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CAN THE THEORY OF PLANNED BEHAVIOUR PREDICT NURSING FACULTY'S USE OF HIGH FIDELITY SIMULATION?

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ARLENE B WALSH-STARKES

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The undersigned certify that they have read the thesis entitled

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Arlene Walsh-Starkes

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The thesis examination committee certifies that the thesis and the oral examination is approved

Supervisor:

Dr. Shawn Fraser
Athabasca University

Committee members:

Mariann Rich
Athabasca University

Dr. Jeff Vallance
Athabasca University

Dr. Jeffrey Chang
Athabasca University

April 15, 2015

1 University Drive, Athabasca, AB, T9S 3A3 Canada
P: 780.418.7536 | Toll-free (CAN/U.S.) 1.800.561.4650 (7536)
fgs@athabascau.ca | fgs.athabascau.ca | athabascau.ca

Dedication

I dedicate my dissertation work to my family and friends. Special feelings of gratitude to my husband, Craig Starkes, for all his love and support. To my loving parents, Sandra and Bill Walsh, whose words of encouragement ring in my ears. To my daughter, Leah, who 'helped' me work on many occasions!

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Abstract

High fidelity simulation (HFS) can have a positive impact on nursing education and safe patient care, yet HFS remains underutilized. In this study, the Theory of Planned Behaviour was used to explore the use of HFS in nursing education. In a cross-sectional, correlational design, 87 Registered Nurse educators (mean age = 48.6 years) completed an online survey assessing attitudes, subjective norms (SN) and perceived behavioural control (PBC). Attitudes, SN, and PBC explained 45% of the variance ($p < .001$) in intended use of HFS with attitude ($\beta = 0.30$, $p < 0.05$) and PBC ($\beta = 0.61$, $p < 0.05$) making significant unique contributions to intention. Subjective norms were not related to intentions ($\beta = 0.01$, $p > 0.1$). Nursing educators have positive attitudes towards HFS use and feel that it is beneficial, but feel low control over HFS use. Yet, given the opportunity, educators seem likely to use HFS.

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Chapter I: Significance of the Problem

Background and Significance

Recent technological advances continue to move healthcare and education to new heights in terms of service delivery. In particular, these advances have become pervasive allowing for extended access in both the delivery of healthcare and in the training of healthcare professionals. Currently in healthcare, technology has contributed to better patient outcomes and more efficient processes for healthcare workers. For example, the use of 'Smart Pump' IV pump technology and the use of computerized physician order entry has reduced the rates of medication errors, led to more effective medication uses and more effective and timely medication administration. (Davidson & Chismar, 2007; Upton & Quinn, 2013). In terms of training health care workers, technological advancements are occurring rapidly in education, and educational institutions are modifying programming to remain current. Given that students are technologically savvy it is suggested that students require more variety and currency in educational modalities to meet their learning needs (Diener & Hobbs, 2012). In the context of nursing education, nurse educators must adapt to meet the demands of the technologically savvy student.

Nursing education is currently trying to keep up with these technological demands, both in healthcare and education, in order to offer students the best possible learning opportunities. Since nursing is a practice profession, hands-on learning is an important aspect of training. This hands-on training is also true where technology is concerned. That is, hands-on training with new technologies is now an essential component of clinical practice for nurses. Many technological advancements are used in nursing education, including multimedia use in both the classroom and

clinical training, the use of e-books (replacing traditional paper textbooks), and online learning management systems (Talcott, O'Donnell, & Burns, 2013). Another technological advancement in nursing education is the integration of high fidelity simulation (Alinier, Hunt, Gordon, & Harwood, 2006; Starkweather & Kardong-Edgren, 2008) to attempt to closely replicate the nurse-patient interaction.

Description and Importance of the Problem

Today, one of the most technologically advanced types of simulation is HFS (Decker, Sportsman, Puetz, & Billings, 2008). HFS has been embraced for many years in professional disciplines, primarily, in the aviation and aerospace industry and more recently in the medical field (Cooper & Taqueti, 2004; Feingold, Calaluce, & Kallen, 2004). Yet, HFS remains a relatively new method of teaching and learning within nursing education (Kardong-Edgren, Starkweather, & Ward, 2008). Simulation technology has moved from low tech, low fidelity simulators to high tech, computerized high fidelity simulators (Alinier et al., 2006; Starkweather & Kardong-Edgren, 2008). The literature separates simulators into one of three types – low fidelity, intermediate fidelity or high fidelity. Fidelity, in simulation, can simply be described as how close the simulation, or simulator, represents real life (Maran & Glavin, 2003; Tuoriniemi & Schott-Baer, 2008). In other words, HFS is the most life-like and low fidelity simulation is the least life-like in terms of representing the nurse-patient interaction.

Low fidelity simulators, also known as 'task trainers' or partial mannequins, are representations of a particular body system, primarily used to practice psychomotor skills (Cooper & Taqueti, 2004; Decker et al., 2008). An example of this type of simulator would include 'arms' to practice intravenous (IV) skills or injection skills.

Intermediate (medium) fidelity simulators offer more realism in the simulation. They are less physiologically advanced, lacking some functionality and are unable to 'respond' to interventions by the user (Canadian Patient Safety Institute [CPSI], 2005; Decker et al., 2008). An example of this type of simulator would be a torso that has the ability to produce heart and lung sounds, but there is no rise and fall of the chest with each 'breath.'

High fidelity simulators, or full-scale simulators, can be programmed to participate in various scenarios, responding physiologically according to student interventions, with the ability to "mimic reality" (CPSI, 2005; Seropian, 2003). These simulators also allow students to have more involvement in both the emotional and sensory aspects of nursing care compared to low and medium fidelity simulators (Feingold et al., 2004). These simulator mannequins anatomically represent humans and can be programmed to simulate physiological processes, such as a cardiac arrest (Seropian, 2003). The 'patient' (simulator) can be connected to a cardiac monitor displaying the heart rhythm, and a defibrillator can be applied to the chest just as in a real cardiac arrest.

An advantage of using simulation is that the use of HFS can meet the need for hands-on learning required in nursing education. In Canada, nursing education programs partner with hospitals and community agencies to provide clinical opportunities for students (Smith et al., 2007). However, due to the large number of students in clinical placements at a given time, many never have an opportunity to practice in certain nursing environments, such as the operating room, emergency room or intensive care units. Limited clinical opportunities have a negative impact on student development of core clinical practices required for the profession (Feingold et al., 2004). Today, hospitalized patients are more critically ill than in the past and novice nursing students may not be allowed to care for this level of patient (Feingold et al., 2004).

In addition to providing opportunities for hands-on experience, the increased interest in simulation can also be attributed to the efficacy of simulation as a training tool. For example, simulation is widely accepted by the medical profession as an acceptable tool for the enhancement of clinical skills and an increased awareness to promote safety for those who have been hospitalized (Canadian Association Schools of Nursing [CASN], 2007; Seropian, Brown, Samuelson-Gavilanes & Driggers, 2004b).

The use of high fidelity simulators provides students with hands-on clinical training in a controlled environment. Evidence suggests this can enhance students' entry-level knowledge base and afford them more realistic scenarios as they transition from student to Registered Nurse (Cooper & Taqueti, 2004; Scherer, Bruce, & Runkawatt, 2007). This can help meet the need felt by nursing programs to produce highly skilled nurses who are ready to practice.

Training support in the use of HFS for nursing faculty continues to be lacking across educational institutes (Cooper & Taqueti, 2004; Feingold et al., 2004; King, Moseley, Hindenlang & Kuritz, 2008; Nehring, Wexler, Hughes, & Greenwell, 2013). In nursing education, the reasons for reluctance on the part of nursing faculty to introduce and use simulation technology in teaching Baccalaureate Nursing students are not clear. Research suggests that reluctance to use technology is directly related to the faculty members' attitudes towards the technology (Akhtar-Danesh, Baxter, Valaitis, Stanyon, & Sproul, 2009; Lewis & Watson, 1997). It is believed that this applies to HFS use as well. Recent research indicates that factors increasing HFS use include positive faculty members' attitudes, faculty mentors for HFS, support from administration and ultimately, faculty members 'buy-in' (Grady et al., 2008; Nehring et al., 2013).

Chapter II: Literature Review

The purpose of this literature review is to gain a better understanding of the existing literature on high fidelity simulation use in nursing education. To do this it is important to identify the search strategies used; this will assist in gaining an overall perspective on the topic. This literature review will identify the differences between simulation and simulators, as identified for the purpose of this research; and, offer a history of simulation including details describing the types of simulations and simulators used. This will be used to provide the foundation from which to build on the concepts of nursing education and simulation, including how simulation is used in nursing education and what theoretical knowledge is associated with simulation use. From this literature regarding the proposed theoretical framework, the Theory of Planned Behaviour will be presented followed by the identified gaps in the literature.

Search Strategy

An initial search strategy was conducted using the keywords nursing education and simulation, with the parameters of peer reviewed, English only articles, published between 2000 and 2014. This search strategy elicited 947 articles. The published research tended to focus on the use of simulation (at all levels of fidelity) and the benefits of simulation use as an educational method and tool (Alinier et al., 2006; Decker et al., 2008) in health professional disciplines, including baccalaureate-nursing education (Kardong-Edgren et al., 2008).

Simulation Versus Simulators

Simulation has been described as both a technique and a technology. Gaba (2004) describes simulation as "a technique – not a technology" (p. i2); a way in which to replicate the real world experiences in an artificial setting. This is consistent with Maran and Glavin (2003) who identifies simulation as "an educational technique …" (p. 22) and Jeffries (2005) who state

simulation is "activities that mimic the reality of a clinical environment" (p. 97). More recent literature describes simulation as pedagogy, a teaching methodology that uses a variety of tools or equipment to aid in a student's learning (Meakim et al., 2013).

Simulation, as a technology, refers to the many tools used to implement simulation, the technique. As with any technology, the tools (simulators) used to implement various simulations have advanced over the years. Currently, HFS is one of the most technologically advanced types of simulation being used in nursing education. The high fidelity simulators, used to conduct HFS are often known as human patient simulators (HPS).

