Nursing students' perceptions and expriences of high fidelity simulation as a learning and teaching strategy in a resource limited setting

By

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Declaration

By submitting this thesis electronically, I Takaedza Munangatire declare that the entirety of the work contained therein is my own, original work, that I am the authorship owner thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Abstract

Introduction and Background

High fidelity simulation (HFS) refers to a mannequin that is modeled to represent a human and is programmed to produce physiologic functions such as palpable pulses, voices and abdominal sounds through computer interfaces. Recent introduction of HFS for learning nursing skills like critical thinking and problem solving in the developing world (Lesotho) has generated debate. The debate is centered on the acceptability of HFS, its effectiveness as a learning strategy compared to its high cost, especially in resource limited settings. Its acceptability in the developing world to date is mixed, affecting its ultimate utilization. Therefore contextual differences between developing and developed countries suggest that research findings on the evaluation of acceptability of HFS in the two places could be different. Additionally, health sciences education is a highly complex discipline with huge differences in practices within and across classes, schools, sites and countries, making it difficult to generalize findings from other settings to the setting of Lesotho.

Aim

The purpose of this study was to explore third year diploma in nursing students' perceptions and experiences of HFS use in learning nursing skills.

Methods

A qualitative descriptive design was utilized to investigate HFS use at a school of nursing. Sixteen participants took part in three separate focus group discussions in two groups of five, and one group of six participants. The data was analyzed thematically.

Results

Students had mixed perceptions, positive and negative, based on the nature of their experiences which were both fulfilling and frustrating. This study revealed five key themes that shaped students experiences, hence perceptions of using HFS in learning. The themes are authentic learning environment, unique learning opportunities, access, contextual factors and transfer of skills.

Discussion

Student nurses had both positive and negative experiences of using HFS in learning. They believe that HFS is a valuable learning strategy but that it needs to be better utilized. Student nurses perceive HFS as providing an authentic learning environment which allows learning of complex skills like critical thinking and problem solving. On the other hand, they believe that learning can be improved if HFS is more accessible for use by students and if supervisors are adequately trained and students are better oriented on the use of HFS in learning.

Conclusions

HFS is viewed as an effective learning strategy among nursing students in resource limited settings, although there in need to improve its utilization for better learning experiences and outcomes.

Opsomming

Inleiding en Agtergrond

Hoëtrou-simulasie (HTS) verwys na ’n pop wat gemodelleer is om ’n mens te verteenwoordig en geprogrammeer is om fisiologiese funksies soos tasbare polse, stemme en abdominale klanke te lewer deur rekenaar-koppelvlakke. Onlangse bekendstelling van HTS in die aanleer van verpleegvaardighede soos kritiese denke en probleemoplossing in die ontwikkelende wêreld (Lesotho) het debat laat ontstaan. Die debat sentreer om die aanvaarbaarheid van HTS en sy effektiwiteit as ’n leerstrategie in vergelyking met sy hoë koste, veral in hulpbronbeperkte omgewings. HTS se aanvaarbaarheid op verskillende plekke in die ontwikkelende wêreld tot op datum is gemeng, wat die uiteindelike gebruik daarvan raak. Daarom dui kontekstuele verskille tussen ontwikkelende en ontwikkelde lande aan dat navorsingsbevindings oor die beoordeling van aanvaarbaarheid van HTS in die twee omgewings kan wissel. Bykomend is opleiding in die gesondheidswetenskappe ’n uiters komplekse dissipline met groot verskille in praktyke binne en oor klasse, skole, omgewings en lande, wat dit moeilik maak om bevindings van ander omgewings tot die omgewing van Lesotho te veralgemeen.

Doel

Die doel van hierdie studie was om derdejaar-diplomaverpleegstudente se persepsies en ervarings van die gebruik van HTS vir die aanleer van verpleegvaardighede te ondersoek.

Metodes

’n Kwalitatiewe gevallestudieontwerp is benut om die verskynsel van HTS by Paray Verpleegkundeskool te ondersoek. Sestien deelnemers het aan die verskillende fokusgroepbesprekings deelgeneem in twee groepe van vyf, en een groep van ses deelnemers. Die data is ontleed met die gebruik van die konstante vergelykingsanalise-model.

Resultate

Studente het gemengde waarnemings, positief en negatief, ervaar, gebaseer op die aard van hul ondervindings wat sowel vervullend as frustrerend was. Hierdie studie het vyf sleuteltemas geopenbaar wat studente se ondervindings, en sodoende hul waarnemings van die gebruik van HTS in opleiding gevorm het. Die temas is outentieke leeromgewing, unieke leergeleenthede, toegang, kontekstuele faktore en oordrag van vaardighede.

Bespreking

Studentverpleegsters aanvaar die gebruik van HTS om verpleegvaardighede te leer. Hulle glo dat HTS ’n waardevolle leerstrategie is, wat egter beter benut moet word. Studentverpleegsters beskou HTS as ’n verskaffer van ’n outentieke leeromgewing wat die aanleer van komplekse vaardighede soos kritiese denke en probleemoplossing toelaat. Aan die ander kant glo hulle dat opleiding verbeter kan word indien HTS meer toeganklik is vir gebruik deur studente en indien toesighouers voldoende opgelei is en studente beter voorgelig word in die gebruik van HTS as opleidingsmiddel.

Gevolgtrekkings

HTS is ’n aanvaarbare leerstrategie onder verpleegstudente in omgewings met beperkte hulpbronne, hoewel daar ’n behoefte is om die benutting daarvan vir beter leerervarings en uitkomstes te verbeter.

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List of Abbreviations

The following is a list of frequently used abbreviations and acronyms.

HFS	High fidelity simulation
NEPI	Nursing Education Partnership Initiative
NESF	Nursing Education Simulation Framework
OSCE	Objective Structured Clinical Examination
PEPFAR	United States President's Emergency Plan for AIDS Relief
SURMEPI	Stellenbosch University Rural Medical Education Partnership Initiative
FGD	Focus Group Discussion
P	Participant

Glossary and Definition of Terms

Clinical attachment. Refers to learning of students in the actual place of practice, like the hospital or clinic through self-practice or observation (ROSE 2014)

Fidelity**.** Fidelity describes the extent to which a simulation represents reality (Durham, Baker & Moore, 2009).

Focus group interview. It is a data collection technique used in qualitative research to explore the views and opinions of participants on a particular topic. Participants are purposively selected due to their common characteristics (Rabiee, 2004).

High fidelity simulation. A HFS is the process whereby a mannequin that is modeled to represent humans and is programmed to produce physiologic functions such as palpable pulses, voices and abdominal sounds through computer interfaces (McGovern et al., 2013; Bux 2009).

High fidelity simulator. A computer driven mannequin (manikin) with a degree of physiologic response that mimics real patients (Ober 2009).

Low fidelity simulation. Refers to the use of static and non-responsive mannequins in teaching and learning of skills (Tosterud, Hedelin & Hall-Lord 2013).

Mannequin/Manikin. Life-sized anatomical human model used in clinical education (Durham, Baker & Moore 2009)

Perceiving. It is a process whereby individuals give meaning to sensations or impressions of objects or events in the world around them (Ballard 2002).

Perceptions. Refers to what people think they see in a given situation (Morris, Dillon 1997).

Simulation. Simulation is the art and science of recreating a clinical scenario in an artificial setting (simulation laboratory) to allow for deliberate teaching and learning of clinical skills (Hicks, Coke & Li 2009).

Chapter 1: Introduction to the study

1.1 Introduction

Nurses training at entry qualification come from different educational levels, ranging from certificate to degree level. In most settings there are clearly defined roles for each level of nurse. In some cases, however, it is difficult to separate the roles of different nurses WHO 2013). In the developing world, the majorities of nurses are trained at diploma level and carry the burden of delivering quality nursing care (WHO 2013). To fulfil this expectation, nurses are expected to master a lot of knowledge, skills and attitudes and integrate them in delivering nursing care in all settings of care. Unfortunately most of the teaching at the school of nursing under study promotes learning of these skills separately. When students graduate, they have to integrate these skills, think critically, and solve problems (Morgan 2006).These skills are needed, but classroom learning, traditional simulation practice, and work based learning without a deliberate goal of integration of skills may not be good enough to produce a competent nurse (Morgan 2006). Therefore, students start integration of skills after graduation, putting a lot of pressure on them and possibly leading to mistakes that may harm both the nurse and the patient (WHO 2013). By introducing high fidelity simulation in the training of nurses these key skills of integration of knowledge, skills and attitudes, critical thinking and problem solving may be deliberately learnt in the simulation laboratory and could lead to better equipped nurses (Thidemann & Söderhamn 2013).

The introduction of high fidelity simulation (HFS) has generated debate on its suitability as a teaching and learning strategy (Davies & Alinier 2011). This debate is based on a lack of evidence to prove that HFS can improve learning outcomes better than low to medium fidelity simulation which has been in use in training of nurses for a long time (Kuznar 2007). In addition, HFS is expensive and complicated to use as compared to other forms of simulation. Yuan, Williams and Fang (2012) and Schiavenato (2009) strongly argue that simulation in general has not been validated as a teaching and learning strategy that could ultimately improve the level of skills of graduating nurses. Therefore, embarking on more expensive and complicated types of simulation like HFS could be seen as an unnecessary complication in the training of nurses.

A number of studies have been conducted to validate and evaluate HFS as a teaching and learning strategy, with the majority of these studies coming from the developed world, and only

a few from developing countries (Davies & Alinier 2011). Validation of HFS in the developing world could yield different results due to a number of reasons. First, HFS is very expensive and having HFS may be considered a waste of scarce resources, and hence unacceptable (Jeffries 2007). Second, having simulators alone is not enough; there is need for a dedicated and secure simulation laboratory and other supporting equipment required for HFS, further increasing the cost (Hicks, Coke & Li 2009). Third, HFS is a new strategy in nursing and is driven by complex technology which educators and students from developing countries may find challenging to cope with. Contextual differences between developing and developed countries suggest that the research findings on evaluation of HFS in the two areas could be different.

Health sciences education is a highly complex discipline with huge differences in practices within and across classes, schools, sites and countries, making it difficult to generalize findings from other settings to the setting of Lesotho (Ringsted, Hodges & Scherpbier 2011). In this context there is a need to evaluate HFS use in learning in Lesotho so as to improve its use as well as justify its future use and the high cost associated with it (Jeffries 2007). Therefore, the researcher proposes to evaluate HFS as a teaching and learning strategy using the Kirkpatrick model of evaluation of training (Kirkpatrick 1996).

1.2 Background

The school of nursing in this study integrated HFS into the training of nurses in 2012. This followed the setting up of a clinical skills laboratory and procurement of high fidelity simulators such as Susie, a product of Gaumard through the Nursing Education Partnership Initiative (NEPI 2012). This project is funded by the United States President's Emergency Plan for AIDS Relief (PEPFAR) and was initiated through the Ministry of Health of Lesotho in 2011. Through the NEPI, Lesotho seeks to train 2,625 nurses and midwives to meet the nurse - midwife density of 1.73 per 1000 people by 2015 (NEPI 2011). This is aimed at addressing the nursing shortage, high maternal mortality rate and the HIV/AIDS disease burden facing the country. In this regard, there has been a general increase in nursing colleges' enrollments in the country, including the school in this study, which increased its intake from twenty students in 2009 to fifty students in 2011 in the diploma in nursing programme. However, this initiative just increases the quantity of nurses without necessarily ensuring their competence. The NEPI has therefore also embarked on a lecturer's capacity building, preceptorship and mentorship programme that includes clinical simulation (NEPI 2012)

With regard to simulation use, students are expected to be enrolled in the simulation laboratory for one week prior to each clinical attachment; there are six one month long clinical attachments per academic year. During the attachment in the simulation laboratory students learn using low fidelity, medium fidelity and high fidelity simulators. The simulation laboratory is open for students to use in their own time, but they have access to high fidelity simulators only when there is a supervisor to assist them. The researcher facilitates learning during this attachment and has been using HFS for two years.

With simulation taking a significant part of students' clinical placement time, there is a need to show that students' outcomes are improved by using HFS (Berragan 2011). The extent to which competence using HFS can be transferred into the real clinical area or how HFS experience compares with real clinical experience in developing students' competence is not well known (Hicks, Coke & Li 2009). In this context further studies are needed to assess the effectiveness of simulation based education and clarify what works for whom and under what circumstances (Jansson, Kääriäinen & Kyngäs 2012 ; Cook et al 2013).

1.3 Motivation for the Study

As a nurse educator in the diploma in the nursing programme, the researcher has a key interest in the quality of graduates from the school of nursing. The investment in a simulation laboratory, and HFS in particular, provided an opportunity to improve student acquisition of key skills required to ensure competent practitioners (Thidemann & Söderhamn 2013). Skills such as the ability to integrate knowledge, skills and attitudes through critical thinking and problem solving could possibly be enhanced through the use of HFS (Wang, Fitzpatrick & Petrini 2012). However, for HFS to improve student competence, the strategy should be well designed and effectively utilized (Weller et al. 2012).

