary

Instructors had many examples of what they did in simulation that they believed affected student learning. From putting the students into roles, to the debriefing sessions at the end, instructors perceived these interventions had an impact on how or what the students' learn in HFS. Instructors had different teaching styles and strategies and it was evident that this was an important topic for instructors as the discussions frequently returned to what the instructors liked to do with their students in HFS. The tricks of the trade that have been presented are a reflection of these discussions surrounding what instructors liked to do with their groups of students.

But How Realistic Is It?

Instructors perceived the realism of the simulation experience as having an effect on student learning in HFS. This issue of realism was often discussed either in terms of the mannequin or in terms of the simulation centre environment. This section of the chapter discusses the perceptions and experiences that instructors had regarding realism in the simulation centre.

The Dummy

Instructors told their students to behave as though the mannequin was a real patient. The groups completed a head-to-toe assessment of the mannequin prior to staring the simulation in order to ensure that the students were aware of its features. Some instructors said that even though they did this, their groups of students were still uncertain of what to expect and that this affected what happened in simulation. According to Rose, her students had mixed feelings about the simulator:

> Umm, I guess a lot of mixed feelings. I tell them to prepare like if we were on a regular clinical ward and it's my assignment, and then when we walk in, they're still not sure, and if they've done their skills, you know they're working on a dummy, it doesn't talk back to them and stuff so… I find that I have to get past that, and tell them like, you're role playing and you have to like, put in to get something back, that kind of stuff.

Rose delivered a pep talk to her students before entering the simulation centre to remind them to treat the scenario as realistically as possible. She also said that the reason she did this with her students was because the simulator was not always as life-like as she would like it to be. In Rose's words:

> I guess a little bit more life-like. Like I was given a microphone […] so I'm kinda like moaning and they're kinda looking at me. You know, just different things, but hard to, I don't know how you would make it more life-like than what we're doing already.

Rose was trying to determine how the mannequin could be more life-like as she believed that this had a significant impact on student learning. She continued by saying that she told the students "this dummy arm, it's going to be perfect every

time, you'll get it in there, you'll get flashback, you know the vein is always there." Rose then compared this to what she described as the "real world" and that what the students did in simulation was not exactly as they might find it in the clinical setting.

Amy felt that she also needed to remind the students about the differences they see in clinical compared to their experiences in simulation. Referring to the pediatric simulator, she told the students that the reactions that they saw with the simulator were not necessarily the same as they might see in the clinical setting.

> I've done both scenarios and one group never had kids and didn't know what to do with a kid, so you know they insert a Foley in and I'm like OK fine, do you really think that a kid is just going to lay there. I'm the mother of 5 kids and my kids are, they will fight, and it's getting, so they look at you kind of funny like what's your problem like you know, I know it's a dummy on the bed whether it's an adult or a child but in the real world you're dealing with a human and they are going to react totally different than this dummy.

Amy's experiences had been that her students did not realize how vastly different simulation was from clinical and she believed that it was important to their learning that she pointed out these differences.

Sylvia found that her students believed that what they saw in simulation was so realistic that even when there were problems with technology, the students believed that it was part of the scenario. She said that because of the orientation to the mannequin at the beginning of the simulation experience, her students expected that everything that happens in simulation was what was supposed to be happening. Sylvia said that while she believed that this helped with student

learning, she relayed a humorous situation when the students thought they had done something wrong when in reality, it was a problem with the mannequin:

> Umm…we had a little bit of trouble getting the mannequin to make the urine, which was OK because in our situation he wouldn't be making a whole lot of urine umm…and then he did turn off on his own, and they were scared that they had killed him. But in reality his vital signs were really good […].

Sylvia said that this was a good learning experience for her students as she told them the importance of looking at all parts of the person, not just one thing.

Rose had a similar experience with opposite outcomes. With her simulation experience, she said that her students saw what was happening with the mannequin, however that they did not necessarily believe that this was what was actually occurring. She believed that her students would have picked up on the changes if they would have been in a clinical setting, but with the mannequin, they first had to determine if this was part of the scenario or if this was something that had to do with the technology.

> I think they're just questioning what they're doing. Because if it was a real patient showing all these symptoms, then I think they would be better….understand you know. Rather than a dummy and someone coming in and they're improvising you know whatever.

The mannequin has the ability to talk through a wireless microphone. As noted in my observations and from the field notes, some instructors liked using this feature, while others did not. Jane, Tara and Ruby were instructors who said that using this feature helped with student learning. Jane explained why she used this feature with her group of students.

> I find using that microphone voice thing to be really effective because if they are doing their assessment for instance, and most, or a lot of your assessments should be based on questioning the patient and asking what type of pain they have and are they… and they forget to do that sometimes so I can cue them as or through being Jake or whoever you're being to ask me those questions. Like I might just say you know start groaning and say oh the pain is different now, and they get, well they laugh, so it's kinda a good thing they like, I like that little microphone thing.

Instructors that used the microphone feature of the mannequin said that this was their favourite feature on the mannequin as this was how they were able to stand back but still direct the simulation. According to Ruby, this was what made "the dummy more realistic" and was key to helping students learn in simulation.

Mia found that realism with the mannequin also helped students see things they might not otherwise have had the opportunity to see. Mia provided an example of this:

> And you know, just the different things that Jake can do. Because I mean, there are just a lot of things that we just don't get in medicine. So it's kind of nice to see, like we don't always get to see NG tubes and anything like this, and you don't get to see melena. And here, you know, we get to see melena. And they just about have a fit when they see that. No, I think Jake is really good.

When the students see these things in simulation and then have exposure to the same things in clinical, Rose believed that this was when they will have it "click in" and that this was when the real learning occurs. In Rose's words:

> Well they're not sure on the dummy, you know so it's that uncertainty. And of course, the dummy is not….bleeding out or I put the bed pan under and they're like oh, what's that and like OK, this is kinda what it's supposed to look like but you know, once they've been exposed to it, like

> on a real patient, then it will click in. We had that last term, that happened. Or the week after simulation lab that happened and they were like Oh, OK.

Whether it is melena, a voice coming from the mannequin, or urine being produced, instructors were clear that they believed realism had an effect on student learning. The instructors perceived that the more realistic the scenario, the more likely the students would engage in the simulation. According to Jane "if you as the instructor make him alive, then they're willing to treat him as being alive." The instructors had different opinions on what made the mannequin more realistic or "alive", but ultimately the majority of them tried to make the experience as realistic as possible, whatever way they knew how to do this. The participants talked about making the mannequin more realistic and none made comments about any perceived lack of realism with the mannequin.

The Environment

In addition to the mannequin, instructors stated that it was equally important that the environment be realistic as well. Their experiences were such that when the environment was not realistic, or when the environment interfered with the simulation, this had an effect on student learning in high fidelity simulation.

According to several instructors, there were detractors from student learning that were related to the simulation environment. When asked what their ideal simulation experience might look like, Rose began with saying that she would like to somehow hide the simulation operator that was in the room. In her

experiences, she believed that the presence of the simulation operator in the room affected student learning:

> Yeah, because they're looking oh now she's going to change something. But if they see her coming, because when we come in, we do the initial, the initial breath sounds and bowel sounds and she works at the computer so they figure that she's going to be doing this all the time….

Rose believed that the students assumed that the simulation operator would be changing sounds often or every time she approached the computer. She surmised that the students were distracted by the operator and that they were only responding to her actions when she went to the computer. Rose was the only instructor who said that this was an issue for her student groups.

Other instructors had different experiences regarding the environment in simulation. Sylvia's perception was that the external environment was noisy at times that this detracted from their learning. She found that they were unable to do what was asked of them and that she needed to confirm with the students that what they were doing was correct. Sylvia provided the following example:

> Like when they do the blood pressures and they get a lower reading and because it's hard with the dummy, they have to wait for the machine (compressor) to end, and also they're not sure so I have to go to my notes, and OK, well actually this is what it is you know, but you're close.

Listening to blood pressures while waiting for a compressor to turn off was a problem for Sylvia. This issue also came up during the focus group discussion. As the instructors talked about the noise level in the room during simulation, Amy relayed her experience of when she was alone in the simulation centre. Amy

believed that it was too quiet for her group and that this had an effect on student learning:

> I try to tell them you know, that this could be a live situation and you have to be able to think on your feet, that sort of thing. But when it's quiet, it's more of a university setting, a school setting. It's not really the same, when there's lots of noise and bustle and stuff, that kind of thing. I don't know, piped in noise, I don't know, to make it more real.

Amy continued by comparing the noise that they heard in the simulation lab to that which was experienced in the hospital setting. She believed that the noise in the simulation environment added to the realism and that when it was too quiet, she found it to be more of a school setting than a clinical setting. The noise was an important feature of simulation for Amy.

Following along on the topic of having noise in the simulation environment, noise could also come from the other simulation groups that were also present at the same time. For instructors, this also had an effect on the simulation experience. Sylvia did not mind sharing resources, but found that space and noise was an issue at times:

> Umm..well when you do have other groups in there, it can get a little tight so umm..I mean it's not a problem sharing equipment and the drug cart, that's real life. You're always going to be sharing with others. But it would be just kinda nice if there was more of a division you know, instead of just curtains.

This instructor wanted a room to herself when she conducted a simulation experience with her students.

Instructors wanted a realistic environment, including realistic moulage. Moulage is the term used to describe the art of applying mock injuries to the mannequins. Lily talked about the moulage she used when she conducted her GI bleed simulation with her students. She liked having the visuals of moulage but believed that there were pieces missing to make it realistic:

> And we did the GI bleed and I was so busy because I had two groups and they were both doing different things and while they were all turned away I stuck in the melena pan and you know, put the blankets the way they were before and then they come back and I'm like oohhh, what's that smell and they're like looking at me like I'm some… not really all there and I kept saying it and looking, and then they were doing something and one of the girls pulled the covers back and OK, fine, and then put the cover back, and then they looked, and she pulled the cover back again, and she's all ohh, what's that. And then they lifted up the pan and went oooohhhhh, and I said well that's melena but there's no smell attached to it. You know, there's none of the other effects that you would get from a normal ward.

Lily found that the more realistic that she could make things in simulation, the more engaged she believed her students were. For her, the realism of the environment was just as important as the realism of the mannequin.

Bev agreed that a realistic environment was important in simulation. She believed that having a realistic environment helped the student engage with the simulation experience. She wanted the entire space to be as realistic as possible:

> Could we not set it up in such a way that I don't know which unit, but even if it was a spare room and we could have like a mock in there, you know and they would actually literally have to go to the desk to get something, or call someone, almost like a real scenario. Because this way then they would have to know that we're in the real place. I think being in

> the lab gives them kind of a different sense you know, of reality kind of thing.

According to Bev, when the environment was not realistic, it looked too much like a traditional skills lab and she found that her students did not engage as meaningfully as she would have liked them to.

Realism included the environment as well as the mannequin. For most instructors, this meant doing whatever they could to create an environment that resembled a hospital setting. The instructors talked about noise levels, about moulage, and about the physical space itself, including the simulation operator who worked in the space. These instructors believed that realism of the environment had an effect on the learning that occurred in the simulation centre. There were limits with what the instructors could do, such as moving or creating walls, but many had an imagination that helped them create a realistic environment in which their students could learn.