History of Simulation

Simulation first made its appearance in the early 1960's and has been used in post-secondary education in varying capacities ever since, most predominantly in aviation and in medicine (Bower, 1997). It seems as though several 'high fidelity' simulators were attempted, even in the 1960's, but due to the expense of the computer equipment they were not marketable (Cooper & Taqueti, 2004). In essence, their developers were well ahead of their time. During the 1960's and the 1970's, after the early attempts at 'high fidelity' simulators, several part-task trainers were developed and used for training in medical schools. The 1980's and 1990's saw the movement toward more sophisticated part-task trainers and full body mannequins, some with computer based technology (Cooper & Taqueti, 2004). Recently there has been an explosion in the use of technology and the integration of this technology into high fidelity simulators (Alinier et al., 2006; Cooper & Taqueti, 2004).

Non-healthcare use of simulation. Due to the high public risk that occurs with training pilots, the airline industry has relied on the use of flight simulators, specifically high fidelity simulators, for crew training for many years (Bower, 1997). The airline industry has the goal of

protecting the public, hence the necessity to simulate mock emergencies such that pilots are able to respond accordingly, without putting people at risk (Bower, 1997).

Simulation in medical schools. Medical schools have been using simulators to train physicians in many specialties, including providing anaesthesia care (Bower, 1997). Simulators have been used to assess competencies in medical residents, discerning novice residents from more experienced residents via their successful completion of a prescribed simulation (Girzadas, Lamont, Caris, Rzechula, & Harwood, 2007). High fidelity simulators are appropriate for medical school training as they allow for the observation of physiological changes in the 'patient's' condition (Canadian Patient Safety Institute [CPSI], 2005).

Simulation in other healthcare professions. Simulation is used in other healthcare professions, including physiotherapy, respiratory therapy and even in pharmacy. The use of simulators in these healthcare professions extends beyond undergraduate level education and into training for the practicing professional, as well. As with medicine and nursing education, simulation has been used, but HFS with high fidelity simulators is still new. Simulators in the form of low fidelity simulators, such as part task trainers and non-computerized patient mannequins, have been used in educating physiotherapists, respiratory therapists and pharmacy students at some point in their education (Blackstock & Jull, 2007; Hanlon, 2014; Stockert & Brady, 2011; Vyas, Wombwell, Russell, & Caligiuri, 2010)). Academic institutions and employers for these healthcare professionals are now exploring the role of high fidelity simulators for practising the more complex skills, patient interactions, critical decision making and interprofessional skills, and are beginning to incorporate their use (Blackstock & Jull, 2007; Hanlon, 2014; Stockert & Brady, 2011).

Types of Simulators

Low fidelity simulators. Low fidelity simulators are sometimes known as 'task trainers' or partial mannequins (Decker et al., 2008). These low fidelity simulators are representations of a particular body system, primarily used to practice psychomotor skills (Cooper & Taqueti, 2004; Decker et al., 2008) This type of simulation does not necessarily require direct faculty supervision; students learn at their own pace and this equipment is often readily available to the students. (Decker et al., 2008). An example of this type of simulator would include 'arms' to practice intravenous (IV) skills or injection skills.

Intermediate fidelity simulators. Computerized task trainers are classified as intermediate (medium) fidelity simulators (Decker et al., 2008). This type of simulation offers more realism in the simulation, except that many of the 'patient' cues are missing; they are less physiologically advanced, lacking some functionality and are unable to 'respond' to interventions by the user (CPSI, 2005). An example of this type of simulator would be a torso that has the ability to produce heart and lung sounds, but there is no rise and fall of the chest with each 'breath.'

High fidelity simulators. HFS is highly technical and costly, requiring extensive faculty involvement for its operation and the supervision of students (Garrett, Tench, van der Wal, & Fretier, 2007; Kardong-Edgren et al. 2008; McCausland, Curran, & Cataldi, 2004; Seropian, Brown, Samuelson-Gavilanes, & Driggers, 2004a). The high fidelity simulators are full size, human-like mannequins, which are anatomically correct with programmable life-like physiological functions – breathing, crying, palpable pulses, and a heartbeat, for example (Holtschneider, 2007; Laerdal, 2014). True to life, the high fidelity simulators respond

physiologically to student interventions (CPSI, 2005). For example, heart rate can decrease or breathing rate increase, based on the intervention performed.

Feingold et al. (2004) described using a high fidelity simulator, to simulate a 65-year-old 'patient' with an exacerbation of chronic obstructive pulmonary disease and pneumonia. This 'patient' was 'admitted' for care and the students were responsible for the assessment and care of this lady. In doing so, cardiac monitoring occurred, where the 'patient' had a heart rate, blood pressure, respiratory rate and a temperature. In addition, the 'patient' had an intravenous (IV), required oxygen and suctioning, had "a chest tube, a urinary catheter, a tracheotomy and a nasogastric tube" (Feingold et al., 2004, p. 158). During the student's time with the 'patient', the 'patient' responded according to the student's interventions. These simulators do allow for students to have more involvement in both the emotional and sensory aspects of nursing care compared to low and medium fidelity simulators. Further, HFS's are useful in helping students apply theory to practice and to develop critical thinking and decision making skills (Alinier et al., 2006; Feingold et al., 2004).

Simulation technology has progressed over the years from low technology to a much higher technology as well as having an increase in fidelity. This increase in both the level of technology and fidelity has brought major advancements in simulation use. This includes the simulators themselves as well as the circumstances in which simulation occurs. It is worthwhile to look at how these advancements have occurred and what impact this has had.

Nursing Education and Simulation

Pressures are mounting across Canada for nursing schools to increase enrolment in an attempt to replenish the nursing shortages (Canadian Nursing Advisory Committee [CNAC], 2002; Canadian Nurses Association [CNA], 2003). In 2007, 9,447 nursing students were eligible

for registration, yet an estimated 12, 000 students should be graduating per year to meet Canada's nursing needs (Canadian Association of Schools of Nursing [CASN], 2007 & CASN & CNA, 2008). The corresponding expectation is that there will be additional demands for clinical placements as enrolment is increased (CNA, 2004). One method to address the problem of increased enrolment and limited clinical space is implementing the technique of simulation through the use of high fidelity simulators.

Being a practice profession, hands-on learning is important to nursing education. In Canada, nursing education programs partner with hospitals and community agencies to provide clinical opportunities for students (Smith et al., 2007). At present, due to the large number of students in clinical placements at a given time, many never have an opportunity to practice in certain nursing environments, such as the operating room, emergency room or intensive care units. Limited clinical opportunities have a negative impact on student development in the core clinical practices required for their profession (Feingold et al., 2004). However, the use of a high fidelity simulator would provide students with hands-on clinical training in a controlled environment. Evidence suggests this would enhance students' entry-level knowledge base and afford them more realistic scenarios as they transition from student to Registered Nurse (Cooper & Taqueti, 2004; Scherer et al., 2007).

Benefits and barriers of HFS. Simulations mirror real life situations and include a broad spectrum of educational uses from the most basic case studies to the technical high fidelity team training experiences. Many benefits accrue to both nursing education and to nursing students, as has been documented in the literature, including an increase in nursing student's self-confidence and improvements in therapeutic communication (Bambini, Washburn, & Perkins, 2009; Feingold et al., 2004; Hodge, Martin, Tavernier, Perea-Ryan, & Alcala-Van Houten, 2008;

Jeffries & Rizzolo, 2006). Simulations in the healthcare setting attempt to "mimic the reality of a clinical environment and are designed to demonstrate procedures, decision-making, and critical thinking" (Jeffries, 2005, p. 97). Simulations allow for rehearsal of high risk, low frequency situations as well as for high frequency procedures in a very safe setting with immediate feedback (Alinier et al., 2006; Brewer, 2011). Students have the opportunity to provide 'patient' care in a controlled setting, providing them the opportunity to develop various psychomotor skill competencies and critical thinking abilities (Alinier et al.; CPSI, 2005; Feingold et al; Seropian, 2003). Additionally, improved teamwork and interprofessional communication were cited as positive outcomes of the use of HFS (Smithburger, Kane-Gill, Kloet, Lohr, & Seybret, 2013). Knowledge acquisition, skill performance, learner satisfaction and self-confidence have all been reported, to varying degrees, as benefits to simulation (Bearnson & Wiker, 2005; Burns, O'Donnell, & Artman, 2010; Laschinger et al., 2008; Shinnick, & Woo, 2014; Smith & Roehrs, 2009).

Research does identify barriers to the use of HFS in nursing education. Barriers can be separated into categories – financial, environmental and people. Financial barriers exist in relation to the costs associated with purchasing simulators and associated equipment, and the cost of operating and maintaining the simulators and equipment (Nehring & Lashley, 2004; Seropian, Brown, Samuelson-Gavilanes, & Driggers, 2004a; Starkweather & Kardong-Edgren, 2008). Environmental barriers include the actual infrastructure and space required to operate and run HFS in a nursing school (Seropian et al., 2004a).

One of the biggest documented barriers, yet it has the least amount of study devoted to it, in relation to HFS in nursing education, is that of nursing faculty (Jones, Fahrenwald, & Ficek, 2013; Nehring, 2008); more specifically, nursing faculty attitudes. Attitudes are defined as one's

perceptions about a behaviour – whether performing the behaviour will be valuable or not (Ajzen, 1991; Perkins et al., 2007). Several attitudes have been identified as barriers to HFS in the literature. These attitudes include a lack of training for nurse faculty (faculty members perceived competence in using HFS); nursing faculty member's comfort level with using HFS or technology (a perceived fear of technology) and even the faculty members' perceptions of the effectiveness (or positive student outcomes) of HFS (Akhtar-Danesh, et al., 2009; Cannon-Diehl, 2009; Davis, Kimble, & Gunby, 2014; King et al., 2008; Nehring & Lashley, 2004; Seropian et al., 2004a; Starkweather & Kardong-Edgren, 2008).