While the design of simulation could be learnt from other settings with established HFS facilities, utilization involves a number of contextual factors like acceptability of HFS and coping with its complex technology which differ from place to place. Due to these differences there is a need to explore people's reaction to HFS introduction from place to place. This exploration took the form of an evaluation based on Kirkpatrick's model of evaluation of training.

According to Kirkpatrick (1996) training can be evaluated at four levels; reaction, learning, behavior and results level. First, evaluation of reaction is about how learners felt, and their personal reactions to the training or learning experience. Second, evaluation of learning is the

measurement of the increase in knowledge, skills and attitudes after the learning experience. Third, evaluation of behavior is the extent to which the trainees applied the learning and changed their behavior. Lastly, evaluation of results is the effect on the output resulting from the improved performance of the trainee.

In this study the researcher deliberately chose to evaluate HFS using the first level, namely learning at the level of reaction. This is based on the fact that studies have shown that HFS set-ups face challenges ranging from poor planning, to underutilization or improper use, resulting in failure to realize its true value as a learning strategy (Weller et al. 2012). Consequently, it would be unfair to evaluate HFS at the level of learning of Kirkpatrick's model without fully understanding how well HFS is being used in learning in Lesotho. Based on Kirkpatrick's model of evaluation of teaching strategies, the perceptions and experiences of student nurses' represent students' reaction to HFS use in learning. This reaction was important in getting a deeper understanding of how well HFS was accepted and hence utilized in Lesotho (Van Tartwijk & Driessen 2009). If well accepted and effectively utilized, then evaluation of HFS at higher levels of Kirkpatrick's model can be conducted.

1.4 Problem Statement

Generally, current teaching and learning strategies fall short of producing competent nurses who possess critical thinking and problem solving skills and can integrate knowledge, psychomotor and affective skills (Banning 2005). The continued production of increasing numbers of inadequately trained nurses is a waste of scarce resources and may culminate in the collapse of the health care delivery system of the country. In light of this, Lesotho has introduced a number of innovative teaching and learning strategies, including HFS, to improve graduating nurses' skills. Although HFS is being regarded as one of the most innovative teaching and learning strategies that can improve nurses training outcomes (Jeffries 2007), it has not been used in Lesotho in any field; therefore its implementation is experimental.

The current group of nurse educators, clinical instructors and student nurses has never used HFS in their training in nursing or nursing education, yet they are expected to accept and effectively implement it in learning nursing skills. Even though studies in the developing world have shown that HFS is favorably received by students, there are contextual factors that may result in different findings in the developing world. Ringsted, Hodges and Scherpbier (2011) support this by arguing that health sciences education is a highly complex discipline with huge

differences in practice within and across classes, schools, sites and countries, making it difficult to generalize findings from one setting to the other.

1.5 Research Question

The research question formulated for this study is:

What are the third year nursing students' perceptions and experiences of HFS use as a learning strategy at Paray School of Nursing?

1.6 Statement of Purpose and Aim

The purpose of this study was to evaluate HFS as a learning strategy at level one (reaction to the strategy) of Kirkpatrick's model of evaluating the effectiveness of training (Kirkpatrick 1996). This was done through exploration of third year diploma in nursing students' perceptions and experiences of HFS use in learning nursing skills in a case study at a school of nursing in Lesotho.

1.7 Objective of the study

The objective of this study is to describe nursing students' perceptions and experiences of HFS use.

1.8 Assumptions

The focus of this study was on the use of HFS as a learning strategy that student nurses in limited resource settings have been exposed to. The students had to adjust to the opportunities and challenges presented by HFS in learning nursing skills in their quest to become competent. Understanding their perceptions and experiences of using HFS in learning can assist lecturers and administrators to devise strategies that maximize learning opportunities and reduce the challenges presented by HFS.

It was assumed that participants were adult learners who would freely express themselves during focus group discussions with the researcher, despite the researcher being a lecturer at the school. This assumption was made on the basis that the researcher was not facilitating learning to this particular group of participants who were third year students, and therefore the authority gradient between participants and researcher may not have been an inhibiting factor. The other assumption was that participants understood and answered each focus group and

debriefing question without bias and responded to the best of their ability while interpreting the items as intended (Gilje, Klose & Birger 2007).

1.9 Envisaged Contribution of the Study

The findings from this study are important in improving utilize of HFS by both nurse educators and students. An understanding of students' perceptions and experiences of HFS use in learning will help improve the design and delivery using this strategy. An effectively utilized HFS strategy forms the basis for the evaluation of the extent of transferability of simulation competence to actual clinical competence. Since HFS is still a new teaching and learning strategy in nursing in Lesotho and other developing countries, there is a lack of evidence to support its suitability for use in the developing world setting (Davies & Alinier 2011). According to Jeffries (2007) simulation is very expensive, requires special training and extra time to develop effective simulation experiences for students. Justification for the value of high fidelity simulation as a teaching and learning strategy is necessary. Therefore findings of this research are significant to:

1. nursing educators in terms of supporting students in learning clinical skills using HFS and linking HFS with the idea of evidence based practice;

2. curriculum developers so they can make informed decisions on how to integrate HFS into the nursing curriculum;

3. funders of HFS in Lesotho (PEPFAR) to know the measure of effectiveness of HFS use in developing student competence and justifying future investments in HFS in the developing world.

1.10 Report Outline

Chapter one gives an orientation to the study which includes an introduction, the background and motivation for the study, problem statement, research question, aims of the study and the theoretical assumptions to the study.

Chapter two presents the literature review which includes a description of HFS, simulation as a learning pedagogy, use of HFS in teaching and learning and students' perceptions and experiences of HFS use in learning.

Chapter three focuses on research methodology, including a discussion on the case study, and a detailed description of all the steps followed to complete this study.

Chapter four gives a detailed description of the results from the focus group discussions.

Chapter five concludes with a discussion of the results, conclusions and recommendations from the study.

Chapter 2: Literature Review

2.1 What is HFS?

Simulation is the art and science of recreating a clinical scenario in an artificial setting (simulation laboratory) to allow for deliberate teaching and learning of clinical skills (Hicks, Coke & Li 2009). Simulation can take the form of low, medium and high fidelity simulation. The form of simulation is determined by the type of simulator in use. An HFS is a mannequin that is modeled to represent humans and is programmed to produce physiologic functions such as palpable pulses, voices and abdominal sounds through computer interfaces (Bux 2009; McGovern et al. 2013). The mannequins can be manipulated to resemble human beings through feeding scenarios into the computer. This use of technologically advanced mannequins in teaching and learning nursing skills is referred to as high fidelity simulation (Cook et al. 2013; Kuznar 2007; McCaughey & Traynor 2010; Solnick & Weiss 2007). The use of responsive mannequins in HFS differentiates HFS from low fidelity simulation which uses static and non-responsive mannequins in teaching and learning psychomotor skills (Tosterud, Hedelin & Hall-Lord 2013).

In Lesotho, high fidelity simulators come in the form of Susie, a Gaumard product. Susie's physiologic states are controlled by a wireless personal computer at distances of up to three hundred meters. The physiologic functions of Susie include respiratory, cardiovascular, ocular and gastrointestinal responses. However, Susie does not respond to pharmacological therapy (Good et al. 2013). The presence of Susie and other simulators in nursing schools in Lesotho has promoted the use of HFS as pedagogy.

2.2 Simulation as a Learning Pedagogy: Underpinning Learning Theories

High fidelity simulation has become a common pedagogical approach in nursing programmes (McGovern et al. 2013; Paige & Daley 2009). In HFS use, learning occurs through the creation of clinical scenarios that students are expected to study and solve on their own. The teacher takes an observer's role as the students work on the clinical scenario and gives feedback to the students after the process. Students have opportunities to try different ways of solving the clinical scenario without any risk to the simulator (Bux 2009). When students have mastered solving the clinical scenario, then they can go to the actual clinical area where they will deal with actual clinical situations and patients. Such learning experience is a shift from teacher centered approaches to a student centered approach because the students are actively involved in the

learning process (Berragan 2011; Maran & Glavin 2003). By going through the clinical scenarios several times, students experientially learn and discover the right skills required to solve a scenario. This type of learning is supported by the theory of constructivism, experiential learning and situated cognition (Paige & Daley 2009).

These learning theories support HFS as a learning strategy which is student centered because students learn by doing and self-discovery. In constructivism students learn by constructing meaning (clinical scenario learning outcome), thus meaning is constructed in a context or situation (HFS in simulation laboratory). However, for learning to take place, several situations and contexts (different scenarios) need to be understood, hence students need to undergo experiential learning (several attempts to solve a scenario) (Berragan 2011). Having mastered several nursing learning outcomes in the simulation laboratory, there is need for situated cognition where students transform and reinvent the learned experiences and apply them to another context, the clinical area (Paige & Daley 2009). Therefore HFS allows nursing students to achieve competence in critical thinking, decision making, problem solving, team work and communication skills, and to practice the integration of these skills (Jeffries 2007; Tosterud, Hedelin & Hall-Lord 2013).

2.2 Use of HFS in Teaching and Learning: Theoretical Framework

The Nursing Education Simulation Framework (NESF) defines simulation education variables and provides an organized guide for simulation use in teaching and learning (Jeffries 2005). It consists of six constructs; teacher, student, educational practices, outcomes, and simulation design characteristics. Variables associated with the teacher, student, and educational practices components are related and interact to facilitate an effective teaching and learning environment (Jeffries 2005, 2007). The first construct of this framework is teacher factors, which include faculty preparation and decisions related to the instructor's role during the simulation. The second construct is student factors, which include consideration of the students' age, type of nursing program, and level within the program. The third construct is educational practices which are based on seven pedagogical principles thought to improve student performance and promote learning (Chickering, Gamson 1987; Jeffries 2007). These seven principles are active learning, high expectations, prompt feedback, student faculty interaction, collaborative learning, diverse learning, and time on task (Chickering, Gamson 1987). The fourth concept in the Jeffries (2005) framework is scenario design characteristics, which include objectives, fidelity, problem solving, and debriefing. The final step in NESF is outcomes evaluation (Jeffries 2007)

which includes knowledge, skills performance, learner satisfaction, critical thinking and self-confidence.

The constructs interplay as shown in Figure 2.1; hence the role of the perception of the students is important to determine the outcomes of the teaching and learning using simulation (Groom, Henderson & Sittner 2013).

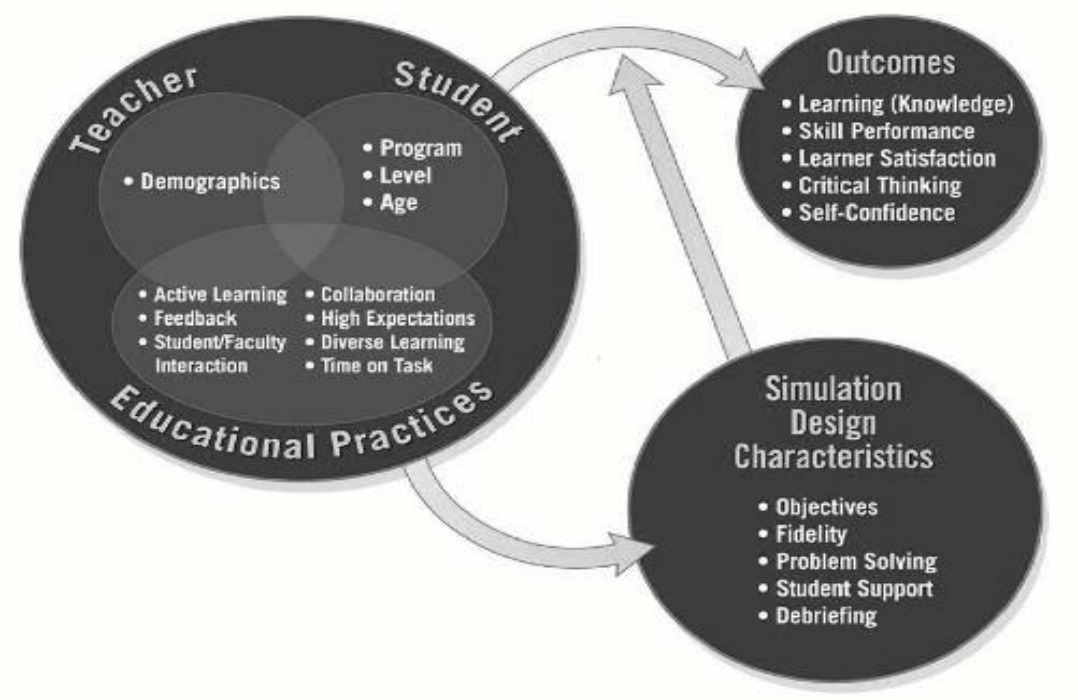

Figure 2.1: The Nursing Education Simulation Framework (NESF), Jeffries (2007)

The model has been utilized in many studies on simulation in nursing. Schlairet (2011) and Young and Shellenbarger (2012) in their studies found NESF to be useful in the evaluation of HFS utilize in nursing. Issenberg et al. (2005) further suggested that the use of this framework improves HFS as a teaching and learning strategy if utilized under the right conditions. These right conditions are feedback, repetitive practice, curriculum integration, range of difficulty level, variety of clinical conditions/scenarios, controlled learning environment, provision for individualized and team learning, clearly defined outcomes and assurance of the validity of a manikin as a teaching and learning tool.