Instructor Confidence

Instructors who participated in the interviews and focus groups made mention of how they felt as they facilitated simulation with their students. During the focus group interviews, the opening question that was put forward to them was "what is it like for you to participate in a simulation activity with nursing students?" The question elicited responses ranging from feeling nervous or anxious, to feeling comfortable. This section of the chapter is dedicated to the

discussion of how instructors felt during simulation and how they believed this was related to student learning in high-fidelity simulation.

I'm Nervous In There

At this institution, instructors were not given the option to participate in simulation. Each clinical group in 3rd year was assigned one day during the term to participate in simulation. Some instructors were enthusiastic about this experience while others were not. While it had been over 5 years since simulation was implemented in clinical at this institution, due to clinical instructor turnover, many instructors were still new to using this teaching tool. The experience of teaching with simulation had an impact on many instructors. For Kate, it was an experience that she "dreads" having:

> I'm very nervous with sim lab. And um, I'm more nervous about that than any other thing in teaching. I think it's just because it's my second year teaching, but um, but I think I over… I take it very seriously. So I don't really relax during the whole thing. So for me, it's something that I really actually kind of dread.

Kate continued by saying that she did not like silence and that when she stepped back, she felt that there was too much silence. She then stepped in and began to teach the students and talk to them throughout the simulation. She believed that if they were silent and there was no activity, it was her responsibility to ensure that something happened. She also said that she felt that they had "at least learned lot of things" when she taught them directly in a didactic fashion and that this was a better use of her simulation time. Kate was uncomfortable and nervous during her simulation experience, and this nervousness led her to directly teach during

simulation. She believed that this made her more comfortable and increased student learning at the same time.

Kate's dread of teaching in simulation was beyond a simple nervousness of doing something new. Kate specifically said that she did not believe that she was qualified to teach in a simulation environment:

> Having only done it twice, before I even walked in the second time, the whole car ride down here, I was thinking why do I have to do this? Why can't the skills people do this? I don't know this, I'm not qualified. I don't know the mannequin, I'm going to ruin it, I'm going to break it.

This feeling of being unqualified to teach simulation was strong for Kate and she did not believe that she was the best person to be taking her students into their simulation experience. Jane echoed this sentiment. Kate felt qualified to teach in the clinical setting but felt that simulation was something different and that the "skills people" were in a better position to teach this. Both Kate and Jane used the word "unqualified" when speaking about facilitating in simulation. This was more than nervousness of doing something different. These were feelings of inadequacy.

Eve also commented that she felt uncertain with what she should be doing in simulation. She acknowledged that she was provided with resources, however felt uncertain with what she should be doing with them, especially when the scenario was not from an area that she is comfortable with:

> I don't know, I think there's these questions you have, we have our scenario given to us and then we have those questions because, you know when I read through them, I'm not sure, do we have to ask every single

> one of those questions? Well I try to, but I found myself reading a bit, especially when, because peds is not my area of strength either […] I felt that I was talking too much and I was worried that I was boring them, but then on the other hand I found that if I just let them go, they would just stand there and look at me. So then I know that I have to step back more perhaps for the next one and maybe I can see which one goes better.

Eve was uncertain of what she should be doing, and so she used the resources that were given to her. She used the suggested cueing questions by going through the list of questions with the students and felt that perhaps this was not the best method as she believed that it did not engage the students and that they looked bored during the simulation.

Others instructors also felt uncomfortable in simulation and found that using resources helped them feel more comfortable. While Eve used the written cues and prompts that were provided, Bev used the simulation operator as a resource to manage her discomfort. In doing this, Bev experienced the simulation activity differently than Eve:

> I found this time actually I enjoyed this sim lab (more than) last time. I don't know what was so different about it. Maybe I got more help too from (sim lab operator) and I kind of felt like I wasn't just there kind of doing the whole thing myself. And I think that might have helped a little bit. Because she was there and she went over things with them before, you know and that really took a lot of pressure off me in the sense that I felt at first, like I'm the one who has to run this thing you know, so…..maybe that's why it was different.

Using the simulation operator to assist her with the simulation experience provided Bev with additional support and allowed her to feel more comfortable as she facilitated the experience.

Jane described a comfort zone that she had in facilitating in the simulation environment. She talked about her experience of facilitating a pediatric scenario when her clinical expertise was in adult nursing. In the third year of this nursing program, adult and pediatric nursing was combined in either the surgical or medical nursing course. Both the students and clinical instructors knew that either scenario was a possibility for their simulation experience. The result was that there were approximately 3 out of 10 groups that may have a pediatric simulation scenario while in an adult clinical setting. Instructors such as Jane and Eve who facilitated pediatric simulation experiences without the clinical expertise said that they believe "the students know more than they do" with regards to what should happen. This created a feeling that they are "outside of their comfort zone." Jane described her feelings:

> I didn't really know where we were going. So I felt a bit lost in doing it and I know that it could have went smoother from my part, like how I delivered my teaching during that period […] I just like to refine it a bit more and know where I'm going so I can think about it before, what I want to ask…

Jane continued and spoke specifically about facilitating a pediatric scenario:

> But maybe part of that is too, because he's out of my comfort zone like I have no idea how to calculate those meds, or the port or whatever, I get them to teach it to me and I'm looking at my sheet and I'm trying to figure it out but I really don't know how to do that, like I would need to be orientated.

This opened the discussion for other instructors who had also facilitated the pediatric scenario. Most agreed that this created a sense of uneasiness for them. Jane believed that she may need to go to the skills lab and have the instructors

there explain things like pediatric medication administration. The instructors' perceptions were that if they were presented with a scenario that they were unfamiliar with, that this was outside of their comfort zone and that they were not qualified to facilitate the experience.

Teaching in simulation was a new experience for several clinical instructors. Many had a sense of uneasiness or apprehension when confronted with something new. Combine this feeling with the possibility of facilitating a scenario that was from a practice area that they were unfamiliar with, and some instructors felt that they were simply unqualified to facilitate the simulation experience. They believed they were either boring the students or felt that they were not "smooth" throughout the experience. Using the supports and resources that were available to them helped some instructors, however the feelings of nervousness were still there. The instructors' perceptions of their abilities to facilitate in simulation can have an effect on student learning in simulation.

It's Not So Bad

The confidence level of instructors as they facilitated the simulation experience ranged from feelings of dread to feeling comfortable in the simulation centre. Few instructors said that they were comfortable in simulation. Some instructors like Fay saw value in simulation, however still were uncertain as to where they fit in the whole experience. During the focus groups, instructors frequently said that they saw value in simulation, however that they did not always believe that they were the best people to facilitate this. Some instructors

like Sylvia believed that facilitating in simulation was a learning experience and that she got better with each experience she had. Sylvia believed that preparation was the key to her comfort in simulation:

> Umm…no. I think it is each time that I go through it, it becomes a little bit easier because I keep my notes from the last time. And I frequently write notes about what worked, what didn't work, what I might want to do in the future. So that actually tends to be, it's almost a calming thing when you're feeling more prepared. As opposed to a couple of times when I did it where I felt like I was out in left field.

Other instructors agreed that when they were prepared and knew how they would like to see the scenario progress, they were comfortable in simulation and could ad lib throughout the experience. Mia described an experience that she had with her students:

> Sometimes I like to ad lib so it's not so dry. To make them realize that there's other things you know, you could be looking at. Like Jake doesn't have hives, so when we did the blood transfusion, my last group I was going, oh my god, what's on his skin! I'd be like sitting back and they're like, looking like I'm strange, but I'm like, we've just given blood, now he's got bumps all over him, why?

Improvising during simulation was not typically something that an instructor did when they were uncomfortable or unfamiliar with a scenario. Mia had facilitated this scenario several times in the past and her experience allowed her to feel comfortable with what she did.

Using the resources available to them was also helpful for many instructors. During the focus groups, many said that when they communicated with the simulation operator prior to the simulation experience, that this made the

experience better for both the instructor and the students. Sue summarized her experience and said that when she and the simulation operator worked together, that they each knew how to behave in simulation. She said that her experience was smooth and that the students were able to follow the cues and prompts they were given.

Significantly fewer instructors said that they felt comfortable facilitating simulation. The instructors that did say they felt comfortable were those who facilitated scenarios from clinical areas they practiced in and had multiple previous experiences with the scenario. Using the simulation operator also increased the comfort level of the instructors. Instructors believed that when they felt comfortable with the simulation, that this improved the experience for all involved.

Concluding Remarks

The instructors' perceptions of the simulation experience and what happens to student learning in that experience are varied. The instructors believed that their involvement during simulation had an effect on student learning. Similar to learning the steps to a dance, the instructors needed to determine when they should let the students dance solo, or if they needed a partner to guide them. The instructors believed that this depended on the level of the student and their own beliefs about what should be their role in HFS.

Being able to talk about what they do in simulation was a highlight for many instructors. During the discussion groups, many of them took the opportunity to speak with their colleagues and talked about what they did in simulation and what they thought this did for the students' learning in high-fidelity simulation. These discussions yielded much data, and the tricks of the trade that they employed were many.

Instructors essentially perceived their comfort level as being a predictor of how interesting they could make the simulation event for the students. It was their perception that it was the instructor that set the tone for learning in the simulation environment and that when they were not comfortable with the scenario, there was an effect on the learning of the students.

The instructors' perceptions of what happens to students' learning in simulation is viewed as being affected by the items discussed above. As we begin to see, there are similarities and differences between students and instructors perceptions. This is further explored in the discussion chapter that follows.

CHAPTER SEVEN

DISCUSSION

The instructors' and students' perceptions of what happens to student learning in simulation have been presented in Chapters 5 and 6. In this chapter, these results are discussed in terms of previous literature, the implications for teaching and learning in the simulation experience, and how simulation design links to student learning in HFS. The discussion is organized by the research questions posed at the beginning of this study. Recommendations related to the experiences of students and faculty in HFS are presented, and opportunities for future research in the area of teaching and learning in HFS is discussed. The limitations of this study are addressed and the chapter concludes with final thoughts regarding the study.

Many themes arose from the data collected through interviews, focus groups and observations. These themes were initially separated into student perceptions and instructor perceptions however it is now evident that there is much that is similar between the two perspectives. The themes are similar regarding what happens to student learning in HFS, however there are differing perspectives about the impact of HFS on learning. For example, each group considers that working together is important, however the instructors believe that it contributes to the development of skills needed for teamwork, while the students believe it provides them with additional resources to draw from. These instances are explored and made more explicit in this chapter.

The research questions are answered throughout the discussion that ensues. Each question that is answered consists of the themes that were included in Chapters 5 and 6 and often includes the combined perspectives of the students and instructors. As several themes were related to more than one research question they are discussed in more than one section of the chapter. Each section ends with a brief summary.

Research Questions

The purpose of this study was to add to our knowledge and understanding about the use of high-fidelity simulation (HFS) in nursing education. The specific aim of the study was to explore the values and beliefs about HFS in a sample of students and faculty in an undergraduate nursing program and to address the following research questions that were initially stated in Chapter 1. For ease, these are restated here.