Theories Used With HFS and Nursing Education

Only a limited number of studies used theories as a theoretical base to the introduction and use of HFS in nursing education. In the few studies that did use theories, no single theory was used consistently as a foundation. Jeffries (2005), one of the most common theories used in nursing education with HFS, developed a framework to be used in designing, implementing and evaluating simulations for nursing programs. Additional theories included in the literature related to simulation use in education were the Adult Learning Theory (Knowles), Benner's Model of Novice to Expert, Experiential Learning Theory (Kolb), Rogers Diffusion of Innovation Theory, and the Theory of Planned Behaviour (TPB), (Ajzen, 1991; Kaakinen & Arwood, 2009; King et al., 2008; Starkweather & Kardong-Edgren, 2008; Waldner & Olsen, 2007). Most of these theories were used as foundations for simulation design and evaluation of student learning.

Nursing education simulation framework. Jeffries (2005) developed a framework that could be used to design, implement and evaluate simulation in nursing education. This framework, known as the National League for Nursing (NLN) Nursing Education Simulation Framework, was developed out of the need to provide structure that supported basic teaching and

learning principles in designing and using simulations for learning purposes (Jeffries, 2005). The model proposes that five key components are needed in order to have a successful simulation: 1) teacher, 2) student, 3) educational practice, 4) simulation design, and, 5) outcomes (Jeffries, 2005). This framework provides a structure that nursing educators can use when they begin to implement simulation into their curriculum. It is useful to nurse educators, as it is one of the only frameworks that incorporate nursing education and nursing into simulation practice.

This framework identifies the importance of 'teacher factors' – that is the educator can take a variety of roles, not just that of the 'teacher' (Jeffries, 2005). The educator is a facilitator, support for the student, an observer or evaluator (Jeffries, 2005). Student factors are what the students bring to the simulation experience and the expectation that students be self-directed & motivated and expect to take on a variety of roles in order to have successful outcomes with simulation (Jeffries, 2005). Educators and students must abide by educational practices, which will ensure student learning and optimal learning outcomes (Jeffries, 2005). The seven principles of adult learning, as outlined by Chickering and Gamson (1987), are used as guidelines in ensuring that best educational practices are followed. Each simulation experience must be specifically designed, keeping in mind the course objectives, as well as expected outcomes (Jeffries, 2005). Successful outcomes are considered met when students achieve success in the areas of nursing knowledge, skill performance, learner satisfaction, critical thinking and self-confidence (Jeffries, 2005).

Adult learning theory. Knowles (1990) identified several assumptions about adult learners that are still used today to guide nursing education. It was assumed that adults are self-directed, they have experience that contributes to their learning, and they are interested and ready to learn. The Adult Learning Theory by Knowles (1990) does fit with simulation as students can

use the simulation experience as a way in which to identify their learning needs, apply their knowledge and learn from the experience. Adult Learning Theory was used to guide simulation design and assessment of students using a computerized simulator (Feingold, et al., 2004). Students perceived the use of the simulator as valuable to their learning experience (Feingold, et al., 2004).

Novice to expert and experiential learning. Benner's Model of Novice to Expert identifies five levels of performance (novice, advanced beginner, competent, proficient and expert) (Benner, 1984; Kaakinen & Arwood, 2009; Waldner & Olsen, 2007). The premise behind Benner's model is that a nurse's skill development progresses through these five levels, depending on their theoretical knowledge and experience. This model has been a long-term premise for nursing and nursing education.

Kolb's Experiential Learning Theory, while not nursing specific is a very useful theory to guide nursing education. According to Kolb, learning occurs through the transformation of student experiences (Kolb, as cited in Lisko & O'Dell, 2010). Students have different learning styles that must be considered in order for learning outcomes to be achieved and the transformation process to occur. Students learn in one or more learning styles, accommodating, diverging, converging or assimilating (Kolb, as cited in Lisko & O'Dell, 2010).

Waldner and Olsen (2007) suggested that nurse educators use a combination of two models: Benner's Model of Novice to Expert and Kolb's Theory of Experiential Learning, to guide the development and use of simulations in nursing education. The 'novice to expert' concept would be used to determine what should be taught using a particular simulation while Kolb's theory would help determine 'how' simulation can accomplish the intended learning

goals. While these theories do identify how to develop simulation, little is included regarding how to implement the simulation, by nursing faculty.

Rogers's diffusion of innovation theory. Starkweather and Kardong-Edgren (2008) used Rogers Diffusion of Innovation Theory to guide the implementation of simulation into one nursing school's curriculum, gaining faculty 'buy-in' and assisting nursing faculty members in implementing HFS into the curriculum. The Diffusion of Innovation Theory is mainly concerned with the steps that occur in adopting technology: knowledge, persuasion, decision, implementation and confirmation (Starkweather & Kardong-Edgren, 2008). The use of the Diffusion of Innovation theory is suitable for actually implementing simulation. It does account for gaining faculty 'buy-in' or ensuring positive 'attitudes' (through the persuasion step) that lead to the actual implementation and use of HFS by faculty members (Starkweather & Kardong-Edgren, 2008). This theory, however, does not actually make links between nursing faculty's attitudes, their intentions and their behaviour (actual HFS use). It is important to consider if these links exist and if so, how they impact the actual use of HFS in nursing education.

Theory of planned behaviour. King et al. (2008) were concerned with the limited use of HFS in nursing education. Using a two phase approach, King et al. (2008) used an online survey to look at factors related to nursing faculty's use of HFS and then, planned an intervention designed to increase faculty's use of HFS. The effectiveness of this intervention was then evaluated. The constructs of the Theory of Planned Behaviour (TPB): attitudes, subjective norms (SN), perceived behavioural control (PBC) and intention, were used to develop the survey tool and guide the data collection process (Ajzen, 1985, 1991; King et al., 2008). They found that most faculty members had no experience or training in using HFS, yet faculty members perceived value in its use. However, these same faculty members perceived using the technology

of HFS to be difficult. After the completion of the intervention, an educational program regarding using HFS, faculty members had a positive increase in all constructs of the TPB, indicating that faculty were happy with the educational program as a method to increase their behaviour, comfort, competence and intention towards the use of HFS.

Nurse educators must feel prepared and be comfortable with HFS to ensure a successful simulation experience for students (Jeffries, 2005; Young & Shellenbarger, 2012). According to the TPB, an individual will attempt to perform a behaviour if it is believed success of performing the behaviour will outweigh the disadvantage of failure and if it is believed that those who are important to the individual thinks the behaviour should be attempted (Ajzen, 1985). Success will occur if the individual has sufficient control over factors (internal and external), which will influence achievement of the goal (Ajzen, 1985).

One's attitudes are determined by behavioural beliefs (Ajzen & Fishbein, 1980). The TPB was chosen to guide this research, as existing studies did not demonstrate what faculty's attitudes towards simulation were or how faculty members decided to participate in simulation. If the TPB could be used to predict 'intentions', could it be useful to 'predict' a faculty member's intention to use HFS in nursing education? The TPB recognizes additional influences that may affect one's decision or intent to perform a behaviour.

Several studies (Adamson, 2010; Harder, Ross, & Paul, 2013; Jones & Hegge, 2007) identified a lack of comfort with HFS (due to lack of training and experience with equipment). Therefore, a lack of comfort and familiarity leads to a lack of use – especially for those who feel technology (such as HFS) is intimidating. A search of EBSCO HOST, using the search terms, "nursing faculty attitudes and HFS", from 2000 to 2014, scholarly, peer reviewed, English only literature revealed 40 articles. Expanding the search terms to "nursing educators attitudes and

HFS" did increase the available literature to 1,997 articles, however, only two to three articles actually addressed the concept, specifically, of 'attitudes' among 'nurses' or 'nurse educators'. Given this lack of available literature, a gap has been identified. None of the theories identified surrounding nursing faculty and the use of HFS specifically considers the attitudes of nursing educators as being influential to the development and use of HFS in undergraduate education.

Theoretical Framework

Theory of planned behaviour. The TPB was the framework chosen to guide this research study (Ajzen, 1991). A conceptual model of this framework, as it relates to intentions to use HFS, can be seen in Figure 1. The TPB is based on the premise that an individual's behaviour can be predicted from their intentions to perform a particular behaviour (Ajzen, 1991; Cooke & French, 2008; Francis et al., 2004; Perkins et al., 2007). In order to predict intentions, the TPB indicates there is a need to know about attitudes, subjective norms and perceived behavioural control surrounding the intention (Ajzen, 1991; Cooke & French, 2008; Francis et al., 2004; Perkins et al., 2007). Attitudes are defined as one's perceptions about the behaviour – whether performing the behaviour will be valuable or not (Ajzen, 1985, 1991; Perkins et al., 2007). Subjective norms (SN) refer to one's perceptions of what others think about performing the behaviour (Ajzen, 1991; Perkins et al., 2007). The final predictor of intentions is known as perceived behavioural control (PBC). PBC refers to how easy one perceives it is to perform the behaviour (Ajzen, 1991; Perkins et al., 2007). Literature suggests that the more positive the attitude and the higher the subjective norm of an individual, the higher their PBC is and ultimately, the stronger their intention to perform a behaviour (Ajzen, 1991; Ajzen & Gilbert-Cote, 2008). However, if one has low PBC the behaviour is less likely to be performed even if attitudes and SN are relatively positive.

The purpose of the TPB is not to change behaviour but rather to help explain and predict people's intentions and behaviours (Ajzen, 2014). In doing so, the TPB can be used as a framework for designing effective behavioural change interventions. It is important to consider looking at ways to change attitudes, SN's, and PBC's in order to potentially impact the behaviour (Armitage, 2014). Salient beliefs play an important role in determining ones intentions and actions – behaviour is a function of beliefs (Ajzen, 1991; Sutton, et al., 2003). There are three salient beliefs identified by Ajzen. They include (1) behavioural beliefs, those beliefs that are assumed to influence an individual's attitude towards the behaviour, (2) normative beliefs, those beliefs that constitute the underlying determinants of subjective norms, and (3) control beliefs, those beliefs that provide the basis for an individual's perception of behavioural control (Ajzen, 1991).