In this study the student's perceptions and experiences are considered in reaction to HFS use as a learning strategy. These perceptions will be elicited using the NESF (Jeffries 2007), which is regarded as the best guide for the design, utilize and evaluation of simulation (Harris et al., 2013). Students' perceptions will be explored with regard to learning outcomes, educational practices, teaching and the design characteristics of simulation.

2.4 Perceptions and Experiences of HFS as a Teaching and Learning Strategy

High fidelity simulation has been perceived to impact on students' level of confidence in performing nursing skills during simulation assessments and objective structured clinical examination (OSCE) in a number of studies. Students who experience HFS perceive it to have increased their level of confidence in performing clinical skills during assessments (Burns, O'Donnell & Artman 2010; Reid-Searl et al. 2012; Reilly & Spratt 2007; Rodgers 2007; Smith, Roehrs 2009; Wang, Fitzpatrick & Petrini 2013). However, it is not conclusive if students' levels of confidence are superior in HFS to other learning strategies (Blum, Borglund & Parcells 2010). The perception of HFS having the ability to improve students' confidence in practicing nursing skills is important as it influences the students' likelihood to practice clinical skills within the simulation laboratory (O'Donnell & Artman 2010). Even though this is the case, perception of having high levels of confidence after HFS experience in the simulation laboratory cannot easily be translated into high confidence in the real clinical situation (Gore et al. 2011). In addition, simulation in general reduces levels of anxiety according to Tiffen, Graf and Corbridge (2009), hence it improves confidence, but when faced with the reality of the actual clinical situation the anxiety levels may rise, reducing the students' level of confidence.

The ability of HFS to motivate students to practice clinical skills in the simulation laboratory helps to promote students participation in the learning process (Butler, Veltre & Brady 2009). Students perceive HFS to be a teaching and learning pedagogy with that unique ability to promote active learning which is important in the acquisition of knowledge and skills that can contribute to the development of competence (Johannesson 2012; Reid-Searl et al. 2012; Weaver 2011). Active learning in HFS is a result of students actually performing activities that lead to discovery of the right knowledge, skills and attitudes required to solve a clinical scenario. According to Butler, Veltre & Brady (2009), Johannesson (2012), Kuznar (2007) and Weaver (2011), students regard HFS to closely approximate the real clinical situation or the human being, giving them a sense of reality and safety when learning in the simulation laboratory. Students value a safe practicing environment as it allows them to fully express and engage in

the teaching and learning process (Johannesson 2012; Reilly & Spratt 2007; Weaver 2011). With full engagement in practicing skills the students' sense of preparedness to practice the skills in real clinical situation increases (Reid-Searl et al. 2012). Consequently, students believe that HFS experience can improve the safety of their practice on real patients due to its greater approximation to the real clinical situation (McCaughey & Traynor 2010).

HFS is perceived to be a very important method of learning clinical skills by nursing students (McCaughey & Traynor 2010). They believe that HFS has a strong, positive impact on their problem solving skills as it allows them to face different clinical scenarios, and think how they can deal with the situations so as to improve patient outcomes (Butler, Veltre & Brady 2009). Furthermore, some feel that HFS can limit the time required in the real clinical situation as well as allow for practice of procedures and simulation of clinical scenarios that are rare in the clinical area (Weaver 2011). This supports students' high level of perception of their satisfaction and acceptance of learning using HFS (Bux 2009; Crouch 2010; Kuznar 2007; Rodgers 2007; Tosterud, Hedelin & Hall-Lord, 2013; Weaver 2011; Wang Fitzpatrick & Petrini 2013). Such positive perception of HFS can be a result of the realities experienced where the number of patients in the clinical area is dwindling against an expanding enrolment of students. Therefore, instead of students being allocated to a clinical rotation where there are limited opportunities to learn, they are attached in the simulation laboratory with HFS, providing them with a highly realistic opportunity to attain competence.

Students' perceptions of their ability to transfer simulation competence into real clinical area competence are mixed. In some instances, students have negative perceptions about their ability to turn simulation competence into clinical competence (Gordon & Buckley 2009). This could be true considering that transferability of clinical skills from the simulation laboratory to the clinical area has not yet been fully established. In some cases students felt that they can apply their psychomotor, problem solving skills and confidence gained in the simulation laboratory to the clinical area (Hope, Garside & Prescott 2011; Radhakrishnan, Roche & Cunningham 2007). Such findings are difficult to contest since perceptions of the ability to do something do not necessarily translate into the actual ability, but are just an indicator of the likelihood of the ability to be replicated. Evidence on the perception of transferability and the actual transferability of HFS competence into the clinical area remains inconclusive, raising the need to further explore this aspect (Cant & Cooper 2010).

According to Adamson (2010) and Ober (2009) students perceive a good orientation to HFS, a well-organized teaching experience and integration of the simulation into their curriculum as well as trained instructors as helpful in promoting the use of HFS. On the other hand, students perceive insufficient instructions on the use of HFS in solving a clinical scenario and lack of full realism of the simulators as barriers to the use of HFS (Longworth 2013; McKenna et al. 2011).

There is sufficient evidence to support HFS use as a teaching and learning strategy in nursing. Theories of constructivism, experiential learning and situated cognition strongly support HFS as pedagogy. Furthermore, the NESF provides a clear guideline on how it can be used in facilitating learning of nursing skills, with research showing positive results in its use as a guideline for HFS implementation (Young & Shellenbarger 2012). However, the evidence on the perceptions and experiences of HFS use in learning shows a mixed reaction, suggesting that HFS may not be well received in certain situations or is not effectively used; hence students have negative experiences and perceptions about it. Therefore, in order to add to the existing evidence, the researcher embarked on a case study to get a deeper understanding of nursing students' perceptions and experiences of HFS use in learning at a school of nursing in a developing country.

Chapter 3: Research Methodology

3.1 Research Design

A descriptive qualitative design was used to conduct this study. The study sought to investigate third year diploma in nursing students' perceptions and experiences of HFS as a learning strategy at a nursing school in Lesotho. This study therefore describes the nursing students' perceptions and experiences of HFS use in teaching and learning. The study provided description of how participants felt and thought and reasons for their feelings and thoughts with regard to HFS use in learning, making a descriptive qualitative design a suitable strategy (Lambert & Lambert 2013) . This allowed the researcher to describe in depth students' experiences and perceptions of using HFS in learning. Furthermore, the study exposed the complex realities of implementing HFS and its results within this particular school (Somekh, Lewin, & Hungler 2005; Polit 1999). Since qualitative descriptive studies a specific case, students' perspectives in this study are very specific to this case; generalizability to a larger population should be based on individual judgment on the quality of evidence presented because a good description can relate to situations beyond a case under study (Parlett & Malcolm 1972; Lambert & Lambert 2013). The reader can recognize aspects of their own experiences or contexts in the described case and generalize them (Stake 1995).

3.2 Research Setting

The study took place at a school of nursing in Lesotho, a developing country where teaching and learning resources are limited; for example, there is a shortage of teaching staff and teaching and learning materials. The acquisition of HFS may be seen as contradictory in a resource limited environment and therefore it is important to acknowledge that HFS was a donation through the Ministry of Health of Lesotho partners. Given the option, the researcher believes that the school would have invested the money in other basic resources required by the nursing school rather than in HFS.

This school of nursing offers a diploma in nursing and a certificate in nursing assistance. The former is a three year programme while the latter is a one year and three months programme. The diploma in nursing is offered on a block release system where students attend classes and do simulation and clinical practice alternatively. In the third year of study students are expected to learn the complex skills of nursing that include critical thinking, problem solving and

integration of knowledge, skills and attitudes in nursing care. This makes strategies like HFS ideal in their learning situation.

With regard to HFS use, students are enrolled in the simulation laboratory for one week prior to each clinical attachment; there are six one month long clinical attachments per academic year. During the attachment in the simulation laboratory, students learn using low fidelity, medium fidelity and high fidelity simulators, with HFS reserved for clinical scenarios and rare or other procedures that cannot be performed using other forms of simulation, for example, resuscitation and blood transfusion, skills ideal for third year students. The simulation laboratory is open for students to use in their own time, but for access to high fidelity simulators there must be a supervisor to assist them.

3.3 Role of the Researcher

This site was selected because of the researcher‘s desire to improve the use of HFS through understanding and insight into participants’ perspectives on the use of HFS in learning. Furthermore, the site was convenient to the researcher and offered easy accessibility for data collection as the researcher is a nurse educator at the school. The researcher also facilitates learning during simulation attachment and has been using HFS for two years, although the researcher was not currently facilitating learning to the group of participants.

3.4 Research Question

“What are the nursing students’ perceptions and experiences of HFS use as a teaching and learning strategy?

3.5 Ethical Considerations

Permission was sought from the school of nursing’s research portfolio while ethical clearance was obtained from the Lesotho Ethics Committee (ethics reference - ID38-2014) and Stellenbosch University Human Research Ethics Committee (ethics reference - S14/02/029)

Participation in this study was voluntary and participants were requested to sign a consent form to participate. There was no direct benefit for participation in the study financially or otherwise, although participants were given refreshments in the form of drinks and sandwiches after the interviews because the interviews took place during their meal time. It is normal practice at the school to provide students with refreshment when they take part in activates that are not directly related to their day to day learning activities. The proposed study findings were anticipated to cause no harm to participants or the community.

Privacy and confidentiality in this study were maintained through a number of measures (Kitzinger & Barbour 1999). First, ground rules were set during focus group discussions where interviewees were given identifiers during the interview, so that responses cannot be linked to any particular participant. Second, the researcher assistant, who also transcribed the data, signed a confidentiality clause (See Appendix E). Third, the transcribed data are stored in password protected folders with access restricted to the researcher only. Fourth, for five years all written information and digital voice recorder files of the study are kept in a locked and secure place determined by the researcher. After the five-year period all material written or recorded will be destroyed. Lastly, the researcher will take care to present findings of this study based on actual facts stated in the interviews and no false information or accusations are included in this report.

3.6 Study Population

The study population for this case study was sixteen third year diploma in nursing students in 2014 at a school of nursing in Lesotho. The researcher deliberately selected this population due to its potential to provide rich data for the study, as the students had experience in using HFS.

3.7 Selection of Subjects

In recruiting participants, the researcher met with the study population to explain the topic and procedures to be followed to participate in the study. This was followed by the hand delivery of information documents and consent forms to potential participants. After a week those willing to participate met with the researcher to clarify any issues before signing the declaration forms. The whole population of sixteen agreed to take part in the study.

3.8 Sampling

A purposive sample of sixteen third year diploma in nursing students who used HFS in learning clinical skills at the school of nursing was selected. The sample was divided into three groups, two groups of five students and one group of six students for the focus group discussions. Although Morgan and Krueger (1993) contend that it is generally acceptable to use a group size of six to twelve participants, Krueger (1995) accepts the use of smaller groups in cases where participants have specialized experience on the phenomenon under study. In this study participants had unique experience in being the first group to use HFS in learning in the school, having previously had experience of using low fidelity simulation.

Focusing on the group discussion, Rabiee (2004) recommends that a focus group is composed of selected individuals that are not necessarily representative, but have a common cause. Therefore the composition of each focus group was randomly formed among the participants since all had a common experience (Onwuegbuzie et al. 2009). The common experiences of the participants created a homogeneity that assisted in generating beneficial data (Kitzinger 1995). Additionally, third year nursing students had most experience of learning with HFS. The reason for this is that utilization of HFS in learning gradually increases as students progress from first year to third year, making them the most informed participants.

The inclusion criteria was all students in the class with the most experience of using HFS, willing to participate, had time to be interviewed and able to express their thoughts in a group. The exclusion criteria was participants all students who were not in the third year diploma in nursing programme, or were unable to attend focus group discussions or could not express their thoughts in a group.

3.9 Instruments

A focus group interview schedule was used in data gathering (see Appendix A). An interview schedule (see Appendix A) was used to allow the researcher to focus and assist in controlling the discussion in the focus group interviews. Krueger and Casey's (2001) guidelines on designing and conducting a focus group interview were used in providing the structure of the interview schedule. Then the NESF and literature on perceptions and experiences of educational experiences were utilized to create the questions of the interview schedule.