1. What are students and instructors' views of the use of HFS on student learning?
2. What is it like to engage in simulated clinical experiences as a student?
3. What is it like to engage in simulated clinical experiences as an instructor?
4. What factors either enhance or impair the simulated clinical experience?

The following sections provide a discussion of the question followed by a summary. The discussion arose from the themes that emerged from the research data.

Students and Instructors' Views of the Use of HFS on Student Learning

Participants identified several themes that related to student learning in HFS. Primarily the themes of working together in HFS and making mistakes in HFS were considered to relate closely to student learning. While students and instructors had differing perspectives on how HFS affected student learning, they both indicated that they were strongly linked to student learning and are further discussed below.

Working Together and Making Mistakes

In this study, participants frequently referred to the learning that took place when they worked together. Working together for these students meant that they were able to talk to each other during HFS, thus increasing their ability to problem solve. Students found working together to be of significant value as they engaged in simulation activities. The instructors did not directly comment on this aspect of teamwork, rather they referred to the ability of students to "help each other out" as a consequence of the roles that were assigned to them. Both groups however, generally expressed that working together has positive effects on student learning in HFS.

It has also been found in other studies that working together had a positive influence on student learning in HFS. Multiple studies indicate that HFS enhances teamwork skills (Kaddoura, 2010; Kuehster & Hall, 2010; Robertson, Kaplan, Atallah, Higgins, Lewitt & Ander, 2010; Siassakos, Bristowe, Draycott,

Angouri, Hambly, Winter, Crofts, Hunt & Fox, 2011a) and several others link the teamwork skills developed in HFS to improved patient outcomes (Capella, Smith, Philp, Putman, Gilbert, Fry, Harvey, Wright, Henderson, Baker, Ranson & ReMine, 2010; Siassakos, Fox, Crofts, Hunt, Winter & Draycott, 2011b). Different from my findings, Garrett, MacPhee and Jackson (2010) found that students least appreciated teamwork aspects in HFS. In their study, students said that they would have preferred working alone and that it felt awkward communicating with each other in their group of four. While students in my study commented on their dislike of role-playing in teams, they overwhelmingly stated that they preferred working with other students in simulation.

Siassakos et al. (2011a) conducted a cross-sectional analysis of data from a large randomized-controlled trial to evaluate training in obstetrical emergencies. They found a positive correlation between strengthened teamwork skills and working with others in HFS. Siassakos et al. (2011a) called them generic teamwork skills and suggested that additional work needed to be done to uncover the specific behavioural characteristics of clinical teams. This definition of teamwork is dissimilar from that in my study. My student participants referred to teamwork as the ability to ask group members questions, and to help each other. They did not describe teamwork in the traditional sense of working together towards a common goal. This is an important differentiation to make as the studies listed above refer to teamwork as working together in teams towards a common goal with each individual having a role to play in achieving that goal. Although student participants did not use the term “collaborative learning,” this

term is similar to what the students describe and offers an interesting avenue for further exploration.

Collaborative learning has not been studied in HFS to the same degree as teamwork skills in HFS. Several studies have been conducted in the area of collaborative learning and online education (Kourdioukova, Verstraete & Valcke, 2011; Oetjen & Oetjen, 2008; Wilson & Fairchild, 2011) and others who looked at the concept of collaboration between disciplines in simulation (Baker, Pulling, McGraw, Dagnone, Hopkins-Rosseel & Medves, 2008; Reese, Jeffries & Engum, 2010). Few studies have been conducted in the area of collaborative learning among nursing students in simulation. Lasater (2007a) explored student cognitive changes as a result of participating in HFS and did not report any findings directly associated with student learning other than to state that learning that occurs in HFS is highly subjective. In an article by Parker and Myrick (2010), there is discussion of transformative learning in HFS, and in Parker's unpublished doctoral dissertation (2011) he continues this discussion by exploring the potential of HFS to promote transformative learning in nursing students. According to Parker (2011), understanding and attending to transformative learning in HFS has the potential to allow the creation of simulation experiences that maximize the social interactions and clinical reasoning that occurs in HFS. Collaborative learning and transformative learning can be supported in HFS if these learning theories are consciously included in both the design and facilitation of the simulation activity. Students in my study indicate that they value the collaboration that occurs in HFS and it is reasonable to suggest that collaborative

learning is occurring in HFS. Transformative learning is ideally supported in the debriefing process (Parker, 2011), and while the debriefing process was not included in my study, transformative learning is also promoted through feedback (Leigh & Hurst, 2008). Students in my study value the feedback they receive from their peers and from the clinical instructor. Collaborative learning includes not only discovering what they should do next in the scenario, but also to learn the subtle, unwritten rules of clinical practice (Roberts, 2009; 2010). Students learn from, with and through each other in HFS. I believe that instructors need to foster this learning to maximize the impact of HFS on learning.

In addition to benefitting from working with their peers, students in this study stated that learning from their mistakes was a key benefit of HFS. Students like to see what can happen to a patient when their decisions or actions are implemented (Garrett et al., 2010). In real health care settings there are often negative consequences to patients that result from making mistakes. Having the opportunity to practice without the fear of making mistakes is something that students' valued. The opportunity to provide experiences with no possibility of adverse patient outcomes was also attractive to instructors. Learning from these mistakes ideally means that the mistakes that are made in HFS are not repeated in the clinical setting with actual patients.

Students indicated that learning from each other's mistakes and making their own mistakes in HFS promoted their learning. They felt safe in simulation as there were no actual patients who could be harmed by their mistakes. In a

thematic analysis conducted using focus groups with 28 medical students, Paskins & Peile (2010) obtained similar findings. They found that students in all four of their focus groups described the environment as safe, mainly because they could do no harm to the patient. Safe exploration is a vital aspect of critical thinking development (Kaddoura, 2010; Bransford, Brown & Cocking, 2000) however the term 'safe' should be defined. I do not agree that simulation is always 'safe' for the students for similar reasons as those expressed by Oberleitner, Broussard & Bourque (2011). As these authors have reported, strong feelings and emotions can be triggered in students by simulation events, and instructors need to be aware of this possibility and respond accordingly. Generally, it is understood that 'safe' means that it is safe for patients in that no actual patients are involved as the students explore the possibilities of their care. During this exploration, it is very possible that errors will be made, and according to Tanner (2006), a nurse will often improve his or her clinical-reasoning skills after an error in clinical judgment, at which time the nurse analyzes the problem. In addition to allowing the students to make mistakes, there should be opportunity to analyze these errors and to learn from them. Analysis of errors is often done in the form of a debriefing session.

Learning from mistakes in HFS is not a new finding (McCaughey & Traynor, 2010) however given the growing body of literature within higher education which suggests that students are able to use the experience of others to learn (Roberts, 2009; Nehls, 1995), the impact on learning that results from working together and making mistakes during HFS should be further explored.

Summary

Students and instructors who participated in this study viewed HFS as a tool to assist with student learning and to prepare them for the clinical area. The simulation centre is an environment where students can explore various options without fear of harming the patient. It is also an environment where they can learn from each other's actions and decisions, and use each other to problem solve through the HFS activities. In general HFS provides students with an environment that assists with learning through participation, collaboration, and exploration without harm to actual patients.

What It Is Like to Engage in Simulated Clinical Experiences as a Student

Students who participated in this study provided many comments regarding what it was like for them to engage in HFS. The comments ranged from expressing feelings of being prepared for the simulation activity to feelings of frustration when the scenario did not progress in a particular way. These feelings were often related to the amount of involvement the instructor had with the students as they participated in HFS. Students also talked about feeling less "pressure" during simulation. As discussed in the previous section, the ability to make mistakes in HFS was also mentioned when participants were asked what it is like to engage in a simulated clinical experience, and these comments are briefly addressed in this section as well.

Preparation for Simulation and Practice

Instructors and students alike indicated that preparation for HFS should be the same as for clinical practice. Instructors stated that they provide students with information that they would typically have access to when preparing for clinical, and students said that they prepared for HFS by using the same tools as they do in clinical practice. Both groups stated that they believed that being prepared for HFS ensured that students were ready for the simulation experience. Students talked about not only what they prepared for, but also what they did not prepare for and the effect this had on their learning. For example, most did not specifically prepare for the psychomotor skills that were required in the simulation experience, and as such, did not always feel adequately prepared. The interesting aspect of this lack of preparation is that students and instructors alike indicated that being able to practice psychomotor skills during simulation was important, although for different reasons. The preparation or lack of preparation, as well as the effect that this had on the simulated clinical experience is discussed in this section. The importance of practice from the perspective of both students and instructors, as well as the relationship of practice to learning is also considered in the context of what it is like for students in simulation.

The students in this study believed that being prepared for the HFS had a positive effect on their ability to participate in the simulation experience. They discussed how being prepared for the experience allowed them to think through the scenario and to look up disease etiology and pathophysiology ahead of time.

In being prepared, students could also anticipate what they might expect in terms of treatment. At no point did the students say that this led to predictability of the scenario, as suggested by instructors during the focus group interviews. Both the instructors and students said that expectations for HFS should be similar to expectations in clinical, and given that they prepare for clinical, they should equally prepare for HFS.

As previously stated, students said they were not prepared for the psychomotor skills required in the scenario. At the university where this study was conducted, HFS occurred concurrently with the skills course and clinical placements, and this meant that conceivably students could encounter skills in HFS that they had not yet learned in their skills course or in the clinical areas. Students discussed feelings of not being comfortable with their skills in HFS and that when they felt that they were not prepared, it negatively affected their ability to participate in simulation.

I could not locate any study that specifically addressed the amount of preparation students have prior to engaging in HFS and how this affects student learning. Most simulation experiences that are conducted with nursing students provide background information regarding the scenario that will be used in HFS (Bremner, Aduddell, Bennett & VanGeest, 2006; Gibbons, Adamo, Padden, Ricciardi, Graziano, Levine & Hawkins, 2002; Radhakrishnan, Roche & Cunningham, 2007). The majority of studies where participants did not have previous awareness of the simulation scenario are primarily in the area of

emergency care, in clinical performance evaluation, or with post-licensure practitioners. (Clark, 2006; Curran et al., 2004; Leflore et al., 2007; Voll, 2007). This is important to note as most nursing students who participate in simulation activities have limited amounts of health care experience, and therefore are less able to effectively participate in simulation without having some background on the scenario. While not explicit in most of the studies that were found, at the university where this study was conducted, simulation was used as a teaching and learning experience, and not to evaluate the performance of students. The purpose of the simulation should be considered when deciding whether to provide background information to students prior to the simulation event. Having some background assists students in planning care for their simulation mannequin. As novice practitioners, students tend to approach tasks without organizing information, and often miss relevant cues and focus on superficial features of a situation (Garrett et al., 2010). In providing some background and requiring students to prepare for simulation, promotes students reflection on all aspects of care. Preparation requires the student to organize their care, and think about assessments and interventions early. Knowing how students typically approach tasks, and given that the findings of this study revealed how important the tasks and skills are to students, students should be advised to prepare for the skills found in the simulation scenario. Being prepared for the skills would mean less time focused on learning the skills in HFS. This may help students focus more holistically on all aspects of care and not solely on the skills.