The TPB has both strengths and limitations. This theory has been used across many populations for predicting and explaining a variety of behaviours and has demonstrated consistent outcomes. Ajzen clearly articulates that the TPB is not static, but rather fluid and can be modified. This is demonstrated from the early roots of the TPB – what originally began as the Theory of Reasoned Action (TRA) has been modified, with the addition of PBC, and is now the TPB (Ajzen, 1985). It is assumed that the behaviour being studied is under volitional control (that is, the individual can choose whether he or she will perform the behaviour) (Ajzen, 1991).

There are limitations associated with the TPB. Some of these limitations include the fact that 'additional' influences, outside of attitudes, SN's & PBC are not factored into the theory and may account for some of the variance that occurs. Additionally, the theory only considers a cross-sectional view of information, not a longitudinal view. Therefore, it only captures concepts

at one point in time and does not consider the effect of changes over time on behaviour and intent.

Gaps in the Literature

Throughout recent literature, it has been noted that there is a lack of research related to the use of pedagogy to implement HFS into nursing education; as well, there is a lack of theoretical foundations to support the use of HFS in nursing education (Parker & Myrick, 2009; Schiavenato, 2009). Simulation of any form is an educational technology and a learning tool. As with any teaching and learning 'tool', formal pedagogy is necessary to offer a solid background and mechanism for educating faculty about how to use and implement simulation. As a result of this, implementation of HFS is often done in a 'piecemeal' manner, rather than in an evidence based, theoretically sound order - knowing how and when to use HFS is important to education (Cannon-Diehl, Rugari, & Jones, 2012; Rourke, Schmidt, & Garga, 2010; Schiavenato, 2009). This can be seen in a recent systematic review of the literature wherein Nehring et al. (2013) identified a number of relevant constructs, barriers to, and facilitating factors for HFS use. However there was no clear framework for understanding how these factors could operate to increase HFS use or faculty development for HFS use.

Without a clear theoretical base, the question is, "How do nursing faculty know how to implement simulation?" It is clear from the literature that there is in fact, a lack of guidelines for faculty development related to orientating and mentoring faculty into the use of simulation (Anderson, Bond, Holmes, & Cason, 2012; Guimond, Sole, & Salas, 2011; Harris, Eccles, Ward, & Whyte, 2013; McNeil, Parker, Nadeau, Pelayo, & Cook, 2012; Nehring et al., 2013). Given the lack of literature and theoretical foundation, nursing faculty often develop and implement

simulation to the best of their ability. This approach, while well intentioned, can lead to problems.

Although the TPB has been successfully applied in predicting intended behaviour patterns in healthcare (King et al., 2008; Tabak & Ozon, 2004); the use of the TPB in relation to HFS has only been studied on a few occasions (King et al. 2008; Jansen, Johnson, Larson, Berry, & Hanson-Brenner, 2009; Jones & Fahrenwald, 2013). King et al. (2008) found that attitudes are a potential contributor to HFS use.

The literature supports the use of HFS in nursing education, citing many benefits to using HFS. However, there are still inconsistencies with how HFS is used. Exploring nursing faculty attitudes is needed to determine the barriers to using HFS. Based on the literature, the TPB provides a framework that is useful for studying attitudes. It is for these reasons that the TPB will be used as the theoretical model underpinning this work.

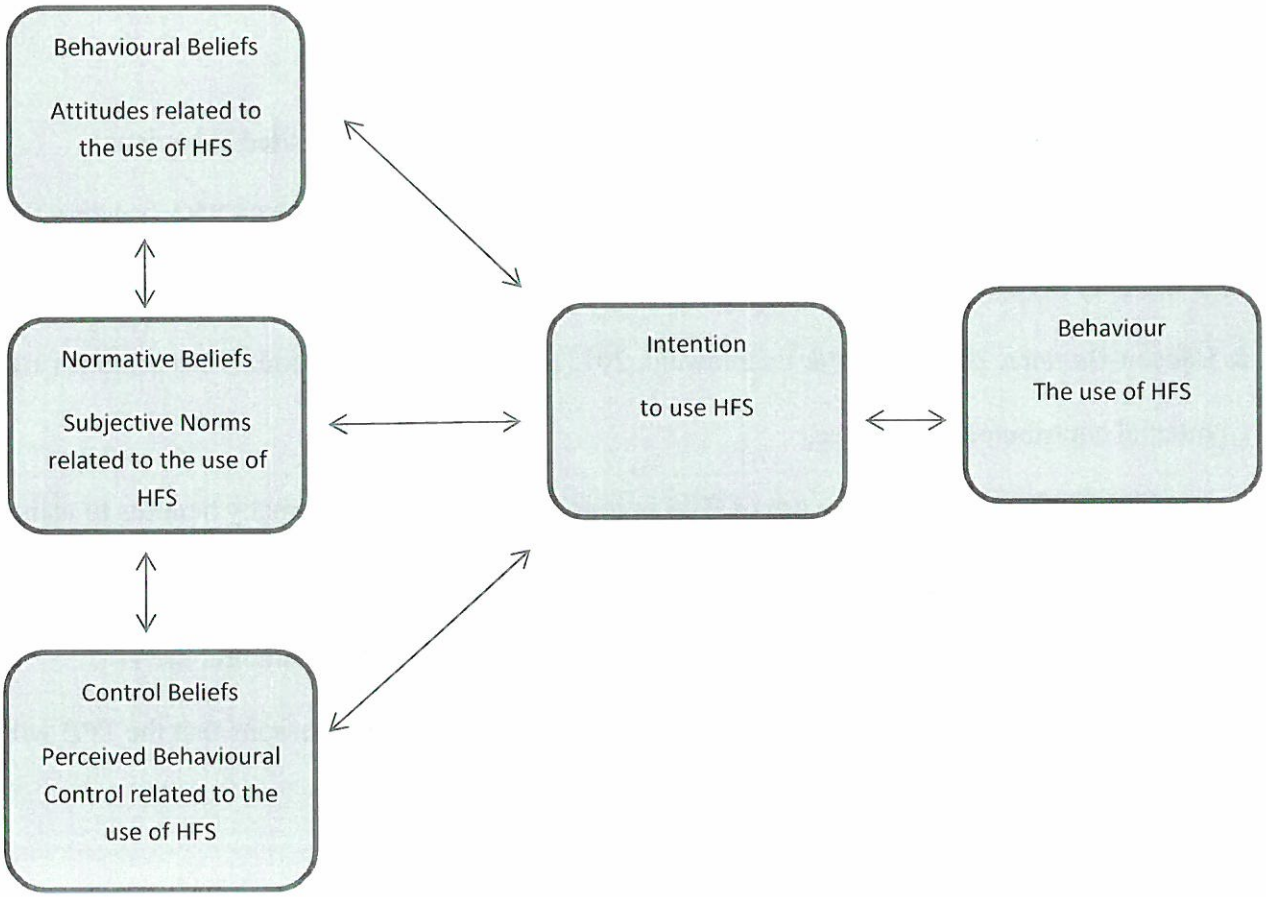

Figure 1. Conceptual Model based on the Theory of Planned Behaviour.

Note: Adapted from "Theory of Planned Behaviour Diagram," by I. Ajzen, 2006b, retrieved from http://people.umass.edu/aizen/tpb.diag.html#null-link.

Purpose, Research Questions and Hypotheses

Training is needed with any technology. High fidelity simulators are no different – training is needed in order to use them. The literature does not clearly identify whether nursing faculty's attitudes regarding simulation affect the use of HFS in nursing curricula. Literature regarding faculty's attitudes towards HFS use is limited; however, positive attitudes resulting from HFS use have been documented (Grady et al., 2008). It is believed that a lack of faculty development related to HFS does lead to a negative attitude towards HFS and therefore limited usage (King et al., 2008).

The purpose of this research is to explore factors related to nurse educator's use of HFS in nursing education in Alberta, using the Theory of Planned Behaviour. To guide this research, two questions were asked: (a) what is the impact of nursing faculty's attitude on their intentions to use HFS in undergraduate nursing education? and (b) Is the TPB a useful theory for examining HFS use in nursing?

It is hypothesized that although nursing schools in Alberta have implemented HFS technology in some undergraduate courses, nursing faculty remain reluctant to use it to its full potential for a variety of reasons, including it is time consuming to set up and operate, it requires technological inclination to operate, and there is a lack of support and resources from the institution to implement its use. Using the TPB, it is hypothesized that HFS use could be determined by one's intentions to use HFS. Intentions are determined by attitudes (whether using HFS is valuable or useful), subjective norms (SN) (perceptions of what others think about using HFS) and perceived behavioural control (PBC) (one's perception of control over using HFS - how easy it is to use and implement). Based on the literature, it is hypothesized that nursing faculty's attitudes are a strong predictor of the faculty members' intentions to use HFS. Faculty 'buy-in' towards the use of HFS and positive attitudes have been cited as necessary to increase the use of HFS in nursing education (Grady et al., 2008; King et al., 2008; Nehring et al., 2013).

Chapter III: Methodology

Research Design

This study used a descriptive, cross-sectional, correlational design in which 87 nursing faculty completed an online survey to explore factors related to nurse educators' use of HFS in undergraduate nursing education in Alberta using the Theory of Planned Behaviour.

Rationale for Design

Advantages. There were several advantages to using a cross-sectional, correlational design for this research. They included an increased flexibility to investigate complex relationships among variables, and this method is efficient and effective when handling large amounts of data, allowing for a foundation on which to build future experimental research (LoBiondo-Wood, Haber, & Singh, 2013). Cross-sectional research is less time-consuming; it entails sampling participants from one point in time, rather than at multiple points in time (LoBiondo-Wood, Haber, & Singh, 2013). This also prevents the risk of maturation that can occur if data is collected over a period of time (LoBiondo-Wood, Haber, & Singh, 2013).

Disadvantages. The cross-sectional, correlational design does not demonstrate a cause and effect relationship between variables (Burns & Grove, 2003; LoBiondo-Wood, Haber, & Singh, 2013). Therefore, this research did not establish what relationship existed between the attitudes of nursing faculty and their use of HFS, but rather determined if a relationship existed. Generally, there is a lack of randomization, that is, the sample participants are not chosen through random sampling methods (LoBiondo-Wood, Haber, & Singh, 2013). Lack of randomization decreases the ability to generalize the results of the study (LoBiondo-Wood, Haber, & Singh, 2013). As this study was designed to explain if a relationship existed among the

identified variables, it corresponded to the purpose of correlational research and therefore, the design was appropriate for the study.

