



High-fidelity simulation: a practice model for nurse educators at a South African private higher education institution

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DECLARATION

I hereby solemnly declare that this thesis, entitled *high-fidelity simulation: a practice model for nurse educators at a South African private higher education institution*, presents the work carried out by myself and to the best of my knowledge does not contain any material written by another person except where due reference is made. I declare that all the sources used or quoted in this study are acknowledged in the text and included in the study's bibliography; that the study has been approved by the Health Research Ethics Committee of North-West University; and that I have complied with the ethical standards set by the institution.



Elizabeth Maria Powell

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ABSTRACT

Nursing education is confronted by many challenges. One of the challenges is the clinical skills development of student nurses. Student nurses' clinical exposure is insufficient for clinical skills development due to limited available clinical placements and learning opportunities and reduced time spent with patients due to hospitalisation time, restrictions from medical aid schemes and less invasive procedures being performed on patients. The increased cost of healthcare has caused a decrease in patient bed occupation rates, which directly decreased the number of patients available for student nurses with whom to interact during work-integrated learning. Simulation training as an optional teaching-learning method creates an environment where collaboration and interactive participation take place, while clinical skills are developed and students are prepared for the nursing profession.

The main aim of this research study was to develop a practice model for nurse educators at a South African private higher education institution to facilitate the implementation of high-fidelity simulation in clinical skills development of student nurses. The research design utilised a convergent mixed-methods, theory-generative and contextual research design.

The study was conducted in two phases including two steps under each phase, and covering four objectives. Phase 1, step 1, consisted of identifying the main and related concepts as set for objectives 1 and 2, namely to describe the nurse educators' current use of and experience of high-fidelity simulation, and to explore the nurse educators' views/assumptions and beliefs of the implementation and use of high-fidelity simulation. All data gathered, synthesised, and concepts identified from objectives 1 and 2 led to step 2 of phase 1, where concepts were described and definitions were formulated. Objective 3 described a conceptual framework for the development of a practice model to implement high-fidelity simulation in the nursing programmes of a South African private higher education institution to facilitate student nurses' clinical skills development.

Phase 2 concluded objective 4, namely the development of a practice model to implement high-fidelity simulation to facilitate clinical skills development. The relational meaning of the main and related concepts was addressed in phase 2, step 1, from the concepts identified in phase 1. Step 2 of phase 2, consisted of the construction of the practice model through theory synthesis. The practice model could be implemented at the South African private higher education institution, which was selected as the focus of this research study.

Keywords: high-fidelity simulation, nurse educator, nursing education, practice model, preparation for clinical practice, private higher education institution.

OPSOMMING

Verpleegonderrig word deur vele uitdagings gekonfronteer. Een van die uitdagings is die ontwikkeling van kliniese vaardighede van verpleegstudente. Die beskikbare kliniese blootstelling en leergeleenthede van verpleegstudente is onvoldoende vir die ontwikkeling van kliniese vaardighede weens beperkte beskikbare kliniese plasings en leer geleenthede. Nog redes is verminderde tyd wat spandeer word met pasiënte as gevolg van beperkinge wat mediese fonds skemas stel op tydperke van hospitalisasie en die minder-ingrypende prosedures wat gedoen word. Verhoogde koste van gesondheidsorg is dus die oorsaak van verlaagde bedokkupasie deur pasiënte, wat direk tot gevolg het dat verpleegstudente minder leergeleenthede en beskikbare pasiënt interaksie het gedurende werk geïntegreerde leer. Opleiding in simulاسie as opsionele onderrig-leer metode skep 'n omgewing waarbinne samewerking en interaktiewe deelname plaasvind, kliniese vaardighede ontwikkel word en verpleegstudente sodoende voorberei word vir die verpleegprofessie.

Die doelwit van die navorsingstudie was om 'n praktykgerigte model te ontwikkel vir verpleegdosente verbonde aan 'n Suid Afrikaanse privaat hoëronderriginstelling om sodoende die implementering van hoë-werklikheidsgetroue simulاسie te fasiliteer ter ontwikkeling van kliniese vaardighede van verpleegstudente. Die navorsing maak gebruik van konvergente gemengde metodes, 'n teoriegeïntegreerde en 'n kontekstuele navorsingsontwerp.

Die navorsings studie was in twee fases bestaande uit twee stappe elk wat vier uitkomstegespreke het voltooi. Fase 1, stap 1, het bestaan uit die identifisering van hoof en verwante konsepte vir uitkomstegespreke 1 en 2, naamlik om die verpleegdosente se huidige gebruik en ondervinding van hoë-werklikheidsgetroue simulاسie te beskryf, en om die verpleegdosente se sienings/aannames en oortuigings van hoë-werklikheidsgetroue simulاسie te ondersoek. Die geïdentifiseerde konsepte van uitkomstegespreke 1 en 2 vanuit die data wat versamel en verwerk was, het gelei tot die tweede stap in fase 1, waar die konsepte beskryf en gedefinieer was. Uitkomstegespreke 3 beskryf 'n konseptuele raamwerk vir die ontwikkeling van 'n praktykgerigte model vir die implementering van hoë-werklikheidsgetroue simulاسie in die verpleegprogramme by 'n Suid Afrikaanse privaat hoëronderriginstelling ter fasilitering van die ontwikkeling van kliniese vaardighede.

Fase 2 het gelei tot die bereiking van uitkomstegespreke 4, naamlik die ontwikkeling van die praktykgerigte model vir die implementering van hoë-werklikheidsgetroue simulاسie ter fasilitering van die ontwikkeling van kliniese vaardighede. Die verwantskap tussen die hoof en verwante konsepte wat geïdentifiseer was tydens fase 1, was beskryf in fase 2, stap 1. Stap 2 van fase 2 het die

ontwikkeling van die praktykgerigte model deur middel van teoriesintese beskryf. Die praktykgerigte model kan by die Suid Afrikaanse private hoërondewysinstelling, wat die fokus was van die navorsings studie, geïmplimenteer word.

Sleutelwoorde: hoë-werklikheidsgetroue simulatie, praktykgerigte model, privaat hoërondewysinstelling, verpleegdosent, verpleegondewys; voorbereiding vir kliniese praktyk.

ACRONYMS

ANOVA	Analysis of variance
CHE	Council on Higher Education
CIOMS	Council of International Organizations of Medical Sciences
DHET	Department of Higher Education and Training
DoH	Department of Health
FET	Further Education and Training
GET	General Education and Training
HEQC	Higher Education Quality Committee
HEQSF	Higher Education and Training Qualifications Sub-Framework
HET	Higher Education and Training
HFS	High-fidelity simulation
HREC	Health Research Ethics Committee
KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
LFS	Low-fidelity simulation
MFS	Medium-fidelity simulation
NQF	National Qualifications Framework
NuMIQ	Nursing and Midwifery Inquiry for Quality
NWU	North-West University
PHEI	Private Higher Education Institution
SA	South Africa
SANC	South African Nursing Council

SANQF	South African National Qualifications Framework
SAPHEI	South African Private Higher Education Institution
SD	Standard deviation
Sig	Significant
SPSS Programme™	Statistical Package for the Social Sciences software
WIL	Work-integrated Learning

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CHAPTER 1

OVERVIEW OF THE RESEARCH STUDY

1.1 INTRODUCTION

The aim of this research study was to develop a practice model for nurse educators at a South African private higher education institution (SAPHEI) to facilitate the implementation of high-fidelity simulation (HFS) in clinical skills development. Chapter 1 provides an overview of the research study. This chapter commences with the concepts, background to and rationale for the research study, followed by the statement of the problem and research questions, research aim and objectives, continuing with the researcher's meta-theoretical, theoretical and methodological assumptions. The rest of the chapter includes the discussion of the research design, rigour and ethical considerations of this research study.

1.2 CONCEPTS

The following concepts were central to this research study:

1.2.1 Private higher education institution

According to the Higher Education Act (101 of 1997) (South Africa (SA), 1997:6), a private higher education institution (PHEI) is any institution registered or conditionally registered to offer learning programmes that result in the award of a qualification at levels 5-8 of the National Qualifications Framework (NQF). Private higher education institutions were therefore granted the legal authority to offer higher education programmes and qualifications accredited by the Higher Education Quality Committee (HEQC) of the Council on Higher Education (CHE) and approved by the Registrar of PHEI.

In this research, the PHEI is a private nursing school with seven learning centres (campuses) in South Africa, approved as a PHEI in 2008. A two-year diploma at an NQF level 6 as a bridging course for enrolled nurses leading to registration as a general nurse (South African Nursing Council (SANC) Regulation 683 of 1989) (SANC, 1989:1), was the only nursing programme offered at this SAPHEI during this research study. The nursing programmes that will be offered in future are a higher certificate in auxiliary nursing (SANC Regulation 169 of 2013) (SANC, 2013a:1) at an NQF level 5 and a three-year diploma in nursing as staff nurse (SANC Regulation 171 of 2013) (SANC, 2013b:1) at an NQF level 6.

The researcher selected the SAPHEI where she is employed as the focus of this study due to the following:

- During this research study only a few PHEI's were registered and aligned with the requirements of the CHE and the SANC. The PHEI where this study was conducted is one of the aligned PHEI's in South Africa.
- Similar studies were not conducted in any PHEI in South Africa prior to this study. According to a study done by Thurling (2016:1), HFS is not appropriately utilised in South Africa for nursing education, due to the cost of installation and maintenance of HFS equipment.
- The SAPHEI where this study was conducted is equipped with the technology used in HFS as well as the technology necessary for the data collection process, which was not available in the other SAPHEI's, thus the decision to use only the one SAPHEI for this study.

1.2.2 Nurse educator

A nurse is a qualified person whose job is to take care of sick or injured people, usually in a hospital (Oxford advanced learner's dictionary, 2010:1009).

A nurse educator is seen as one skilled in transferring knowledge of nursing, as well as an administrator in education, according to the Merriam-Webster online dictionary (2016).

In this research study the nurse educator is a qualified registered nurse with an additional qualification in nursing education and registered at the SANC as nurse educator that will facilitate clinical and theoretical teaching-learning for student nurses enrolled under Regulation 683 of 1989 (SANC, 1989:1), Regulation 169 of 2013 (SANC, 2013a:1) and Regulation 171 of 2013 (SANC, 2013b:1) (first student intake 2020), at a SAPHEI. The mentioned SAPHEI is part of a private hospital group and has seven learning centres. Each learning centre has a head nurse educator (also referred to as a learning centre manager) and nurse educators that facilitate clinical and theoretical teaching-learning for student nurses. The SANC approved clinical facilities for each learning centre where the student nurses can obtain their work-integrated learning (WIL). At each clinical facility a learning and development facilitator and clinical facilitators are responsible for the clinical guidance and on-the-spot training of student nurses.

In this research study the word nurse educator was used for the population, consisting of nurse educators and including the learning and development facilitators and clinical facilitators.

1.2.3 Student nurse

The Oxford advanced learner's dictionary (2010:1484), defines a student as a person who is studying at a university or college to enter a particular profession. A student can be an undergraduate or postgraduate candidate. In this research study the student nurse was a pre-registered diploma student, which according to the Oxford advanced learner's dictionary (2010:1484), refers to a student who is studying for his/her first degree (qualification) at a university or college. According to Regulation 169 of 2013 (SANC, 2013a:1) and Regulation 171 of 2013 (SANC, 2013b:1), the term learner is used and defined as a person registered with the SANC as a learner nurse in terms of section 32 of the Nursing Act (33 of 2005) (SA, 2005:3). For the purpose of this research study the term student nurse was used and not learner nurse.

1.2.4 Simulation training

Simulation is the representation of the behaviour or characteristics of one system through the use of another system (Schiavenato, 2009:388). It simulates or resembles an event or situation to reflect clinical practice as closely as possible to teach procedures and facilitate critical thinking (Billings & Halstead, 2009:160; Harder, 2010:23). The two main types of simulation mostly used in nursing education are low-fidelity simulation (LFS) and HFS. **Low-fidelity simulation** is the use of a manikin that is portable and does not replicate physiologic changes. It also does not have a power source or technical support, for example a resuscitation trainer or intravenous arm (Grant & Cheng, 2016:232). **Medium-fidelity simulation** (MFS) is the use of a task trainer combined with a scenario to simulate one portion of the simulated learning environment (Grant & Cheng, 2016:232). A **high-fidelity** manikin can also be used in MFS by only focussing on one system, for example to teach the student nurses the different lung sounds. In this research study the focus was on HFS.

1.2.4.1 High-fidelity simulation

High-fidelity simulation can be defined as a complex, realistic and interactively challenging experience enhanced by the use of programmed manikins that present abnormal or normal breathing sounds and patterns, heart sounds, pulses, bowel sounds and computer-generated dialogues that provide subjective data (Billings & Halstead, 2009:323; Grant & Cheng, 2016:232). Nurse educators can create scenarios and program the equipment to simulate serious and real-life clinical situations.

1.2.5 Clinical teaching-learning

Clinical teaching-learning refers to certain learning experiences that are considered to be essential to the curriculum and agreed upon by the nurse educator and accredited by the SANC. Student nurses must achieve these learning experiences before successful completion of the nursing programme outcomes (Billings & Halstead, 2009:159). Clinical teaching-learning refers to clinical exposure of student nurses in the hospital wards and departments for the prescribed period of training with the goal of gaining clinical WIL experience in accordance with Regulation 683 of 1989 (SANC, 1989:3), Regulation 169 of 2013 (SANC, 2013a:2), and Regulation 171 of 2013 (SANC, 2013b:2). In this research study, clinical teaching-learning posed to be a problem to facilitate all clinical skills needed, therefore the investigation regarding enhancing certain clinical skills training in a simulation laboratory by making use of HFS.

High-fidelity simulation is referred to as a teaching-learning method (Agea *et al.*, 2019:62; Eyikara *et al.*, 2018:101), -strategy (Botma, 2014:1; Doolen, 2015:35) or –approach (Berragan, 2011:660; Garrett *et al.*, 2011:671). In this research study the researcher referred to HFS as a teaching-learning method (due to questionnaire used with permission) (Annexures 5 and 7) except when denoted by other researchers.

1.3 BACKGROUND AND RATIONALE FOR THE RESEARCH STUDY

Throughout time, nurse educators have sought different ways to help student nurses become competent practitioners. Until the twentieth century nurses gained clinical experience on the battlefield or in primary clinical settings (Jason, 2015:1). Since then, nursing education has taken place in the lecture room, the skills laboratory and in the health care delivery setting as learning takes place through cognitive, psychomotor and affective domains (Nehring & Lashley, 2016:528). Traditional models of learning focus on the acquisition of knowledge and skills. Learning theories (traditional learning theory, Pavlovian conditioning, behaviourism and contemporary learning theories) have shifted their focus from individual learning to social learning. Learning is no longer passive, receptive and content-driven, but active, dynamic and requires reflexivity (Berragan, 2011:661).

Simulation training was added to the traditional models of learning in an attempt to enhance cognitive learning and improve clinical skills towards competence (Nehring & Lashley, 2016:528). Over the past 20 years, there has been a steady growth in simulation as a clinical teaching-learning method in nursing education (Garden *et al.*, 2015:300). The challenge of placing student nurses to obtain WIL in a safe environment is one of the main reasons for the mentioned growth (Garrett *et al.*, 2011:671). Berragan (2011:661) emphasises this by stating

that time spent with patients is limited and therefore educators need to develop alternative opportunities for clinical skills development.

In 1911 Hartford Hospital (Connecticut) approached the Rhode Island doll manufacturer M.J. Chase to design what would be the first tailored-made manikin for health care practice. The manikin, called Mrs Chase, featured stitched knees, hips, elbows and shoulders. Three years later she acquired an arm injection port and an internal reservoir allowing for procedures involving the rectum, urethra and vagina (Jason, 2015:1; Nehring & Lashley, 2016:528). In the 1970s Mrs Chase was replaced by more advanced manikins with realistic heartbeats and breathing sounds, which could be heard with a stethoscope when listening to the heart and lungs. With technological changes, manikins became even more advanced and can bleed, blink, cry and react in real time (Jason, 2015:1; Nehring & Lashley, 2016:528).

Henrietta Stockdale started a training programme at Carnarvon Hospital in Kimberley in 1877, which was the beginning of formal nursing education in South Africa in the form of 'apprenticeship training' (Bruce *et al.*, 2011:24; Searle *et al.*, 2013:345). The first hospital schools were approved by the Colonial Medical School in 1892 (Searle *et al.*, 2013:345). According to Bruce *et al.* (2011:25), 18 hospitals in South Africa conducted nursing training by the end of the 19th century. Low-fidelity simulation in the form of anatomical models was used to teach student nurses. From 2006 to 2012 The Atlantic Philanthropies' funding (2014:11) funded a state-of-the-art simulation laboratory at a university in the Free State province in order to provide student nurses with the learning opportunities they need to become competent practitioners. Simulation, using high-fidelity manikins is now widely used to teach student nurses skills that are necessary to reduce the frequency and harm attributable to errors in the healthcare setting (Garden *et al.*, 2015:300; Garrett *et al.*, 2011:671).