Instructors in this study believed that practicing skills was important to students, and from observations made during the HFS, it appeared that at times, instructors also focused on skills during HFS. Psychomotor skills are familiar and comfortable to instructors compared to other aspects of HFS. In the absence of knowing what to do with students in simulation, instructors tended to default to psychomotor skills. The students also wanted to focus on psychomotor skills when they were unsure of what to do in HFS. However that focus could mean that they were not looking at the bigger context or what else they might be able to do. When this occurred students were using the high-fidelity mannequins as task trainers.

Proficiency of skills does not make the student a competent practitioner in a simulated experience. Students enjoy practicing skills but a key feature of high-fidelity simulators is their ability to mimic life-like vital signs and other physiological features. It is remiss to opt out of using these features and focus only on the psychomotor skills. In a quasi-experimental pilot study that included 15 nursing students and looked at determining the relationship between nursing student's clinical ability to prioritize their actions and the associated cognitions and physiologic outcomes of care using HFS, the researchers found that students who perform well on procedural tasks are not necessarily students who would excel in scenarios requiring one to make complex decisions while prioritizing the care required to stabilize an acutely ill patient (Hauber et al., 2010). If a goal of HFS is to provide students with opportunities to develop clinical reasoning skills, instructors need to provide enough information to prepare the student for the

simulation experience and to refrain from focusing on the psychomotor skills in isolation of other assessments of interventions. Roberts and Greene (2011) came to similar conclusions and note that while HFS provides an opportunity to practice psychomotor skills, the use of mannequins goes beyond practicing these skills and can demonstrate the therapeutic value of nursing. For example, when the student speaks to the simulated patient in a calming manner or uses therapeutic touch, blood pressure and heart rate can be shown to decrease through the monitor (Roberts & Greene, 2011). Promoting clinical reasoning involves the whole mannequin and the features that are available. It is understood that facilitating in HFS may not be an area of comfort for instructors, however if the goal is to assist students to learn clinical reasoning and to become safe, competent practitioners, attention to psychomotor skills alone will not achieve this goal. Instructors need to refrain from focusing on behaviours related to the reinforcement of skills if they wish the students to change their focus in simulation (Kaakinen & Arwood, 2009). Changing the focus of HFS was difficult for some of the instructors in my study.

Students in this study said that they felt less “pressure” when they were in HFS. The stress that is commonplace in the clinical setting was removed. Students were better able to think about what they were doing or would like to do when they knew that no harm would come from their actions. The statements that the students’ made in this study are congruent with what other studies have found. In a multi-site study in which student viewpoints about simulation were examined, the findings showed that students felt that they could make mistakes

without fear of harming someone and that they were more comfortable in the clinical setting because of the simulated experience (Baxter, Akhtar-Danesh, Valaitis, Stanyon & Sproul, 2009). In a pre and post-test study with 112 medical students that addressed student learning in large groups in simulation, Heitz, Brown, Johnson & Fitch (2009) found that the simulation environment allowed students to experience the stress and responsibility of acute care without risk to the patients or themselves. Students still experience stress in HFS however they have less fear of making mistakes in HFS compared to the clinical setting. The decreased fear is attributed to decreased feelings of pressure while in HFS. Childs and Sepples (2006) and Reilly and Spratt (2006) found that the stressful experiences were the ones that students learned the most from. Outside of the realms of this study, it would be interesting to see if mistakes that are made in the clinical setting are the same as those that are made in HFS, and what differences might be attributed to these errors.

With regards to instructor involvement in HFS, most students want the instructor to be involved only when they appear to be struggling in simulation. They do not want the instructor constantly present in the HFS activity providing a didactic lecture on what is happening with the scenario. While most students indicate a preference for the level of involvement of the instructor, it is truly variable. The level of involvement ranged from having the experience considered to be either a waste of time and boring, to exciting or interactive. When students enter the simulation centre with their instructor, they look for direction however also look for learning opportunities. Students want to explore their environment

and look to the instructor to facilitate this. When it does not happen or happens at the wrong time, or even at the perceived wrong time, the experience is not a positive one. That is what it is like for students in HFS with regards to the instructor involvement.

In a pilot evaluation study addressing evidence-based learning approaches with thirty nursing students by Garrett et al. (2010), a similar theme regarding the level of involvement of instructors in HFS arose. According to their research, students indicate that they value clear-cut learning goals, basic preparation and orientation, and minimal faculty intervention during the scenarios. Roberts and Greene (2011) state that the role of the faculty members is to provide support, facilitate and guide student activities as needed, and to monitor appropriateness of interventions. These findings are similar to those found in my study. Compared to Roberts and Greene (2011), few instructors in my study expressed an understanding of their role. Some instructors may be facilitating with minimal involvement, however their reasons for doing so are generally based on the level of the student. Similar to how they facilitate clinical experiences, instructors step back when students are closer to the end of term, but believe that they need to be more involved at the beginning. The students did not agree with this approach.

Instructors must also make their role clear to the students in HFS. As the students in this study experienced, when the instructors were unclear with the role they were assuming, students were left to fill in the gaps themselves, often with adverse effects. Students became frustrated, felt that they were off-track, and

believed they missed important cues during the simulation experience. Learning is affected when these feelings surface and students reported that they felt disengaged because of this.

Clarifying roles when designing simulation experiences will not solve all of the issues mentioned above however it can improve the simulation experience. In a study that used role-playing to improve communication, one of the interesting findings was that students who received role-playing instructions performed significantly better than those who did not (Kesten, 2011). I heard similar responses from the students in my study. In order to facilitate student learning in HFS, it behooves instructors to consciously decide what the roles might look like in the scenario and what type of script or prompting these roles require. Without guidance, students are left to decide the direction of the scenario on their own, which can potentially lead to confusion and disengagement. The students in this study needed more direction with respect to the roles that individuals in the simulation experience would play. This should be taken into account when designing the simulation experience.

Summary

Students described what it is like to engage in HFS. They said that they feel that the simulation centre is an environment where not only can they make mistakes, but that they have an opportunity to work with their peers in order to make clinical decisions. They also said that they feel less pressure during HFS than they do in the clinical practice setting. There is less pressure from the

instructor, especially when they are working as a group caring for the mannequin. Student participants also shared that being in HFS is stressful at times, particularly when they feel ill prepared to perform psychomotor skills or when they are waiting to be "tricked" during the experience. Other stressful situations in HFS come when the students are put in non-nursing roles during the experience without having any clear direction of what is expected of them. The fear of the unknown makes HFS stressful and frustrating at times, particularly when students believed there was a lack of direction with the simulation scenario. Overall, students perceived that HFS can have a positive effect on their learning, primarily when roles are well defined and preparatory information is provided. The students felt better prepared and less stressed when all aspects of simulation design were consciously attended to.

What It Is Like to Engage in Simulated Clinical Experiences as an Instructor

As participants spoke of their experiences with HFS, several themes related to how the instructor teaches in simulation emerged from the data. Students and instructors indicated that the level of involvement an instructor has in the simulation has an effect on student learning. This level of involvement is described as a 'Balancing Act' in Chapter 5 and as 'Stepping In/Stepping Out' in Chapter 6. While both of these themes refer to the involvement of the instructor during HFS, they are different in terms of why this happens. For instructors, looking at the students' knowledge level, when HFS occurred in the term, or simply their own comfort level determined what type of involvement they had.

Students believed that the level of involvement hinges heavily on the experience and comfort level that their instructors have with simulation. While students speculated about the impact of the instructors' comfort level, instructors bluntly stated that their comfort level affected their effectiveness in HFS and students' learning. In turn, the degree of comfort of instructors also had an impact on students' level of involvement. These issues represent the instructors' perceptions of what it is like to engage in a simulated clinical experience.

Level of Involvement

The instructors' perceptions of the simulation experience were not entirely dissimilar from those of students engaging in simulation. Both students and instructors believed that having instructor involvement affected students' learning. Similar to teaching the steps to a dance, the instructors needed to determine when they could let the students dance solo, or if they needed a partner to help guide them. The instructors believed that this depended on the level of the student, and what the instructors understood their role to be in simulation. Students believed that the level of involvement of instructors should be determined by the needs of the scenario, their own personal needs, as well as include impromptu involvement when the scenario seemed to be going in a wrong direction. While the idea of being more or less involved was expressed by both groups, the reasons why the instructor should or should not be involved differed between the groups.

Instructors also described what they believed was the purpose of the simulated clinical experience. For some, they described HFS not only as a

learning experience for the students, but used HFS to informally evaluate students prior to going into the clinical setting. As described in Chapter 6, some instructors preferred having simulation at the beginning of the term to see how their students performed and then to create patient assignments based on what they saw in HFS. This in turn created another way in which instructors were involved and did not always take into account student learning in HFS. It appeared that the intended purpose of simulation was not always understood.

In order to successfully facilitate a simulation experience, the instructor should have an understanding of their role in simulation. As was found in this study, instructors have differing opinions regarding their role in HFS. At the university where this study was conducted, there is an opportunity to attend a workshop regarding instructors' roles in HFS. Not all instructors choose to attend. This workshop is discussed later in this chapter however the issue is that instructors are not clear about what should be their role in simulation. Roberts and Greene (2011) compare simulation to a theater and use this analogy to introduce students and instructors to HFS. The role of the instructor is to facilitate and assist the student's learning. The instructors in my study believed that this is what they were doing however without attending the workshop, many instructors were left to determine what their role entails on their own. Roberts and Greene (2011) believe that facilitating and assisting the student's learning means that "they set the scene for the learners, provide them with information prior to their participation and observe carefully as the learners engage with the patient." (p. 369). This may not have been the understanding of most instructors in my study

however it seems that this is what the students are asking for from the instructors. In order to enhance the learning in HFS, most students want the instructor to be involved only when they appear to be struggling in simulation. They do not want the instructor constantly present and providing a didactic lecture on what is happening with the scenario. Some instructors chose to teach during HFS, while others chose to let the students work on their own. The area that promotes student learning in HFS is somewhere in the middle.

The instructors agreed that they should be involved at some point during HFS however without an understanding of their role and without clear direction, many instructors felt uncertain as to how much involvement they should have. They all had their own ideas, and for many instructors, being in HFS was full of uncertainty. These feelings affected how they interacted with students and for some, led to feelings of being uncomfortable in this environment. The feelings of being uncomfortable are further discussed in the subsequent section.

The level of involvement appeared to be the most challenging aspect of facilitating in HFS. Understanding the scenario, understanding the students' background and experience, and understanding the difference between facilitating in HFS versus clinical and skills lab is not something that all instructors are familiar or comfortable with. In the next section of this chapter, I discuss the instructors' level of comfort, however in order to promote student learning in HFS, there needs to be more than a level of comfort. In my role as the coordinator of the simulation centre, I was aware of who did not attend the

orientation sessions. From my observations during the data collection period, it is my belief that the lack of attendance at the orientation session, combined with the contents of the orientation session itself has led to the confusion regarding the role of the instructors. Not only should the instructor feel comfortable in HFS, but they should also understand how their role affects student learning in HFS.