Setting, Collection and Time

The data for this research was collected using a self-report technique, by way of an online survey (Morgan, Gliner & Harmon, 2006) using Limesurvey. Limesurvey is free to use and is hosted on Athabasca University's servers. All participants received a postcard invitation (Appendix B) to participate in the online survey. The postcard contained the purpose of the study as well as a web link to the online survey. The completion and submission of the online survey was considered informed consent to participate.

Upon completion and submission of the online survey, participants were offered an opportunity to provide their name, address and email address to a different forum, for a draw, as a thank you for participating. Of those participants, who voluntarily provided their contact information, five separate draws were made, each for a $50 gift card to The Keg. This was done as a "Thank you" for participating and did not influence the results of the study.

Population and Sample

Population of interest. In choosing the population of interest for this research, the larger population was first identified as nursing faculty teaching in baccalaureate schools of nursing across Canada. To get a representative sample of this larger group, it was necessary to choose a target population, and from this, an accessible population (Haber & Singh, 2013; Morgan et al., 2006). A sample was then chosen to conduct the needed research from the accessible population (Haber & Singh, 2013; Morgan et al., 2006).

Choosing the sample. The target population was Nursing Faculty teaching in baccalaureate schools of nursing within the Province of Alberta. In order to establish an

accessible population from the target population, assistance from the College and Association of Registered Nurses of Alberta (CARNA) was required. CARNA's database was used to generate a list of all nurses in Alberta, who had chosen their primary place of employment as a nursing education institute for the 2010-2011 licensing year. From this list, all of the 429 nurses were chosen as the sample population – a non-probability, convenience sample.

Inclusion criteria. All participants included in this study were Nursing Faculty teaching in an undergraduate baccalaureate nursing program within the Province of Alberta who are Registered Nurses in the Province of Alberta, holding licensure with the College and Association of Registered Nurses of Alberta (CARNA) during the 2011-2012 licensing year. Nursing faculty teaching in both theory and clinical courses were included, regardless of previous experience with HFS.

Exclusion criteria. Nursing faculty who teach exclusively in Graduate Nursing programs and other non-nursing health care disciplines were not included in the sample.

Why this sampling strategy? Non-probability sampling, particularly that of convenience sampling, was used for this research. Given that a sample, meeting a specific criterion was needed for this study, convenience sampling was a good choice.

Advantages and limitations. As with any sampling strategy, there are both advantages and limitations. The use of convenience sampling for this research made it easy to find a sample that met the inclusion criteria, as was needed. However, using a convenience sample introduces a higher element of bias as the participants who completed the online survey most likely had a vested interest in the topic of the survey, which may bias the results (Haber & Singh, 2013).

Data Collection

Measures. To conduct this research, an online survey was developed and used. A modified TPB survey based on work originally developed by Ajzen was utilized for data collection pertinent to the variables being studied (Appendix C) (Ajzen, 1985, 1991, 2006). The survey was available through online access using the web tool Limesurvey. Demographic data was collected for the study using questions that were placed at the beginning of the online survey. Demographic data collected included age and employment status. Other data collected included experience with HFS, categories of courses taught that used HFS, the year of Baccalaureate Nursing (BN) education that participants have taught in, as well as the amount and types of HFS training the faculty member received. The thirty six-item survey was in the form of a Likert scale that allowed for the examination of whether attitudes of nursing faculty affect HFS within the TPB. Reliability was determined using Cronbach's alpha, ranging from 0.73 to 0.96 for the subscales of the questionnaire.

Attitudes. Attitudes, individual nursing faculty's beliefs about the use of HFS, were measured with 13 survey statements (items). Examples include: "Using HFS is an effective teaching strategy", "Using HFS is a realistic patient care experience", and "I choose teaching strategies based on effectiveness". Items were on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Internal consistency was 0.96.

Subjective norms. Subjective norms, nursing faculty's beliefs about what others think of HFS, were measured with 16 items. Examples include "My institution's administration would approve if I used HFS in nursing courses regularly over the next 4 weeks", "Other faculty members (peers) would approve if I use HFS in nursing courses regularly over the next 4 weeks", "Students would approve if I use HFS in nursing courses regularly over the next 4

weeks". Items were on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Internal consistency was 0.95.

Perceived behavioural control. PBC, nursing faculty's beliefs about their control over using HFS, were measured with 4 items. These items measured ease of use and motivation to use HFS on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Asking participants if they intended to use HFS and how often they intended to use HFS assessed behavioural intentions, the intentions to use HFS. Internal consistency was 0.84.

Intentions. Intentions to participate in HFS were measured with 2 items, on a 7-point Likert scale and one open-ended question. Specifically, one question asked, "I intend to use HFS regularly over the next 4 weeks". This item was measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The other question asked, "How motivated are you to use HFS regularly over the next 4 weeks?" This item was also measured on a 7-point scale ranging from 1 (extremely unmotivated) to 7 (extremely motivated).

One item asked about the intended frequency and duration of HFS use, using an open-ended question. Specifically, the question asked, "How often do you intend to use HFS over the next 4 weeks?" Participants responded by indicating that they intend to use HFS ___ times per week for ____ minutes each time.

Data Analysis

A power analysis was performed, *a priori*, to determine an appropriate sample size using GPower 3.1.5 (Faul, Erdfelder, Buchner & Lang, 2009). It was determined that at a 0.05 level of significance and a power of the test of .80 for a sample of 85 participants would be sufficient to detect a medium effect size of $f^2 = .15$ (Cohen, 1992).

Following data collection, the data was downloaded from the online survey tool and exported to the statistical software package, SPSS 19.0.0.3 (IBM Corp, 2010). Data were cleaned and inspected for influential outliers. Means and standard deviations were reported for continuous variables, such as the age of the nursing instructors. Frequencies were calculated for categorical variables, such as participants experience with HFS. Pearson correlations were calculated and reported among continuous study variables to test relationships between nursing faculty's attitudes, subjective norms, perceived behavioural control and the use of high fidelity simulation in nursing education.

Ordinary least squares regression analyses were used to test the main hypotheses that using the TPB, HFS use could be determined by one's intentions to use HFS. One model was tested to see how attitudes, subjective norms and perceived behavioural control were related to the faculty member's intention to use HFS. This model included the test of attitudes, subjective norms and perceived behavioural control. Tests of variable significance (i.e., beta coefficients) were one-tailed, since the direction of the relationships was hypothesized in advance.

When interpreting the regression analyses, both beta coefficients (β) and structure coefficients (r_{sc}) were examined, as there is growing recognition that regression analysis with correlated predictors can be misleading. That is, the size of beta coefficients is expected to change as variables are introduced or removed from a regression model when even small correlations exist among independent variables. Thus, reporting both beta coefficients (β) and structure coefficients (r_{sc}) presents a stronger interpretation of a regression analysis (Courville & Thompson, 2001; Kraha, Truner, Nimon, Reichwein-Zientek & Henson, 2012; Onwuegbuzie & Daniel, 2003). Specifically, analysis with structure coefficients (r_{sc}) reduces the chance that adding or removing predictor variables to the regression model will alter it. In addition, structure

coefficients (r_{sc}), are not affected by collinearity (multilinearity) (Courville & Thompson, 2001; Kraha, et al., 2012; Onwuegbuzie & Daniel, 2003). They provide an indication of how each independent variable is related to the dependent variable (Courville & Thompson, 2001; Kraha, et al., 2012; Onwuegbuzie & Daniel, 2003).

Ethical Considerations

Participants in this study were not exposed to any physical harm or discomfort, any social harm, or emotional or psychological distress. Subjects completed an anonymous online survey that included some demographic data. There was no personal information or personal identifiers requested by the researcher. Thus, anonymity and confidentiality were maintained.

This research study received ethical approval from Athabasca University's Research Ethics Board (see Appendix A). Ethical consent and permission from the College and Association of Registered Nurses of Alberta (CARNA) was also obtained for the use of their database to gather subjects for the study. Informed consent from each subject was obtained through implied consent with the completion and submission of the online survey.

Chapter IV: Results

Demographic Statistics

There were 429 Registered Nurse educators who met the subject inclusion criteria for the study. Twenty percent (20%) responded to the online survey (n=87), with 52% of these participants (n=45) completing all questions. The mean age of the participants was 48.6 years old (SD=8.99). Ages of the participants ranged from 30 to 69 years with most participants being between the ages of 40 and 60 (n=65).

Of those who answered the demographic questions (n=84), 72 were fulltime-nursing faculty (85.7%); five were part-time nursing faculty (6.0%) and seven were contract-nursing faculty (8.3%). Of those who participated, 26 had no previous experience with HFS (31.0%), while 58 did have experience (69%). Thirty-seven of these (44.0%) had only 1 to 2 years' of experience (see table 1).

Many of the nursing educators had received training with HFS: 39% indicated they had received some level of hands-on training with HFS and 31% noted they had participated in a HFS educational program. 68% of the nursing educators identified they had used HFS in their courses, and of these, 55.7% had used HFS in clinical courses, 32.8% had used HFS in laboratory courses while only 11.5% had used HFS in theory courses. Usage of HFS across each year of undergraduate nursing education was relatively consistent among nurse educators: 30% used HFS in first year, 23.3% in second year, 23.3% in third year and 22.2% in fourth year.

Finally, participants were asked to provide more details regarding the training they received prior to using HFS. Again, answers varied from none to demonstration in a simulation lab by peers to specialized certification courses offered by simulation experts. In fact, one participant identified that they had completed graduate studies with a focus on simulation (see

Table 2).