Simulation is an active, collaborative learning method being student centred with the nurse educator acting as a facilitator of learning. According to Bland *et al.* (2011:664), student nurses demonstrate greater self-motivation and direction while applying cognitive and psychomotor skills during a simulation. Clinical settings are often very stressful for student nurses, from being victims of horizontal violence (peer bullying due to limited available learning opportunities) to learning new and often invasive technological skills (Clark, 2016:9). Student nurses' lack of confidence in the clinical practice due to limited learning opportunities can create an 'unsafe' environment for them and the patient. The student nurse develops self-confidence by being exposed to clinical experiential learning in a non-threatening environment (Harper *et al.*, 2013:16). Shin *et al.* (2015:179), contend that simulation education allows student nurses to practise nursing skills in safe environments and that patient simulation improves student nurses' clinical skills and critical thinking skills. The act of observation and participation in a simulated

scenario enhanced the student nurses' understanding and their learning through absorption into the learning event and individual construction of meaning (Harper *et al.*, 2013:20). As Kolb's learning cycle indicates, much of the learning when working with simulation methods occur when the student makes sense of the simulated experience and develops new understanding, skills and practices as a consequence (Nestel & Bearman, 2015:35). Berragan (2011:661) also concludes that the simulated environment addresses patient safety as well as nurse educators' concerns regarding protecting patients from ill-prepared student nurses.

Waxman (2010:29) conducted a study on the development of evidence-based clinical simulation scenarios written for HFS training (the use of high-technology, life-like programmed manikins that breathe, talk, blink, and have heart and bowel sounds). She felt that the development of evidence-based clinical simulation scenarios and guidelines for nurses is an important step in redesigning nursing education. Crofts *et al.* (2011:11) confirm Waxman's statement that in areas such as obstetrics, where hospital clinical experiences can be difficult to find, simulation training can provide student nurses with deliberate, guaranteed clinical experience in a safe, controlled environment with no risk to patients. Crofts' study proved that simulation training improved clinical outcomes, especially for obstetric emergencies, which the student nurses were not exposed to in the clinical practice. High-fidelity simulation training allows student nurses to learn through graded experience rather than 'practising on' potentially distressed and vulnerable patients in real-life consultations (Nestel & Bearman, 2015:18). Nurses are expected to solve complex clinical problems in real-life situations. High-fidelity simulation is thought to increase and develop critical thinking skills such as clinical reasoning, problem solving, and clinical decision-making, to arrive at a clinical judgement (Doolen, 2015:35) through the ability to draw student nurses into a scenario quickly and achieving deep engagement (Nestel & Bearman, 2015:1).

The South African education system had undergone major changes and restructuring since 1994 (Bruce *et al.*, 2011:55). In 2009 a split between the National Department of Education into the Department of Basic Education and the Department of Higher Education and Training (DHET) took place. In the case of the DHET, there was one directorate each for Further Education and Training (FET colleges) and Higher Education (universities). The SAPHEI referred to in this research study, was previously only registered as a learning centre and could only offer certificate courses, as this institution was registered at the FET band of the formal-national-education systems in South Africa. Nursing Schools and departments based at universities had to meet the criteria set by the CHE and the SANC, whereas nursing schools/colleges had to meet the criteria set by the SANC (Bruce *et al.*, 2011:12).

After legislative changes and amendments in 2009, nursing schools were allowed to apply for registration as higher education institutions and must be aligned with the requirements of the CHE. The SAPHEI in this research study was, as result, registered and approved as a PHEI in 2008 for two nursing programmes. After the legislative changes and amendments in 2009, the two-year diploma for a bridging course for enrolled nurses leading to registration as a general nurse (SANC Regulation 683 of 1989) (SANC, 1989:1) was added. The new nursing programmes, a higher certificate in auxiliary nursing (SANC Regulation 169 of 2013) (SANC, 2013a:1) and a diploma in nursing as staff nurse (SANC Regulation 171 of 2013) (SANC, 2013b:1) were added in 2017.

Nursing education institutions have to comply with the legislation stipulated by the SANC for each accredited nursing programme. The SAPHEI, where this research study was conducted offered the last intake of one SANC accredited programme during this research study, which was the two year diploma for a bridging course for enrolled nurses leading to registration as a general nurse (SANC Regulation 683 of 1989) (SANC, 1989:1). All nursing programmes were reviewed and the legacy nursing qualification referred to above was gradually phased out so that the new nursing programmes, that are in line with current legislation both in nursing and higher education, could be phased in from 2020. According to a media release by the SANC, dated 20 December 2016 (SANC Circular 7 of 2016:1), the last enrolment date for the two-year diploma for a bridging course for enrolled nurses leading to registration as a general nurse (SANC Regulation 683 of 1989) (SANC, 1989:1), will be 31 December 2019.

The new nursing programmes that will be offered by this PHEI are a higher certificate leading to the registration in the category auxiliary nurse, which is a one-year programme (SANC Regulation 169 of 2013) (SANC, 2013a:1), and a three-year diploma in nursing leading to registration in the category staff nurse (SANC Regulation 171 of 2013) (SANC, 2013b:1). These programmes are registered with the DHET and the South African Qualification Authority and are endorsed by the SANC. The proposed implementation date for these new programmes depends on the final accreditation by the SANC. The last enrolment date for first-time entering students in Non-HEQSF (Higher Education and Training Qualifications Sub-Framework) aligned programmes is 31 December 2019 (Department of Higher Education and Training, 2016:4; SANC Circular 7 of 2016:1).

According to the curriculums of the above-mentioned programmes, student nurses are expected to achieve clinical learning outcomes before the qualification can be awarded to them. Therefore, student nurses must be exposed to clinical learning opportunities, including WIL or any other experiential learning in approved clinical facilities. Clinical facilities are service providers that promote health and provide care to individuals and groups that were used to

teach student nurses (SANC Regulation 173 of 2013) (SANC, 2013c:1). Previously the SANC prescribed a minimum of 1000 hours of clinical training per academic year of training according to the training regulations of the legacy nursing qualification mentioned above. The clinical placement for the new programmes' in-phasing from 2020 is according to the total of the practical credits of the programme, by which 1 credit equals 10 notional hours. According to the one-year higher certificate in auxiliary nursing qualification's minimum requirements of the (SANC Regulation 169 of 2013) (SANC, 2013a:1) programme consists of a total of 120 credits of which 72 credits (720 notional hours) will include clinical training. Clinical education and training must only be provided in clinical facilities that are approved in terms of the accreditation of the programme (SANC Regulation 169 of 2013) (SANC, 2013a:2). The three-year diploma in nursing programme (SANC Regulation 171 of 2013) (SANC, 2013b:1) consists of a total of 360 credits of which 197 credits (1970 notional hours) need to be acquired in an accredited clinical facility as referred to above. The SANC prescribed that a minimum of 60% of formative clinical assessment activities must be done in real life situations (SANC Regulation 169 of 2013) (SANC, 2013a:6) (SANC Regulation 171 of 2013) (SANC, 2013b:6). Clinical education and training in simulation, as well as the formative and summative assessment of student nurses, is allowed with the condition that simulation laboratory time should not exceed 40% of the clinical teaching-learning hours.

In private health care, medical aid schemes play an important role in the duration of hospitalisation of a patient. The patients are discharged as soon as they are medically fit to leave the hospital. Therefore the student nurse does not have clinical exposure to procedures, for example, the removal of stitches as this is done in the doctors' rooms a few days after the patient is discharged from the hospital. On the other hand, the paying patients expect the doctor to perform certain tasks, which would have been done in the public health care setting by a registered nurse or enrolled nurse. The above statement was established through personal experience and observation as well as through previous research conducted by the researcher (Powell, 2012).

The SAPHEI had to arrange a partnership with the public health care sector in order to place student nurses in public hospitals for clinical exposure and WIL to take place. Clinical placement is a challenge as there are student nurses from various public and private institutions that need clinical placements and this causes an 'overcrowding' of student nurses at certain times, which influence the learning opportunities available to a student nurse. Due to this, the SAPHEI's nurse educators have to find new ways of teaching student nurses clinical skills before going to the clinical facilities where exposure to clinical skills are limited and practical guidance or

supervision may not be possible due to the number of student nurses placed at a clinical facility at a certain time.

In the SAPHEI of study, various simulation methods are used. Anatomical models are used to teach anatomy and physiology to first and second-year student nurses. Examples of anatomical models are the skeleton, models of the heart, lungs, kidney and eye. Task trainers that are used for second-year procedures are models of legs and arms that the student nurses can use to practice the removal of stitches and clips. The above mentioned are examples of LFS models. Medium-fidelity simulation models are also used for first and second-year student nurses. Examples of MFS models are role-playing or the use of MFS training models. The use of HFS is still investigated but the need to implement it is a reality that the nursing profession is faced with due to the new nursing programmes that will be offered by the SAPHEI and the challenge of clinical placement of student nurses in speciality areas, for example, maternity, intensive nursing care, and emergency nursing care. Therefore the focus of this research study was on the implementation of HFS.

The researcher is an educator with 16 years' experience at the SAPHEI. Through personal experience and observation, the researcher found that learning takes place through relationships between peers and engagement or personal experiences during patient-care delivery in practice. This is due to constraints in clinical placement of student nurses as well as clinical guidance received from shift leaders and mentors (registered nurses that are registered on the private health care facility's mentorship database after having completed a mentorship workshop; they are then charged with the task of helping to train, advise and share practical experience with the student nurse in the clinical practice). In order for student nurses to develop clinical skills towards clinical competence, they have to gain knowledge and acquire understanding by experience obtained through their day-to-day functioning as a student nurse (Berragan, 2011:662).

1.4 STATEMENT OF THE PROBLEM AND RESEARCH QUESTIONS

Student nurses' clinical exposure is not efficient for clinical skills development due to limited clinical placement options and reduced time spent with patients due to cost, demands from medical aid schemes and less-invasive procedures done on the patients (Garrett *et al.*, 2011:671; Berragan, 2011:661). Jones (2005:1) emphasises this by stating that the increased cost of healthcare has caused a decrease in patient bed utilisation, which then decreased the number of patients available for student nurses to interact with during WIL. As mentioned in the background and rationale for this research study, clinical placement and clinical skills

development pose to be a challenge due to the unavailability of learning opportunities for student nurses.

High-fidelity simulation as a clinical teaching-learning method may offer a solution. Simulation training encourages the student to think innovatively using higher-order thinking skills to make sense and enable students to integrate each new experience into the schema that they are constructing of 'how things are' while in a safe environment. This simulation environment mimics the real world with real patient problems where students can better integrate theory and practice principles (Bambi *et al.*, 2009:79). Berragan (2011:662) accentuates that simulation training creates an environment where collaboration and participation take place, while clinical skills are developed and students are prepared for the real world of nursing.

As indicated, the need for innovative educational nursing approaches was accentuated due to higher-order thinking skills needed by student nurses to solve complex patient problems in nursing practice. Nurse educators should strive to promote critical thinking skills and clinical competence through various teaching strategies. However, the limitation on clinical placements and clinical experiences is a concern and alternative strategies should be explored (Shin *et al.*, 2015:176; Garrett *et al.*, 2011:671).

Successful implementation of simulation training depends on the support of nurse educators (Jones, 2005:4). During a review of literature applicable to this research study, it became evident that there were only a few studies that explored nurse educators' assumptions and beliefs that underpin simulation pedagogy (Jones, 2005:12; Paige & Morin, 2015:11). Paige and Morin (2015:11), explain that nurse educators hold varying beliefs toward teaching-learning and the simulation pedagogy due to their views, perspectives, cultural differences and the availability of resources. According to Paige and Morin (2015:12), the different perspectives from which nurse educators use simulations are unknown. They state that an awareness of these perspectives is a means to enhance instructional delivery and development of nurse educator's skill in simulation design.

The researcher, with the assistance of a librarian, could not find literature evidence that a practice model exists to facilitate the implementation of HFS, indicating a gap in the knowledge base in the field of nursing as it was not clear what nurse educators' assumptions and beliefs about HFS are and how HFS could be implemented in a SAPHEI. Therefore, the need exists to investigate nurse educators' assumptions and beliefs about HFS and the development of a practice model for nurse educators. Such a practice model will facilitate the implementation of HFS as a teaching-learning method in order to ensure an innovative stimulating teaching-learning environment that facilitates learning and clinical skills development of student nurses in

private and other educational institutions in order to support this gap in nursing education in South Africa.

The core question to ask was:

- *How can HFS be implemented in a SAPHEI to facilitate clinical skills development of student nurses?*

The researcher formulated the following questions, based on the statement of the problem and literature mentioned above:

1. What are nurse educators' current use of and experience of HFS in the nursing programmes of a SAPHEI?
2. What are nurse educators' views/assumptions and beliefs of HFS as an educational approach in the nursing programmes of a SAPHEI?
3. What evidence does literature provide on the use and implementation of HFS as a teaching-learning approach in the nursing programmes?

1.5 RESEARCH AIM AND OBJECTIVES

Considering the statement of the problem above and the questions that it poses, the main aim of this research was:

- *To develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development of student nurses.*

The main aim was obtained upon by achieving the following objectives:

1. To explore nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI;
2. To explore and describe the views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes at a SAPHEI;
3. To describe a conceptual framework for the development of a practice model to implement HFS in the nursing programmes at a SAPHEI; and
4. To develop a practice model to implement HFS in the nursing programmes at a SAPHEI.

1.6 RESEARCHER'S ASSUMPTIONS

Thomas Kuhn introduced the concept 'paradigm' in 1962 by defining it as: "those aspects of a discipline that are shared by its scientific community" (Meleis, 2012:27; Bruce *et al.*, 2011:39). A paradigm is a world view or general perspective on the complexities of the world (Polit & Beck, 2017:738). Thus, it reflects the way we view and analyse the world around us, including our beliefs, assumptions, values and practices (Bruce *et al.*, 2011:39). Scientific research is conducted within a specific paradigm, or way of viewing one's research material (Walker & Avant, 2011:7; De Vos *et al.*, 2015:41). The researcher's approach to the research study was guided by her worldview. The meta-theoretical, theoretical and methodological assumptions of the research study are stated subsequently.

1.6.1 Meta-theoretical assumptions

Meta-theoretical assumptions mean the statements of beliefs (Bruce *et al.*, 2011:41). According to Bruce *et al.*, (2011:39), the meta-theoretical assumptions are based on the researcher's view of the world and society and are not intended to be tested. Worldviews represent ways of thinking about reality and knowledge generation (Nestel & Bearman, 2015:350).

The researcher's meta-theoretical assumptions are based on a constructivism point of view. Constructivism, according to Davis Elkind, is the recognition that reality is a product of human intelligence interacting with experience in the real world (Dudovskiy, 2014:1). Constructivism is mainly a teaching philosophy based on the idea that student nurses' understanding is formed by reflecting on their personal experiences, which allow them to relate new knowledge to the knowledge that they already have (Dudovskiy, 2014:1).

Within this framework, the researcher defined the meta-theoretical statements of man, health, environment and nursing.

1.6.1.1 View of man / the person

Man is a system with biologic, sociologic and psychological components, thus making such an individual unique (Chinn & Kramer, 2011:46). The researcher sees man as an exceptional individual, able to construct his/her knowledge through interacting with his/her environment and with other people. An individual's perceptions and experiences from this interaction will be different because of their current knowledge and previous experiences. The researcher acknowledges that each person has different experiences and that their cognitive levels will differ. Man's emotional- and cognitive state will influence his/her perceptions and experiences. These experiences can generate new knowledge if and when man interprets and applies new

experiences to current knowledge, causing conceptual change. Man is the creator of his/her reality, therefore this reality is perceived to be subjective and based on his/her interpretation of their day-to-day experiences.

In this research study, the nurse educator was seen as a unique human being with knowledge and skills. They acquired their knowledge and skills through formal training and personal experiences. The nurse educators' current experience regarding HFS was explored and described before a practice model was developed. The practice model could guide nurse educators to implement HFS, leading to new experiences that will guide new knowledge generation. These experiences can influence cognisance, perception and behaviour.

In this research study, the person (nurse educator) must obtain knowledge and new skills to facilitate teaching-learning to ensure that student nurses reach the set outcomes to become competent nurse practitioners at the end of their formal training programme.

1.6.1.2 View of health

According to the World Health Organization (2006:1), health is viewed as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Chinn and Kramer (2011:48), explain that the focus should not be on the absence of illness or the concept of health, but rather on the totality of a person's situation. The researcher views health as complete physical, mental and social well-being enabling man to interact with his/her environment, generating new knowledge through experience.

The researcher understands that 'health' has a different meaning to different individuals and that it is unreasonable to presume that nurse educators will consistently be without any illness. As unique individuals, circumstances and day-to-day life can influence the physical, mental and social health of nurse educators. The researcher sees health as the ability of nurse educators to act competently (physically, mentally and socially) during their interaction with student nurses and with each other.