Degree of Comfort

Instructors acknowledge that their level of comfort had an effect on how they facilitated learning in HFS. This was a theme that arose from both my observations and interviews with instructors and students. Essentially the instructors perceived their comfort level as being a predictor of how interesting they could make the simulation event for the students. They believed that they were setting the tone in HFS. Being comfortable in HFS was not linked to years of teaching experience. Only one student talked about the instructor being new to facilitating clinical and new to simulation as having a significant impact on their learning in HFS. Rather most students talked about what the instructor did during HFS and how they perceived this to affect their learning. Students said things such as being "frustrated with the lack of communication" and that they received no assistance when they were "visibly struggling." The students also said that they would like to be given "direction" when they were "off-track." The students' statements reflect what the instructors are doing, whereas the instructors comment on their feelings of comfort during simulation. Combined with the statements from several instructors who indicated that they "felt lost in there" and stated that

they did “not feel qualified,” it is assumed that these feelings of discomfort affect how the instructors facilitate learning in HFS. One instructor explicitly stated that she “didn’t know where we were going” with the scenario and another said that she felt “nervous” and that she couldn’t “relax.” These feelings of confusion and nervousness explain what it is like for instructors participating in HFS. The feelings also lead instructors to participate in HFS in less than optimal ways. It is difficult to guide students through a simulation activity when the instructor does not know “where they are going.”

This is not uncommon when instructors are learning new skills. As Hyland and Hawkins (2009) conclude in their review of the literature, it takes time and commitment from instructors to learn the new skill of facilitating HFS. Instructors are not familiar with the mannequins nor have they any previous experiences to relate to. Instructors who participated in a large international multi-site survey conducted by Nehring and Lashley (2004) were asked about their receptivity to using this technology. Similar to my findings, their instructors reported that they were wary and fearful of using HFS with their students. It is not uncommon to feel uncomfortable facilitating HFS, primarily when this is a new activity for the faculty members.Facilitating in HFS is not something that most clinical instructors today have experience with. Very few will have had personal experience of working with HFS as a student, so they have little to draw from to help them to facilitate in this kind of an environment. Most students and instructors are familiar with a behaviourist approach to learning, where the role of the instructor is to transmit knowledge and the student role is to passively receive

it (Roblyer, 2003). This is not a productive use of the technology available in HFS. Teaching and learning through HFS can be considered more consistent with the theory of constructivism (Oliffe, 2002; Reilly & Spratt, 2006). Constructivists believe that learning is constructed and built on previous knowledge (Hoover, 1996) and that the role of the student is to be an active creator of their own knowledge (Brandon & All, 2010). Constructivism is based on the concept that learners create their own meaning through interaction with the environment (Brandon & All, 2010; Parker & Myrick, 2009; Roblyer, 2003). This theory is more consistent with the idea of learning through HFS, but may not be one that many instructors are familiar or have experience with. Without understanding the theory behind the use of HFS, and without having experience in facilitating with a constructivist approach, this can affect the comfort level of the instructor in HFS.

The use of high-fidelity simulation in nursing education also requires a comfort level and working knowledge of technology. The term technostress was introduced by Brod (1984) and is described as the inability of an individual or organization to adapt to the use of new technologies. Several studies have been conducted since then (Burke, 2009; Care & Scanlan, 2000; Yang, 1999), and a main finding is that while people may initially be excited about the use of technology, stress related to technology results in a gradual withdrawal and dissatisfaction with the technology. Burke (2009) conducted a study that was aimed directly at nurse educators and their use of technology in undergraduate nursing education, and found that while technostress was not related to age or gender of the faculty, it was associated with education level. She found that the

higher the education of the faculty, the less technostress they experienced. This has interesting implications for high-fidelity use in nursing education. At this University, most clinical instructors who facilitate simulation have a bachelor degree as their highest educational achievement. This is important to note as it potentially has direct implications on the ability of simulation centre faculty to comfortably and effectively teach with this technology.

It would be easy to assume that providing a thorough orientation would reduce these feelings of discomfort. However, this alone may not be sufficient. As Jansen, Johnson, Larson, Berry & Hanson-Brenner (2009) discovered in their experiences with simulation, even with an initial orientation to the simulator and teaching with HFS, instructors are still daunted by the sophistication of HFS. They asked faculty to complete an online survey pertaining to obstacles to using simulation in teaching. The researchers found that while the instructors were already using some level of mannequin-based simulation and recognized the potential for learning through simulation, one of the barriers described was that of training. Faculty did not have the time or the expertise to feel comfortable with the high-fidelity mannequins. Some of their proposed solutions to address the feelings of comfort are to keep the training simple, to hold faculty retreats and workshops, and to possibly create super-users. As several instructors from my study report, they found that the element that made them feel most comfortable during HFS was having support from the simulation operator during the simulation activity and knowing that they were not alone in the simulation centre. While an initial orientation session is imperative, it is the ongoing support as the

instructors learns their role that will assist the instructor in facilitating HFS in a way that promotes student learning.

The themes of comfort level of instructors and the level of involvement of instructors in HFS had a significant relationship with student learning in HFS. Both instructors and students identify these as being issues, albeit in differing ways. In order to promote or enhance student learning in HFS, both groups agree that there is a certain level of involvement that needs to be achieved and that there is no clear procedure about how to do this. An orientation session could be of significant benefit, however ongoing support for the instructors as they develop their role in HFS is seen as a key element in creating a comfort level for instructors.

Summary

The experiences of instructors who engaged in HFS spanned from the feeling of being supported to the feeling of being lost. Many instructors reported feelings of unease in facilitating in an unfamiliar environment and said that they were nervous in HFS. They felt lost at times, primarily when they were unsure about the role they should play in HFS. Other instructors did not find the experience “that bad” and said that they felt supported in their role by the simulation lab staff who worked along-side with them in HFS. The feelings of comfort or discomfort conveyed by instructors hinged on the support they believe they received combined with their own previous experiences in HFS. Many

instructors said they felt nervous in HFS and that this was not an experience they enjoyed.

Factors That Either Enhanced or Impaired the Simulated Clinical Experience

While much work goes into creating a simulation experience, this research study suggests that some items need to be attended to more closely. Making the environment and the mannequin as realistic as possible has significant consequences on student learning in simulation. Similarly, the roles that students have in simulation as well as the roles of the instructor, affects what happens in the simulation experience. We have discussed how the instructors experience HFS and how their role and actions affect student learning. We have also discussed the students' experience with HFS and how their actions affect their learning. The subsequent section will include a brief review of what was addressed in previous sections as it relates to either enhancing or impairing the simulated clinical experience, as well as a discussion about how the environment and the way the scenario are presented either enhance or impair the simulated clinical experience. As discovered in this study, essentially all aspects of HFS had an effect on learning in some form.

The Instructor and the Student

While discussed at length in previous sections of this chapter, it is important to mention again that the level of involvement that instructors had in

HFS either enhanced or impaired the simulation experience. When there was too much involvement, students found the experience boring however when there was too little involvement, students became frustrated with the lack of direction. Both of these levels of instructor involvement impaired the simulated experience. The instructors and students spoke about a balance with regards to how much or how little the instructors should be involved and it is this balance that enhances or impairs HFS.

The instructor involvement also determined how much they allowed students to work on their own. This had an impact on the students' ability to either work in groups or make mistakes during HFS. Students perceived the ability to make mistakes in HFS as enhancing the experience and valued this part of HFS. They also appreciated learning from each other and believed that being able to talk to each other and watch each other participate in HFS enhanced the simulation experience. The amount of information students received prior to their simulation experience and subsequent preparation either enhanced or impaired the simulated clinical experience. If they did not prepare for all aspects of care, they felt lost in the HFS which impaired the experience. The more prepared they were with regards to the pathophysiology, medications, and more specifically for the psychomotor skills required for the simulated clinical experience, the more this enhanced the experience. For the most part, students wanted to be well prepared for the HFS.

Irrespective of whether it was from the student or instructor perspective, they both agreed on the actions that either impaired or enhanced the simulated clinical experience. Participants reported that the instructor's level of involvement in HFS, the ability for students to make mistakes in HFS and the ability to work together in HFS influenced student learning. As described earlier in this chapter, while the perspectives of the participants varied, the themes themselves were consistent with what was considered to have an effect on students' learning in HFS.

Keep It Real

Repeatedly during the interviews and focus groups, participants introduced the theme of realism. Some of the comments that were made indicated that the students believe that the mannequin could be used more effectively during their simulation experience. Students reported that they were waiting to be tricked, that they were responding to the technology and not the change in patient status, or that they were simply using technology for technology's sake. These comments reveal a relationship between how students view and value the use of "Jake" in simulation and the environment they practice in. The degree of realism established during the simulation experience in this study was an important factor that influenced learning in HFS. In a qualitative descriptive study looking at the perceptions on the process and outcomes of a simulation experience that involved 10 nursing students, the researchers found that the lack of reality can lead to lack of complete care and a focus on physical skills rather than looking at the patient

holistically (Ogilvie, Cragg & Foulds, 2011). Without realism, the simulation experience can be impaired and thus negatively influence learning.

Realism is important to both students and instructors however how realism affects students' learning in HFS is not congruent between the two groups. Compared to the students, instructors in this study did not place as much emphasis on the importance of creating a realistic environment in HFS. This is an interesting difference, but not entirely unique to students at the university where this study was conducted. Students in the National League for Nursing study (Jeffries & Rizzolo, 2006) rated realism as one of the most important features of HFS. For students, this is an important issue to attend to. Students note that it is difficult to treat the high-fidelity mannequins as real patients (Rhodes & Curran, 2005) so anything that further impedes realism can also impair how students perceive the experience.

While instructors did not comment directly on the realism of the mannequin, they often referred to the mannequin as "the dummy." Recognizing that dummy is another term for mannequin, it is conceivable that there is nothing pejorative in using this term to refer to the high-fidelity human patient simulator. The issue is that instructors did not refer to the mannequin as the patient nor did they speak to any degree of depth about the physiological features that are available with the mannequin. In speaking about "the dummy," they were simply referring to the mannequin as the piece of equipment that was used during simulation. There is a degree of separation between the relationship that students

believed they should have with the mannequin and what the instructors saw as the mannequin's role. Simulation also requires psychological fidelity (National Council of State Boards of Nursing, 2009) and this can reflect the degree to which the student perceives the simulation experience to be believable. When instructors refer to the mannequin as "the dummy," students may psychologically distance themselves from the simulation experience.

Given the comments made throughout the study, students perceived realism as necessary for the scenario, and instructors perceived it as a nicety. This disparity is a significant one to address when designing simulation experiences. Other researchers have found that the fidelity or the realism of simulation in an important contributing factor that benefits the simulation experience (Ackermann, Kenny & Walker, 2007; Lasater, 2007b; McCaughey & Traynor, 2010; Swenty & Eggleston, 2011). Failing to recognize the significance that realism has on student learning in HFS, instructors may not be taking advantage of learning opportunities that are available. If students are expected to treat the mannequins as though it is a living patient, instructors would be remiss not to do the same.