Table 1

Demographic Characteristics of Study Participants

Demographic Variable	*n*	Percent
Employment Status		
Full time	72	85.7
Part time	5	6.0
Contractual	7	8.3
Total	84	100
Missing	6	-
Experience with HFS		
No experience	26	31.0
1 - 2 years	37	44.0
2 - 5 years	19	22.6
> 5 years	2	2.4
Total	84	100
Missing	6	-
Training with HFS		
Hands on Training	35	49.3
No Hands on Training	36	50.7
Total	71	100
Missing	19	-
Formal Educational Program	28	38.9
No Formal Education Program	44	61.1
Total	72	100
Missing	18	-
Courses Where HFS Used		
Clinical Courses	34	55.7
Theory Courses	7	11.5
Nursing Laboratory	20	32.8
Total	61	100
Missing	29	-

Table 2

Training with HFS

Training	*n*	Sample (%)	Respondents (%)
		n=87	*n*=63
Lab demonstration	14	16.1%	22.2%
Formal workshop (> one day)	12	13.8%	19.0%
SIM Salesman led in-service (< one day)	10	11.5%	15.9%
No training received	10	11.5%	15.9%
Peer faculty led in-service (< one day)	9	10.3%	14.3%
Certificate courses through SIM providers (> one day)	5	5.7%	7.9%
Graduate studies (Simulation focus)	1	1.1%	1.6%

HFS Use and TPB Constructs

To gather data within the TPB constructs (attitudes, subjective norms, perceived behavioural control and intent to use), nursing faculty were asked to rate items using a Likert scale with values ranging from 1 to 7.

Attitudes. Thirteen survey items measured individual nursing faculty's beliefs about the use of HFS. The overall attitude composite mean score was 5.1, indicating an overall positive attitude towards HFS.

Subjective norms. Three groups were identified as being potentially influential on nursing faculty in choosing whether or not to use HFS. These groups were the administration at the educational institute, other faculty members (peers) and students. 86.8% (*n*=68) of the faculty responded positively that their institution's administrators approved of their use of HFS. 79.6% (*n*=69) of the faculty responded that other faculty members (peers) approved of their use of HFS,

while 82.6% (n=69) responded that their students would approve of their use of HFS. 97.3% (n=73) of faculty agreed that student opinions were important to them. The overall subjective norms mean score was 5.3 indicating that participants thought peers were likely to think favourably about HFS use.

Perceived behavioural control. PBC results were based on 4 items, 1 item measuring ease of use, 1 item measuring confidence in use, and 2 items measuring control over use. Thirty four of the participants surveyed (49%) felt that the use of HFS would be easy (n=69). 35 faculty members (51%) believed that HFS would be difficult to use (n=67). 39 faculty members (57%) agreed they were confident to use HFS while 29 faculty members (43%) did not feel confident n=68). 24 faculty members (36%) felt they had little control over using HFS, while 43 faculty members (64%) felt they were in control over their use of HFS (n=67). The PBC composite mean was 3.6, indicating slightly low to neutral perceptions of control over HFS use.

Intentions. Three items (including one open-ended question) were used to explore faculty members' intentions to participate in HFS. The participants' intentions to use HFS as a teaching tool had a composite mean of 3.5 demonstrating, that on average, participants had moderate intentions to use HFS.

Table 3 reflects the composite mean scores for all the TPB variables. The findings indicate the mean of the faculty member's SN towards the use of HFS (5.3) was the most positive while the means of intention to use HFS and PBC were slightly less positive at 3.5 and 3.6, respectively. Correlations were used to show the extent to which nursing faculty's attitudes, their perceptions about what others think of HFS, their perception of their control over using HFS and their intent to use HFS were related (see Table 3).

Table 3

Zero Order Correlations Among the Theory of Planned Behaviour Constructs and HFS

TPB Constructs	Intentions	Attitudes	Subjective Norms	Control Beliefs	Mean (7 point Likert Scale)	SD
Intentions	-	.34*	.36**	.56**	3.4	1.6
Attitudes		-	.18	.05	5.0	1.7
Subjective Norms			-	.41**	5.3	1.2
Control Beliefs				-	3.8	1.6

*$p<.05$
**$p < .01$

Predictors of Intention to use HFS

Linear regression was used to test the association between the theoretical concepts of the TPB, attitudes, subjective norms and behavioural beliefs contribute to the nursing faculty members' intentions to use HFS. A significant regression emerged with attitudes, subjective norms and perceived behavioural control explaining 45% of the variance ($F(3, 41) = 13.08, p <$ .001) in intended use of HFS. Attitude ($\beta=0.30, p < 0.05$) and PBC ($\beta=0.61, p < 0.05$) made significant contributions to intentions to use HFS (See Table 4). Subjective norms were not related to intentions to use HFS ($\beta=0.01, p > 0.1$). However, the structure coefficient for SN (r_{sc} = .47) was similar in size to the structure coefficient for Attitudes (r_{sc} = .48). The structure coefficient for control beliefs was r_{sc} = .90. This indicates control beliefs had the most impact on intentions to use HFS and attitudes and SN made similarly important contributions to HFS.

Table 4

Regression analysis predicting Intentions to use HFS from Theory of Planned Behaviour constructs

TPB Construct	R	R^2	B	p	r_{sc}
Constant (Intentions)	0.70	0.49		0.78	
Attitudes			0.29	0.01	0.47
Subjective Norms			0.01	0.97	0.47
Control Beliefs			0.63	0.001	0.90

Note. $F_{3,41} = 13.08$, $p<0.001$; r_{sc} = structure coefficient

Qualitative Data – Beliefs about HFS use

The survey included three open-ended questions used to gather data on the participants' salient beliefs about HFS. Table 5 presents the most common behavioural beliefs (perceived advantages and disadvantages of HFS), normative beliefs (people who would approve of HFS) and control beliefs (facilitative factors and barriers to HFS) of those nursing faculty members regarding HFS use. The three most common perceived advantages (behavioural beliefs) concerning HFS use was that it provides realistic patient care experiences, promotes critical thinking and does so in a safe, controlled learning environment for students. The three most common perceived disadvantages (behavioural beliefs) concerning HFS use was that it is time consuming to learn & use (for faculty members), there is a lack of support to use HFS and that it actually does not fit with the courses that are taught. Lack of support included a lack of support from peers and from the administration of the educational institutions. A lack of resources included lack of space (infrastructure), lack of time (no additional release time to prepare), no additional financial support or human resources. Interestingly, one participant cited no advantages to HFS, stating, "None, as it is time consuming and I have little to no support from peers."

For control beliefs, nursing faculty members perceived that they would engage in regular use of HFS (facilitative factors) if they had support from others, formal education & training on the use of HFS and the resources of offer HFS (including human & financial resources). The three most common perceived barriers to regular use of HFS were that there was a lack of time, resources and support to actually use HFS. Some comments by participants included, "Faculty are not familiar with HFS and there have negativity on its use" and another said, "It's already pretty difficult to use".

It was identified that the majority of nursing faculty participants identified that they thought all levels of individuals, administrators of their educational institution, peers and students, would approve of them using HFS use regularly. Interestingly, approval for using HFS does not always equate to actually implementation of and use of HFS in nursing education. Some nursing faculty perceived that peers would disapprove of using HFS the most. Participants cited varying reasons for this, including: "faculty unfamiliar with HFS", "peers negative attitude", "peers set in their old ways resistant to change" and one participant who said, "25% of peers, due to lack of comfort with technology, time constraints and not seeing the benefits associated with HFS for the students." However, a similar number of participants identified that no one would disapprove.

Table 5

Most common behavioural, normative, and control beliefs of nursing faculty members regarding HFS use

Beliefs	*n*	Sample (%)	Respondents (%)
Behavioural beliefs			
Perceived advantages		*n*=87	*n*=68
Provides realistic patient care experiences	26	29.9%	38.2%
Promotes critical thinking	17	19.5%	25.0%
Provides a safe learning environment	15	17.2%	22.1%
Encourages active learning	10	11.5%	14.7%
Promotes collaboration	2	2.30%	2.94%
Perceived disadvantages			*n*=58
Time consuming (to learn & use)	20	23.0%	34.5%
Lack of support	8	9.2%	13.8%
Does not 'fit' with courses taught	7	8.0%	12.1%
Poor 'reality'	5	5.6%	8.6%
Poorly implemented	5	5.6%	8.6%
Lack of space	4	4.6%	6.9%
Technology (intimidation with using)	4	4.6%	6.9%
Costs too much	3	3.4%	5.2%
Stressful for students	3	3.4%	5.2%
Lack of training	3	3.4%	5.2%
Lack of comfort	2	2.3%	3.4%
Limited number of students participate at one time	2	2.3%	3.4%
Normative beliefs			
People that would approve			*n*=67
Administration	31	42.5%	55.2%
Peers	27	31.0%	40.3%
Students	27	31.0%	40.3%
People that would disapprove			*n*=65
Peers	15	17.2%	23.1%
No one	14	16.1%	21.5%
Administration	3	3.4%	4.6%
Students	3	3.4%	4.6%
Online learning educators	1	1.1%	1.5%
Control beliefs			
Facilitative factors			*n*=68
Support from others	24	27.6%	35.3%
Formal education/training	16	18.4%	23.5%
Resources (space/time to use HFS)	10	11.5%	14.7%
Theoretical foundation	8	9.2%	11.8%
Perceived barriers			*n*=67
Lack of time (to use HFS)	17	19.5%	25.4%
Lack of resources	13	14.9%	19.4%
Lack of support	13	14.9%	19.4%
Lack of education/training	12	13.8%	17.9%
Lack of access to HFS labs/space	12	13.8%	17.9%
Faculty are uncomfortable with using HFS	5	5.7%	7.5%

To gain an understanding of how HFS was currently being used, participants were asked to indicate the purposes for which they had used HFS (see Table 6). While participants identified a variety of purposes that HFS was used for, many of the uses included demonstrating and evaluating care in complex situations that students may not always have an opportunity to experience in the clinical area. For example, several participants reported using HFS to demonstrate care of the patient during labor and delivery. Others identified using HFS to simulate care of the patient during anaphylaxis or during cardiac events, such as requiring cardiac monitoring or what to do in the event of a cardiac arrest.

Participants identified using HFS for both learning and evaluation purposes, as well as for remediation with students when needed. It was noted that HFS allowed for students to practice (repetition) in a safe-controlled environment prior to moving into the clinical area or for remediation to solidify knowledge and practice, once in the clinical area.