In this research study, the ability of the nurse educator to interact with his/her environment and with other people, demonstrating acceptable physical, mental and social behaviour, enabled the nurse educator to interpret, analyse and apply new experiences, leading to new knowledge generation as an indication of his/her well-being.

1.6.1.3 View of society/environment

The concept of society and environment is central to the discipline of nursing (Chinn & Kramer, 2011:47). Chinn and Kramer (2011:47) further accentuate that society and culture are the two

critical interacting forces that shape the individual's environment. The researcher views the society/learning environment as that the nurse educator and student nurse come from diverse cultural, religious and educational backgrounds. The nurse educator shares the learning environment with the student nurse. They come together in a shared society/environment where interactive learning takes place (they teach and learn from each other) by collaboration, participation and interaction.

In this research study, the focus was on theory-practice integration through experiential learning that takes place during practical demonstrations, repetitive practice of clinical procedures and assessment of clinical skills in a simulation laboratory. New knowledge and understanding are formed via reflection on personal experiences acquired during clinical accompaniment. The researcher understands that the individual (nurse educator and student nurse) will develop a new but different meaning or perception about the simulation experience. The student nurse will reflect on the experiences and create his/her reality according to his/her cultural, religious and educational background.

1.6.1.4 View of nursing

Chinn and Kramer (2011:46) explain that (according to nursing's theoretical writings) nursing is referred to as a helping process with the primary focus on interpersonal interaction between the nurse and another individual. The nurse acts as a facilitator to enable the will and behaviour of the person who is receiving care. The researcher views nursing as a caring and ethical profession that focuses on providing assistance to those in need of healthcare. Caring refers to the ability of a person to have empathy with another being and therefore taking care of the individual in need with compassion and understanding. Nursing is concerned with improving the health of individuals, families and communities.

In this research study, interaction takes place between the nurse educator and student nurses. The focus of this research study was to develop a practice model for the implementation of HFS to enhance clinical skills development. This practice model will guide the nurse educator to facilitate real-life experiences for student nurses to practice their nursing roles, functions and skills in a safe and caring environment. Reflecting on these experiences will enable student nurses to construct new means (knowledge and skills), before attending to patients in the real world to become competent and safe practitioners, capable of showing empathy and understanding towards the patients' needs. The primary focus should not just be on the clinical skills development of student nurses, but must include the development of interpersonal skills.

1.6.2 Theoretical assumptions

Theories suggest directions on how to view facts and events until disproved (Bruce *et al.*, 2011:43). According to Mouton and Marais (1996:148), the researcher should not strive to discover new theories, but should rather solve those problems that have been identified. This can be achieved by matching existing theory with the facts as closely as possible by further refinement and articulation of that theory. The theoretical assumptions include models and theories used in the research that are central to this research's field of study.

1.6.2.1 Models and theories

Billings and Halstead (2009:192) describe learning theories as a focus on how people learn and it is descriptive in that it is focused on and describes the processes used to bring about change in either how students perform or how they understand or organise elements in their environment.

The following theories' principles of adult learning theory, constructivism, behavioural learning theory and experiential learning theory are relevant and integrated into nursing education within the context of simulation training, as nursing is a practise discipline allowing adult students into the nursing profession. The theories will be discussed individually as follows:

Adult learning theory

Quinn and Hughes (2007:17) and Clapper (2010:7), describe adult student nurses as individuals that differ widely from each other. These individual differences encompass physical characteristics, such as age and gender, and psychological characteristics, including motivation, personality, intelligence, learning styles and expectations. One aspect that adult student nurses have in common is being voluntary participants. The general perception is that these student nurses want to prepare for a career by furthering their studies, therefore referred to voluntary participants. During selection interviews (conducted by the researcher) of candidates pursuing a nursing career, it became evident that these candidates applied for a training position because it became a necessity to study to be gainfully employed. This changes the 'voluntary participant' into 'must do to be employed'. The shift moved from 'wanting to become a nurse' to 'need to become a nurse in order to provide for his/her family'. The intent may differ, but the motivation will be the same.

Adult learning (andragogy) can be described as the art of teaching adults (Knowles *et al.*, 2015:3). According to Klopper (2001:2), the nursing practice demands total responsibility for patient care from as early as the first year of nursing training. Student nurses are expected to take responsibility and behave in an adult manner from their first day in this new demanding

profession. They need to portray critical thinking skills and should function independently under direct supervision.

It is the responsibility of the nurse educator to facilitate learning and assist the student nurse to develop into an adult, responsible, critical thinker that can act independently. Clinical teaching-learning in a simulated environment will assist the nurse educator in facilitating clinical competence of student nurses. According to Clapper (2010:7), Knowles has significantly influenced the clinical world, particularly those conducting simulation training for the improvement of clinical skills, through his learning theory.

Knowles (1980) originally identified the assumptions of adult learning, which include the following:

- *The student nurse's self-concept* – adults have an independent self-concept, which allows them to be self-directed. They want to independently plan and evaluate their learning abilities (Bruce *et al.*, 2011:97).
- *Role of student nurse's experience* – they have a rich source of experience, which they want to share with fellow student nurses in group discussions and case studies (Bruce *et al.*, 2011:98).
- *Readiness to learn* – adults become ready to learn when they experience a need to know. When their existing knowledge is deficient to cope effectively in real-life situations, curiosity, mastery and challenge will influence their readiness to learn according to Knowles (1980) (*as cited in* Bruce *et al.*, 2011:100). Readiness to learn can be induced through exposure to simulation training exercises.
- *Orientation to learning* – is life-centred and problem-centred. Adults learn to be able to complete a task or solve a problem. They acquire new skills when these are presented in the context of application to real-life situations (Bruce *et al.*, 2011:101).

Simulation training is setting the physical and psychological climate for learning. The simulation laboratory ensures a safe place for student nurses where they can learn clinical skills without the fear that they may harm a patient. The student nurses can share their experience with fellow student nurses during the peer assessment and group discussions on case studies and role play in the simulation laboratory. During these interactions, student nurses improve their interpersonal skills and confidence by reflecting on learning that took place and improving their clinical skills.

Constructivist learning model

The researcher used teaching-learning from a constructivist framework and used the model for constructivist learning in nursing science as developed by Klopper (2009:14).

Learning implies a qualitative change in a person's view of reality. Each person creates his/her own reality or interpretation from day-to-day experiences. The model for constructivist learning supports this view of learning as an assumption. Student nurses construct knowledge within the framework of their own experience. The nurse educator (learning accompanist) is responsible for creating a learning environment where the student nurse can gain new experiences by interacting with this environment. The nurse educator's role is supportive and he/she acts as a facilitator of learning.

Facilitation of student learning requires constant interaction between the nurse educator and the student nurse. The student nurse and the nurse educator enter the teaching-learning situation with the aim to attain deep-holistic lifelong learning. The nurse educator focuses on the student nurse and on methods to create a situation whereby the student nurse can build on his/her current knowledge by practising new skills. For this process to be successful, the nurse educator needs to establish the student nurse's existing cognitive framework and build on his/her current experiences to enhance further skills development.

Interaction between the nurse educator and student nurse is based on reflection and this requires dialogue (exchanging ideas using reflection), discourse (discussion, debating) and narrative (relating a series of events within a specific context). The nurse educator should be motivated to create a context conducive to learning, and the student nurse should be motivated to become a lifelong learner through constructivist learning.

In this research study, the context included clinical practice in nursing science. The nurse educator acts as the facilitator of learning by using his/her knowledge, experience and skills to create an environment that is conducive to learning to take place. In this research study, the environment was a simulation laboratory that resembles the real world of nursing practice. The student nurse could practice his/her clinical skills in a safe environment. In such a situation, the nurse educator must act as a role model and must move away from traditional teaching styles and be enthusiastic about facilitating the teaching-learning of clinical skills. Good communication skills are important as a continuous interaction between the nurse educator and student nurse (adult learner) is imperative during simulation training. Learning takes place through motivation, the practice of clinical skills, reinforcement of skills learned, and feedback. The nurse educator and student nurse share the same goal/purpose to ensure that learning

takes place. The goal/purpose is to strive for clinical skills development and to become a competent, responsible, critical thinker as an independent nursing practitioner.

Behavioural learning theory

Behaviourism focuses on positive reinforcement as a reward and motivation for student nurses to learn and change their behaviour (Billings & Halstead, 2009:194). Skinner (as cited in Quinn & Hughes, 2007:94), contend that learning takes place through continuous positive reinforcement and, as a result, change the respondent's behaviour.

During simulation training, the nurse educator appraises correct actions and gives immediate feedback after the student nurse has practised and mastered a procedure. Positive reinforcement in the form of support, encouragement and feedback by nurse educators during clinical skills development of student nurses is essential to enhance a change in behaviour that will lead to new knowledge and clinical competence. During the simulation training process, the nurse educator acts as a facilitator of active learning, and promoting the understanding and application of cognitive and psychomotor skill development (Bland *et al.*, 2011:664).

Experiential learning

Quinn and Hughes (2007:33), as well as Poore *et al.* (2014:241), explain experiential learning as learning by doing and not by listening to other people or reading about it. The characteristics of this form of learning are an active involvement of the student nurse together with student-centeredness, a degree of interaction, some measure of autonomy and flexibility, and a high degree of relevance. Nursing education takes place in the clinical setting, therefore clinical experience is gained. Thus, the result is that experiential learning takes place continuously.

David Kolb (1984) viewed learning as the process whereby knowledge is created through the transformation of experience (Lisko & O'Dell, 2010:106; Billings & Halstead, 2009:175). Figure 1.1 outlines the process through which student nurses experience an aspect of nursing and then follow this with a period of reflection (Kolb & Yeganeh, 2011:3).

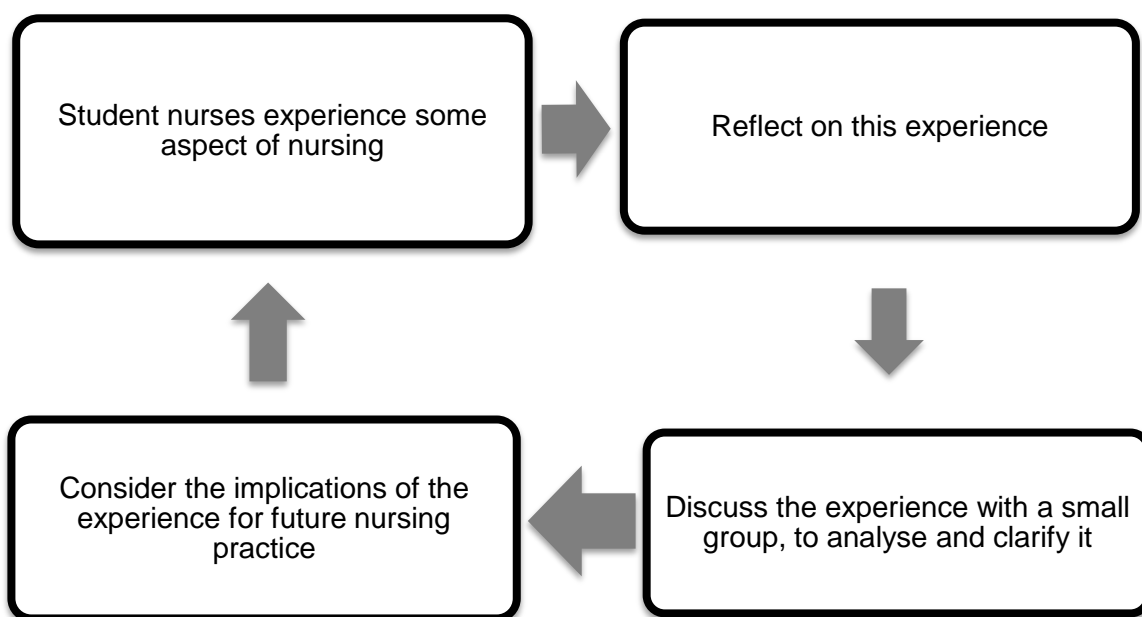


Figure 1-1: The process of experiential learning in nursing
(Kolb & Yeganeh, 2011:3)

For learning to occur, experiences must be transformed through either extension or intention (Lisko & O'Dell, 2010:106). Simulation training gives student nurses exposure to some aspects of nursing by employing demonstrations of procedures. Intention takes place when the student nurses reflect on this experience by observing the same procedures in the clinical environment in their daily nursing activities. Extension is achieved by active participation by the student nurses when practising these procedures in the simulation laboratory or the clinical practice. Student nurses practise these procedures in the simulation laboratory and ask questions. Peer group evaluations, as well as discussions about the steps to follow when doing the procedures, take place. The student nurses reflect on the learning experience and consider how to apply this in future nursing practice.

1.6.2.2 Central theoretical statement

This research study aimed to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. The researcher investigated HFS to identify certain similarities or relationships and systematised these as a practice model of the phenomenon. Mouton and Marais (1996:139), defined a model as a framework or the symbolic depiction (Chinn & Kramer, 2011:252) of reality that provides a schematic

representation (Walker & Avant, 2011:61) of certain relationships among phenomena by using symbols or diagrams to represent an idea.

The importance of the practice model is to facilitate clinical skills development of student nurses employing HFS. Human beings form perceptions about all the information they receive through their senses while experiencing the world. These experiences can lead to the formation of new knowledge generation and application in our daily lives. The researcher believes that through experience, clinical skills can be developed if the student nurse is exposed to a specific type of experience needed in a speciality within a certain timeframe. Creating a safe learning environment is necessary to simulate the real-life situation, where student nurses can be exposed to and interact with a specific learning experience within their scope of practice, which can lead to clinical skills acquisition and competence.

According to Nestel and Bearman (2015:350), theories can be seen as frameworks of ideas, which illuminate simulation-based practises, suggesting that theories seek to provide understandings of how people learn and how teaching is enacted. The student nurses are adult learners that learn through experiential learning. New knowledge is generated and builds on previous experience. Motivation and reflective practices will assist the process of new knowledge generation.

The researcher believed that if she reached the specific aim and objectives of this research study, she would be able to develop a practice model and that such a model would improve clinical skills development of student nurses in a simulated environment.

1.6.3 Methodological assumptions

The researcher used a constructivist approach. According to Lincoln and Guba (2013:39), reality can change when you change the individual or the context. If the context changes, the individual's experience and interpretation will change, thus influencing his/her reality or perception thereof. This approach suggests that there are multiple interpretations of reality and that the goal of the research is to understand how individuals construct reality within their context. Denzin and Lincoln (2008:257; 2011:13) explain that the constructivist paradigm assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and respondent co-create understandings) and a naturalistic (in the natural world) set of methodological procedures (Onwuegbuzie *et al.*, 2009:122).

The researcher aimed to develop a deep understanding of how the participants relate to the phenomenon investigated in this research study through a convergent mixed-methods design. For the first part of the research study, the researcher gathered data through a questionnaire

and interviews as this approach enabled her to explore and describe the perceptions of the participants regarding HFS. After these perceptions were explored and described, central concepts were identified and used during further exploration of evidence through a conceptual framework and literature review, on the basis of which a practice model was developed for the implementation of HFS.