3.10 Data Collection

The researcher chose focus group discussion for data collection because it allows exploration of experiences and interaction that elicits rich experiential data more than can be achieved in a one on one interview (Krueger 2009). The researcher and the assistant prepared the venues and seating arrangement in a semi-circle to promote interaction. The researcher moderated the focus group discussions, while the assistant moderator managed digital voice recorders and took notes. Three once off focus group discussions which lasted between 45 and 55 minutes were conducted. Although Morgan (1997) suggests that a focus discussion lasts between one and two hours, in this study the duration was limited by group saturation, when participants started repeating the same perceptions and experiences shared before (Onwuegbuzie et al. 2009). Furthermore, selected participant numbers reflected the range of participants that made

up the population under study, making it possible to reach saturation (Corbin & Strauss 2008**;** Lincoln & Guba 1986; Monnette, Sullivan & DeJong 2005; Sandelowski 2000)**.**

3.11 Data Analysis

While focus group discussion yields different types of data, including transcription data, non-verbal data and moderator notes, Krueger and Casey (2001) recommend analysis of transcription data for less experienced moderators like the researcher in this study. The data recordings were transcribed by the research assistant and given to the researcher together with notes taken during the interviews. The researcher organized the data into paper records to make it easy for the thematic analysis.

Thematic analysis is a method for identifying, analysing and reporting patterns within data which are presented as themes that are vital to describe the case under study (Daly et al. 1997; Braun, Clarke 2006 ;Rice, Ezzy 1999). The researcher chose thematic analysis because it's not closely tied to any specific theory so it suits the descriptive qualitative study which is also not tied to any specific theory allowing for flexibility in analysis resulting in detailed description of data.

Data analysis in this study was an iterative and reflexive process to ensure richness of the analysis (Tobin, Begley 2004). Data collection and analysis stages in this study were done simultaneously to ensure that the developing themes were grounded in the original data. The analysis commenced by the coding process which involved recognizing (seeing) an important moment and encoding it (seeing it as something) prior to a process of interpretation (Boyatzis 1998). The encoding organized the data in such a way that themes can be identified and developed. Encoding process resulted in the development of the codebook (See Appendix G) which served as a data management tool for organizing segments of similar or related text to assist in interpretation. Basically the code book was written following (Boyatzis 1998) guideline of developing a code book; code name, the definition of the code and a description of how to know when the code occurs (See Appendix G). As a way of testing the reliability of the codes I invited my supervisors to code the transcripts too who agreed to the codes (Boyatzis 1998).

Following this each transcript was read and summarized by outlining information given by participants during the discussion so as to identify the emerging themes. Then the codes from the code book were applied to the text so as to come up with meaningful units of text that aligns with the codes.

The codes were then connected through the discovery of themes and patterns emerging from the data (Crabtree, Miller 1999). Here the researcher relooked at the transcripts to ensure that emerging themes were correlating with the initially assigned codes. The themes were then drawn and described based on the meaning underpinning each theme. Five core themes emerged that gave a rich description of the participants' perceptions and experiences based on

3.12 Trustworthiness

Several measures were taken to ensure the trustworthiness of this study. According to Guba and Lincoln (1994), a qualitative study's trustworthiness can be ensured by taking into consideration the constructs of credibility, transferability, dependability and conformability.

Credibility

Credibility refers to the extent to which a study measures what it is intended to measure (Polit & Beck 2012). Credibility in this study was enhanced by several measures. First, the study utilized focus group discussion as the data collection method, a well-established method in studies seeking experiences and perceptions (Krueger 2009). Second, the researcher, being a member of the community, had a prolonged engagement through facilitating the participants learning using HFS in year two of their study (Lincoln & Guba 1994). Third, all the participants were asked to consent to participation and recording of the interviews. Fourth, to allow for full expression, the participants were given an option to choose where they feel comfortable to conduct the focus group discussion. This allowed participants to accurately express their perceptions and experiences without any distractions. Lastly, following transcription, researcher took the transcripts to the participants to read through so as to and verify the accuracy focus group discussions data.

Dependability

Dependability refers to the extent to which similar results would be obtained if the study were repeated in the same context using the same methods with the same participants (Polit & Beck 2012). The data collection method in this study allows for an easy audit trail process on how the data were collected and analyzed. This was made possible by presentation of clearly described methods that can be easily followed from what was planned and what was executed, making it possible for anyone to replicate the study.

Transferability

Transferability refers to the extent to which study findings can be applied to other situations (Burns & Grove 2010). This was ensured by purposive selection of the study sample made up of participants that provided the maximum range of detailed information possible. Also, the researcher gave a detailed description of the context of this study, as well as the participants, to allow others to compare their contexts and use findings from this study (Guba & Lincoln 1994). The description included the school where the study was done, the limitations of the study, methods employed, length of data collection, sessions and time over which data were collected.

Conformability

Conformability refers to the extent to which research findings are a true reflection of the experiences and ideas of informants rather than the researcher's perceptions (Burns & Grove 2010). In this study accuracy of findings was enhanced by recording interviews and transcribing them verbatim so as to ensure an accurate reflection of the participants' views. As the researcher's beliefs and values might impact the research due to its interpretivistic nature, these aspects were declared throughout the theses.

In summary, this chapter served to discuss the research design used in the study, the research instruments used to generate data, the ethical considerations, as well the issues of trustworthiness. The results of this study are presented and discussed in the subsequent chapters.

Chapter 4: Findings

4.1 Introduction

The purpose of the study was to determine student nurses' experiences and perceptions of using HFS in learning. In order for students to effectively use HFS they must believe or perceive that it promotes their learning better than alternative learning methods. The results may be useful in restructuring the use of HFS in teaching and learning for educators and manufacturers of HFS. A number of key themes emerged from the student focus group discussions data. Students had mixed perceptions, positive and negative, based on the nature of their experiences which were both fulfilling and frustrating. This study revealed five key themes that shaped students' experiences and hence their perceptions of using HFS in learning. The themes are authentic learning environment, unique learning opportunities, access, contextual factors and transfer of skills. Largely students believed that HFS is a valuable learning strategy and felt strongly that its use in learning could be improved for better learning outcomes.

4.2 Demographic data

The participants' demographics were not explicitly elicited in this study. Basically there were sixteen participants, fifteen females and one male. All participants were in the third year in diploma in nursing programme at this school where the study was conducted.

4.3 Authentic Learning Environment

Students overwhelmingly perceived HFS as real, hence creating an authentic learning environment which challenged them to practice as they would do in areal clinical area. This helped students improve their knowledge, understanding, practical skills and confidence in performing tasks.

> *'And the way we handle me' Susie is just like the way you can handle a real patient/ human'.*
>
> ***FGD 2, P1***

This explains the repeated statements by different participants that Susie is helpful. They found learning with HFS giving them a sense of reality, which is a feeling of working with a real patient in practice hence striving to perform their skills as if they were in actual practice.

'….it is helping us because we are able to build confidence'.

FGD3, P1

On the other hand, the high level of realism scared off some students, thereby compromising their learning. The unexpected responses by Susie were either easily recognised by students who became afraid or were not recognised at all because students never thought a manikin could respond to their care like a human being. This kind of fear can be expected of students who lack a lot of exposure to complex technology because of a poor background.

'Sometimes I am scared of me' Susie'

FGD 1, P1

4.4 Unique Learning Opportunities

In this study participants appreciated the unique learning opportunities presented by HFS. HFS made it possible to learn critical thinking, problem solving and certain practical skills that were not easy to learn outside the clinical area without HFS. Such opportunities gave students a valued or satisfying learning experience. These are skills students were expected to have, but didn't have a chance to acquire, hence the description of HFS as having improved their skills.

'Susie can be manipulated to any condition that we have to manage so it gives more skills.'

FGD 3, P3

Additionally, just like with most forms of simulation, students perceive HFS as providing a safe learning environment allowing deliberate practice where students can make mistakes without harm to the patients. This promotes experiential learning among students which can ultimately improve students learning. Also this kind of learning where mistakes can be made without consequences and different scenarios can be created using state of the art technology to imitate human beings stimulate students making learning interesting.

'That was a satisfying experience because was able to make mistakes and have a chance to see where I can improve.'

FGD3, P5

'Learning has become more interesting with Susie...'

FGD 1, P5

4.5 Access to HFS

Most students bemoaned the lack of practicing opportunities using HFS since it is not easily accessible. This decreases their level of satisfaction in using HFS in learning and negatively impacts on their perception of HFS as a learning tool.

'We are not allowed. It is restricting us on some of the things we want to do.'

FGD2, P4

Lack of access to Susie for a school of nursing in a resource limited setting, is not surprising since there may be fear of repairing costs if this expensive gadgets breaks down. Unfortunately this is done at the expense of students learning, the purpose of why Susie was bought in the beginning. When students have gained access to Susie for practice, there should always be supervisor to monitor their practice. This can restrict students use of HFS in learning as they may raise students level of anxiety hence fail to fully take advantage of learning opportunities provided by Susie. Students feel that learning with HFS they should get more time to learn using HFS without anyone restricting the extent to which they manipulate HFS, since this restriction does not promote experiential and self-directed learning, the principles upon which HFS is based on.

4.6 Contextual Factors

The effectiveness of HFS as a learning strategy is influenced by contextual factors as learning occurs in a specific context. Key factors reported in this study are HFS continuous monitoring and training on HFS use and rules and regulations. Participants expressed a need for training or orientation for both students and educators on how HFS is used in teaching and learning. Students found HFS to be a complicated device to use in learning, therefore lack of adequate skills to use it affect learning negatively since effective use of HFS depends on its manipulation in creating scenarios. In the end HFS may well be used as low fidelity simulation. The participants and their educators are all experiencing HFS for the first time; therefore it is not surprising that they are struggling to use HFS.

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'It's as if we can be taught how to manipulate Susie.'

FGD 2, P2

While participants appreciated supportive supervision from their educators and because it helps make learning authentic through manipulation of Susie, they also feel that they need to practice alone without any form of surveillance. There should be a balance between practice without educator's supervision and practice with supervision.

'The supervision is helpful, but sometimes we think that we should do it alone without the presence of supervisors, but when they are there, they are very helpful.'

FGD 2, P4

The rules and regulations governing the use of Susie are believed to be too restricting on the students, making them uncomfortable about using HFS in their learning. Such restriction supports the idea that there is lack of understanding about Susie and the fear for breaking Susie is too costly compared to underutilising it.

'…we were given the rules; I find them much more complicated than the ones we were using in the old demonstration room with me' Joyce.'

FGD 2, P1

4.7 Transfer of Skills

Most participants realised that performing skills on Susie is not the same as on a real patient. They reported that when working with real patients, it is a different challenge.

'I think it's more important to do on the real patient than on me' Susie because the challenges that you can meet with a real patient are different from challenges you can get to me' Susie. At the end of the day the challenges that you need to be competent in are the ones of real patients not, for me' Susie.'

FGD3, P5

While Susie approximates a human being, she still lacks all the challenges presented by an actual human being, hence students have to adjust when faced with real patients. This adjustment has been found to be not any easy one, therefore compromising the value of HFS in ultimately improving competence.

'On my side, even though, I have practiced on me' Susie, but sometimes I am still struggling to help patients like inserting a cannula, to me' Susie, I can see her veins are very clear, but when I get to the real patient sometimes I struggle'.

FGD 1, P4

Only a few participants reported a different experience, finding it relatively easier when practicing the same skills learnt on Susie, on real patients. Such students experiences may need to be critically looked it since they offer hope for better utilization of HFS in learning because students' ultimate competence is measured in actual practice.

'The procedures we have practiced on Susie, we have found it better when practicing on real patients.'

FGD3, P4

In conclusion, this study revealed that student nurses perceive HFS as a strategy that makes learning nursing skills realistic and makes learning of rare skills possible. The effectiveness of HFS as a learning strategy as perceived by student nurses can be affected by access to simulators and other contextual factors like the level of training of supervisors and nurse educators.

Chapter 5: Discussion, Conclusion and Recommendations

5.1 Discussion

Findings of this study revealed that students believe that HFS is a valuable learning strategy which, in this context, can be better utilized to improve their learning experiences and outcomes. HFS was perceived to provide a high level of realism, and to create an authentic learning environment which students believed resulted in an improvement in knowledge, skills and confidence levels. Furthermore, HFS was seen to have the ability to simulate certain critical scenarios that give students unique learning opportunities which allow integration of knowledge, skills and attitudes. However, students also expressed the need for improved access and an available supervisor to fully maximise the benefits of simulation. With regard to the transfer of these skills to the actual clinical area, the students' experiences and perceptions show that it is not easy to replicate their skills in the actual clinical area; therefore this remains an area for further exploration. HFS is an acceptable learning strategy for students which, if strategically utilized, will result in good learning experiences that can ultimately improve learning outcomes. While such a positive perception and good learning experiences resonate with most findings on HFS found in the literature (Bux 2009), very few studies highlighted the influence of access and supervision.

Positive student perception means that HFS can be fully utilized for learning practical skills since it is acceptable among nursing students. Although perception of reality is based on individual cognitive structures and does not afford an objective view of reality, personal perception of reality guides a person's actions. Therefore, if students believe that HFS is good for learning, they will utilize it and it may yield better learning outcomes (Van Tartwijk & Driessen 2009).