Role Assignment

In the simulation activities that were observed in this study, there was no consistency with how instructors assigned roles to their students or to themselves. Findings revealed that some instructors assigned students particular roles, while others were letting students work as a large group without assigned roles. Instructors put themselves in the roles of family members, physicians, other health

care providers, or as themselves. This made some simulation experiences difficult for some students. When instructors assumed a particular role, many students thought the HFS lacked direction. While all the participants knew they needed to care for the mannequin just as they would for a patient, they were uncertain about who was responsible for which aspects of care, and most importantly, what the instructors' role was with regards to facilitation. In order to benefit from the learning opportunities available and to promote student learning in HFS, attention should be paid to the roles of participants when designing the simulation experience.

Assigning roles is not an easy task. Roles in simulation can often be seen as role-playing. While similar, taking a role in simulation is not the same as role-playing. At times, students will be expected to role-play especially if they are assigned roles that are outside of what they typically might do in the clinical setting. For example, if students are asked to play the role of a family member, they would be expected to role-play. Role-playing frequently assumes that you are taking on the role of another that you likely are not familiar with. How a role is played can enhance realism but requires the student to know what is expected of the role. In our setting, students are often assigned to the role of a family member, and students would be expected to role-play in those situations. Not surprisingly, taking on the role of the nurse in whatever capacity was something that the students were more familiar with and required less preparation than role-playing a family member. Roles need to be realistic and reasonably challenging. Students need clear guidance about how to play their assigned role (Nestel &

Tierney, 2007). Roberts & Greene (2011) compare simulation to a theater performance and state that students take on the role of the nurse and act out the scene in front of an audience. Many instructors assigned students to a nurse role such as a primary nurse, secondary nurse, medication nurse or documentation nurse. These roles all have components of nursing practice and students are expected to take the role of the nurse and focus on a specific activity. Participating in these activities should be familiar to students as they are typical nursing activities of nurses in clinical practice.

The research findings do not clearly inform us about what should be expected of students in the HFS environment. Some simulation designers have students engage in activities typical of their profession. Others have students play roles that are unfamiliar to them such as playing the role of other professions or family members. Paskins & Peile (2010) in their work with simulation with medical students found that one of the causes of anxiety was the 'performance' element of role-play. Nestle & Tierney (2007) report that lack of realism can result in students perceiving the role-play to be unhelpful. Students in my study frequently reported anxiety related to role-playing as well when they had been in roles other than the nurse or when they feel that they had to perform. The students reported that it is not necessarily that they were in front of a group that made them anxious, but rather what they are asked to do in that situation. The students in my study did not enjoy being in non-nursing roles.

In planning simulation experiences, roles need to be well defined for students. If the student is expected to role-play and is given a role they are unfamiliar with such as a family member, the expectations of that role need to be made clear to the students and possibly even scripted (Nestel & Tierney, 2007). This will largely depend on the purpose of the role that the student is expected to play. Even when students are expected to play the role of the nurse in whatever form it might take, instructors must have a clear understanding of what the focus of the role should be. For example the expected behavior of the nurse's role would differ in a scenario with a primary objective of learning communication and another scenario with the primary objective of learning about detecting signs of rapid physiological deterioration in a patient. When there is no direction given to students, they can become frustrated with their role or lose interest in the simulation experiences, neither which enhance the simulated clinical experience.

Summary

The experiences that both students and instructors have while engaging in HFS influences student learning. The way participants feel about the experience and the extent that they engage with the environment enhanced or impaired student learning in HFS. First, the level of involvement of instructors in HFS should be fluid. HFS was impaired when there was too little or too much instructor involvement. Students expect the instructor to be clear and articulate their role in simulation, and to move in and out of the experience as the scenario dictates. Second, while it is understood that facilitating in HFS may be new for

most clinical instructors, the degree of comfort of the instructor is perceived to have an effect on the learning experience and often the learning is perceived as proportional to the comfort level of the instructor. Third, students perceived the ability of being able to work together as enhancing the simulation experience. Fourth, students perceived the ability to make mistakes in simulation where there are no adverse patient outcomes as an activity that enhanced their learning. Fifth, the amount of preparation for HFS was important in simulation and this means not only understanding the patient disease process, but refreshing or learning the psychomotor skills prior to beginning the simulation activity. According to students, this would enhance the experience. Sixth, the more realistic the simulation, the more this enhanced the simulation experience. This includes the mannequin as well as the environment. Failure to attend to realism impairs the experience. Lastly, the seventh factor that was discussed as impairing the simulation experience was the roles that students were assigned to. Having no assigned roles or being assigned to what the students consider observer roles was seen as impairing the experience. Participating in active roles, having clear definitions of the roles of the students and instructors, and rotating roles during the simulation experience were all perceived as enhancing the simulation experience. Keeping these factors in mind, as well as how the students and instructors experienced HFS, the following recommendations are made.

Recommendations

From this study, several recommendations are made. These are listed in this section.

1. Provide a thorough orientation session and ongoing education for clinical instructors who bring students into a simulation experience.

Providing an orientation session and subsequent education sessions for instructors is seen as a key feature of promoting student learning in HFS. In an unpublished study, instructors indicated that they came to an orientation feeling anxious and stressed and that they wanted more ideas and guidance on how to facilitate a simulation scenario (Harder & Hrabowych, 2009). In another study, Nguyen, Zierler and Nguyen (2010) found that 69% of their faculty respondents indicated a need for training with simulation, despite half of them indicating that training was already provided. Instructors are asking for help with using simulation with their students. It is suggested that preparing the instructors is essential if simulated learning is to be successfully integrated into nursing education curriculum (Jansen et al., 2009). Orientation sessions are not optional if simulation is to be successfully used. They are a necessity for all instructors as they begin to learn to teach with simulation.

Equally important is what should be included in the orientation session. From this study, it was discovered that instructors needed to understand how the simulator functions, and the resources that are available to them during the

simulation experience. There also needs to be a consistent use and understanding of the resources that are available. For example, this study found that not all instructors interpreted stepping back during the simulation equally. Clarifying roles and responsibilities could be discussed during the initial orientation. Role, responsibilities and teaching strategies can be reinforced at subsequent education sessions. Perhaps these resources could be available in another format such as a video or a training manual that instructors could take with them after the orientation session.

2. Instructor should be familiar with psychomotor skills required in HFS.

Students reported feeling ill prepared to perform psychomotor skills in simulation. They prepared for HFS however this primarily included the pathophysiology and medications that may be administered. Instructors may want to look at what skills are required for the simulation experience and encourage students to do some advanced reading or remedial work on this if they are unfamiliar with the skill. The instructor themselves may want to do a refresher of the skills prior to the experience as well. Explaining the reasoning for review psychomotor skills during the orientation session would benefit the instructors.

3. Instructors need to be aware of the influence of realism on HFS.

Instructors need to become familiar with the concept of realism and should understand how realism plays into the experience of HFS. In recognizing the importance that realism has to student learning, additional concepts such as

moulage can be discussed. Moulage is the term used to describe the props used in HFS. Most importantly, instructors need to understand how their own perceptions, behaviour, and terminology use can affect the realism in the simulation experience.

4. Develop roles for students based on objectives of the scenario.

Understanding the objectives for the simulation can assist instructors in developing roles for students during HFS. This will also allow the instructor to anticipate cues or prompts that students may require in the scenario, as well as understand their own role in HFS. In an ideal setting, the orientation session should include concepts related to simulation, but would also include time to rehearse and allow the instructors to implement some of the strategies prior to facilitating HFS with their group of students. Putting instructors in the roles of the student as well as the instructors would hopefully provide them with a better understanding of what can be done during the simulation experience to promote student learning. Creating an orientation session that addresses the factors that were found in this study to either enhance or impair the simulation experience may benefit both the instructors and the students' simulation experience

5. Create a manual or other type of resource to support the orientation session.

Some instructors may either not be able to attend the orientation session or be unable to recall all that was discussed during the session. Reminding the

instructors of what was included in the orientation session can be achieved by creating a manual that instructors can refer to time and again. Alternative to a manual, one could create an online demonstration or some other type of audio visual resource that instructors could refer to as they develop their expertise in simulation. This could also help with the issue of consistency between instructors as well and ensure that all students receive a similar learning experience in the simulation centre.

Since this study was conducted, as the coordinator of the simulation centre, I have begun to circulate simulation related newsletters to all clinical instructors once per term. These newsletters include tips on facilitation and debriefing, news on changes to scenarios, and other small pieces of information that the clinical instructors can refer to as they prepare for their simulation experience. This has been well received and it is recommended that this continue. This often allows instructors who may not have attended an orientation session, or those who wish for more resources to have access to additional information regarding facilitating in the simulation centre.

6. Provide support during the simulated clinical experience.

Just as the instructors stated that they felt supported by the simulation centre lab staff, this support needs to be ongoing. Simulation lab instructors need to be aware of their role in faculty development and be aware of how much the clinical instructors are relying on them to assist in HFS. Simulation lab instructors are very comfortable with the technology and generally have a grasp

on the teaching strategies associated with HFS. These individuals should ideally be more involved in the facilitation of the simulation experience with instructors and students.

7. Have the same instructor facilitate the simulated clinical experience.

Given the challenges of orientating clinical and the difference in facilitating HFS compared to other teaching strategies, it may be beneficial to have a simulation staff member facilitate all of the simulated clinical experiences. This would reduce inconsistencies between instructors and would reduce the amount of orientation required every term and ongoing throughout the year. While this might ideal, it can be difficult to arrange logistically and would require additional human resources in the simulation centre. There would still need to be one individual responsible for the technology with another individual responsible for the students' learning. With these additional human resources come additional financial costs, which can be difficult for some institutions particularly after providing much financial support to purchase the equipment to start with.

Areas for Further Research

An exciting part of this study is the discovery of areas of research that can further contribute to promoting student learning in HFS. While the need for an orientation session is evident, the elements listed above are based on this one study alone. Every part of the orientation session should have a purpose and by researching the needs of instructors to prepare them for simulation, this would

provide the groundwork for an optimal orientation session. While an initial small study was conducted regarding the usefulness of the orientation session, if the session is now revamped and includes additional support, a new study that looks at the value of this new orientation session could be conducted.

As mentioned earlier in discussing student mistakes in simulation, it would be interesting to see if mistakes that are made in the clinical setting are the same as those that are made in HFS, and what if any, differences might be attributed to these errors. It is understood that students appreciate the ability to make mistakes in a simulated setting, however if they are not learning from them, one should question the purpose of allowing students to make the mistakes. A study that addresses the types of errors made in simulation compared to those made in the clinical setting might assist in understanding how students can learn and benefit from the mistakes that are made in HFS. In addition to studying the types of errors made in HFS, it would also be interesting to study what students attribute their mistakes to while in a simulated setting. Several items were presented in this study that were considered to either enhance or impair the simulated experience, and it would be interesting to see if any of these items translate into mistakes made during HFS.

In combing through the literature, there were no studies found that addressed the amount of preparation students have prior to engaging in simulation experiences. Most papers did not even include whether preparation was necessary for the simulation experience. This study discovered that students and instructors

both believe that preparation is necessary for simulation. Typically the current preparation includes textbook preparation only, and not any kind of preparation of psychomotor skills. Additional research could be undertaken around preparation and what kind of preparation might benefit those who use simulation in their programs.