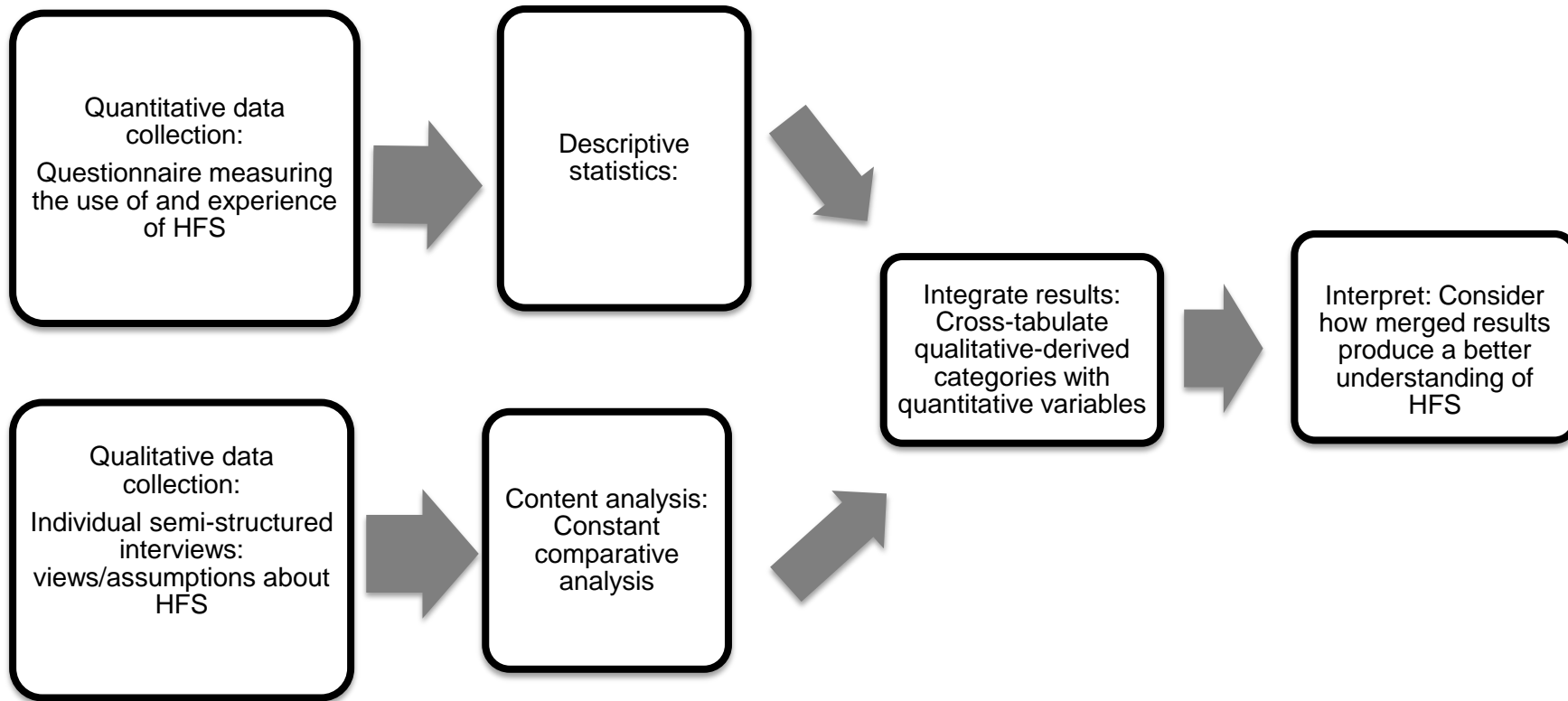
In the end, the researcher intends to implement the practice model that was developed for nurse educators at a SAPHEI and use it for the clinical practice of nursing education, specifically for the facilitation of HFS at all the learning centres of the SAPHEI where the research study was conducted. The researcher hopes that other higher education institutions will also benefit from this model by using it to implement HFS to the benefit of all nursing students to improve their clinical skills development.

1.7 RESEARCH DESIGN

The research study utilised a convergent mixed-methods (Creswell, 2014:270), theory-generative (Walker & Avant, 2011:7; Chinn & Kramer, 2011:185), and contextual (Klopper, 2008:68) research design to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. The research study was conducted in two phases including two steps under each phase, and covers four objectives (Chapter 2).

Convergent mixed-methods design

The researcher selected the convergent mixed method research design, which involves the collection of both qualitative and quantitative data simultaneously, integrate the data and use the results to understand the research problem (Creswell, 2014:270). Qualitative and quantitative data were compared in a side-by-side analysis to identify emerging categories (Creswell, 2014:580) during phase 1, step 1, of this research study (chapters 3 and 4). These categories were used to identify the concepts that were used in describing the conceptual framework (phase 1, step 2) (Chapter 5), which was important for the development of the practice model (phase 2) (Chapter 6) (Walker & Avant, 2011:124). Figure 1.2 is a graphic explanation of the integration of the data during the quantitative and qualitative data collection.



**Figure 1-2 Convergent mixed-methods research design
(Creswell, 2014:571)**

Quantitative phase

A descriptive quantitative research design was used during phase 1, step 1. Quantitative research describes phenomena after a thorough investigation and quantification of the data obtained (Creswell, 2014:10). Descriptive quantitative research observes and describes a situation as it occurs and serves as a starting point for hypothesis generation or theory development (Mouton & Marais, 1996:43).

The method used to gather data was through a teaching-learning feedback questionnaire. A link to the questionnaire was sent electronically to all the participants (nurse educators in the SAPHEI) who gave informed consent to take part in this research study. The objective of the quantitative phase was to describe the nurse educators' current use of and experience of HFS (refer to objective 1 in phase 1, step 1 as discussed in Chapter 2).

Qualitative phase

The researcher used a descriptive and contextual qualitative design (Mouton & Marais, 1996:43) to explore the nurse educators' views/assumptions and beliefs of the implementation and use of HFS. In this research, individual semi-structured interviews via Vidyo (internet/Skype) were used as a data gathering method (refer to objective 2 in phase 1, as discussed in Chapter 2).

Contextual

According to Klopper (2008:68), qualitative research studies are always contextual, as the data is only valid in a specific context. A description of the context/setting in which the research was conducted is therefore described in this contextual research study.

Research setting refers to the specific place or, in the case of this research study, the settings where the data was collected (Creswell, 2014:12).

In this research study, the context was a PHEI in South Africa. The intrinsic and immediate contextual significance of this research study was to develop a practice model for nurse educators at a SAPHEI to implement HFS for the facilitation of the development of clinical skills in nursing programmes.

Theory-generative design phase

Barker (as cited in De Vos *et al.*, 2015:37) defines theory as a set of interrelated hypotheses, concepts, constructs, definitions and propositions that present a systematic view of phenomena (Walker & Avant, 2011:7; Chinn & Kramer, 2011:185) based on facts and observations, with the

purpose of explaining and predicting the phenomena. The theory generation process was followed to develop the practice model.

This research study aimed to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. A model is a symbolic depiction of reality that provides a schematic representation of certain relationships among phenomena by using symbols or diagrams to represent an idea (Mouton & Marais, 1996:139; Chinn & Kramer, 2011:252; Walker & Avant, 2011:61). Different research methods were used to lead to the development of a HFS practice model for nurse educators at a SAPHEI to facilitate clinical skills development.

This research study may guide future studies on the implementation of HFS to facilitate clinical skills development. The research method for each phase, step and objective will be discussed in Chapter 2 in detail.

1.8 RIGOUR

Rigour is referred to as the scientific merit of a research study (Polit & Beck, 2017:160). It demands critical examination during each phase of the research study to guarantee accurate and scientific data of the research (Botma *et al.*, 2015:84). It refers to the principle of the truth value of the research outcome (Brink *et al.*, 2015:97). According to Polit and Beck (2017:160), two important criteria are reliability and validity. Reliability refers to the accuracy and consistency of information obtained in a study and validity is a more complex concept that broadly concerns the soundness of the study's evidence. In qualitative research, different criteria is used, namely trustworthiness, which encompasses several dimensions; credibility, transferability, confirmability, dependability and authenticity (Polit & Beck, 2017:161).

The universal standards for trustworthiness, validity and reliability are discussed under each phase in Chapter 2.

1.9 ETHICAL CONSIDERATIONS

The researcher accepted the responsibility to conduct this research ethically. The researcher recognised, selected and abided by specific codes of ethics as stipulated by the following local, national and international institutions:

- **University's code of ethics:** The researcher functioned within the scientific domain as a PhD candidate, registered as a student at the North-West University (NWU). In this research study, the researcher adhered to the University's code of ethics as stipulated by the Statute.

A research proposal was submitted to the NWU Health Research Ethics Committee (HREC) and research was conducted only after the HREC had granted its consent (North-West University, 2016b:5). (Annexure 1)

- **National ethical governance:** The researcher adhered to the code of ethics in health research as governed by the South African Department of Health (South Africa (DoH), 2015).
- **International codes of ethics:** From an international perspective, the researcher chose to adhere to the code of ethics by the Council of International Organizations of Medical Sciences (CIOMS, 2016) as well as the ethical principles and guidelines for the protection of human research subjects as stipulated in the Belmont Report, of the World Medical Association Declaration of Helsinki's ethical principles for medical research that involves human subjects, and the Nuremberg Code (North-West University, 2016a:28).

Ethical principles of beneficence, respect and justice were adhered to during this research study by being honest and accurate in reporting the studies' review and keeping a detailed record of review and appraisal for audit purposes. The researcher is ethically obliged to assess the research study's benefit versus the potential harm it could cause, to ensure that the participants' right to be protected against any harm will be maintained (North-West University, 2016b:1). The well-being of the participants was ensured by avoiding or minimising any emotional or physical discomfort. The researcher submitted a research proposal and written request to the NWU, HREC. Members of the panel of experts were informed of the benefit of the research study as well as potential risks.

The above-mentioned ethical codes were consciously employed and decided upon and a definite awareness of ethical considerations was maintained throughout the research process. Specific ethical considerations that were adhered to during this research study will subsequently be described in detail.

1.9.1 Permission and informed consent

The NWU, HREC (NWU-00011-18-A1) provided written consent to the researcher to conduct this research (see Annexure 1 for a copy of the ethical approval confirmation letter). The proposal was also submitted and approved by the Postgraduate and Research Committee of NuMIQ (Nursing and Midwifery Inquiry for Quality) in November 2017, before submission to the HREC. The researcher also obtained permission to conduct the research study at a SAPHEI (Annexure 2).

The principle of justice (North-West University, 2016b:1) refers to the participants' right to a fair selection as well as their right to privacy and anonymity. Participants were requested to complete an informed consent agreeing to participate in this research study voluntarily. They were informed of the reasons why they were included in the sample. Informed consent from all participants (nurse educators, learning and development facilitators, and clinical facilitators at a SAPHEI) were obtained, during which the participants were informed that the results would be used and kept confidentially. They gave informed consent before they completed the questionnaires (Annexures 3 and 4). Informed consent will be discussed in detail in Chapter 2.

1.9.2 Anonymity

Respect for others rests upon the autonomy of others and therefore emphasises each person's right to be protected against any harm, taking into account the principles of beneficence and justice (North-West University, 2016b:1). The researcher respected the participants by confirming their availability to participate voluntarily. In circumstances where a participant either refused or terminated participation, it was accepted without discrimination.

Anonymity in research implies that the researcher does not know to whom responses belong (Polit & Beck, 2017:719). Participants were assured that their privacy was at all times protected and anonymity was guaranteed (Polit & Beck, 2017:143) by letting the participants complete an electronic questionnaire, which was sent to them anonymously via a link in an email. Anonymity will be discussed in detail in Chapter 2.

1.9.3 Confidentiality

The researcher followed the fundamental ethical principles of respect for the information sources and databases by handling information with confidentiality and responsibility (Polit & Beck, 2017:147) during the qualitative phase of this research study as anonymity could not be achieved due to the 'face-to-face' interview. The researcher was responsible for keeping all information confidential and in safe custody as discussed in Chapter 2.

1.9.4 Prevention of plagiarism

The researcher acknowledged the North-West University's policy to prevent plagiarism (North-West University, 2016a:21) and declared her adherence to this policy. Complete abstinence from plagiarism was achieved by giving credit where due in the text and including bibliographic details in the list of references. The researcher showed respect for copyrights where applicable by giving credit in the text when diagrams, illustrations or statistical graphics were used from articles or books including bibliographic details in the list of references.

1.10 STRUCTURE OF RESEARCH STUDY

The researcher addressed the above questions and objectives in chapters that were planned according to the phases of model development (Table 1.1).

Table 1-1: Outline of this research study

Main aim and objective according to the phases and steps of model development	Chapter	Heading / Content of chapter
	Chapter 1	Overview of the research study
	Chapter 2	Research methodology
<p>Phase 1, Step 1 (Convergent Mixed-methods research design) Objective 1: To explore nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI</p>	Chapter 3	Nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI
<p>Phase 1, Step 1 (Continued) Objective 2: To explore and describe the views/assumptions and beliefs of nurse educators on implementation and use of HFS in the nursing programmes at a SAPHEI</p>	Chapter 4	The views/assumptions and beliefs of nurse educators on implementation and use of HFS in the nursing programmes at a SAPHEI
<p>Phase 1, Step 2 (Concept descriptions and definitions) Objective 3: To describe a conceptual framework for the development of a practice model to implement HFS in the nursing programmes at a SAPHEI</p>	Chapter 5	Conceptual framework
<p>Phase 2 (Model construction) Objective 4: To develop a practice model to implement HFS in the nursing programmes at a SAPHEI.</p>	Chapter 6	Description of a practice model for the implementation of a HFS at a SAPHEI
<p>Step 1 (To construct the relational meaning of main and related concepts) Step 2 (Model construction through theory synthesis)</p>	Chapter 6	Description of a practice model for the implementation of a HFS at a SAPHEI
	Chapter 7	Evaluation of the research study, limitations and recommendations for research, education and practice

1.11 SUMMARY

In Chapter 1 an overview of the research study was presented. The concepts, background and rationale, problem statement, research questions, aim and objectives were discussed. The researcher then discussed the meta-theoretical, theoretical and methodological assumptions. The research design, rigour and ethical considerations were also outlined in this chapter.

The research methodology will be discussed in detail in Chapter 2.

CHAPTER 2

RESEARCH METHODOLOGY

2.1 INTRODUCTION

An overview of the research method used, as well as the phases during the practice model development, will be discussed in this chapter. The research method and results for each objective and the phases of the practice model development will be discussed in detail in the following chapters.

This research study utilises a convergent mixed-methods, theory-generative and contextual research design (Creswell, 2014:8; Polit & Beck, 2017:735) to explore and describe the implementation of high-fidelity simulation (HFS) with the aim of developing a practice model for nurse educators at a South African private higher education institution (SAPHEI) to facilitate the implementation of HFS in clinical skills development. Each of the elements is discussed next.

2.2 RESEARCH DESIGN

Convergent mixed-methods design

A convergent mixed-methods design involves the collection of both quantitative and qualitative data simultaneously, the integration of the data by using the results to understand the research problem (Creswell, 2014:270; Creswell & Plano Clark, 2011:70) (Chapter 1, Figure 1.3).

In this research study, the quantitative and qualitative data were collected at the same time and compared in a side-by-side analysis in order to identify emerging categories (Creswell, 2014:580; Creswell & Plano Clark, 2011:70; Plano Clark & Ivankova, 2016:39) during phase 1, step 1, of this research study (chapters 3 and 4). These categories were used to identify the concepts that were used in describing the conceptual framework (phase 1, step 2), which was important for the development of the practice model (phase 2) (Walker & Avant, 2011:124).

Quantitative phase

Quantitative research describes phenomena after thorough investigation and quantification of the data obtained (Creswell, 2014:10; Plano Clark & Ivankova, 2016:4). A descriptive quantitative research design was used during phase 1, step 1 (Chapter 3). Descriptive quantitative research observes and describes a situation as it occurs and serves as a starting point for hypothesis generation or theory development (Mouton & Marais, 1996:43).

The method used to gather data was by employing a teaching-learning feedback questionnaire (Annexure 7). A link to the questionnaire was sent electronically to all the participants (nurse educators at a SAPHEI) who gave informed consent to take part in this research study. The objective of this quantitative phase was to describe the nurse educators' current use of and experience of HFS in nursing programmes at a SAPHEI (objective 1, in phase 1, step 1, as discussed in 2.3.1.1).

Qualitative phase

Qualitative research is the investigation of phenomena (Creswell, 2014:10) based on the researcher's experience or from observation. According to Creswell (2014:30), qualitative research explores a problem and leads the researcher to develop a detailed understanding of a central phenomenon.

The researcher used a descriptive and contextual qualitative design (Mouton & Marais, 1996:43) to explore the participant's views/assumptions and beliefs of the implementation and use of HFS in nursing programmes at a SAPHEI. In this research study, individual semi-structured interviews via Vido (internet/Skype) were used as a data gathering method (objective 2, in phase 1, as discussed in 2.3.1.1).

Contextual

According to Klopper (2008:68), qualitative research studies are always contextual, because the data is only valid in a specific context. A description of the context/setting in which the research was conducted is therefore described in this contextual research study.

Research setting refers to the specific place or, in the case of this research study, settings where the data were collected (Creswell, 2014:12).

In this research study, the context was a SAPHEI consisting of seven learning centres with affiliated, approved clinical facilities that formed part of a private health group, for each learning centre. The learning centres are situated in the following provinces: Free State, Gauteng (Two learning centres), Mpumalanga, Northern Cape, Limpopo and Western Cape (Table 3.1). The intrinsic and immediate contextual significance of this research study is to develop a practice model for nurse educators at a SAPHEI to implement HFS for the development of clinical skills in nursing programmes.

Theory-generative design

Barker (as cited in De Vos *et al.*, 2015:37) defines theory as a set of interrelated hypotheses, concepts, constructs, definitions and propositions that presents a systematic view of

phenomena (Walker & Avant, 2011:7; Chinn & Kramer, 2011:185) based on facts and observations, with the purpose of explaining and predicting the phenomena. Walker and Avant (2011:3) view theory development as a way to identify and express key ideas about the essence of the practice.

The four levels of theory (on which there is consensus by authors), is explained (Chinn & Kramer, 2011:48; Walker & Avant, 2011:18; Polit & Beck, 2017:118; Alligood, 2018:572; Brink *et al.*, 2015:22).