This study revealed interesting findings on the authenticity of the learning environment. Contrary to evidence that students only positively perceive and value HFS as a real, practicing environment, in this study participants' perceptions were mixed. Findings of Butler, Veltre & Brady (2009), Weaver (2011), Johannesson (2012) and Kuznar (2007) confirm the positive perception about HFS providing an authentic learning environment. This is further supported by the evidence of McCaughey and Traynor (2010) which discovered that HFS experience can improve the safety of students practicing on real patients due to its greater approximation to the real clinical situation. In an unusual finding which was not found in the literature, the realism of

HFS initially instilled fear in the students, and this resulted in negative experience and perception. This fear was triggered by Susie's talking and physiological responses and the consequences of not properly handling her. Some participants were discouraged from learning using HFS, suggesting that a good orientation to HFS for its users is important in order to eliminate unnecessary fear. This is in agreement with Ober (2009) and Adamson (2010) where students perceived a good orientation to HFS as helpful in promoting utilization of HFS and reducing unnecessary anxiety that negatively affects learning.

Participants perceived HFS to be unique in that it creates learning situations that are not easily simulated in addition to providing a safe learning environment that culminates in improved competence. This replicates the findings of Butler, Veltre & Brady (2009); Weaver (2011), Johannesson (2012) and Kuznar (2007), that students perceive HFS as giving them a sense of safety when learning in the simulation laboratory as it allows deliberate practice and making mistakes without risk to patients. Simulation of scenarios that are rare and unique allows student to learn more skills like critical thinking, problem solving and certain skills that are rare in the clinical area. This has been found to encourage students to fully express their views and engage in the learning process, impacting positively on their confidence (Reilly & Spratt 2007; Johannesson 2012; Weaver 2011).

In this study participants believed that HFS improved their confidence levels in performing nursing skills. Such a finding is consistent with evidence which proved that students who experience HFS perceived it to have increased their level of confidence (Reid-Searl et al., 2012; Reilly & Spratt 2007; Wang, Fitzpatrick & Petrini 2013; Rodgers 2007; Smith & Roehrs 2009; Burns, O'Donnell & Artman 2010). However, students' confidence in the safe environment of a simulation laboratory has been found to decrease when it comes to the actual clinical area due to increased levels of anxiety (Tiffen, Graf & Corbridge 2009).

Participants in the study perceived their access to HFS as restricted; hence it limited their practice time and learning experience and consequently negatively affected their perceptions. This finding is interestingly absent from the literature. The perception of having limited access to HFS can be seen as a desire to engage more with HFS, confirming that HFS has the ability to motivate students to practice clinical skills in the simulation laboratory (Butler, Veltre & Brady 2009). This promotes active learning as students work through on their own (Weaver 2011; Johannesson 2012; Reid-Searl et al. 2010). In this context, the experience of restricted access to HFS limited students learning opportunities using HFS and negatively affected their attitude

to HFS with the result that they wanted to give up using it. HFS as a learning strategy is viewed in the context in which it is used and these contextual factors ultimately affect people's perception and experience of HFS.

Findings revealed that an apparent low level of training among educators in the use of HFS negatively influenced students' experiences. These findings are in agreement with the view that insufficient instruction and lack of full realism of the simulators act as barriers to the use of HFS (Longworth 2013 and McKenna et al. 2011). Under these circumstances, HFS as a learning pedagogy is negatively affected, and viewed negatively by students.

This study showed that even though HFS is a good learning strategy Issenberg et al. (2005); it may not always be effectively utilized as a learning opportunity. Students felt that they do not get enough time to be on their own and learn without the educator, hence the value of HFS as a learner centered strategy is undermined, contrary to theories that suggest that HFS is a teaching and learning strategy that shifts learning from a predominantly behaviorist pedagogy (teacher centered) to more student centered approaches (Bux 2009; Berragan 2011; Maran & Glavin 2003). Students valued HFS as having the ability to create learning situations that are unique through the creation of scenarios, and hence it promotes experiential learning as found by Berragan (2011). Thus learning in HFS allowed learners to actively construct knowledge by linking new information and new experiences with previous information and experiences in the simulation laboratory. However, lack of more practicing opportunities in this study was found to limit experiential learning and opportunities to construct meaning, and hence students' perception and learning outcomes, and transfer of learning.

With regard to participants' perception and experiences on the transfer of practical skills into the clinical area, findings confirm the evidence which demonstrates that students' perceptions of their ability to transfer simulation competence into real clinical area competence are mixed. Some had negative perceptions, while some had positive perceptions about their ability to turn simulation competence into clinical competence (Gordon, Buckley 2009). These contrasting findings on perception of transferability of HFS competence make the area of transferability of HFS competence a high priority area for research (Cant & Cooper 2010).

The findings of this study add to the growing body of evidence that supports the positive perception of the ability of HFS to transfer skills from the skills laboratory to the clinical area. Radhakrishnan, Roche and Cunningham (2007) and Hope; Garside and Prescott (2011) believe that skills gained in the skills laboratory can be transferred offers hope for HFS as an effective

learning strategy. Until evaluation of HFS proves its usefulness at this level, doubts about its full value will remain.

Negative perceptions and experiences in this study could be as a result of limited access, strict rules and lack of adequate training of educators and students, which compromised practice that students perceive to be vital to their competence. This may have discouraged students from learning with HFS, and the full extent of the usefulness of HFS may then not have been realised. Students' negative experiences could be as a result of an unclear utilization strategy for HFS in learning.

The findings of this study have serious implications for the use of HFS in teaching and learning clinical skills for students, educators and education administrators. Considering the favourable perception students have about HFS, there is need to use the findings of this study to improve HFS use in learning by providing effective orientation for HFS students. What are referred to as strict regulation, limited access and strict monitoring may have been due to lack of understanding about what HFS is and how best it can be used in learning. Furthermore, the training of educators in the use of HFS is very important. It could help promote the use of HFS through a teaching and learning model, starting by adapting pre-existing models like Jeffries' model on simulation (2005).

This study shows that there are several similarities between using HFS in developing and developed countries, for instance the ability of simulation to create unique realistic learning experiences and improve student confidence. This study also found, however, that there are other factors that could impact the use of HFS in the developing countries' context. This includes students' fear of using HFS, which might be fuelled by educators wanting to protect HFS by introducing very strict guidelines for HFS use, for example paying for damage to the simulator, and no access without the presence of an educator. The fear of damaging expensive equipment, and having to pay very high repair costs, discouraged students from using HFS. Such restrictions can result in students not being given the opportunity to learn with HFS without supervision (Jeffries 2007). Constant supervision may then be a source of fear for students, limiting the potential of HFS as a learner centred pedagogy (Berragan 2011).

The findings of this study are congruent with the NESF for effective utilization of HFS in teaching and learning. Students' experiences and perceptions were positively shaped by the role of the educator (Issenberg et al. 2005). These educators' roles include determining the educational practices such as active learning, student interaction, diverse learning scenarios

and feedback (Jeffries 2007; Young & Shellenbarger 2012). On the other hand, while the NSEF and Issenberg et al. (2005) suggest that a controlled learning environment supports simulation use in learning. In this study cameras and continuous supervision of students resulted in fear among students. Furthermore, the NSEF and findings of Harris (2013) point out that repetitive practice promotes learning using simulation. The findings of this study, however, show that students have limited opportunities for repeated practice, and that this created a negative perception of HFS use in learning.

In conclusion, the student perceptions and experiences of HFS use in their learning are closely associated with the NESF. Specifically looking at the outcomes in the NESF, they correspond with the perceptions of students on what they can learn using HFS.

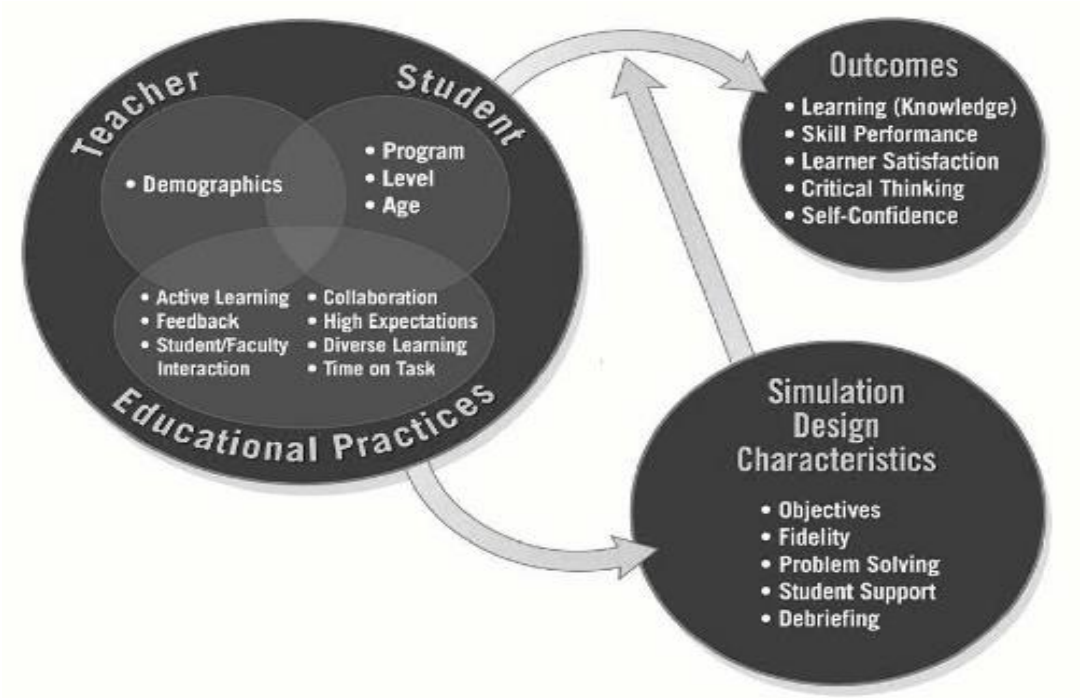

Figure 5.1 Nursing Education Simulation Framework (NESF), Jeffries (2007)

5.2 Limitations

With regard to limitations, this is a qualitative study in which the researcher was part of the community, and may thus have influenced the research process. Furthermore, the sample was drawn from a group of students who have been together for over two years, hence they may have established norms on what should be said or not said, affecting the expression of opinions and experiences in the discussion (Kitzinger (1994). The complexities of scheduling,

coordinating, and facilitating a focus group is another limitation that must be considered. Individuals' ideas, feelings, or emotions may not surface given the variation of group dynamics (Holloway & Wheeler 2002). Despite the limitations the study has provided a good insight into students' thoughts and experiences about learning using HFS, and important information that can be used to improve learning outcomes using HFS. The sampling method used was purposive sampling and this may limit the generalizability beyond the study population.

5.3 Recommendations

1. Nursing educators and clinical supervisors must be trained in the use of HFS in teaching and learning so as to maximize the learning potential that it presents (Longworth 2013.

2. Students need to be oriented to HFS simulation so that they understand the rules and regulations regarding HFS, its use as a teaching and learning strategy, and to lessen their fears about HFS.

3. There is need for improved access to HFS by students even when clinical supervisors are not there and the use of cameras should be strategic so that it will not deter students from actively engaging in learning activities using HFS (Berragan 2011; Jeffries 2007).

4. There is need for further studies to objectively evaluate the usefulness of HFS in terms of skills acquisition and transfer (Hallenbeck 2012).

5.4 Conclusion

This study showed that nursing students had positive perceptions and experiences of HFS use in learning if it is used under the right conditions, which allow students to engage more with it and learn better. Realism, and the unique learning opportunities created by HFS favorably influenced student's perceptions and experiences. On the other hand, limited access, lack of training of educators and students on HFS, as well as close monitoring of students during learning with HFS negatively impacted on students' perceptions and experiences. It means, therefore, that although HFS has its own advantages and disadvantages as a pedagogy, it needs to be strategically utilized through the modification of the NESF to suit the developing world context so as to improve students' perceptions and learning experiences and hence their nursing skills. Furthermore, evaluations at a higher level of Kirkpatrick's model need to be conducted to evaluate the acquisition of skills and the extent of transfer of clinical skills from the simulation to the real clinical area.

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Appendix A: Focus Group Interview Schedule

Date: ……

Time: …….

Number of participants: ……..

Facilitator: T. Munangatire

Welcome remarks

Introduction of the moderator and assistant

Our topic is... ……

Purpose of the researches is…….

The results will be used for...

You were selected because...

Ground rules of the focus group discussion

1. The discussion will be led by the facilitator.
2. All participants will be given an opportunity to speak.
3. One speaker at a time while others listen as we are tap recording.
4. The speaker will address the topic not the facilitator or other participant.
5. No dialogue between any two participants.
6. No option is wrong or irrelevant.
7. You don't need to agree with others, but you must listen respectfully as others share their views.
8. We ask that your turn off your phones. If you cannot and if you must respond to a call please do so as quietly as possible and rejoin us as quickly as you can.

9. My role as moderator will be to guide the discussion.

Adapted from Designing and Conducting Focus Group Interviews (Honey, Mumford 2000)

QUESTIONS

1) What is your opinion on using Susie for teaching and learning?

2) Has Susie changed the way you learn, if yes how?

3) Has Susie helped improve your confidence in practicing?

4) How satisfied are you in using Susie in your learning?

5) What guides you in the use of HFS?

6) What has improved since the arrival of the HFS?

7) What makes it difficult to use HFS and what makes it easy to use it?