Reality was a theme that was discussed repeatedly in this study, and instructors did not have the same reaction to realism as the students did. The students referred to the mannequin a "Jake" while the instructors referred to the mannequin as "the dummy." An interesting study to conduct would be around the perceived importance of realism for instructors facilitating HFS. Perhaps instructors are already intimately familiar with the clinical environment and are better able to imagine the gaps in realism in the simulation environment. Whatever the reason, this is one that would be interesting to pursue.

Students expressed a comfort in working with each other in simulation, and how they enjoyed the opportunity to collaborate with each other to provide care to the mannequin. Teamwork skills in the traditional sense of working together in specific roles towards a common goal has been studied, however the collaboration between students and the vicarious learning that takes place from watching peers in simulation is less prominent in the literature. The concept of peer-to-peer learning in HFS might be one that would be important to explore.

It is exciting to see the many directions that this original research study can take. In continually going back to the findings of this study, there are likely

many more areas that can be further explored to provide a better understanding of what happens to student learning in HFS, and how we can design and structure these activities to provide the best possible learning experience for nursing students.

Limitations of the Study

Limitations were identified in the analysis of this study. First, as an instructor at the institution where this study was conducted, I was both a researcher as well as an insider. Personal biases were identified early, however it is conceivable that given my history and experience in simulation at this institution, they may have unconsciously affected either the questioning during the interviews or even the observations recorded in the field notes. It was important to remember that while I have collected the participants' data, I was still looking at the data coloured by my own perspective and experiences. This was attended to by including member checks and comparisons to the field notes from the observations, as well as by having my supervisors review the data and my analysis to determine if any bias was overtly present.

Second, there was no clear understanding of the concept of teamwork skills. It appeared that instructors and students each had a different perspective and definition of what teamwork meant. This could have been clarified with the participants earlier during the interviews however was overlooked. There is a similar issue with the concept of safety. Students and instructors often spoke of the opportunity to make mistakes in simulation in a safe environment. Even as

the participants were being interviewed, I had previously understood that safety in HFS included not only safety for the patient, but safety for the student as well. This was not addressed with the participants.

Final Reflections on the Findings

This ethnographic study on nursing students' learning in high-fidelity simulation has revealed important findings about simulation. The instructors and students had their unique perspectives, and an interesting aspect of this study is that the main themes that emerged were notably similar regardless of the difference in perspectives. It is encouraging to report that both groups have similar thoughts on what affects the students' learning in HFS. The differences found between students and instructors offer avenues for further reflection and research. High-fidelity simulation is much more than the mannequin. It is the technology, the environment, the instructor and the students. How to use HFS and what to include are important feature of this activity. Understanding what happens in simulation to student learning can help determine the structure of the simulation experience. Putting a mannequin and a group of students together in a room is not going to promote student learning, rather it is the pedagogy and not the technology will assist the students best (Roberts & Greene, 2011).

Focusing away from the psychomotor skills and more on the judgment and reasoning is described as being important, however is something that can be challenging to attend to. Comfort level of the instructor and familiarity with simulation has much to do with this. Clinical reasoning in nursing goes beyond

critical thinking and clinical decision making and includes metacognitive elements (Dreifuerst, 2009). Integrating these elements is difficult when the instructor is not familiar with how to facilitate these types of activities. Despite these difficulties, instructors must begin to understand how simulation can promote clinical reasoning before they thoroughly integrate it in their courses.

It is anticipated that this study has provided the reader with the opportunity to see how HFS affects student learning, both from the perspective of the student as well as the instructor. Further ideas for research, both inductive and deductive have been provided, and the hopes are that in building on this research, a strong body of knowledge that informs users of simulation on what promotes student learning in HFS can be developed.

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Appendix A

Ethics approval certificate – University of Alberta

[redacted]

APPROVAL FORM

Date: June 29, 2009

Principal Investigator: Pauline Paul

Study ID: Pro00007704

Study Title: Perceptions and experiences of nursing student's learning in high-fidelity simulation

Expiration Date: June 28, 2010

Thank you for submitting the above study to the Health Research Ethics Board (Health Panel). Your application, along with revisions submitted June 29, 2009, has been reviewed and approved on behalf of the committee.

The ethics approval is valid until June 28, 2010. A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Health Research Ethics Board does not encompass authorization to access the patients, staff or resources of Capital Health or other local health care institutions for the purposes of the research. Enquiries regarding Capital Health administrative approval, and operational approval for areas impacted by the research, should be directed to the Capital Health Regional Research Administration office, #1800 College Plaza, phone (780) 407-1372.

Sincerely,

Glenn Griener, Ph.D.
Chair, Health Research Ethics Board (Health Panel)

Note: This correspondence includes an electronic signature (validation and approval via an online system).

[redacted]

Appendix B

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

Letter of invitation to participate in a research study

Title: Perceptions and experiences of nursing students' learning in high fidelity simulation

Investigator: Nicole Harder, RN, MPA
Co-Supervisors: Pauline Paul, PhD, RN & Carolyn Ross, PhD, RN

Looking for 3rd Year Clinical Education Facilitators (CEF's) Interested in Sharing their Views about Simulation

---

I am conducting a study to explore the experiences and perceptions of nursing students' learning in high-fidelity simulation. It is part of my doctoral program at the University of Alberta.

If you agree to participate, you will be assigned to one of two groups:

- Group 1: I will observe you and your group of nursing students during a simulation experience. This experience will not be additional to the simulation experiences already planned for third year students. Immediately after the simulation experience or within the next 7 days, I will want to interview you about your experience and views about simulation. This conversation will take around 1 hour of your time and will take place in the [redacted] or a location of your choosing. Sample questions are things such as 1) what are faculty and students' views of the use of HFS on student learning; 2) what is it like to engage in simulated clinical experiences as an instructor; 3) what factors either enhance or impair the simulated experience

- Group 2: You will participate in a focus group with other CEF's to discuss your experiences and views about simulation. This will take around 1 to 1 ½ hours of your time and will take place in the [redacted].

To find out more about the study, please contact Nicole Harder at [redacted] or e-mail me at nicole_harder@[redacted].

Appendix C

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH
Clinical Faculty Participants

Title of Research Study: Perceptions and experiences of nursing students' learning in high fidelity simulation

Investigator: B. Nicole Harder, RN, MPA
[redacted]

Co-Supervisors:
Pauline Paul, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences Building
Building
Edmonton, Alberta
T6G 2G3
(780) 492 7479

Carolyn Ross, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences

Edmonton, Alberta
T6G 2G3
(780) 492 4894

THE STUDY:

High-fidelity simulation (HFS) is fairly new in nursing education. There are only a small number of studies on this topic. Perceptions and experiences of student learning in HFS have yet to be discovered.

The reason for this study is to understand how HFS is seen in nursing education. We want to study the values and beliefs about HFS in a group of students and teachers in your nursing program.

If you decide to take part in this study, I will ask you to do two things:

1. Attend your simulation just as you normally would. I will be in the room

and will be taking notes during the HFS. Simulations are routinely videotaped and these tapes may be looked at a later time by either myself or one of the co-supervisors.

2. About 1 to 7 days later, I will ask to interview you at a location that is good for you. The interview will take about one hour of your time. I will also ask you to give me some basic information about yourself (e.g. age, gender, years of nursing experience and years of teaching experience). I will then ask you about:
   a) the use of HFS in helping students learn
   b) what it is like to take part in simulated clinical experiences
   c) what helps increase learning during HFS
   d) what impairs learning during HFS

The interviews will be audio-taped and then typed. I may get in touch with you if I need clarification after I have typed your information. You will have the option of seeing the typed information and can change things in it if you wish.

There are no known risks to take part in this study. Your participation or withdrawal from the study will not affect your work with the University.

There are no direct benefits to you for take part in this study. However, you may find our discussion about HFS useful to you.

All information will be kept private. Myself and my co-supervisors will be the only ones who will have access to the data. Only I will know your name and you will be identified in the reports of the study by a number.

Information will be kept in a locked cabinet. I will keep your records for seven years after the study is finished. One of my co-supervisors in Edmonton will also keep an electronic copy of the data for seven years.

Your participation in the study is voluntary. You can drop out of the study at any time without giving me a reason. Your employment will not be affected and your supervisors will not know that you are participating. You may also refuse to answer any questions you don't want to answer and still be in the study. You can stop the interview and the tape recorder can be turned off at any time just by telling me.

There is no payment for taking part in this study.

Information from this study might be looked at again in the future to answer other questions. If this happens, the ethics board will first look at the new study to make sure that your information is used properly.

If you have any concerns about your rights as a study participant, please contact Dr. Christine Newburn-Cook, Research Office, Faculty of Nursing, University of

Alberta (780) 4926764. This office has no direct affiliation with the study investigators.

If you have any questions about the study, contact Nicole Harder at [redacted] or email: nicole_harder@[redacted]

Please keep a copy of this letter for reference.

Participant initials: _____ Witness initials: _____

Note for ethics reviewers:

Flesch-Kincaid Grade level is 8.8.

Appendix D

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

CONSENT FORM – Clinical Faculty (HFS Group)

Part 1

Title of Project: Perceptions and experiences of nursing students' learning in high-fidelity simulation

Investigator: Phone Number(s):
Nicole Harder [redacted]

Co-Supervisors
Pauline Paul (780) 492-7479

Carolyn Ross (780) 492-4894

–

Part 2 (to be completed by the research subject):	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to withdraw from the study at any time, without having to give a reason and without affecting your employment?	☐	☐

Has the issue of confidentiality been explained to you? ☐ ☐

Who explained this study to you?
_____

I agree to take part in this study: YES ☐ NO ☐

Signature of Research Subject
_____

(Printed Name)
_____

Date:_____

Signature of Witness
_____

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

Signature of Investigator or Designee_____ Date _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE RESEARCH SUBJECT

Appendix E

Interview Guide – Clinical Faculty Participants

1. Topics of interest
    1.1. Overall experience as an instructor
    1.2. Difficulties experienced during the simulation
    1.3. Perception of roles in simulation
    1.4. Perceptions of students' learning that takes place during simulation
    1.5. Perceived differences or similarities between simulation and clinical teaching
    1.6. Perceived value of simulation to nursing students' education
    1.7. Perceived influence of their teaching in simulation to students' learning

2. Potential questions
    2.1. What is it like for you to participate in a simulation activity?
        2.1.1. Reflect on the one you participated in this week.
3. Tell me about your teaching in simulation.
    3.1. How useful is simulation to the way that you teach?
    3.2. Looking at the students' pre- and post-test scores, how do you think the simulation experience impacted these, if at all?
    3.3. How do you think your teaching in simulation affects student learning in simulation?
4. Reflect on your role during the simulation activity?

4.1. Have you assumed other roles during simulation? (i.e. family member, etc.)

4.2. How do these different roles affect the way you teach students in simulation?

4.3. Do you think your role has an impact on student learning during simulation?

5. Do you think student learning in simulation is different or similar to their learning in other lab activities (i.e. psychomotor skills lab)?

5.1. Do you think student learning in simulation is different than any other way that is used to help students learn (other classes or activities)?

6. What do you think happens to a group of students in simulation?

6.1. Does their behaviour change or do the dynamics of the group change when they are in simulation compared to other lab classes or clinical practice?