The four levels of theory are:

- **Metatheory:** At this level, Alligood (2018:35), explain that nursing philosophy sets forth the meaning of nursing phenomena through analysis, reasoning and logical presentation. The knowledge acquired from nursing theories contributes to the development of new knowledge. Walker and Avant (2011:7), explain that broad universal issues are debated without producing grand, middle-range or practice theories. The focus is on broad issues, including analysis of the purpose and to define the types of theory needed and being appropriate within disciplines (Brink *et al.*, 2015:22). Chinn and Kramer (2011:41) regard meta-theory as writings that made significant contributions to the development of theoretical thinking, by clarifying what the essential qualities of a theory should be and how to develop such a theory.
- **Grand theory:** At this level, Alligood (2018:35), regarded the aim as the development of conceptual models that provide a perspective on a worldview/meta paradigm in nursing practice, i.e. the systematic constructions of the nature of nursing, the mission of nursing and the goals of nursing care (Meleis, 2012:33). It is constructed from a synthesis of experiences, observations, insights and research findings (Meleis, 2012:33; Brink *et al.*, 2015:22). Grand theories are the highest in abstraction and do not lend themselves to empirical testing (Meleis, 2012:33). Walker and Avant (2011:12) and Chinn and Kramer (2011:188) regard the aim as explaining a worldview useful in understanding key concepts and principles within a nursing perspective of the goals and structures of nursing practice.
- **Middle-range theory:** Chinn and Kramer (2011:48) explain that the focus at this level is the development of a substantive theory that provides a meaningful foundation for the development of nursing practice with specific practice concepts of interest and related phenomena. Alligood (2018:574), contest that this type of theory has an even more specific focus and is more concrete and precise with a focus on answering specific nursing practice questions. Walker and Avant (2011:16) explain that this level of theories has fewer numbers

of variables and a limited scope, but are still testable and sufficiently general to be of scientific value in theory development.

- Practice theory:** Chinn and Kramer (2011:48) support the stance of Meleis (2012) that this level of theory focuses on nursing concepts that are grounded in a practice context. According to Alligood (2018:574), this type of theory was developed from conceptual frameworks and is more specific to a particular aspect or setting of nursing practice. Walker and Avant (2011:18) explain that this level of theory has at its core a particular goal and direction for actions to accomplish the goal. It was at this level of practice theory that this research study was engaged with the research aim of developing a practice model for nurse educators at a SAPHEI to implement HFS. The specific practice phenomenon under study is HFS and its implementation in practise to enhance clinical skills development of student nurses. The emergent main and related concepts on the phenomenon and their interrelatedness within the practice setting form the essence of this research study.

Walker and Avant (2011:20) point out that there are linkages between the levels of theory development, as shown in Figure 2.1, indicating how they are interrelated.

Direction of action	Levels of theory development	Direction of action
	Metatheory level	Clarifies
Provides Material for	Grand Theory level	Guides
Refines	Middle-Range Theory level	Directs
Test in practice	Practice Theory level	

Figure 2-1: Linkages between levels of theory development (adapted from Walker & Avant, 2011:20).

Dickoff *et al.* (1968:420) identify four levels of theory at the practice level of nursing theory development, which are:

- Factor-isolating theories
- Factor-relating theory
- Situation-relating theory
- Situation-producing theory (or prescriptive theories)

The last level (situation-producing theory or prescriptive theories) applied to this research study on the functional role of the nurse educator in the implementation of HFS because it was the situational context in teaching-learning of clinical skills that contributed to the development of a practice model. Dickoff *et al.* (1968:421) indicate that three components are essential in a situation-producing theory. These components are applied in this research as follows:

1. Goal content that is specific as to the aim of the activity. In this research study, the goal is the implementation of HFS at a SAPHEI to facilitate clinical skills development of student nurses.
2. Prescriptions for the activity to ensure that the goal content is realised. In this research study, the prescriptions are the concepts identified (Table 5.1) during objectives 1 and 2 of this research study that constitute the phenomenon under study and are aimed at developing a practice model.
3. A conceptual framework (survey list) that serves to classify the prescriptions aimed at future preparation so that the prescriptions are carried out aimed at attaining the goal content. In this research study, the conceptual framework is used in Chapter 5 to facilitate concept classification after concept identification from empirical data (from objectives 1 and 2) was produced.

In Table 2.1, the levels of practice theory by Dickoff *et al.* (1968:420) are presented and the relevant application to model development in this research study is outlined.

Table 2-1: Application of the levels of practice theory by Dickoff *et al.* (1968:420) in relation to model development in this research study

Levels of practice theory by Dickoff <i>et al.</i> (1968:420)	Application to model development in this research study	Phases and steps of model development in this research study
1. Factor-isolating	<ul style="list-style-type: none"> • Concept identification • Concept classification 	<ul style="list-style-type: none"> • Phase 1, Step 1
2. Factor-relating	<ul style="list-style-type: none"> • Conceptual framework • Relational statements 	<ul style="list-style-type: none"> • Phase 1, Step 2 • Phase 2, Step 1
3. Situation-relating	<ul style="list-style-type: none"> • Description of practice model 	<ul style="list-style-type: none"> • Phase 2, Step 2
4. Situation-producing	<ul style="list-style-type: none"> • Evaluation of practice model 	<ul style="list-style-type: none"> • Phase 2, Step 2

The first step in theory generation is to identify recurring elements related to theoretical ideas and their application to the phenomenon. These elements include the concepts, definitions of concepts, relational statements, and map or model (Chinn & Kramer, 2011; Meleis, 2012). This step was executed under phase 1 of the model construction (Table 2.1). Meleis (2012:25) defines a concept as a term that describes a phenomenon, thus providing it with a separate meaning that symbolises some degree of classification or categorisation. It provides a summary of thoughts related to the phenomenon (Meleis, 2012:26) and refers to the selection of concepts that are highly abstract to retain meaning. When the term is removed from a specific situation, the primary challenge that surrounds concept identification is that the concept should still remain identifiable and have clear boundaries (Walker & Avant, 2011:58). Primitive concepts should be avoided as it has a commonly shared meaning among all individuals and cannot be defined (Walker & Avant, 2011:58). The latter refers to concepts that are so broad that they can encompass a variety of meanings and lead to confusion. The selected concepts should be important and significant to the research problem and should further theoretical development (Walker & Avant, 2011:59).

Defining a concept allows consistency in the way that the term is used. Concepts, once formulated and labelled, tend to shape and guide what the researcher sees and they provide order to observations and experiences that enhance understanding of situations and events (Meleis, 2012:371). Concepts evolved from experiences and their conceptual definitions reflect the theorists' perspectives and the theoretical frameworks that guide their work (Meleis,

2012:372). A conceptual definition is more comprehensive than a denotive definition and includes associated meanings the word may have (Meleis, 2012:372).

Walker and Avant (2011:59) explain that statements express a relationship between two or more concepts and that this can be useful and efficient, thus developing statements is an important aspect of theory development. A relational statement clarifies the type of relationship that exists between or among concepts (Walker & Avant, 2011:60). The identification of concepts and relational statements were done from data gathered and analysed from objectives 1 and 2 of this research study (phase 1, step 1, in Table 2.1).

A theory is an internally consistent group of relational statements that presents a systematic view of a phenomenon (Walker & Avant, 2011:61). One strategy for expressing a theory is a model that shows the interrelationships of the concepts and relational statements. Interrelated concepts assembled in a rational and explanatory structure to illuminate relationships among them is called a conceptual framework (Polit & Beck, 2017:723). A conceptual framework includes all the major concepts in a theory or study framework. These concepts are linked by arrows expressing the proposed linkages between them. Each linkage shown by an arrow is a graphic illustration of a relational statement of the theory. A conceptual framework was developed from data gathered and analysed in phase 1, step 1, of the model development process (phase 1, step 2, in Table 2.1).

As already stated the main aim of this research study was to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. A model is a symbolic depiction of reality that provides a schematic representation of certain relationships among phenomena by using symbols or diagrams to represent an idea (Mouton & Marais 1996:139; Chinn & Kramer, 2011:252; Walker & Avant, 2011:61). Different research methods will be used to lead to the development of 'models' of what 'reality' is supposed to be and then testing the models against empirical data. Mouton and Marais (1996:136) argue that the heuristic or descriptive function is the most common characteristic of models, while the explanatory function is usually attributed to theories. The researcher used theory construction to develop a HFS practice model for nurse educators at a SAPHEI to facilitate clinical skills development.

2.3 RESEARCH METHOD

The research method for each phase, step and objective will now be discussed. Table 2.2 provides an overview of the planned research method followed by the discussion.

Table 2-2: Overview of the phases and research methods planned for this research study

Aim of this research was to develop a practice model for nurse educators at a South African private higher education institution to facilitate the implementation of high-fidelity simulation in clinical skills development.				
Research Objective	Data Collection	Population and sampling	Data Analysis	Rigour
PHASE 1: STEP 1: CONVERGENT MIXED METHOD RESEARCH DESIGN				
<p>Objective 1: Nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI.</p>	<p>Objective 1: Descriptive quantitative research design: Teaching-learning feedback knowledge questionnaire to explore nurse educators' current use of and experience of HFS.</p>	<p>Objective 1: Population included nurse educators (permanent staff) at a SAPHEI (N=120). The sample was an all-inclusive sample consisting of nurse educators that gave voluntary informed consent to participate in the research study. The sample size was n=69.</p>	<p>Objective 1: Descriptive statistical analysis of the questionnaire was conducted by the North-West University's Statistical Consultation Services (objective 1, (par f)).</p>	<p>Objective 1: Validity and reliability will be discussed in this chapter (objective 1, (par d)).</p>
<p>Objective 2: Views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes at a SAPHEI.</p>	<p>Objective 2: Descriptive and contextual qualitative design:</p>	<p>Objective 2: All the nurse educators (permanent staff) at a SAPHEI who participated in the quantitative phase of this research study (N=69).</p>	<p>Objective 2: Content analysis (objective 2, (par e)).</p>	<p>Objective 2: Trustworthiness will be discussed in this chapter</p>

Research Objective	Data Collection	Population and sampling	Data Analysis	Rigour
	Individual semi-structured interviews to investigate the views/assumptions and beliefs of nurse educators on the implementation and use of HFS.	The sample was a randomised purposive sampling consisting of nurse educators who gave voluntary informed consent to participate in the individual semi-structured interview. The sample size was n=33.		(objective 2, (par f)).
PHASE 1: STEP 2: CONCEPT DESCRIPTION AND DEFINITION				
Objective 3: To describe a conceptual framework for the development of a practice model to implement HFS in the nursing programmes at a SAPHEI. During this phase, concepts will be described and defined (phase 1, step 2).	Extensive literature searches were conducted to describe a conceptual framework for the implementation of HFS.	Population: The selected main and related concepts that were identified in phase 1, step 1, were used. Sampling: Purposive sampling was done in the form of literature searches.	A conceptual framework was developed through identifying and defining concepts and proposing relationships between these concepts. The researcher used all the data gathered from objectives 1 and 2 as well as an in-depth literature	Deductive and inductive logical reasoning strategies to enhance trustworthiness.

Research Objective	Data Collection	Population and sampling	Data Analysis	Rigour
			control to develop and describe the conceptual framework.	
PHASE 2: MODEL CONSTRUCTION				
PHASE 2: STEP 1: CONCEPTUAL FRAMEWORK				
To construct relational meaning of main and related concepts.	Results of phase 1, steps 1 and 2.	Population: All available national and international sources of data. Sample: Conclusion statements.	Statement synthesis.	Deductive and inductive logical reasoning strategies to enhance trustworthiness.
PHASE 2: STEP 2: MODEL CONSTRUCTION				
Objective 4: To develop a practice model to implement HFS in the nursing programmes at a SAPHEI. Model construction through theory synthesis.	Results of phase 2, step 1.	Sample: Conclusion statements.	Model construction process through theory synthesis.	Deductive and inductive logical reasoning strategies to enhance trustworthiness.

(based on Walker & Avant, 2011)

2.3.1 Phase 1

Phase 1 consists of two steps. Each step will be discussed as follows:

2.3.1.1 Phase 1: Step 1: Convergent Mixed-methods research design

Under step 1, two objectives will be discussed with each of their research methods, population and sampling, data collection, and data analysis. Rigour and ethical principles applicable to each phase will also be discussed.

Although the two objectives in phase 1 step 1 was discussed separately as well as the quantitative and qualitative phases were reported in different chapters (chapters 3 and 4), Figure 2.2 illustrates the application of the convergent mixed methods research design in this research study.

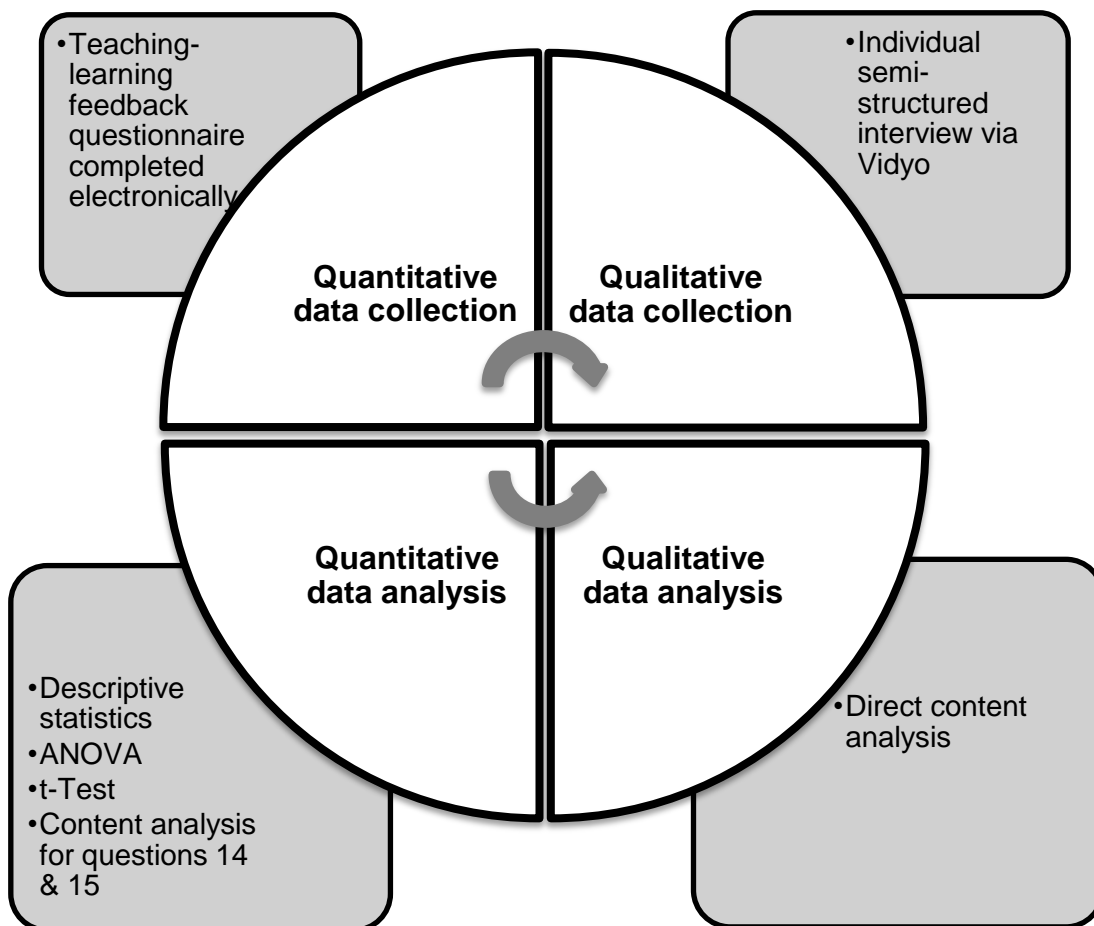


Figure 2-2: Convergent mixed-methods research design
(Creswell, 2014:571)

Objective 1: Nurse educators' current use of and experience of high-fidelity simulation in the nursing programmes at a South African private higher education institution

The aim of objective 1 was to explore nurse educators' current use of and experience of HFS as a teaching-learning method at the selected SAPHEI.

(a) Research method

A descriptive quantitative method (Mouton & Marais, 1996:43) was used to explore and describe the nurse educators' current use and experience of HFS in the nursing programmes.

(b) Population

Population refers to the entire group of persons that is of interest to the researcher (Creswell, 2014:9). In this research study, the population consisted of all the nurse educators (permanent staff) at a SAPHEI (N=120). The researcher did consult with a statistician regarding the small population. The population size did not pose a threat to the research study because the quantitative phase is descriptive and a means to a bigger goal, namely the development of a practice model.

Conflict of interest

The researcher is employed at the SAPHEI and was excluded from the population total. The research study did not pose any financial gain or commercial benefit to the researcher. The researcher managed any conflict of interest to safeguard the integrity of the research and protecting the rights of the participants. To protect the rights of participants and to ensure voluntary consent the researcher made use of mediators to facilitate the informed consent process. The nurse educators from the learning centre where the researcher is employed as the manager were excluded from this research study. The other learning centres were independent of the researcher.