8) Based on your experiences what are your future recommendations with regard to high fidelity simulation use as a teaching and learning strategy?

Appendix B: Budget

RESOURCE	COST
Internet Charges	R1,000.00
Stationery Pen, paper, code books, bond paper, coders	R500.00
Printing and photocopying and binding	R1,000.00
Training on qualitative data analysis	R2,394.00
Transcription	R2,000.00
Payments for interviewer	R600.00
Refreshments for participants	R600.00
Digital voice recorder	R1,500.00
Poster for presentation at SAAHE	R 900.00
TOTAL	**R 9,494.00**

Appendix C: Project Timetable 2014

Tasks & time 2014	January	February	March	April	May	June
Faculty feedback						
Review of proposal						
Submission for ethics approval						
Data collection						
Data analysis						
Report writing						
Abstract writing						
Project submission						

Appendix D: Consent Form

TITLE OF THE RESEARCH PROJECT: Nursing students' perceptions and experiences of high fidelity simulation use as a learning and teaching strategy in a resource limited setting**Reference Number: S14/02/029 & ID38-2014**

Principal Investigator: Takaedza Munangatire

Address: Paray School of Nursing, P.O.Box 2 Thaba Tseka 550, Lesotho

Contact Number: +26663282105

Dear Sir/Madam

My name is Takaedza Munangatire and I am 2nd year MPhil in Health Sciences Education student at Stellenbosch University. I would like to invite you to participate in a research project that aims to explore student's perceptions and experiences of the use of high fidelity simulation in teaching and learning at a school of nursing. You are invited to participate in this study because you are student at this school and has been involved in teaching and learning using high fidelity simulation.

Please take some time to read the information presented here, which will explain the details of this project and contact me if you require further explanation or clarification of any aspect of the study. Also, your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This research can be terminated by the research ethics committee if it fails to adhere to the ethical requirements or you can be asked to withdraw from the study if you are in a position not be able to take part through either illness or dismissal from this school.

This study has been approved by the Health Research Ethics Committee (HREC) at Stellenbosch University as well as the Lesotho Research Ethics Committee and will be conducted according to accepted and applicable National and International ethical guidelines and principles, including those of the international Declaration of Helsinki October 2008.

This study will take place between March 2014 and May 2014 and you are expected to participate in one focus group discussion at a school of nursing prior the focus group discussion. During the focus group discussion you are expected to fully participate and express your views without necessary having to agree or disagree with any other participant. During the session, no names will be used; instead numbers will be used to identify the participants. It is expected that a total of sixteen people will take part in this study and the focus group discussions will be audio recorded and such records will be reviewed by the investigator and the supervisor. However the sponsors or Research Ethics committees may request to inspect them. The records will be kept in lockable files by the principal investigator and no other person besides the one mentioned above will have access to the records.

There are no anticipated risks for participating in this study and there is also no direct benefit, but it is expected that the results of this study will help improve teaching and learning using high fidelity simulation at the school of nursing. As a participant you will not incur any costs, transport, and food or otherwise, the researcher will take care of that.

For any queries with regard to this research please feel free to contact my supervisor, Estelle Smuts at estellesm@sun.ac.za or the Stellenbosch Research Ethics Committee at ethics@sun.ac.za if you have any concerns or complaints that have not been adequately addressed by your researcher.

You will receive a copy of this information and consent form for your own records.

If you are willing to participate in this study please sign the attached Declaration of Consent attached and (hand it to the investigator in his office).

Yours sincerely

……

Takaedza Munangatire

Principal Investigator

DECLARATION BY PARTICIPANT

By signing below, I ……..……. agree to take part in a research study entitled**: Nursing students' perceptions and experiences of high fidelity simulation use as a learning and teaching strategy in a resource limited setting.**

I declare that:

- I have read the attached information leaflet and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (place) .....…..…….. On (date) ……...…….. 2014.

Signature of participant

Appendix E: Confidentiality Clause

I …… the transcriptionist and assistant moderator in the data collection and analysis process of the study entitled

Nursing students' perceptions and experiences of high fidelity simulation use as a learning and teaching strategy in a resource limited setting

Solemnly pledge that I will not disclose any information from this study to anyone under whatever circumstances. I understand ethical principles underlying the need to maintain this information confidential and to that effect will adhere to the ethical principles. I am aware that failure to do so will result in certain repercussions against me.

Signature of transcriptionist

……..

Date:

Signature of principal investigator

……..

Date:

Appendix F: Focus Group Transcriptions

FOCUS GROUP DISCUSSION 1

10 MARCH 2014

SIMULATION CLASSROOM

NUMBER OF PARTICIPANTS – 5

KEY

M: MODERATOR

P: PARTICIPANT

AP: ALL PARTICIPANTS

Me': Sesotho way of addressing a woman

M. What do you think about using Susie in teaching and learning?

P3. I think Susie has more characteristics of a human being since we treat human beings in the hospital, than me' Joyce. So we gain more information on using Susie as our model in practising what we have been taught in class.

M. How does that make you feel? Do you feel like it's an advantage or disadvantage to have Susie?

P1.I feels it's an advantage because she has more characteristics of humans since she can talk, she can say whatever you are doing on her.

P3.I think it is helping us because we are able to build confidence when we are going to treat the real patients because like venipuncture, when you practice to Susie before going to the real patient, so I think it's helping us.

P1.Sometimes I am scared of me' Susie because as to compare with me' Joyce, Susie is more complicated because when if ever the procedure is to be done to me' Susie, we are being told we should handle her properly. Due to that, it makes me not comfortable even though on the other hand, she is more helpful so that can be able to practice .That my opinion.

M1. What makes you afraid of me' Susie

P1. I think the rules and regulations ,the standards that we were told before the procedure were demonstrated using Susie, we were given the rules , I find them much complicated than the ones we were using in the old demonstration room with me' Joyce. But even though, she has been more helpful for sure.

P4.She is like a human being. I think those rules are because Susie can be able to talk rather than me' Joyce.

P5.With Susie you don't have much access on her than me' Joyce. Sometimes if you want to practice with Susie, it makes it difficult when there is no tutor to guide us. Like what the others have said, I think Susie is important because like a real human being, than me Joyce. Like for the first experience, someone comes for the first time to do the practical, I still think it's better to use me' Joyce because there are something's like Joyce is a statue, is not like a human being, so practicing for the first time on Susie, is difficult so one can start with Joyce then when one has gained some skills can come to Susie.

M. Let's talk more about the fear you have mentioned, were you afraid when you were using Joyce and are you afraid now as you are using Susie.

P3.I would rather think that what make us afraid are the rules we were given when using Susie.

P2.We doesn't have much access practicing on Susie, than we had on me' Joyce. Like it can happen sometimes that during weekend as students we want to come to simulation, like we did before, when we were able to come even during the night, so with me' Susie, we don't have that access to do procedures if there is no teacher like during weekend, you find that our teachers are not around.

M. How does that affect your learning and what is your opinion on that?

P3.I thinks it affects our learning in such a way that most of our procedures are on Susie than Joyce, for example abdominal palpation on Susie, and there is no one to supervise, it means I can practice on the patient before I feel competent.

P4.It affects our learning negatively because we don't have access to practice any time we want, meaning we are not learning.

P5.M e I was thinking like we have the surveillance camera in Susie's room, so we can be allowed to practice anytime we want.

P1.For me, what I have seen is that before me Susie came, it's like the instructors use to take a screen ,it's obvious that if that screes is not on, we can't be able talk with me' Susie or if ever we can come and practice, whatever we did for practice before we go to the clinical area. Maybe if we are given that chance to practice on our own, we can learn more.

M.What makes you uncomfortable?

P1.The presence of the teacher as I have said me' Susie is complicated because if ever she can talk alone without any supervision, we can work cooperatively.

P2.I think if we can be shown or be taught how to manipulate Susie, if we come to practice , some among us as students will be regulating Susie and the other ones are practicing.

P4.I can say we need to have access to Susie at any time like me' Joyce. Susie must not remain; locked, so that can help us .In that room there is a camera, so we can use Susie at any time.

P5.I also thinks that if we cannot be let to then someone who knows how to manipulate Susie should always be available at any time.

M.Tell me more about the availability of the supervisors

P2.Like I said, you see sometimes it happen that the tutors are not around at school or they are gone to workshops or they are not around on weekend, unlike for me Joyce, even the weekend, it was happening that we had access to the keys for the demonstration room.

P1.Sometimes you see that we don't have access to Susie, somebody have to supervise you.

P3.despite all this, I find me' Susie helpful to me, to us as students. I can make an example, I remember the other day when we were doing blood transfusion, and I toniquted me Susie and I forgot to remove the tonquiet and during transfusion it happen that she was fitting, of which if it was me' Joyce she could not have done that and that makes me ware that I forgot to remove the tonquite and I find it very helpful.

P3.Another important thing about Susie is that we can learn how to manage an emergency, because me and my colleagues we once had a chance to resuscitate me' Susie so such experience is important.

P5.I also think that me' Susie is important because we are able to do breast examination on her ,She has soft breasts and sometimes you even find lumps and we are able to do abdominal examination and hear bowel sounds and she has veins and we can do venipuncture on her. She is very important.

P1.And again, as my collogues have said already, she is cooperative, whenever she feels uncomfortable with whatever you are doing, she gives an immediate response that you haven't done this or I am feeling pain, something like that.

M. Confidence is important for a nurse. How has Susie affected you level of confidence.

P4.With Susie we are able to build confidence before going to the real patient because like my colleagues have said, that she is like a human being, so we are able to do things that we could do to human beings before we could go to a real patient, so I think we are able to build our confidence.

P2.I practice on Susie because I knew she was not a real [patient, I punctured her many times, but now I feel confident to do it on a real patient.

P1.It is even more helpful during blood withdrawal when sometimes you see that it's much easy for the first experience to withdraw blood on the real patient so I found it much helpful to do venipuncture on me' Susie before I can go to the real patient in the hospital because I was struggling.

P3. Also she has helped improve my competence on how to treat a human being as a human, because she is able to tell how she feels, she can tell you what you are doing on her so that gave us confidence that even dealing with real patients you can ask what they need and what kind of help do they require of us.

P4. On my side, even though, I have practiced on me' Susie, but sometimes I am still struggling to help patients like inserting a cannula, to me' Susie, I can see her veins are very clear, but when I get to the real patient sometimes I struggle.

M1. What does that make you feel and think about Susie as a teaching and learning model?

P4.I can say that she is helping on the other hand she doesn't help because, like I said, her veins are clear but when I get to real patients I struggle.

M. What then can you say has improved since you started using Susie in your teaching and learning?

P5.Use of Susie has been very important because she can talk and is structured like a human being. We think that our skills of nursing practice improved because of Susie.

P3.Like the other participant have said, I think me' Susie arrived first; I find it more challenging to work with her. Sometimes I find me Susie more helpful to practice with her before going to the hospital because it improves clinical competence. It's better as compared to first time when we're practicing with me 'Joyce because this one is like a real human being. You feel like you are treating a real patient.

P2. Also I gained confidence on using Susie, maybe how we can care for a patient and who is more like a patient and we can manage some things which we were not aware of.

P1.I gained a lot in terms of practical which I didn't have enough confidence to practice, but as for now I can like as we go for clinical outside Paray,we can be able to recall what we have practiced when we were working with me' Susie. When we were at Tsepong we gained skills in terms of blood transfusion because there were different conditions that we have to manage or take care of, but that knowledge I have gained me' Susie played an important role, but now I have confidence.

M. Can you talk more about challenges that you are facing when using Susie.

P3.since Susie behaves like a human being, sometimes we have to manage an emergency, using the emergency trolley, some of the required drugs are not there on our trolley

M .Based on you experience of learning using Susie, what recommendations could you make that would improve the teaching and learning experience with Susie.

P4. I think before we can go to the real patient we have to start in me' Susie, so that that we can practice to her, then we can go to the real patent, every student should do that.

P5. In addition, I would recommend that students should be taught to manipulate Susie, if it would be possible, someone should be taught and be available every time students want to practice with me Susie

P3.Another recommendation would be we should have access to Susie anytime we want to practice.

P1.Also, in terms of practice, the seniors should be given that chance to work with me' Susie so that we have enough responsibility on how to take care of her.

M. What is you take on supervision

P1. On my side, I haven't had that enough confidence in the presence of the supervisor, because, sometimes I am scared if ever I make any mistake towards Susie maybe I will hurt the teacher ,so that I won't have another privilege to practice on her, that my take. Maybe we should be given a chance to be alone and work with Susie without cameras. Even the camera maybe we can for the first time the teacher can come and supervise, without the camera, and for the second time we can do on our own without the camera.

P2.On my side, like others have said, I think we should be given an opportunity to practice with Susie anytime without a supervisor. With regard to the camera, they should be there when we are alone ,for example, if it happens that there is a mistake that happen to me' Susie, the student who is working with me' Susie can be accountable. Because, if there is no camera, and it happens that I am the one who was with me' Susie, maybe I am told that I was involved and many other colleagues come, that means I would be responsible because the tutor would say it's you who came to me and asked for permission to work with me' Susie, so I think if the camera is there the one who can make a mistake will be accountable.