6.2. Is there anything that you think you may contribute to this possible change?

6.3. Do you think you are different when you are in simulation compared to the clinical setting?

6.4. Do you think this has an impact on student learning?

7. What would be the perfect simulation? Why?

Appendix F

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

Information letter for focus group

Title of Research Study: Perceptions and experiences of nursing students' learning in high fidelity simulation

Investigator: B. Nicole Harder, RN, MPA
[redacted]

Co-Supervisors:
Pauline Paul, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences Building
Building
Edmonton, Alberta
T6G 2G3
(780) 492 7479

Carolyn Ross, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences

Edmonton, Alberta
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(780) 492 4894

As you know the Faculty of Nursing uses high-fidelity simulation (HFS) in the second and third year of the nursing program. As part of a doctoral study, I would like to invite you to participate in a focus group to discuss you experiences and perceptions of student learning in HFS. This should help us better understand what happens to student learning during HFS. The focus group will be conducted by Nicole Harder, doctoral student at the University of Alberta. The focus group will take place at the [redacted] at a time and date that is convenient for the group.

Participating in this focus group will take approximately one hour of your time. The group conversation will be tape recorded. I will ask you to give me some basic information about yourself (e.g. age, gender, years of nursing experience and years of teaching experience) prior to the session.

At the session, I will ask questions that address the following:

a) the use of HFS in helping students learn
b) what it is like to take part in simulated clinical experiences
c) what helps increase learning during HFS
d) what impairs learning during HFS

Your participation in this study is voluntary. You may choose not to answer some of the questions and you are free to withdraw from the study at anytime. Participating or not participating in this focus group will not affect your employment with the [redacted].

Your name will not appear on the audio-tape and will not be linked with the information you provide. All findings will be reported as group results and all efforts will be taken to ensure that the identity of participants is not revealed. Your name will never be used in any presentation or publication. Only the members of the research team will have access to the data. The information you provide will be kept in a locked cabinet for seven years.

All information will be held confidential by the research team. Although we cannot entirely guarantee confidentiality because we will be doing a group interview we will ask those who participate in the group to keep the conversation within the group.

There are no benefits for you in participating in this focus group other than having a chance to discuss your experience about becoming teaching nursing students using HFS.

There are no known risks in participating in this focus group.

If you have any questions about this project please feel free to contact Nicole Harder at [redacted]. If you have any concerns about this project please contact Dr. Christine Newburn-Cook, Associate Dean Research Faculty of Nursing, at (780) 492-5929. Dr. Newburn-Cook is not linked with this project.

Appendix G

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

CONSENT FORM – Clinical Faculty (Focus Group)

Part 1

Title of Project: Perceptions and experiences of nursing students' learning in high-fidelity simulation

Investigator:	Phone Number(s):
Nicole Harder	[redacted]
Co-Supervisors	
Pauline Paul	(780) 492-7479
Carolyn Ross	(780) 492-4894

Part 2 (to be completed by the research subject):

	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to withdraw from the study at any time, without having to give a reason and without affecting your grades or employment?	☐	☐

Has the issue of confidentiality been explained to you? ☐ ☐

Who explained this study to you?
_____

I agree to take part in this study: YES ☐ NO ☐

Signature of Research Subject
_____

(Printed Name)
_____

Date:_____

Signature of Witness
_____

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

Signature of Investigator or Designee_____ Date _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE RESEARCH SUBJECT

Appendix H

Interview Guide – Focus Group with Clinical Faculty

1. What is it like for you to participate in a simulation activity with nursing students?

2. Do you think that student learning in simulation is any different than learning in the clinical setting? How?

3. What do you think happens to a group of students during simulation?

4. Do you think that your role or how you conduct a simulation has any effect on student learning during simulation?

5. What would be the perfect simulation experience? Why?

Appendix I

Letter of invitation to participate in a research study

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

Title: Perceptions and experiences of nursing students' learning in high fidelity simulation

Investigator: Nicole Harder, RN, MPA
Co-Supervisors: Pauline Paul, PhD, RN & Carolyn Ross, PhD, RN

Looking for 3rd Year Nursing Students

Interested in Sharing their Views about Simulation

I am conducting a study to explore the experiences and perceptions of nursing students' learning in high-fidelity simulation. It is part of my doctoral program at the University of Alberta.

If you agree to participate:

- I will observe you and other students during a simulation experience. This experience will not be additional to the simulation experiences already planned for third year students.
- Immediately after the simulation experience or within the next 7 days, I will want to interview you about your experience and views about simulation. This conversation will take around 1 hour of your time and will take place in an interview room on the 4th floor of the [redacted]. Sample questions are things such as 1) what are faculty and students' views of the use of HFS on student learning; 2) what is it like to engage in simulated clinical experiences as a student; 3) what factors either enhance or impair the simulated experience

To find out more about the study, please contact Nicole Harder at [redacted] or e-mail me at nicole_harder@[redacted].

Appendix J

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH
Student Participants

Title of Research Study: Perceptions and experiences of nursing students' learning in high fidelity simulation

Investigator: B. Nicole Harder, RN, MPA
[redacted]

Co-Supervisors:
Pauline Paul, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences Building
Building
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(780) 492 7479

Carolyn Ross, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
3rd Floor Clinical Sciences

Edmonton, Alberta
T6G 2G3
(780) 492 4894

THE STUDY:

High-fidelity simulation (HFS) is fairly new in nursing education. There are only a small number of studies on this topic. Perceptions and experiences of student learning in HFS have yet to be explored.

The reason for this study is to understand how HFS is seen in nursing education. We want to study the values and beliefs about HFS in a group of students and teachers in your nursing program.

If you decide to take part in this study, I will ask you to do two things:

1. Attend your simulation just as you normally would. I will be in the room and will be taking notes during the HFS. Simulations are routinely

videotaped and these tapes may be looked at a later time by either myself or one of the co-supervisors.

2. About 1 to 7 days later, I will ask to interview you at a location that is good for you. The interview will take about one hour of your time. I will also ask you to give me some basic information about yourself (e.g. age, gender, previous degree, previous health care experience). I will then ask you about:
   a) the use of HFS in helping students learn
   b) what it is like to take part in simulated clinical experiences
   c) what helps increase learning during HFS
   d) what impairs learning during HFS

The interviews will be audio-taped and then typed. I may get in touch with you if I need clarification after I have typed your information. You will have the option of seeing the typed information and can change things in it if you wish.

There are no known risks to take part in this study. Your participation or withdrawal from the study will not affect your grades with the University.

There are no direct benefits to you for take part in this study. However, you may find our discussion about HFS useful to you.

All information will be kept private. Myself and my co-supervisors will be the only ones who will have access to the data. Only I will know your name and you will be identified in the reports of the study by a number.

Information will be kept in a locked cabinet. I will keep your records for seven years after the study is finished. One of my co-supervisors in Edmonton will also keep an electronic copy of the data for seven years.

Your participation in the study is voluntary. You can drop out of the study at any time without giving me a reason. Your grades will not be affected and your teachers will not know that you are participating. You may also refuse to answer any questions you don't want to answer and still be in the study. You can stop the interview and the tape recorder can be turned off at any time just by telling me.

There is no payment for taking part in this study.

Information from this study might be looked at again in the future to answer other questions. If this happens, the ethics board will first look at the new study to make sure that your information is used properly.

If you have any concerns about your rights as a study participant, please contact Dr. Christine Newburn-Cook, Research Office, Faculty of Nursing, University of

Alberta (780) 4926764. This office has no direct affiliation with the study investigators.

If you have any questions about the study, contact Nicole Harder at [redacted] or email: nicole_harder@[redacted]

Please keep a copy of this letter for reference.

Participant initials: _____ Witness initials: _____

Note for ethics reviewers:

Flesch-Kincaid Grade level is 8.8.

Appendix K

FACULTY OF NURSING
UNIVERSITY OF ALBERTA

CONSENT FORM – Student Participants

Part 1

Title of Project: Perceptions and experiences of nursing students' learning in high-fidelity simulation

Investigator:	Phone Number(s):
Nicole Harder	[redacted]
Co-Supervisors	
Pauline Paul	(780) 492-7479
Carolyn Ross	(780) 492-4894

–

Part 2 (to be completed by the research subject):	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to withdraw from the study at any time, without having to give a reason and without affecting your grades?	☐	☐
Has the issue of confidentiality been explained to you?	☐	☐

Who explained this study to you?
_____

I agree to take part in this study: YES ☐ NO ☐

Signature of Research Subject
_____

(Printed Name)
_____

Date:_____

Signature of Witness
_____

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

Signature of Investigator or Designee_____ Date _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE RESEARCH SUBJECT

Appendix L

Interview Guide – Student Participants

1. Topics of interest

    1.1. Overall experience as a student

    1.1. Difficulties experienced during the simulation

    1.2. Perception of roles in simulation

    1.3. Perceptions of learning that takes place during simulation

    1.4. Perceived differences or similarities between simulation and other courses

    1.5. Perceived value of simulation to their nursing education

    1.6. Perceived link (or not) of simulation to other classes

2. Potential questions

    2.1. What is it like for you to participate in a simulation activity?

        2.1.1. Reflect on the one you participated in this week.

    2.2. Tell me about your learning in simulation.

        2.2.1. How useful is simulation to your learning?

        2.2.2. Looking at your pre- and post-test scores, how do you think you simulation experience impacted these, if at all?

    2.3. What was it like in your role during the simulation activity?

        2.3.1. Have you assumed other roles during simulation?

        2.3.2. How do these different roles affect your learning in simulation?

        2.3.3. How was this simulation experience different from your previous simulation experiences?

    2.4. How is learning in simulation different or similar to your learning in other lab activities (i.e. psychomotor skills lab)?

2.4.1. How does simulation compare with any other way that is used to help you learn (other classes or activities)?

2.5. What do you think happens to a group of students in simulation?

2.5.1. Does your behaviour change or do the dynamics of the group change when you are in simulation compared to your other lab classes or clinical practice?

2.6. What would be the perfect simulation? Why?

Appendix M – Demographic Data

Title: Perceptions and experiences of nursing students' learning in high-fidelity simulation.

Student participant demographics

Please answer the following questions.

1. What is your age?
   - 18-22 years
   - 23-26 years
   - 27-30 years
   - 31-34 years
   - 35-38 years
   - >39 years or high

2. What is your gender?
   - Male
   - Female

3. Do you currently hold a completed previous degree?
   - Yes
   - No

4. Do you have any previous health care experience (i.e. health care aide, internationally educated nurse, etc.)? If so, please indicate you experience on the blank line below.
   - Yes
   - No
   - What kind?

     _____
     _

Appendix N – Demographic Data

Title: Perceptions and experiences of nursing students' learning in high-fidelity simulation.

Clinical instructor participant demographics

Please answer the following questions.

1. What is your age?
   - 20-25 years
   - 26-30 years
   - 31-35 years
   - 36-40 years
   - 41-45 years
   - 46-50 years
   - >50 years

2. What is your gender?
   - Male
   - Female

3. How many years of nursing experience do you have?
   - 0-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - 21-25 years
   - >25 years

4. How many years of teaching experience do you have?
   - 0-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - 21-25 years
   - >25 years