(c) Sample

Creswell (2014:11), stated that a sample refers to a sub-group of the target population that the researcher plans to study to make generalisations about the target population.

The researcher used all-inclusive sampling of participants that gave voluntary informed consent, which, according to Creswell (2014:228), refers to the researcher's selection of all individuals and sites available to learn or understand the central phenomenon.

Inclusion criteria:

- Head nurse educators and nurse educators permanently employed at one of the remaining six learning centres at the SAPHEI (the learning centre where the researcher is employed as the manager, was excluded);

- Learning and development facilitators and clinical facilitators permanently employed at the clinical facilities affiliated with the seven learning centres at the SAPHEI; and
- Had to give voluntary informed consent to participate in this research study (Annexures 3 and 4).

Exclusion criteria:

- Nurse educators employed at the learning centre where the researcher is the manager.

The sample consisted of all the nurse educators at a SAPHEI that gave informed consent to participate in this research study. Population consisted out of 120 participants (N=120) and 69 participants indicated that they were willing to partake in this research study (n=69).

(d) Data collection

Quantitative data were collected using a teaching-learning feedback knowledge questionnaire (Jones, 2005:112-114), to explore and describe nurse educators' use and experience of HFS (Annexure 7).

Participant recruitment:

An email, containing information regarding the research project and the informed consent document, was sent by the researcher to all the nurse educators at the SAPHEI after permission to conduct this research study was granted by the legal authorisations (Chapter 1) and goodwill permissions were received from the head nurse educators (learning centre managers) from each learning centre. This was received via email from each learning centre manager and was submitted to the ethics committee of the SAPHEI after which permission was granted to conduct the research study on behalf of all the participating learning centres (Annexure 2).

A mediator (administrative assistant appointed at each learning centre for administrative duties) was used to facilitate the recruitment process as well as the informed consent from the nurse educators at, and affiliated with each learning centre (excluding the educators from the learning centre where the researcher is employed as the manager). The mediators were trained by the researcher to engage with the participants and to assist them if and when needed regarding the informed consent. The specific role played by the mediator will be discussed under the recruitment and informed consent steps.

The recruitment process included the following steps:

- First contact with the population: by email from the researcher regarding the research project;

- Contact after two weeks: by email from the researcher reminding the nurse educators about the research study; and
- Direct contact: by Vidy, email and phone if and when clarification or more information was required by the population.

Informed consent:

Participants have the right to be informed about the nature and consequences of the research they will be involved with. Respect for human freedom includes two conditions; voluntary participation and their agreement to participate in the research study based on full and open information (Denzin & Lincoln, 2008:192).

Informed consent is a process that requires the researcher to provide relevant information to potential participants, ensuring that they adequately understand the facts and decide to participate or refused to participate without being subjected to coercion, undue influence or deception (Council of International Organizations of Medical Sciences (CIOMS), 2016:33). Ethical principles were adhered to and this ensured a safe environment for the nurse educators (refer to ethical principles after each phase). Participation of this research study was voluntary and data were kept safe at all times as discussed under each phase. The 'gatekeeper' in this research study was the head nurse educator (learning centre manager) of each learning centre.

The nurse educators are seen as individuals capable of giving informed consent. Participants in this research study were all educated and experienced people who obtained post-basic diplomas or degrees. They were all permanently appointed educators at the time of the research study, with the same teaching-learning goal to teach students to achieve clinical skills development and clinical competence.

The following process was followed to obtain informed consent:

- The researcher sent an email with information regarding the research study and the informed consent document to the nurse educators as mentioned above.
- The researcher was available via Vidy or phone in cases where the nurse educators had any questions regarding the research study.
- In the absence of the researcher at some of the facilities, a mediator was trained by the researcher and used to assist by engaging with the participant and to assist them if and when needed during the completion of the informed consent document. The mediator (administrative assistant) is not an educator.

- The mediators couriered the completed informed consent documents to the researcher for safekeeping.
- Informed consent documents were locked away in a cupboard (only the researcher had the key) in the researcher's office (refer to data management).

The following aspects were addressed in the informed consent document (Annexures 3 and 4):

- That the participant is being asked to participate in the research study;
- That the choice of whether to participate is voluntary;
- That refusal to participate will not be penalised;
- That choosing to participate can be reversed;
- The purpose and nature of the research procedures and components;
- The research-related activities and procedures that the participants were being asked to consent to;
- The expected duration of participation;
- The nature of the participants' responsibilities;
- The nature of the researcher's responsibilities;
- The anticipated risks of harm or discomfort;
- The measures to minimise the risk of harm;
- The extent to which confidentiality is possible;
- Whether reimbursement for expenses is available;
- That the research study is not sponsored;
- Who the researcher is and the nature of her expertise;
- The potential benefits for participants both during and after the research; and
- That the research has been approved by the North-West University (NWU) Health Research Ethics Committee (HREC).

Questionnaire design

A questionnaire is a document containing questions and or other types of items designed to solicit information appropriate for analysis (Creswell, 2014:169). The questionnaire was developed by Jones for her study to determine the faculty members' (nurse educators') comfort level and perceptions regarding utilising HFS (Jones, 2005:112-114). The questionnaire applied to the researcher's study due to Section C, which tests the current use of and experience of educators regarding HFS. Jones did permit the researcher to use the questionnaire (Annexure 5).

The researcher, with the assistance of a technical expert, created an electronic teaching-learning feedback questionnaire using a programme called 'Question Perception'.

The teaching-learning feedback questionnaire (Annexure 7) consisted of demographic detail in part A; simulation programme identification in part B; use of and experience with HFS as a teaching-learning method evaluation in part C; and general feedback in part D. The questions asked in part C determined the current use of and experience of HFS in the curriculum of nursing education.

Validity of the data-collection instrument

Validity is the development of sound evidence that the test interpretation matches its proposed use (Creswell, 2014:177).

Jones (2005:68) developed the questionnaire following a review of the literature. The survey items were content-based and developed from the literature related to simulation. The survey questions were collated to a matrix to provide **content validity**. The questionnaire was sent to three simulation specialists, each employed in a different setting, to validate the instrument (**face validity**) (Jones, 2005:69). The specialists were selected following specific criteria: they had worked directly with HFS; they had experience working with a curriculum in a nursing programme, and they understood the technology involved with HFS.

The instrument was adapted (with permission from Jones) (Annexure 6) according to the SAPHEIs' nurse educator positions and nursing programmes (Part A, biographical data). The researcher conducted a pilot study before using the instrument (refer to the pilot study as discussed later in this chapter). A pilot study during quantitative research is to ensure that the questionnaire is validated before being utilised to achieve two objectives: firstly, to improve the face and content validity of the instrument and secondly, to estimate how long it takes to complete the questionnaire (Creswell, 2014:9). The questionnaire was used in a previous study in a different context and therefore the need for the pilot study to ensure application of it in the SAPHEI environment.

Explanatory factor analysis was performed through statistical calculations to determine the validity of the instrument (Chapter 3). Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy as well as the Barlett's test of sphericity was done to determine if there was sufficient data for the factor

analysis (Williams *et al.*, 2010:5). The results of the statistical analysis will be discussed in detail in Chapter 3.

Reliability of data-collection instruments

Reliability means that the data obtained from a research instrument is stable and consistent in that it should have nearly the same outcome when used multiple times at different times (Creswell, 2014:177). The instrument used in this research study was only developed and used in the study conducted by Jones, as mentioned above.

Reliability testing focuses on the following aspects of reliability, e.g. stability, equivalence and homogeneity. The researcher determined reliability by means of an internal consistency reliability approach. Cronbach's Alpha was used to estimate the extent to which the different sub-parts of the instrument were reliably measuring the critical attribute (Polit & Beck, 2017:308; Creswell, 2014:179). If the items scored as continuous variables, the alpha provides a coefficient to estimate the consistency of scores on an instrument (Creswell, 2014:180). The statistical package for the social science (SPSS program™) software was used to calculate the alpha (Chapter 3).

Pilot study

The researcher used an instrument developed and used for another study conducted in the United States of America and adapted it (with permission from Jones) (Annexure 6) according to the SAPHEI's nurse educator positions and nursing programmes (Part A, biographical data). As explained above, the researcher conducted a pilot study, merely to test the content of the instrument and the time it took to complete the questionnaire.

In this research study, the electronic link to the questionnaire was sent via an email to at least six participants (one from each learning centre) possessing the same characteristics as those of the main investigation (excluding the learning centre where the researcher is employed as the manager). The six participants voluntarily consented to the pilot study. Due to confidentiality and anonymity of the questionnaire, the data obtained from the pilot study was included in the data analysis as it could not be separated from data obtained.

The pilot group were asked to complete the questionnaire and to give feedback by sending the researcher an email indicating:

- The time it took to complete the questionnaire; and
- To identify any word or phrases in the instrument that was confusing.

The participants in the pilot study stated that the questionnaire took between two and five minutes to complete and they established that the questionnaire was understandable and should not be changed.

The same ethical principles were applied to the pilot group as with the rest of the participants. Ethical principles will be discussed under each step of each phase in this proposal.

Time frame

The researcher, after receiving the returned informed consent documents, sent an email to the participants that indicated that they wanted to participate in the research study. The email contained a link to the questionnaire. The nurse educators accessed the questionnaire by clicking on the link. The link opened the questionnaire on the intranet.

The participants had three weeks during which they had to respond/complete the questionnaire. The educators are involved in clinical and theoretical training and therefore do travel to the various clinical facilities. Each had access to a company laptop and therefore could adhere to the time frame. The learning and development facilitators and clinical facilitators each have a computer and therefore access to complete the questionnaire. The researcher sent a reminder after two weeks of the initial email. The researcher felt that if the time frame was over a longer time, the nurse educators would have omitted to respond due to overlooking it.

(e) Data capturing

The instrument that was used was completed electronically; therefore data were captured simultaneously as the participants completed the questionnaire. After data collection, a summary of the data gathered was drawn by the technical expert, reflecting all the relevant data captured on the questionnaires by the participants. An Excel report was sent via an e-mail to the researcher. The researcher stored the data in a personal folder which was password protected. The researcher consulted with a statistician for data analysis and interpretation of the data (Annexure 8).

(f) Data analysis

Statistical analysis of the questionnaires was conducted by the NWU's Statistical Consultation Services through the SPSS Program™. Data analysis was in the form of a report and graphical representation.

Descriptive statistics were used to describe the responses obtained from Section A (biographical data) to determine the overall trends and distribution of the data. Descriptive statistics describe and summarise data (Creswell, 2014:203). Instead of only reporting descriptive statistics, effect sizes

were also determined. Practical significance can be understood as a large enough difference to affect practice (Ellis & Steyn, 2003:52).

Almost all statistical analysis was focused on finding relationships between the variables and is therefore called variable-centred analysis (Fielding & Gilbert, 2009:8). Analysis of variance (ANOVA) was used to determine whether there are any statistically significant differences between the means of two or more independent groups. Measurement of central tendency is summary numbers that represent a single value in a distribution of scores and is expressed as an average score (the mean), the middle of a set of scores (the median), or the most frequently occurring score (the mode) (Creswell, 2014:204). The mean was determined to describe responses of all participants to items on the instrument. The mode was determined to describe the most common score per question for each of the questions in Part C of the questionnaire. Standard deviation was determined as an indication of the variability indicating the spread of scores in a distribution.

The t-test is used to determine if two sets of data are significantly different from each other (Howell, 2017:195). It focused on the t-statistic, the t-distribution and degrees of freedom to determine the probability of difference between populations. A t-test was conducted between the years of nursing experience and the dependent variables: the comfort level utilising HFS and the experience level utilising HFS. Spearman's correlation coefficient for ranked data was used to rank values on continuous variables (Howell, 2017:195).

Content analysis was done for questions 14 and 15. Data analysis will be discussed in detail in Chapter 3.

(g) Ethical considerations

Good research practices are based on four fundamental principles of research integrity (All European Academies (ALLEA), 2017:4):

- Reliability in ensuring the quality of research;
- Honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair, full and unbiased way;
- Respect for colleagues, research participants, and the society; and
- Accountability for the research.

Denzin and Lincoln (2008:192), state that the four ethical guidelines for directing a research project are informed consent, deception, privacy and confidentiality. In this research study, the above-

mentioned principles and guidelines were addressed and adhered to. The following discussion addresses the ethical consideration mentioned above:

Fair selection and informed consent

The above ethical considerations were discussed previously (phase 1, step 1 d).

The right to privacy and confidentiality

Anonymity in research implies that the researcher does not know to whom responses belong (Denzin & Lincoln, 2008:193; Polit & Beck, 2017:719, Department of Health (DoH), 2015:17). Participants were assured that their privacy would at all times be protected and anonymity was guaranteed. The participants completed the questionnaire anonymously via a link sent to them in an email. When the participants access the questionnaire via the link sent to them in the email, they completed the questionnaire without being identified. The questionnaire was set up on a secure data network on the intranet of the SAPHEI. The security setting for the questionnaire was set on not identifying the participant, thus ensuring confidentiality. Only the nurse educators of the SAPHEI were able to complete the questionnaire as the security setting was set only to allow the nurse educators access to the questionnaire via the link.

Data management: questionnaire and informed consent

The hard copies of the completed informed consent forms were locked away in a cupboard in the researcher's office. The researcher was the only one with access to the cupboard. The report of the data was saved on the researcher's computer (password protected) after data collection until data analysis. Only the researcher had access to this report after data collection was done. No personal information regarding respondents were captured on the report.

On completion of the research study, the hard copies (informed consent forms as well as quantitative data report) will be safely stored in a locked cupboard in the director's office of NuMIQ (Nursing and Midwifery Inquiry for Quality), School of Nursing Science - NWU, for a period of five years from completion of the research study. These research materials (informed consent and quantitative data report) will be destroyed after five years in accordance with the university's policy and regulation on data and record management.

Objective 2: Views/assumptions and beliefs of nurse educators on implementation and use of high-fidelity simulation in the nursing programmes at a South African private higher education institution

The aim of objective 2 was to explore and describe the views/assumptions and beliefs of nurse educators on the implementation and use of HFS at a SAPHEI during the qualitative phase of this research study.

(a) Research method

The researcher used a descriptive and contextual qualitative design (Mouton & Marais, 1996:43).

Individual, semi-structured interviews were used (Creswell, 2014:30), to understand the participant's views/assumptions and beliefs of the implementation and use of HFS in the nursing curriculum at a SAPHEI. A qualitative interview occurs when researchers ask one or more participants general, open-ended questions and record their answers (Creswell, 2014:239). One-on-one interviews via Vidyio were conducted.

(b) Population

In this research study, the population consisted of all the nurse educators (permanent staff) at a SAPHEI who participated in the quantitative phase of this research study (N=69), excluding nurse educators from the learning centre where the researcher is employed as the manager as discussed previously.

Inclusion criteria:

- Head nurse educators and nurse educators permanently employed at one of the remaining six learning centres at the SAPHEI (the learning centre where the researcher is employed as the manager, was excluded);
- Learning and development facilitators and clinical facilitators permanently employed at the clinical facilities affiliated with the seven learning centres at the SAPHEI;
- Had to give voluntary informed consent to participate in this research study (Annexures 3 and 4); and
- Participants who took part in the quantitative phase of the research study and voluntarily consented to take part in the individual semi-structured interview (Annexures 3 and 4).

Exclusion criteria:

Nurse educators employed at the learning centre where the researcher is the manager.

Conflict of interest

As explained under objective 1 (b), the researcher has a dual role as manager of one of the learning centres, and being the researcher of the research study. The nurse educators from the learning centre where the researcher is the manager were excluded from this research study. The other learning centres are independent of the researcher.

(c) Sample

The sample was randomised purposive sampling. For the researcher to understand the phenomena, individuals were intentionally selected to participate in the qualitative phase of the mixed-methods research study. The researcher did not know in advance how many participants were needed before data saturation occurs (Creswell, 2014:228).

The invitation to take part in the interview process was sent in the same email containing the link to the teaching-learning feedback questionnaire as well as on the informed consent document. The participants that indicated that they would participate in the interview process were grouped per learning centre (n=33). The researcher selected a representative sample from each learning centre (Table 4.2). The Vidyo interview process was conducted until data saturation occurred. According to Polit and Beck (2017:744), data saturation occurs when additional sampling yields no new information, only redundancy of data already collected. If saturation did not occur, due to the small population, the researcher would have sent an email to the participants asking more participants to participate from the willing participants. Participants from each learning centre, not sampled at first, would be asked to participate in a second round individual, semi-structured Vidyo interviews. This, however, was not necessary for this research study because data saturation was obtained after 19 interviews (Chapter 4).

(d) Data Collection

Creswell (2014:234) discussed various techniques to gather qualitative data. In this research study, individual, semi-structured (Creswell, 2014:235) Vidyo interviews were conducted. An interview is a method of data collection in which an interviewer obtained responses from a participant in a face-to-face encounter (Creswell, 2014:243), through a telephone call or by electronic means (Creswell, 2014:241). Vidyo interviews consist of collecting open-ended data through interviews with individuals using computers connected via internet to do so (Creswell, 2014:241).