Table 6

Purposes for HFS Use

Main Purposes	Activities HFS Used With
Assessment	Normal Physical Assessment – head to toe • Both adult & pediatric Assessment of Abnormal Findings
Psychomotor Skills	Medication Administration Blood Administration Vital Signs Oxygenation Therapy
Foundational Concepts	Basic Patient Care • Hygiene • Comfort Measures
Evaluation	
Remediation	
Complex Situations	Care of the patient during labor & delivery Code Scenarios Cardiac Monitoring

Chapter V: Discussion and Implications

HFS and TPB Constructs

It was hypothesized that although nursing schools in Alberta have and implement HFS technology in some undergraduate courses, nursing faculty remain reluctant to use it to its full potential for a variety of reasons. These include simulation being time consuming to set up and simulators are time consuming to operate, requiring a technological inclination to operate the simulator, and a lack of support from the institution to implement the use of simulation. These reasons were all supported by the participants who said, "Time, confidence in my abilities, lack of ongoing support", or, "Technical difficulties, time constraints trying to get HFS to work".

Of those who participated in this research, 26 (31%) had no previous experience with HFS, while 58 (69%) did have some previous experience with HFS. Thirty-seven of the participants (44%) had only one to two years' experience (see Table 1). Whereas a majority of participants reported some HFS experience, the amount of experience was low. Only two participants had more than five years of experience. Since data was not collected around how long these participants had been involved in nursing education, it is not clear if years of experience with HFS were related to years in nursing education. This is a consideration for future research. Overall these results suggest that HFS technology is available for use by nursing faculty but faculty members' experiences with HFS are still fairly new.

Of the participants, 70% had received some training with HFS. This training varied from hands on training provided by a colleague who was 'experienced' with the use of the simulator, to a formalized education program with an expert in simulation training. Data was not obtained regarding the specific types of training received by nursing faculty in relation to HFS use. These results suggest that nursing faculty do receive some amount of training related to HFS, but the

extent of this training can vary. Whereas exposure to the technology was generally high, there was no evidence of a consistent process for training faculty.

It was also hypothesized that the TPB would be a useful theory for examining HFS use in nursing education. Specifically, based on existing literature, it was hypothesized that nursing faculty's attitudes would be a strong predictor of the faculty member's intentions to use HFS (Nehring et al., 2013). The results of this study showed that an individual's attitudes, as well as ones' perceived control over an action, were significant contributors to their decision to use HFS. The effect of subjective norms around HFS use was similar in magnitude to attitudes. This suggests that subjective norms for HFS use are relevant. The findings in this research are consistent with findings of other research that indicates that attitudes are strong predictors of nursing faculty's intention to use HFS (King, et al., 2008; Nehring et al., 2013).

These results also highlight the role of social norms in terms of influencing intentions. Social norms arguably reflect a number of factors, as identified by Nehring et al. (2013) in their systematic review of the literature on HFS use among faculty. Specifically, they noted that a lack of faculty buy-in was a barrier to the use of FHS and that a "champion" was required to help coordinate the use of HFS in clinical nursing programs. In this study, participants reported social norms for HFS based on their beliefs that faculty and administrators would support HFS use. Thus, this study is consistent with the results of Nehring et al. (2013). That is, these results suggest that participants perceiving faculty and administrator buy-in or support for HFS use were more likely to intend to use HFS.

The results in the current study indicate that control beliefs were the strongest predictor of intention to use HFS. Thus, the nurse educators in this study who had positive attitudes towards HFS use and felt that their peers were more in favor of HFS use were more likely to

report intending to use HFS. Control beliefs around HFS use were the most important predictor of intending to use HFS. Consistent with the TPB, control beliefs seem to have the power to overtake positive attitudes and subjective norms (Ajzen, 1991). That is, control beliefs involve beliefs about whether or not a behaviour is actually possible to execute. If one believes that using HFS is simply not possible, this would trump any positive attitudes towards HFS and the person would not intend to use HFS. Whereas this is consistent with the TPB literature it is also similar to what has been seen in the HFS literature. That is, a number of specific barriers to HFS use that would be considered as contributing to a sense of poor control have been identified in the literature including cost, scheduling problems, and lack of time (Jones et al., 2013; Nehring & Lashley, 2004; Seropian et al., 2004a, 2004b).

Overall, these results are consistent with the TPB, which suggests that one's attitudes and perceived control over a behaviour as well as one's notions of how one's peers and important other's view the behaviour are both strong predictors of one's intention to perform an action (Ajzen, 1985, 1991; Ajzen & Gilbert-Cote, 2008). Attitudes towards HFS use are generally positive and instructors seem to feel that their institutions and fellow faculty members think HFS use is appropriate and useful. However, instructors have comparatively low control over HFS use and this is the strongest predictor of whether or not an instructor intends to use HFS. Given the number of disparate studies identifying factors leading to increased HFS use as well as barriers to using HFS, this study has shown that a theoretical framework involving previously identified factors, like attitudes and lack of control, can be useful in studying this particular problem, HFS use.

Implications for Research

Several opportunities exist for future research, including using the TPB to study how nursing faculty intend to use HFS. It would be important to further identify other relevant attitudes existing among nursing faculty and how these attitudes predict the use of HFS use in nursing education. Such research would be beneficial to educational institutions - understanding what influences nursing faculty's intentions to use HFS will help to increase HFS use in nursing education. The study of nursing faculty members' attitudes towards HFS has had little research; therefore, further research, with a larger sample size, and additional research with comparisons across institutions would be beneficial. In addition, it would be important to study whether or not there are differences in the intent to use HFS for those nursing faculty members who have more experience with it. Asking does age of the faculty member or experience with HFS have an effect on intent to use HFS is also important – this could have effect on the variances.

Another area of future research would also include studying the extent to which the actual use of HFS by faculty is influenced by TPB constructs and intentions to use HFS. Given that PBC is a strong predictor of the intent to use HFS in nursing education, it will be important for institutions to ensure their nursing faculty members have an increased perceived control over HFS. Identifying how the faculty members can increase their perceived control will assist in actually increasing this control, resulting in an increased intention and actual use of HFS. Further, identifying and incorporating barriers to HFS use that may impact on control beliefs would make a valuable addition to the literature on HFS use and the TPB.

This study examined predictors of intention to use HFS, but future research should examine actual behaviours of those individuals with access to HFS equipment. For example, the TPB hypothesizes that control beliefs can directly influence the behaviour. Based on the

observations in this study, one would expect low control beliefs for HFS use to directly impact upon HFS use. That is, nurse educators who are unsure about their access to HFS equipment or how to use it would likely have low intentions and would be less likely to use HFS.

In terms of simply using HFS equipment for instruction, this study suggests that further testing of the TPB would be useful. However, it may be that effectiveness of HFS use may be affected by poor or favorable attitudes among those who are required to use HFS for educational purposes. It may be that nurse educators find themselves in situations where they have low control, since they may not be fully competent to teach using HFS. Future research would be necessary to examine whether or not the TPB constructs affect performing the behaviour effectively and perhaps, with some effort, in addition to simply performing the behaviour at all.

Implications for Practice

In nursing education two levels of practice needs to be considered, the practice of education and nursing practice in general. This research has implications for both the practice of education and nursing practice. Enhancing the practice of nursing education is necessary for growth of both the nursing faculty member, as an educator and the nursing student, as a beginning practitioner.

Faculty members' attitudes are critical to ensuring positive student learning experiences. It is important that faculty using HFS have a positive attitude, making the HFS experience positive for the student. Administrators of educational institutions should encourage nursing faculty to engage in and learn about HFS. This would help to decrease faculty members' perceptions that administrators are not interested in HFS.

Having opportunities for formal education courses regarding HFS, for nursing faculty, is needed to promote/encourage comfort with technology and use of HFS. Technology in education

is expected – the students expect this in their education, as a part of the delivery of education. Increasing the access to and encouraging attendance at workshops and having discussions for faculty where members can learn and discuss their beliefs and feelings concerning HFS is important.

An increase in HFS in the practice of education will translate into better nursing practice. The use of HFS has been identified as one method of addressing the problem of increased enrolment and limited clinical space. Evidence suggests that HFS enhances students' knowledge base and offers them more realistic scenarios as they transition from student to Registered Nurse (Cooper & Taqueti, 2004; Scherer et al., 2007). Having nursing faculty who embrace and utilize the technology afforded through HFS will enhance student learning and ultimately patient care, leading to more confident, highly skilled nurses.

This current research demonstrates that the nursing faculty member's control beliefs are significantly related to the faculty member's intent to use HFS. That is, control beliefs, beliefs about the factors that may enable or prevent one from using HFS, significantly contribute to one's intention to use HFS. This information is important, as it can be used in terms of identifying what nursing educators believe to be facilitators or hindrances to using HFS. Identifying and remedying perceived or real barriers to HFS use could be a strategy to increase educators' control beliefs, ultimately, increasing their intentions and use of HFS. It may be, as argued above, that poor control can stem from issues of confidence in using HFS in the classroom setting or a lack of control may speak to limited access to HFS equipment. Whether real or perceived, addressing these beliefs and the source of these beliefs might help in terms of improving the use of available HFS equipment.

Strengths & Limitations

This study has both strengths and limitations that should be considered. First, this study adds important and relevant information to the small body of literature regarding HFS simulation use by nursing faculty members. Literature does exist regarding the use of technology by educators and this study adds to that body of literature and extends to more specific circumstances. Another strength of this study is that uses the TPB model and appropriate TPB measures that have demonstrated evidence of validity and reliability (King et al., 2008). As well, the questionnaire used was constructed following previously used TPB questionnaires and following the TPB model for constructing such questionnaires (Ajzen, 2006a; King et al., 2008).

There were several limitations related to this study. The response rate of the survey was relatively low at 20%, with 87 Registered Nurse educators participating in this study. A self-report method for data collection is not often ideal, as there is the possibility of the responses not being accurate. However, there are very few methods for accurately gathering data about attitudes and ones beliefs or feelings, as was collected in this study. Questioning participants is the only way to attain perceptions of attitudes, SN's and PBC. More objective data around access to HFS, actual use of HFS, and objective level of skill with using HFS would enhance future research in this area.