M.Tell me more about these cameras and what you feel about them in relation to their use in learning with Susie

P4. The cameras are to see if any mistake can happen to Susie and for learning; because I remember the other time we were able to observe our colleagues when they were doing a procedure, so I think they are for both teaching and seeing if there are any mistakes.

P1. I do agree, but the purpose of this camera is for security, we know it's for security and also it can be applied whenever there is a mistake, in terms of doing practical with me Susie.

P5.They has served both security and learning purposes because we could see our colleagues as we are in the other room.

M.As we draw close to the end, Susie has to be manipulated by your supervisors, what do you feel about their level of supervision and skills in manipulation of Susie?

P3.I can see whatever the supervisor say when they are manipulating Susie is more likely to aid what the patients can do and it helps us to tackle more problems as we go to the patients in the hospital.

P2.they are good and more helpful because they give us more challenging questions like a real patient can ask and that helps us to answer questions if we happen to meet them in the **hospital.**

P5. Me I think, they are important but also I think that because someone will be choosing each condition, to set, for me, they will be other conditions they will not select.

Anything else you would like to say about your experiences with using Susie in your learning?

P2. I am still on the point that there should be someone to manipulate me' Susie always .If that is impossible, they should be easily available, like we have been demonstrated the procedure during the day, you will find that not all of us will find access to do return demonstrations during that time.so if we want to come at night or weekends, we should have access to do that procedure. Because you find that when we go to the hospital, or clinics we find more challenges that we didn't practice on me' Susie when you come to the real patients.

P3.On the same point of being left alone with me' Susie after the demonstration, the tutor can leave us alone for some time with the camera on, but to leave us practice without their presence.

P5.I can say generally, learning has become more interesting with the use of Susie compared to when I arrived as a first year practicing only on me' Joyce, I have gained more knowledge when using Susie.

M. Thank you

THE END

FOCUS GROUP DISCUSSION 2

7 April 2014

Simulation Classroom

Number of Participants = 6

KEY

M: Moderator

P: Participant

AP: All Participants

Me': Sesotho way of addressing a woman

M: Just tell me, what you think about using Susie in your teaching and learning.

Long pause

M. Did Susie bring any difference to the way in which you were taught?

P1. *Eh* me I think *em* It is very important to, me' Susie is very important as compared to me' Joyce because *eh* she can be manipulate like a human being, she can breathe and you can sounds , she can, you hear sounds such as abdominal sounds an some of the procedures like when you doing maybe abdominal examination, for me' Joyce we couldn't hear anything, but for me Susie you can hear and you differentiate different sounds just you like as you can hear from a real patient, and I think it is important and it has been helping for us. And the way we handle me' Susie is just like the way you can handle a real patient/ human being because of may be the instructions or rules you have to follow when you handling me' Susie. That's my opinion.

P5. *Nah* I didn't hear the question, are we comparing me' Susie and me' Joyce or we talking of the importance of the use simulation prior to the going to the hospital.

M. We are focusing mainly on me' Susie, here and there maybe we can compare or mention me' Joyce, in terms of what do you think about Susie and why do you think that about Susie,

like she mentioned Susie maybe more important than me' Joyce because me Susie can do that and me and me' Joyce cannot do that. If you want to saying anything about compare using me Susie before going to the clinical areas, is ok you can go ahead and say at do you think and feel about it, it's still okay

P5. Me I was thinking that, on me' Susie we can do procedure like venipuncture and it can be demonstrated and we are able to do return demonstration and that increases the competence than we were doing with me' Joyce.

M. Anyone else

Brief silence

P3. Again you can also does breast examination and the examination with the speculum and I think that improves our practical skills than when we were using me' Joyce.

M. So are you saying now that there is me' Susie your level of competence or practical skills has improved because of me' Susie, if they have improved how?

P4. *Nah* I think, like they said me' Susie is like a real human being, so I think if you do the procedures on her, may be you think of the real human being that you are dealing with in the clinical and that will, when you are in the clinical it is easier to practice unlike, when you are being told you are doing venipuncture to it ,but you don't even go inside the patient, but with this one we went and we see *aee* it's really difficult for me to do venipuncture. But when we are using this one you realize here don't know and you would want to practice to her so that you will be at least perfect, unlike being told it's done this way. When you are in there you are still scared, that this is the patient and this is how it improves competence

M. You mentioned issues like you don't have a chance to practice, but when you had choice you use top practice, tell me your experience, and are you saying after practicing with Susie are you telling me that you are more confident to practice.

AP. Yes

P2- I think that with me Susie we are given the scenarios, maybe the conditions we have to manage, and me' Susie can be manipulated to any condition that we have to manage so it gives more skills and it

M. So are saying you do more skills and get a chance to practice. How has it changed the way you learn, has it made it more effective or interesting and how?

P1. As we have said , nah I think it's more interesting like we said me' Susie can be manipulated and even if, maybe we think , the patient can feel pain, even me Susie can feel pain say ichuu, that gives me the skills to care about the patient holistically because when you do the practical's on a model like me' Joyce, you don't even think of the patient that it feel pain, psychologically you even don't care the patient , but me' Susie can sometimes say something, like *ichu, I am tired* and all those things this helps us to think about the human being and the patient and sometimes you have to care for him or her holistically you don't only focus on the procedures, you have to have other skills that have improved our skills. With me Joyce you can do whatever you want because she can't say anything.

P3. And again, sometimes we are doing procedures like blood transfusion, maybe *hakere* you are expecting the patient may react and when you are told that you will see patient turning pale tell and *what what what*, all those ones you don't even see. Sometimes when you are transfusing, the patient may react and you may not see as quickly as possible that the patient is now reaction if you haven't seen it before, with Susie you have a chance to see this one is changing into this one this one turned into this one, so that when you go there you know something, and you when it's like this maybe it's when the patient is reacting unlike you are being told there will be one two three.

P6. *Nah* I agree with what they said, but with the last participant but on the other side I disagree, sometimes we are panicking because we think it's a real patient, we need to practice on a patient who is not reacting.- *smiling*

AP. *Laughing*

P1. With the use of cameras we always try to do the right thing because we think that sometimes they are looking at us and it helps us to care and be considerate so that even if we are with teachers in the clinical area with real patients we can do the same thing ,that we have done to me' Susie.

M. You mentioned the use of cameras, others how do you feel about having cameras watching you all time?

P2. *Eh*, sometimes it's not okay because you are restricted on what you can do.

P3. We have used cameras when we were doing the OSCE, our teachers were watching what we were doing so that they could correct us, when doing the procedures.

P5. When the camera is on and you are alone, you are going to be free than with the clinical instructor and the mistake that you are going to make will show the true picture of yourself that you know the procedure or not competent enough. The camera is going to help now others like colleagues and the clinical instructors are going through the whole procedures, then you are going to see your mistake than when you make the mistake with the clinical instructor who is going to react somehow, like *ah eh*

M1. You have said there are guidelines that you follow when you are working with Susie, How do you feel about these guidelines?

P1. Some of them are good ,because sometimes , you are frustrated and not comfortable to work with Susie, because of those instructions and when the camera is there you don't feel comfortable as we were with me 'Joyce.

M. Do you ever get to work with Susie without your instructors?

P4. We are not allowed .It is restricting us on some of the things we want to do. - *low voice*

Long pause

P5. It's restricting, but sometimes helpful to protect me' Susie so that others who are coming behind us can also have access to Susie because if we work without supervisor, we sometimes not handle with care about her- *low voice*

P1. Maybe me' Susie is too expensive

AP: *Loud laughter*

P2. Again we don't know how to manipulate her, may be if you want to take blood pressure, if there is no supervisor, I will not be able to manage.

P4. *Nah* me I think it's restricting our practice because it's not always that you find the supervisor when you want to practice. Like if you want to practice without a supervisor, I can't practice.

M. What is you experience working with supervisors when working with Susie?

P4. Like I said, it's not enough like if you do the procedure once, and the other time you do it in the clinical area, I think it's not enough. If you don't understand, you can go back and practice but if you don't get that chance, I don't think it's good. Maybe something can be done so that we can practice.

P3. I can't say it's enough, but I can say having the supervisor there when practicing is important because for example, if may be we have to do abdominal auscultation, the sound that is manipulated there is important because all of us we are going to hear the same thing and be able to identify a certain sound- different from when you are just being told that there are different sounds like tympany, but when you are with me' Susie, you can identify all those. So it's important for the supervisor to be there.

M. If there is anything that you think has improved in terms of your teaching and learning, since you started using Susie, what could it be.

P5. My skills of suturing have improved after using Susie because I get more chance to practice as many times as I could.

P2. I have improved, we were given scenarios where we have to transfuse Susie and she reacted and we had to manage her when she was reacting. That was a satisfying experience because was able to make mistakes and have a chance to see where I can improve.

P1. Adding on to that, it's important because we were seeing, and not being told you have done this, we could see exactly what we have done, and then we were able to understand.

P4. We have improved a lot because with me' Joyce, we could not have a chance to withdraw blood as with me' Susie.

P5. To add on to that, me' Susie we were doing venipuncture and we left the cannula there in the patient and the patient reacted and that made me to realize that every time you are doing the venipuncture as a procedure you have to know the steps that you have to do , than when doing it with me' Joyce.

M. How does practicing with Susie compare with practicing with a real patient?

P1. Working with me' Susie is more like working with areal patient because me' Susie's organs are like real organs and the difference is that, me' Susie cannot feel the real pain as the real patient can have, and when you are practicing on me' Susie, the procedure can be repeated

many times as possible for us to understand, without the patient complaining that helps understanding and competence. For example, when we were demonstrated about the use of the speculum and some of us even had a chance to do return demonstration and it will be easy for us to do on a real patient and we can do it again and again. I would prefer to practice on me' Susie than on the real patient.

P4. Sometimes it's not easy to practice on a real patient because the patient can refuse if you tell that you are a students and I want to do a procedure and they will say no and you can't practice.an sometimes the patient will tell you they want the qualified person.

P5. Again most of the patients' needs privacy, so to me' Susie some procedures we are able to do view keeping in mind the privacy and we are able to use the speculum, yet with real patients , it's not going to be easy to do so and observe.

P3. Also we can make some mistakes which can be dangerous to the patient, if you go straight to the patient without practicing, so we have to practice first so that when we go to the patient we are quite sure of what we are doing.

M. Based on your experiences of using Susie in teaching and learning, what recommendations can you make to improve the teaching and learning with Susie?

P5. I can say the student nurses should have access to me' Susie, just like they had access to me' Joyce. Like the procedures we are doing on me' Joyce can be done as many times as possible, but to me' Susie, they are not done many times.

P3. We should also be given other chances to practice alone with other students, if you make a mistake, they can see, that one we should practice without the supervisor to distract us.

P2. We can be taught how to manipulate me' Susie, so that when the supervisor is absent we can manipulate Susie if that's possible.

P4. We have to be free to me' Susie, like we were using me' Joyce because working with me' Susie is making us uncomfortable, we sometimes tend to be afraid to practice with her because you have to do like this and all those things, we are being threatened that you will pay if anything happens then after if you can't practice, I feel like I want to, but I can't.

M. You mentioned the issue of fear, ,is it something you have been told that if you break me' Susie you are going to pay or you are just afraid that if anything goes wrong with Susie you may be asked to pay.

P1. Those guidelines tell us that if you can do anything outside those, then you can pay or something can happen.

M. How does that make you feel?

P5. It makes us to be uncomfortable that is we don't have the motivation to go to the clinical instructor and use me' Susie for a certain procedure.

P1. It's because we are even told that if you want to practice, go and practice on me' Joyce and you are never allowed to practice on me' Susie alone. In addition we are not getting enough support, since we only go there when supervisors are there, when there is no supervisor, you are not allowed and sometimes you only see that one supervisor can manipulate Susie. I think we need supervisors to be able to supervise us if that one is not available.

P2. I think it's better if we can be given a chance to manipulate Susie, every one of us teachers and students.

P5. Na I think the teachers should be taught to manipulate Susie and maybe something like a schedule can be made for supervisor of students using Susie, so that you can know that if someone is busy then the other one is available.

P4. It should even be after hours because that's when we have time, not during class times and even on weekends.

P3. Educators and class reps should be taught how to manipulate me' Susie so that when educators are not available, the class reps should take responsibility of their class.

M. There is only one Susie. And how about me' Joyce

P4. At least if they can be four Susie, one for each class.

P3. Me' Joyce can still be there because it's not all procedures you can practice on me' Susie, we can still practice on me' Joyce.

P1. We can't even use water on me' Susie- *laughter*

M. As we draw towards the end, what do you think about a situation where we had many Susies and we do all procedures in the simulation without going or limiting time for the clinical area?

P4. We are being trained so that we can nurse patients, real ones not these ones, yes we can still be using Susie, but when you go there, you realize that it's like something is missing.at least if we can have a week with Susie and the other three weeks with the real patients. That way it's fine.