The researcher attended a workshop on qualitative data collection strategies (Annexure 9). The focus of this workshop was individual interviews and focus groups. The researcher conducted individual, semi-structured interviews with participants that were not employed at her learning centre due to her dual role as researcher and manager in the mentioned learning centre (to limit conflict of interest as discussed under objective 1 b).

After feedback from the participants regarding their willingness to participate in the interview process, an interview schedule was drawn up and arrangements were made with participants and permission was obtained from the head nurse educators of each learning centre (gatekeepers). The Vidyo system is known to all the educators and therefore no set-up or training was needed

regarding the operation of the system. The researcher and participant were able to have face-to-face interaction during the interview which allowed the researcher's observational and personal notes during the interviews.

Data collection process:

- The researcher set up two recording devices before the start of the interview;
- The researcher and participant signed in on the Vidyo at the arranged time, venue and date;
- The researcher introduced herself and started with the introductory pleasantries;
- The participant was thanked for joining the Vidyo interview;
- The purpose of the interview was confirmed as well as the role of the interview in the research study;
- The participant was informed that all the data will be treated with confidentiality and that only the researcher will have access to the raw data;
- The participant was informed that the interview will be recorded for data analysis purposes and consent was obtained regarding the recording of the interview;
- The researcher informed the participant that she will take notes during the interview;
- The researcher confirmed the informed consent with the participant by asking if the participant was still willing to participate in the semi-structured interview as indicated on the informed consent document;
- The researcher started the interview with an introduction and the questions;
- After completion of the interview, the researcher thanked the participant for her/his willingness to participate and conclude the interview.

The following guidelines were used to develop the central qualitative research question (Creswell, 2014:148): by beginning with the word how or what, specifying the central phenomenon, identifying the participants, and mentioning the research site.

Central qualitative question: What are the views/assumptions and beliefs of nurse educators on the implementation of HFS in the nursing programmes at a SAPHEI?

Sub-questions refine the central question to be addressed in the research during the interview process (Creswell, 2014:150). It is, therefore, questions that narrow the focus of the central

question into specific questions or issues; the researcher seeks to learn from the participants in the research study.

The following introduction and open-ended questions were asked in the individual semi-structured interviews:

As nurse educators, our goal is to improve clinical competence of student nurses through various teaching methods. High-fidelity simulation is one of those teaching methods used to enhance clinical competence.

- What is your view about the implementation of HFS as a teaching method in nursing programmes at your institution?
- What is your expectation of HFS as a teaching method?
- What is your perception of HFS as a teaching method to enhance clinical competence of nursing students?
- What is your opinion about the current practices and use of HFS in your institution?
- What value does HFS add as a teaching method in a nursing programme?

The individual, semi-structured Vidyo interviews were recorded and the researcher took field notes (Creswell, 2014:238). These notes consisted of:

- Observational notes: the researcher's observations during the interviews.
- Personal notes: the researcher's feelings and perceptions during the interviews.
- Methodological notes: reflections on strategies and methods used during the interviews.

(e) Data analysis

Analysing qualitative data requires understanding how to make sense of text and images so that the researcher can form answers to the research questions (Creswell, 2014:260).

Content analysis was done (Hsieh & Shannon, 2005:1277). The researcher used a direct content analysis approach (Hsieh & Shannon, 2005:1281). Data was organised (Creswell, 2014:262) to prepare for data analysis. After each semi-structured interview, the researcher listened to the recordings and looked at the field notes. The data was transcribed in detail as soon as possible after the interview and transcription was done verbatim. The researcher read through the data to make sense of the material.

Transcription of data was done in three columns as:

- Personal notes;
- Transcriptions of the interview; and
- Categories identified (Annexure 10).

The following steps in Figure 2.3 were used to identify and categorise concepts applicable to HFS (Hsieh & Shannon, 2005:1281):

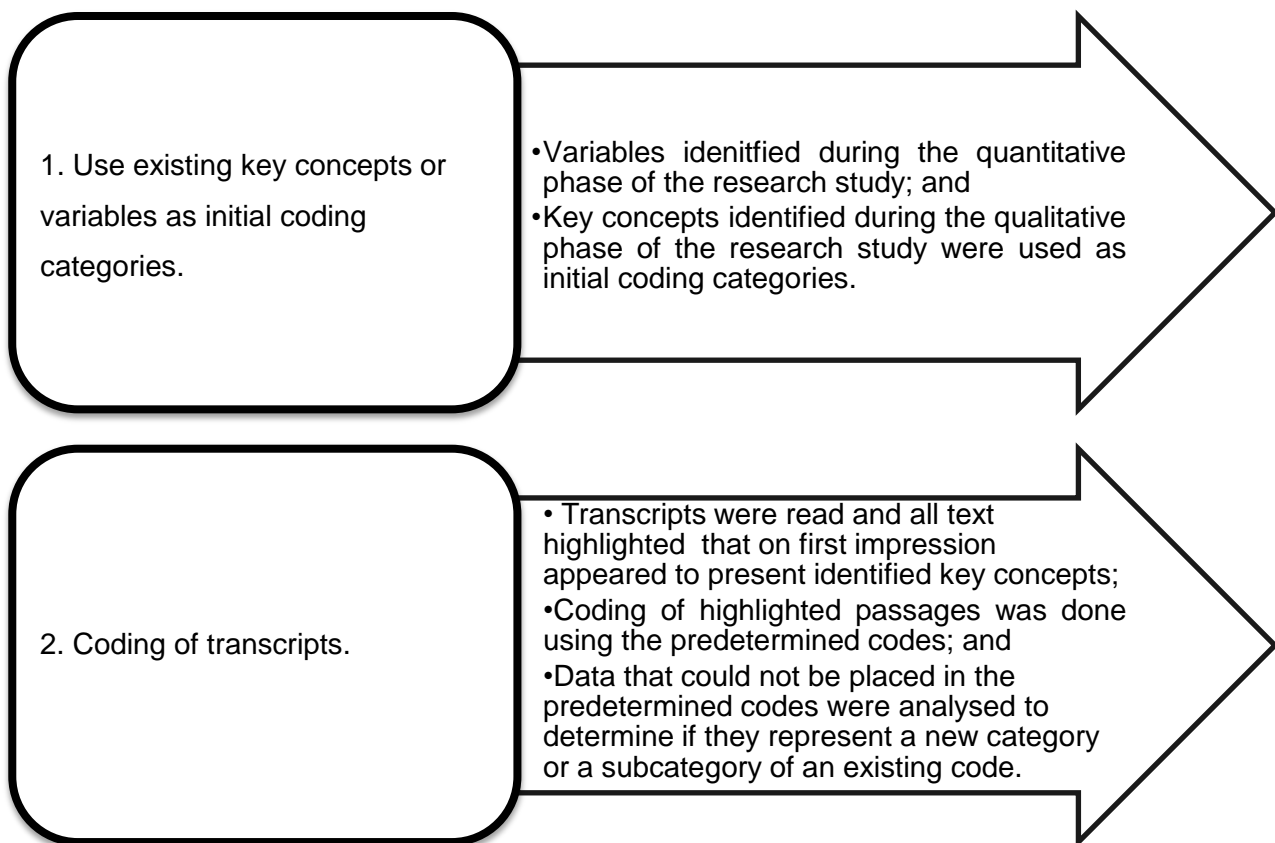


Figure 2-3: Steps to identify and categorise concepts (Hsieh & Shannon, 2005:1281)

Coding is the process of segmenting and labelling text to form descriptions and broad themes (Creswell, 2014:267). Describing and developing key- and sub-concepts from the data consisted of answering the research questions and forming an understanding of the phenomenon (Creswell, 2014:271).

The researcher described the findings by reporting the incidence of codes that represent the views/assumptions of nurse educators on HFS. The data obtained from the qualitative phase was

integrated with data from the quantitative phase to determine how the merged results produce a better understanding of HFS (Chapter 4).

In this research study, the goal of directed content analysis, using deductive and inductive reasoning strategies (Chinn & Kramer, 2011:181), was to validate and extend a conceptual framework for the development of a practice model. The next step under phase 1 of this research study will describe the process of defining the concepts identified and describing their relationship within the context of the research study (phase 1, step 2).

(f) Trustworthiness

Lincoln and Guba (1985) suggested four criteria for developing the trustworthiness of qualitative research (Klopper, 2008:69):

- Truth value/credibility;
- Applicability/transferability;
- Consistency/dependability; and
- Neutrality/conformability.

Truth value/Credibility

Truth value determines whether the researcher has established confidence in the accuracy and truthfulness of the research findings (Klopper, 2008:69). This refers to the implementation of procedures to ensure the accuracy of findings (Polit & Beck, 2017:559). Authenticity and credibility are important for qualitative research.

Triangulation was used as a method to enhance the credibility of the research study by means of:

Researcher triangulation: peer debriefing between the researcher and the promoters contributed to the credibility of this research study. The researcher used a co-coder to determine the accuracy of the research findings (Annexure 12). Data was analysed independently by both the researcher and co-coder. A meeting was scheduled and consensus was reached by the researcher and co-coder. **Data triangulation:** was ensured by employing multiple data collection methods such as interview, questionnaire and literature review (Klopper, 2008:69). **Methodological triangulation:** occurred through a mixed-methods research design used during phase 1, step 1. There was no need for a follow-up meeting with participants to clarify concepts.

Applicability/Transferability

External validity refers to transferability and/or fittingness of the research result in other settings or samples. It can be defined as the degree to which the research results can be generalised to other contexts (Klopper, 2008:69).

The researcher ensured that the findings were documented as thoroughly using ‘thick descriptions’ (sufficient detailed descriptions) as a strategy to enhance transferability of the research findings (Polit & Beck, 2017:560). The researcher observed for data saturation, which can occur when participants provide no new information and when concepts that emerged become repetitive (Polit and Beck, 2017:744). Data saturation was achieved after 19 interviews. The research study was conducted in one SAPHEI and can therefore not be generalised to other contexts.

Consistency/Dependability

Dependability refers to the provision of evidence such that if the study were to be repeated with the same or similar participants in the same or similar context, its findings would be similar (Klopper, 2008:69). This indicates the study’s stability of data over time.

The researcher replicated all steps of data analysis by coding and re-coding of data to ensure that consistency was obtained in this research study as well as to ensure that raw data was available for cross-reference (Klopper, 2008:69). The researcher ensured that all data was documented accurately and comprehensively and continuously cross-checked transcripts for correctness. The researcher used a co-coder for the triangulation of data (Annexure 12). The co-coder had experience as a qualitative researcher as well as with co-coding of data.

The researcher and co-coder observed for data saturation, which occurred after 19 interviews, when concepts and categories in the data become repetitive and redundant, such that no new information could be gleaned by further data collection (Polit & Beck, 2017:559) (Chapter 4).

Neutrality/Conformability

Conformability entails freedom from bias during the research process and results from descriptions. The researcher ensured that the findings, conclusions and recommendations were supported by the data and that there was an internal agreement between the researcher’s interpretation and the actual evidence (Klopper, 2008:69). This was done by triangulation as explained above.

(g) Ethical considerations

Recruitment and informed consent were discussed above (objectives 1 d and 2 d).

The right to privacy and confidentiality

Anonymity cannot be achieved in qualitative research studies due to the 'face-to-face' techniques that are used. Therefore confidentiality was adhered to by the researcher. **Confidentiality** pertains the management of personal information that the researcher was directly involved with and that this information will not be willingly or unintentionally shared with other people unless the participant consented to it (Polit & Beck, 2017:723; Denzin & Lincoln, 2008:193).

The researcher was responsible for keeping all information confidential. Recordings were downloaded every day onto a password-protected computer. Data were coded according to category and concepts as identified during the data interpretation phase. Identifying names were removed from transcripts. Data were password-protected on the computer.

The co-coder used in this research study signed a confidentiality agreement (Annexure 11). As stated previously, she had years of experience as a qualitative researcher and does have Master's students that she needs to supervise as an educator at a university in Gauteng.

Data management

Electronic data were copied and stored on a password-protected USB flash drive, which was locked away in a safe with only the researcher having access to it. No personal information regarding respondents were captured.

On completion of the research study, a backup of all electronic data was made on an external drive and together with all of the hard copies (transcriptions of the qualitative data) will be safely stored in a locked cupboard in the director's office of NuMIQ, School of Nursing Science - NWU for five years from completion of the research study. All research material will be destroyed after five years in accordance with the university's policy and regulation on data and record management.

2.3.1.2 Phase 1: Step 2: Concept description and definitions

The goal of this research study was to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. To develop a practice model, the researcher had to develop a conceptual framework. Mouton and Marais (1996:136) explain that concepts are structured in certain types of statements. These statements are arranged according to regulative interests or orientations to form conceptual frameworks, which can be presented as theories or models.

The steps to develop a conceptual framework are (Chinn & Kramer, 2011; Walker & Avant, 2011):

- Selecting and defining concepts;
- Developing statements relating the concepts;

- Expressing the statements in a hierarchical fashion; and
- Developing a conceptual map that expresses the framework.

During phase 1, step 2, the researcher used all the data gathered from objectives 1 and 2 as well as an in-depth literature review to identify main and related concepts. The researcher defined and established proposing relationships between these concepts (Chapter 5).

Concepts were selected for the framework based on their relevance to the phenomenon. The researcher developed relational statements by providing evidence from the literature for the validity of each relational statement. The following steps were used during the literature review process (Polit & Beck, 2017:90):

- Searching for references in bibliographic databases;
- Using references cited in relevant studies to track down earlier research on the same topic (ancestry approach); and
- Finding a pivotal early study and search forward in citation indexes to find more recent studies (descendancy approach).

The following inclusion- and exclusion criteria were used to select literature for the literature review:

Inclusion criteria

In this research study only original research articles, dissertations and books were used and the inclusion criteria were that the literature must address the following:

- High-fidelity simulation studies in nursing education from 2009 till 2019;
- Nursing education studies focused on adult learning, constructivist learning model, experiential learning and behavioural learning theories;
- Clinical practise and practice model development.

Exclusion criteria

In this research study the exclusion criteria were other kinds of literature including the following:

- Opinion papers;
- Summaries;

- Blogs;
- Newspaper reports; and
- Non-scientific articles.

This research method and results will be discussed in greater detail in Chapter 5.

2.3.2 Phase 2: Practice model development for nurse educators to implement high-fidelity simulation in the nursing programmes at a South African private higher education institution

As explained above there are various steps in developing a conceptual framework. During phase 1, step 1, and step 2, main and related concepts were identified and defined. The next step was to develop statements relating to the concepts.

2.3.2.1 Phase 2: Step 1: Construct relational meaning of main and related concepts

This step described a practice model for nurse educators at a SAPHEI for the implementation of HFS to facilitate clinical skills development. This commenced by contextualising the relational statements within the teaching-learning context of a SAPHEI by a representation of interrelated structures in a schematic diagram that contributed to the practice model. A relational statement declares a relationship of some kind between two or more concepts (Walker & Avant, 2011:60).

(a) Population and sample

All available national and international sources of data were used to formulate conclusion statements of the main and related concepts. Concepts used were identified from qualitative and quantitative results (Chapter 6). Concepts are mental images of a phenomenon, an idea or construct in the mind about a thing or an action (Walker & Avant, 2011:59). Concepts help us identify how our experiences are similar or equivalent by categorizing all the things that are alike about them (Walker & Avant, 2011:59).

(b) Data Collection

Results from phase 1, step 1, and step 2 were used.

Phase 1, step 1: Quantitative results. Numerical or statistical data are necessary for quantitative synthesis. Quantitative data about the phenomenon of interest may be employed to extract clusters of attributes comprising a new concept as well as depicting those attributes that do not belong to the concept (Walker & Avant, 2011:114).

Phase 1, step 1: Qualitative results. Sensory data obtained during the interviews through listening to and observing the participants were examined for similarities and differences, consequently recognising patterns among observations (Walker & Avant, 2011:113).

Phase 1, step 2: The careful examination of literature was required in literary synthesis to acquire new insights about the phenomena of interest (Walker & Avant, 2011:114).

(c) Data analysis

Statement synthesis was done and was aimed at specifying relationships between two or more concepts based on evidence (Walker & Avant, 2011:123). Evidence can come from various sources: 1) qualitative and quantitative methods; and 2) literature-based sources such as literature reviews, conclusions extracted from interrelated studies, standards of practice, or practise guidelines (Walker & Avant, 2011:123). The evidence that was used in this research study was concepts identified during phase 1, step 2.