Response rates to surveys/questionnaires have been lower in recent years. A 20% response rate is higher the published response rates for web based surveys. Dillmann (2009) reports a 13% response rate for an online survey in his study comparing phone, mail & web based surveys.

Convenience sampling can be a limitation as there is a risk for sampling bias – this may produces a less representative sample and limits the generalizability of the research. The sample

size, sampling method and a lower response rate of 20% may also limit the generalizability, as I am unsure of the representativeness of the sample. The same results may not apply with another group of participants.

In addition, final data collection for this research was not completed until June 2011. It is possible that, due to the time of year this survey was administered and the nature of the questions asked, educators may not have had active teaching duties as the winter semester was already completed for the academic year. It is unknown whether the nursing educators who responded to this survey were novice or experienced nurse educators since this question was not asked. Experience in nursing education may have an effect on the nursing faculty member's comfort /attitude towards the use of a variety of teaching modalities, including technology, such as HFS.

Chapter VI: Conclusions

As the use of HFS in undergraduate Baccalaureate Nursing programs increases, it is evident that most nursing faculty have some experience with the use of HFS in their courses. It is clear that the needs of nursing faculty in terms of successfully accessing and using HFS must be considered in order to have successful simulations. Gaining an understanding of what influences nursing faculty's intent to use HFS will help to further increase the use of HFS in nursing education. One way to understand faculty development needs in terms of HFS is by using the TPB. Attitudes towards the use of HFS are generally positive and nursing faculty members feel that their administrators and fellow faculty members think HFS is appropriate and useful. However, in practice and in perception, nursing faculty has comparatively low control over HFS use and this perception of control was the strongest predictor of whether or not a faculty member intended to use HFS. Providing faculty development to give nursing faculty members an increase in their control over the use of HFS will increase the use of HFS. If given an opportunity, instructors and institutions seem likely to use HFS.

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Appendix A

Athabasca University CNHS Research Ethics Review Approval

MEMORANDUM

DATE: June 4, 2010

TO: Arlene Walsh-Starkes

COPY: Dr. Shawn Fraser, (Supervisor) Assistant Professor, Health Studies
Janice Green, Secretary, Athabasca University Research Ethics Board
Dr. Simon Nuttgens, Chair, Athabasca University Research Ethics Board

FROM: Dr. Sherri Melrose, Chair, CNHS Research Ethics Review Committee

SUBJECT: Ethics Proposal #CNHS-10-05-Walsh-Starkes: "Can Nursing Faculty's Attitudes Predict High Fidelity Simulation Use?"

The Centre for Nursing & Health Studies (CNHS) Research Ethics Review Committee, acting under authority of the Athabasca University Research Ethics Board to provide an expedited process of review for minimal risk student researcher projects, has reviewed the above-noted proposal and supporting documentation.

I am pleased to advise that this project has been awarded interim APPROVAL TO PROCEED. You may begin your research immediately.

This approval of your application will be reported to the Athabasca University Research Ethics Board (REB) at their next monthly meeting. The REB retains the right to request further information, or to revoke the interim approval, at any time.

As implementation of the proposal progresses, if you need to make any significant changes or modifications, please forward this information immediately to the Centre for Nursing & Health Studies Research Ethics Review Committee via cnhsreb@athabascau.ca for further review.

If you have any questions, please do not hesitate to contact cnhsreb@athabascau.ca.

Appendix B

Postcard Invitation to Participate in Online Survey

Nursing Faculty's Attitudes
& High Fidelity Simulation

This survey is being administered as part of a Master's Thesis in Nursing from Athabasca University. This study will examine nursing faculty member's reasons for using or not using HFS in nursing curriculum in Alberta.

Your participation in this survey will provide information that will help to identify existing HFS use in the province of Alberta and may help to guide nursing faculty in implementing and using HFS in nursing curriculum in baccalaureate nursing education in the future.

Please complete the online survey no later than May 31st, 2011. For a more detailed information letter and to complete the online survey please go to the following web address:

http://www.littleurl.net/AU-Study

Appendix C

Nursing Faculty and High Fidelity Simulation Use Survey

Thank you for taking the time to participate in this survey. Please read each question carefully and answer to the best of your ability.

This questionnaire will ask you specifically about high fidelity simulation use (HFS). HFS is defined as:

> A technologically advanced teaching tool that replicates the real world experiences in an artificial, controlled setting. (GABA, 2004; Jeffries, 2005; Leigh, 2008; Maran & Glavin, 2003; Tuoriniemi & Schott-Baer, 2008)

Please remember this definition of HFS as you answer the following questions.

Demographic Data

1. Please indicate your age, in years _____

2. Please indicate your employment status:

1 = full time nursing faculty 2 = part time nursing faculty 3 = contract nursing faculty

3. As a nursing faculty member, what is your experience with HFS, to date?

1 = No experience 2 = 1 – 2 years 3 = 2 – 5 years 4 = more than 5 years

4. Select the types of nursing courses you have used HFS in:

__ Clinical courses __Theory courses __Laboratory courses

5. Select the year(s) of nursing education you have used HFS in:

__ 1st year __2nd year __3rd year __4th year

6. Indicate the purposes you have used HFS for in your courses:

_____

_____

_____

_____

7. As a nursing faculty member, have you received hands on training with HFS?

   1 = Yes 2 = No

8. As a nursing faculty member, have you participated in a HFS educational program?

   1 = Yes 2 = No

9. Describe the type(s) of training you received prior to using HFS:

_____

_____

_____

Please fill in the blank:

10. I have used HFS as a teaching tool, with students, _____ times during the past 4 weeks.

Overall, how would you evaluate using HFS over the next 4 weeks? Please use the scale below each item to guide your responses. Please complete all 6 items (i.e., a through f).

For me, using HFS over the next 4 weeks would be…

a.	1	2	3	4	5	6	7
	extremely unenjoyable	quite unenjoyable	slightly unenjoyable		slightly enjoyable	quite enjoyable	extremely enjoyable
b.	1	2	3	4	5	6	7
	extremely boring	quite boring	slightly boring		slightly fun	quite fun	extremely fun
c.	1	2	3	4	5	6	7
	extremely useless	quite useless	slightly useless		slightly useful	quite useful	extremely useful
d.	1	2	3	4	5	6	7
	extremely unpleasant	quite unpleasant	slightly unpleasant		slightly pleasant	quite pleasant	extremely pleasant
e.	1	2	3	4	5	6	7
	extremely bad	quite bad	slightly bad		slightly good	quite good	extremely good

Please remember to complete all the above items (i.e., a through e)

Please choose the best answer to the following statements.

(1) HFS fits well into the courses that I teach.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	Neither	slightly agree	moderately agree	strongly agree

(2) I am comfortable using HFS as a teaching tool.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(3) I am comfortable using different technologies when I teach.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(4) I am competent using HFS as a teaching tool.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(5) Using HFS is an effective teaching strategy.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(6) Using HFS is a realistic patient care experience.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(7) I choose teaching strategies based on effectiveness.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

(8) Providing realistic patient care to students is important.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

Overall, how much support do you feel you will receive from:

(1) Your institution's administration, (2) Other faculty members (peers), and (3) The students if you use HFS in nursing courses over the next 4 weeks?

Please use the scale below each question to guide your responses.

1. My institution's administration would approve if I use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

2. Other faculty members (peers) would approve if I use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

3. The students would approve if I use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

4. My institution's administration would encourage me to use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

5. Other faculty members (peers) would encourage me to use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

6. The students would encourage me to use HFS in nursing courses regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

7. My institutions administration would support me using HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

8. Other faculty members (peers) would support me using HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

9. The students would support me using HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

10. Other faculty members (peers) will use HFS regularly themselves over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

11. My institutions administration wants me to use HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

12. Other faculty members (peers) want me to use HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

13. The students want me to use HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

14. My institutions administration's opinions are important to me.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

15. Other faculty members (peers) opinions are important to me.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

16. The student's opinions are important to me.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

Overall how easy or difficult will it be for you to use HFS y over the next 4 weeks if you were really motivated? Please use the scale below each question to guide your responses.

1. If you were really motivated, using HFS regularly over the next 4 weeks would be…

1	2	3	4	5	6	7
extremely difficult	quite difficult	slightly difficult	Neither	slightly easy	quite easy	extremely easy

2. If you were really motivated, how confident are you that you could use HFS regularly over the next 4 weeks?

1	2	3	4	5	6	7
not at all confident			moderately confident			extremely confident

3. If you were really motivated, how much control do you feel you would have in using HFS regularly over the next 4 weeks?

1	2	3	4	5	6	7
very little control			moderate control			complete control

4. Whether or not I use HFS regularly over the next 4 weeks is completely up to me.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

Overall, do you plan on using HFS regularly over the next 4 weeks? Please use the scale below to guide your responses.

For questions #3, please fill in the frequency (number of times) and duration (minutes) that you intend to use HFS.

1. I intend to use HFS regularly over the next 4 weeks.

1	2	3	4	5	6	7
strongly disagree	moderately disagree	slightly disagree	neither	slightly agree	moderately agree	strongly agree

2. How motivated are you to use HFS regularly over the next 4 weeks?

1	2	3	4	5	6	7
extremely unmotivated	quite unmotivated	slightly unmotivated	neither	slightly motivated	quite motivated	extremely motivated

3. How often do you intend to use HFS over the next 4 weeks?

_____ times per week for _____ minutes each time

For this next set of questions, we ask you to focus specifically on HFS.

1. What do you think, for you, would be the main advantages and disadvantages of using HFS?

Main advantages	**Main disadvantages**
_____	_____
_____	_____
_____	_____

2. What factors do you think would it make it easier or more difficult for you to use HFS?

Preventive factors	**Helpful factors**
_____	_____
_____	_____
_____	_____

3. What people or groups would approve or disapprove of you using HFS? (e.g., peers, institutional administration, students, etc)

People that would approve	**People that would disapprove**
_____	_____
_____	_____
_____	_____