P3. Yes I agree with her, because in the hospital, there are conditions that cannot do with Susie, we just need to have skills on Susie and then apply them to the real patient

P5. And the way, me' Susie is manipulated, you cannot see that the condition is changing, Just like we were doing blood transfusion, she got cyanosed and became pale like and we didn't even realise- *laughter*

M. Let's come to the time of examinations, how do you feel having your final examinations on Susie?

P1. It's ok because we practice procedures on her.

P5. I think its ok, because sometimes patients refuse if you are asking to do the procedure to them, so me' Susie won't refuse.

P4. The other thing is that even some procedures you are not competent and the patients sees you are shaking, then patients is looking at me, like then tomorrow when you want to help, that patient will say, no, the patients are refusing drugs because they see that these people don't know and on Susie you can do as many procedures as possible without getting sad.

P5. I think it's more important to do on the real patient than on me' Susie because the challenges that you can meet with a real patient are different from challenges you can get to me' Susie. At the end of the day the challenges that you need to be competent in are the ones of real patients not, for me' Susie. So in meeting those challenges from patients, you are going to have some problem solving skills, they are going to make us to be strong when we meet challenges and to be knowledgeable on how to approach the patient than when to me' Susie who can't even say no when you want to do the procedure.

P3. It can be possible in simulation that all students can be examined on one procedure not the other one can be doing bed making, I will be doing oral medication, then the marks are given to

be the same or maybe that one of the bed making will get more marks ,than me , but procedures will be different.

P1. Maybe we can do same procedures like on, me' Susie.

M. We have come to the end of our discussion.

THE END

FOCUS GROUP DISCUSSION 3

16 APRIL 2014

EDUCATOR 3 OFFICE

NUMBER OF PARTICIPANTS – 5

KEY

M: MODERATOR

P: PARTICIPANT

AP: ALL PARTICIPANTS

Me': Sesotho way of addressing a woman

M. What do you think about the use of Susie for teaching and learning in nursing?

P4. *Eh, nah* I think it gives us the opportunity to learn since we can do some of the procedures with it, but sometimes it's challenging because of the technology and some of the things you cannot do with it.

P5. I think it's very helpful because since there sometimes it's only that you can go to the hospital and do the procedures on real patients and it's also challenging because when you are using it you should be knowledgeable about it and you should also be careful.

P1.Myself I find it to be very *em* helpful in that when we were first years most of the procedures would start them on the real patient so I think this gives us chance to practice on the models before we go the patients.so I think it's helpful because it allows us to make mistakes to it before we can go to the real patient. Even though it is very helpful, I find it challenging because on the other hand ,it doesn't give us time to practice ,for example after hours like at night, because when we were first years, we free to go during the night to practice.

M. You are saying it's very helpful but it has got its challenges. Can you discuss more on how specifically Susie helped you in terms of your learning of clinical skills?

P4.Some of the conditions are not there at the hospital, but Susie because she is computerized she can be manipulated to, to imitate that condition so that you will be able to manage those conditions using Susie.

P3.To add on that , I think , since Susie behaves more like a human being, its true it helps us to have confidence unlike before me' Susie arrived, we didn't have that chance to practice on a model which behaves more like a human. So most of our procedures we practiced them on the real patient which is very tough for us.

P5.Like my colleagues have said, since our hospital here is very small since I arrived here I haven't done CPR before of blood transfusion but since Susie has arrived I managed to do CPR one day and that's how I gained that competence to do blood transfusion and suturing also.

M1. You said its tough practicing on the real patient; tell me what makes it easy practicing on Susie, if it is so.

P3.Sometimes when practicing with the real patients, just because we know that they are real people we become scared, but when we practice on Susie we know that it's just a model behaving like or imitating human characteristics so we do the procedures freely rather than on a human being

P1. It also helps to be more confident than if we start practicing on the real patient because when we are attending to this Susie, we are relaxed, we are not afraid that it is our first time to do the procedure, then the patient will realize it's my first time and I am not yet competent in doing such a procedure but this one I am free and cannot even *eh* complain or frighten me anyhow I fell it's helpful, truly.

P5.There is no big difference because on Susie, you can do as if it's a real patient, so when you its areal patient you go to the patient with more information and skills rather than when you just go from the class to the patients.

P2. In addition to what she has said , about practicing on me Susie, It gives someone confidence , since previously we used the model which was not modernized, meaning when practicing on Susie, definitely you are like practicing on a real patient, there is no difference from practicing on Susie and the real patient, you will be confident enough.

P1. Again we are always able to correct the mistakes you make before going to the patient, then we go to the patient , we will be a little bit confident even if we cannot be perfect.

M. You have mentioned confidence; can you discuss more on how practicing using Susie has affected you confidence?

P3. For me I think it has improved, when we were doing, the procedures to the patients, we just recall what we have been doing to Susie, and then we do the same on the patient.

P4. The procedures we have practiced on Susie, we have found it better when practicing on real patients.

P1. But we have found some challenges, I want to be specific like for suturing the model, the skin is soft, but the human skin is hard to prick, so you have to use more energy because it's tougher

P4.And also the patient will be feeling more pain than Susie and will be complaining than Susie.

M. Can you please tell me more about your challenging experiences when using Susie?

P2.For me, for the first time I met Susie, I was so surprised that she is able to talk because I thought it was just a model.

AP. Laughter

P5.It's challenging also because when I want to practice, alone without the supervisors it's impossible, because may be I don't know how to do blood transfusion, I won't know how to do it because I can't manipulate Susie alone, and it's not all the time that when I want to practice that my supervisors are there, so it's challenging. It's as if we can be taught how to manipulate Susie.

P1. I have observed , in addition to what participant 5 has said , is that our tutors ,some of them do not know how to manipulate Susie, because I have seen them waiting for someone even if the person is not there, they can wait saying that clinical instructor is not around.

P4. And Susie, like before you touch Susie, you have wash hands, you have to do so many things and you have to use different solutions to Susie from the patient, some of the solutions that we don't even know, hey it's so difficult.

M1.So how does this make you feel about using Susie in your learning.

P4. It is uncomfortable, you are afraid that you might break her or you may use some of the solutions she is allergic to and you don't know, it's kind of uncomfortable.

P1. Susie is overprotected

P3. Yes, when dealing with Susie, we are not free because there are so many restrictions.

M. Discuss more about these restrictions and how they affect your learning?

P1. It affects us , like when we were learning procedures like injections, then you are supposed to disinfect, the skin of the patient, but me' Suzie cannot use the same disinfectant as the one you use on the patient.

P4.You see that some of the procedures we avoid doing them because we know that Susie is demanding, so we try to avoid and practice on me' Joyce rather than Susie or we just go to the patients.

P2.What I think is that since me' Susie is demanding, when you are going to a procedure to her, she is able to correct you and maybe you are not expecting to be corrected to that extent buy a model, meaning you are going to be scared when doing the procedure.

M. Having said all this, how satisfied are you with Susie as a learning model?

P4.On my side, I am not that satisfied, I am comfortable with me' Joyce, I feel like it's difficult to use Susie. I am not satisfied.

P2.On the other side, it may be we use critical thinking meaning when meeting the challenges from me' Susie, it helps you to think the future that you won't do any mistakes with the real patient, so meaning it's okay to have me' Susie but I don't know how it can operated in a way that it can't frighten us.

P5. Also when dealing with Susie, it's true, it affects my learning .I may need to do some procedure on her but maybe afraid to do so , but maybe with time, I will be comfortable to work with her when I am used to her.

M. Okay so has Susie changed the way you learn, if so how?

P4.I think learning is still the same, may be the exposure we are being exposed to new things that we were not able to see before Susie.

P1.Again due to the challenges we have mentioned, I wish there could be a room for practicing, because when we were first years, we had more time to practice. We could knock off at 10/11pm while in the demonstration room.*Nah* I wish if Susie who is too restricted, we are not allowed to use all the time when we want to practice, can be made available or locked away so that we can practice as long as we want on the other models, like we were doing when we were first year. We were not shivering when it comes to procedure because we had time to practice before going to the real patient.

P5.Now it's like because of Susie, we can't have more time to practice

P1.Here we have to be fair, we know that there is something troubling us. This camera thing doesn't allow someone to be free, because when we are practicing we even have to imitate the clinical instructors when they were demonstrating so we when we know that there is this camera thing looking at us we are not free truly.

M. Tell me more about these cameras .Why are they there and what has been your experience working with them?

P4. The cameras are there because of Susie.

P3.The cameras are there so that maybe there is something which is broken or go missing, sometimes it can be helpful to trace who did that or who has taken something?

P1.Those cameras don't allow freedom.

P2.As others have said, that they are there for security, since Susie is so expensive, so for any damage done must be known, who has done that. The other thing I think is that by the time we are practising on Susie, the one who is operating on Susie is not in the same room with Susie so they can see and operate Susie well, so it serves a purpose to manipulate Susie.

M. What does this emphasis on Susie's security make you feel and is there any way it affects your learning.

P1.If you damage Susie you have to pay.

P5.There is no sense of comfort when dealing with Susie, because I am always afraid what if I do that or that and damage her, so it doesn't really help.

P3.We is also not comfortable at all working on Susie, truly.

P4.It's really uncomfortable because we don't even know how well we can handle Susie, we only know that things such as antiseptics or water should not be used and we don't even know how to manipulate her. We were warned that we should be very careful when working with her.

P5.And you should also wash hands before touching her.

M. Let's talk about supervision, how satisfied is you with the level of supervision you get when you are using Susie.

P4.The supervision is helpful, but sometimes we think that we should do it alone without the presence of supervisors, but when they are there, they are very helpful.

P3.It's helpful when with the instructors who are able to manipulate Susie because she is computerized, if the teacher cant manipulate ,the scenario its difficult .With those who can change the scenarios there are things Susie will do to make me realize that the condition is changing.

M. In the context of all you have discussed, have Susie taken you forward in improving your learning?

P1. I can say we have gone backwards, not necessarily to say we haven't leant anything, but I think Susie, dosen't give us more time or more chance to practice than before, I had more chances of practicing than now.

P5. I can say Susie is very helpful especially, if you had a chance to practice on her, but now that she can be very complicated and we end up being not comfortable working with her. It makes us not to have more practice

P3.I thinks I have improved but not too much, but I have improved since Susie arrived.

P2.*Nah* on my side Susie is very helpful, even though,, I didn't do much to her, but is very helpful because I have seen that unlike before, the students are supposed to practice on Susie before they go to the hospital without practice on such a model, one is supposed to do many procedures in the hospital, some will end up being frightened and doing many mistakes with

easy procedures but if you practice to Susie before, like OSCE before going to hospital one is supposed to pass OSCE.

M.as we get to the end, based on your experiences, lets discuss recommendations you can make to improve the use of Susie for learning.

P5.Since, we have found that Susie is very helpful, it will be better to be taught about that computer thing so that we can operate Susie on our own so that we can go anytime we want to practice.

P4.I think Susie should be left for final procedure like OSCE and other models should be put in other buildings so that we can have access to them and practice since we are not able to practice on me' Susie and also Susie should be kept for demonstrations.

P3.Since there are cameras, all over the simulation, students should be given the opportunity to practice on their own to me Susie.

P2.It's quite correct to have me' Susie despite all those cameras because when we go to the patients, there is no one who is sure of the condition of the patient, but the other thing is what will happen if there is any change to the condition, meaning me' Susie is giving the chance like those ones. All those cameras are good to be exposed to work in such hospitals like Tsepong, there are cameras all over and nurses are still working.

P1.Another point is that I recommend that the preceptors should be consistent when demonstrating the procedures because at times you find they differ according to the university, tertiary or colleges they attended so that we don't get confused when doing the procedures.

M1.Is there anything you would want to say about Susie.

Silence

THE END

Appendix G: Code Book

THEMES	CODE	DEFINITION	EXAMPLE
AUTHENTIC LEARNING ENVIRONMENT	**Realism**	Refers to a description of HFS equating to a real human being.	*'Susie has more characteristics of human being'*
	Helpful	Whenever HFS is described as useful in improving learning	*'I think it is helping'*
	Fear	Circumstances or situations that make participants scared to use HFS in learning.	*'Sometimes I am scared of me' Susie…..'*
UNIQUE LEARNING OPPORTUNITIES	**Confidence**	Situations in participants describe HFS as making them believe in themselves and sure they can do something or lack of belief in the ability to do something.	*'Working with Susie is making us comfortable'*
	Interesting	Learning situations with HFS that are stimulating to participants.	*'It is very interesting'*
TRANSFER OF SKILLS	**Transfer of skills**	The extent to which participants are able to replicate skills learnt using HFS in real clinical situations.	*'…but when I get to real patients I struggle'*
CONTEXTUAL FACTORS	**Fear**	Circumstances or situations that make participants scared to use HFS in learning.	*'Sometimes I am scared of me' Susie…..'*
	Complex	The extent of user friendliness of HFS in teaching and learning.	*'I think teachers should be taught to manipulate Susie'*
ACCESS	**Access**	Describes situations of when and how students can work with HFS for learning purposes.	*'With Susie, you don't have access on her'*