2.3.2.2 Phase 2: Step 2: Model construction through theory synthesis

The aim of theory synthesis is the construction of a theory from evidence, consequently resulting in a more complex representation of phenomena than a concept or statement synthesis (Walker & Avant, 2011:146). For the purpose of this research study, the theory generation process was followed to develop a practice model. The researcher will not generate a theory. A model illustrates the relationships between the major elements of a phenomenon in a simplified form and therefore one can claim that the model is an 'as if framework' (Mouton & Marais, 1996:139). A model is frequently described as a symbolic illustration of reality. It provides a schematic representation of certain relationships among phenomena, and it uses symbols or diagrams to represent an idea (Brink *et al.*, 2015:26).

(a) Data collection

Results from phase 2, step 1, were used. The concepts identified during phase 2, step 1, were used to develop a framework of several focal concepts and how they may be interrelated (Walker & Avant, 2011:151).

(b) Data analysis

Theories that are synthesised may be presented in graphic form, where the relationships within and among statements are depicted in a graphic form. This constitutes a model of the phenomenon (Walker & Avant, 2011:147). The outcome of phase 2, step 2 was evaluated against the theoretical criteria by Chinn and Kramer (2011:235-239) and are discussed in this chapter as well as in Chapter 6.

The reasoning strategies used for the development of the practice model are discussed as follows:

Reasoning strategies

The main reasoning strategies used in theory development and construction are induction and deduction reasoning strategies (Alligood, 2018:532; Walker & Avant, 2011:66).

In an inductive argument, genuine supportive evidence can lead to highly probable conclusions, therefore lending gradual supporting statements to the conclusions (Mouton & Marais, 1996:112). Alligood (2018:532) explains that induction occurs when generalisations are built from several specific observations.

Deduction occurs when a specific conclusion is inferred from general premises or principles. It proceeds from the general to the specific (Alligood, 2018:532). True premises necessarily lead to true conclusions (Mouton & Marais, 1996:112), therefore the truth of the conclusion is already either implicitly or explicitly contained in the truth of the premises.

Induction and deduction strategies are used sequentially to arrive at an adequate theoretical formulation (Walker & Avant, 2011:66). The researcher used these two strategies interdependently to help understand the concepts identified during phase 1, step 1. Concept analysis guided the researcher to formulate operational definitions.

Evaluation of practice model

Analysis, critique and evaluation are methods used to critically study theoretical works (Alligood, 2018:46; Chinn & Kramer, 2011:228). In order to develop a practice model, the steps of theory development were used. Analysis of theory is the first step in applying it to the nursing context and in practice. Hence the first step of ensuring the credibility of the practice model will be to evaluate it according to certain components (Alligood, 2018:46). Chinn and Kramer (2011:228) emphasise the importance of validation of the practice model to determine whether the content is appropriate for use in clinical situations and relevant to the clinical population.

Alligood (2018:46) proposes five components for use when evaluating a model. These are: 1) clarity, 2) simplicity, 3) generality, 4) accessibility and 5) importance (Chinn & Kramer, 2011:197) (Annexure 13).

1. Clarity of the model

Clarity of the model refers to how well the theoretical components can be understood and the consistency of the concepts in relations to semantic clarity, semantic consistency, structural clarity and structural consistency (Chinn & Kramer, 2011:198-201; Alligood, 2018:46).

Semantic clarity

Semantic clarity refers to how well-defined concepts are to establish empiric meaning within a theory (Chinn & Kramer, 2011:198). Clarity implies the consistency in the meaning and visualisation of the concept within a certain population or practice. Hence, the concept will be understandable and meaningful so that the reader would portray comprehension of both the specific and general features of the concepts.

Semantic consistency

Semantic consistency means that the concepts of the theory are used in ways that are consistent with their definitions, the purpose of the theory, and in accordance with the stated relationships between the concepts (Chinn & Kramer, 2011:199).

Structural clarity

Structural clarity is closely associated with semantic clarity in that it refers to how understandable and organised concepts are into a coherent whole (Chinn & Kramer, 2011:200).

Structural consistency

Structural consistency identifies the consistent use of structural form within a theory (Chinn & Kramer, 2011:201) to serve as a structural map that enhances clarity.

2. Simplicity of the model

Simplicity means that the number of concepts and their interrelationships within each descriptive category are minimal (Chinn & Kramer, 2011:201). Adding concepts to a theory will significantly increase the theoretical complexity.

3. Generality of the model

Generality refers to the purpose of the model and if it can be applied in a broad array of situations (Chinn & Kramer, 2011:202). The purpose and the concepts of the practice model will predict its generality in healthcare practice.

4. Accessibility of the model

Accessibility of the model refers to the empiric accessibility of the concepts contained within the practice model to validate the theoretic relationships and therefore the practicality of the model in practice (Chinn & Kramer, 2011:204).

5. Importance of the model

The importance of the model reflects on the clinical significance of its practical value (Chinn & Kramer, 2011:204). The significance is that the model must create the desired future, therefore containing concepts, definitions, purposes and assumptions that are grounded in practice and have a practical value for enhancing theory-based research (Chinn & Kramer, 2011:204).

The evaluation of the practice model will be discussed in detail in Chapter 6.

2.4 SUMMARY

In Chapter 2 the research methodology was discussed in detail. The results of the first objective, to explore nurse educators' current knowledge, use of and experience of HFS in the nursing programmes in a SAPHEI will be discussed in Chapter 3.

CHAPTER 3

NURSE EDUCATORS' CURRENT USE AND EXPERIENCE OF HIGH-FIDELITY SIMULATION IN THE NURSING PROGRAMMES AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

(Phase 1: Step 1)

3.1 INTRODUCTION

Phase 1 of the development of the practice model is discussed in chapters 3, 4 and 5. In chapters 3 and 4, phase 1, step 1 (Convergent Mixed-methods research design) is discussed and phase 1, step 2 (Concept description and definitions) is discussed in Chapter 5.

In Chapter 3 the research method, including population and sampling, data collection, data analysis as well as rigour and the research findings of the following objectives are addressed:

Objective 1: To explore nurse educators' current use of and experience of high-fidelity simulation (HFS) in the nursing programmes at a South African private higher education institution (SAPHEI).

3.2 RESEARCH DESIGN

As discussed in Chapter 2 (2.2 – 2.3), a Convergent Mixed-methods research design (Creswell, 2014:270) was used in this research study.

The design used during the quantitative phase of this research study was a descriptive quantitative method (Mouton & Marais, 1996:43) to explore nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI by means of a teaching-learning feedback knowledge questionnaire (2.3.1.1, objective 1, (par a)).

3.3 RESEARCH METHOD

The discussion of the research method in this chapter includes the population and sampling, data collection, as well as the data analysis of phase 1, step 1, objective 1.

3.3.1 Population and sampling

Refer to Chapter 2, section 2.3.1.1, objective 1 (par b), and 1 (par c) for the discussion on the population and sampling. The population consisted out of:

- Head nurse educators and nurse educators permanently employed at one of the six learning centres at the SAPHEI (the learning centre where the researcher is employed as the manager was excluded) (Chapter 2); and
- Learning and development facilitators and clinical facilitators permanently employed at the clinical facilities affiliated with the seven learning centres at the SAPHEI as discussed in Chapter 2.

Table 3.1 indicates a breakdown of the population in the seven learning centres.

Table 3-1: Population

Population N=120				
Region	Head Nurse Educator	Nurse Educator	Learning and Development Facilitator and Clinical Facilitator	Total
Western Cape	1	11	28	40
Free State	1	6	24	31
Limpopo	1	1	2	4
Mpumalanga	1	1	5	7
Gauteng (Northern region)	0*	0*	19	19
Northern Cape	1	0	1	2
Gauteng (Tshwane region)	1	6	10	17
Total (N)				120

* Excluded from this research study (chapter 2 phase 1 step 1 b).

Table 3.2 is representing the sample used in the quantitative phase of this research study and includes the participants that gave informed consent to participate in the research study as well as those that declined and those that did not respond from the population N=120.

Table 3-2: Research Population and Sample n=69.

Region	Sample n=69					Decline			No response		
	Head Nurse Educator	Educator	Learning and Development Facilitator	Clinical Facilitator	Total	Educator (including Head Nurse Educator)	Learning and Development Facilitator and Clinical Facilitator	Total	Educator (including Head Nurse Educator)	Learning and Development Facilitator and Clinical Facilitator	Total
Western Cape	1	7	8	6	22	1	0	1	2	15	17
Free State	1	3	3	2	9	0	1	1	3	18	21
Limpopo	1	1	0	0	2	0	0	0	0	2	2
Mpumalanga	1	1	1	4	7	0	0	0	0	0	0
Gauteng (Northern region)	0*	0*	7	10	17	0	0	0	0	2	2
Northern Cape	1	0	1	0	2	0	0	0	0	0	0
Gauteng (Tshwane region)	1	6	3	0	10	0	0	0	0	7	7
Total					69	Decline		2	No response		49

* Excluded from this research study (chapter 2 phase 1 step 1 b).

3.3.2 Data collection

The teaching-learning feedback knowledge questionnaire was developed by Jones (2005:112-114) (Chapter 2, 2.3.1.1 d). The questionnaire was adapted (with permission from Jones) (Annexure 6) according to the SAPHEIs' nurse educator positions and nursing programmes (Part A, biographical data). The researcher, with the assistance of a technical expert, created an electronic teaching-learning feedback questionnaire using a programme called 'Question Perception', by using the questions developed by Jones and adapted (as previously explained).

The questionnaire (Annexure 7) consists of sections A to D. Section A includes 9 questions exploring the demographic details of the participants. Section B includes 2 questions regarding the simulation programme identification. Section C includes 2 questions regarding the use of and experience with HFS as a teaching method. Section D includes 2 questions regarding general feedback.

A scale was used for question 9, question 12 and question 13. The scale was divided into five categories: a great deal; quite a bit; somewhat; very little and not at all.

Nurse educators at a SAPHEI participated in data collection by completing the questionnaire via a link that was sent to them in an email (n=69 participants completed the questionnaire sufficiently for the process of statistical analysis).

3.3.3 Data analysis

Statistical analysis of the questionnaires was conducted by the NWU's Statistical Consultation Services through the SPSS Program™. Explanatory factor analysis was done to validate the questionnaire. Cronbach's Alpha was utilised to investigate the reliability of the scale. Analysis of variance (ANOVA) was done to determine whether there were any statistically significant differences between the means of three or more independent groups. A t-test was done to determine the probability of the difference between the means of the two groups.

3.3.4 Hypothesis

A hypothesis is a statement of the predicted relationship between two or more variables in a specific population (Brink *et al.*, 2015:87; Howell, 2017:157). A null hypothesis, also referred to as a statistical hypothesis, is used for statistical testing and interpreting statistical outcomes. It refers to the fact that no difference between groups or correlations between variables exists (Brink *et al.*, 2015:89; Howell, 2017:159). A research hypothesis is an alternative to the null hypothesis. It states that a difference or correlation does exist. In this research study the following groups were used:

- μ_1 = head nurse educator;
- μ_2 = nurse educator;
- μ_3 = learning and development facilitator; and
- μ_4 = clinical facilitator.

The researcher's research null hypothesis is:

- The comfort level of integrating technology into the classroom is equal across the different groups. [$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$].
- The comfort level utilising HFS is equal across the different groups. [$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$].
- The experience level utilising HFS is equal across the different groups. [$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$].

The alternative hypothesis is:

- The comfort level integrating technology into the classroom is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].
- The comfort level utilising HFS is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].
- The experience level utilising HFS is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].

3.3.5 Results

The researcher discussed the descriptive statistics, factor analysis and reliability, ANOVA, t-test, correlation with ranked data and content analysis.

3.3.5.1 Descriptive statistics

Descriptive statistics were used to describe the responses obtained from Section A (biographical data) to determine the overall trends and distribution of the data. Pie charts and bar charts were used for a graphical illustration of the data and all values were rounded to the nearest two decimals.

The current positions of the participants (question 1) are illustrated by using a pie chart (Figure 3.1). The majority of participants (33.33%) (n=23) were equally employed as learning and development facilitators or clinical facilitators. Participants in nursing education positions were 26.09% (n=18) and head nurse educators 7.25% (n=5).

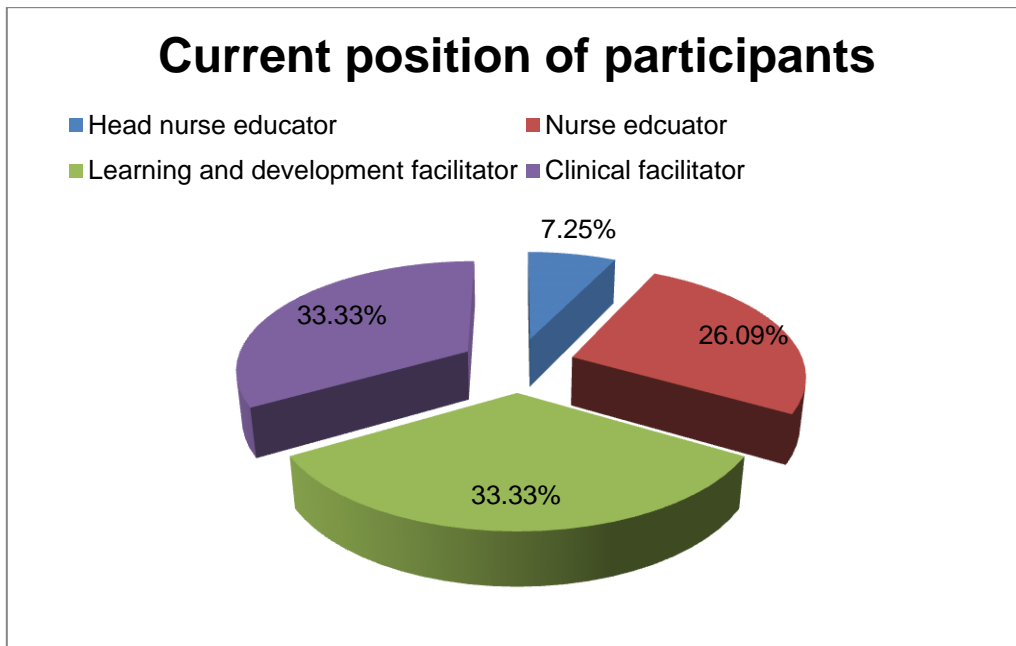


Figure 3-1: Current position of participants

The participants' highest qualification (question 2) is illustrated in Figure 3.2.

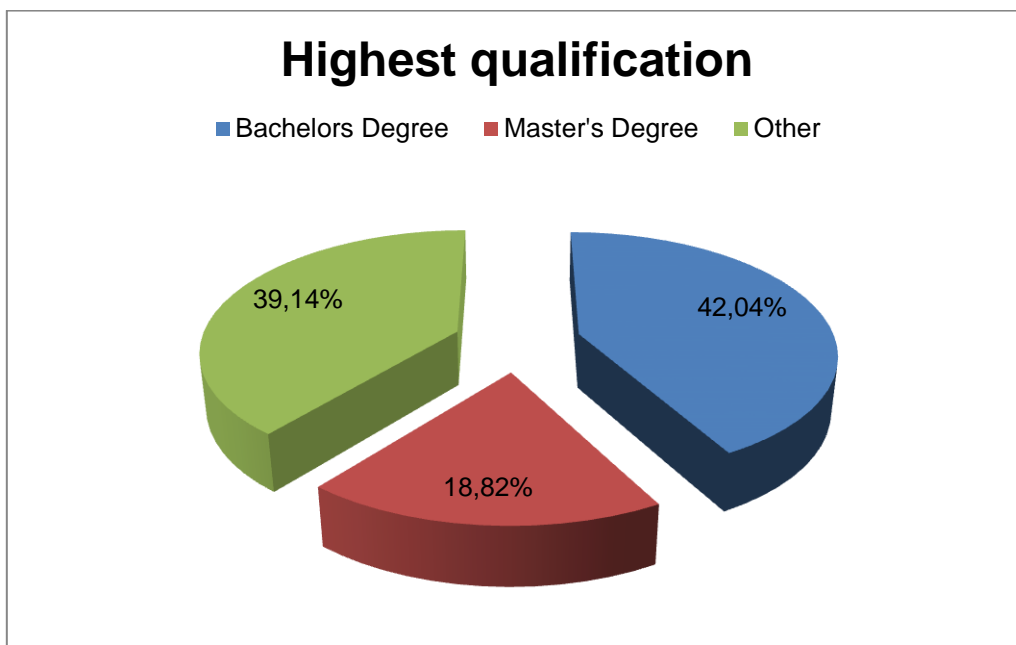


Figure 3-2: Highest qualification

The majority of participants have a Bachelor degree (B Degree) (42.04%) (n=29). Only 18.82% (n=13) of the participants obtained a Master's degree. Participants indicating that they obtained a nursing diploma consisted of 39.14% (n=27) (Figure 3.2).

Employment status as answered in question 3 indicates that 1.45% (n=1) said that he/she is working part-time and 97.10% (n=67) of the participants indicate that they are full-time employed. There was one participant that did not answer the question (1.45%) (n=1). The participant that

indicated that he/she is working part-time formed part of the pilot study and recently changed from a full-time position to a part-time position (Figure 3.3).

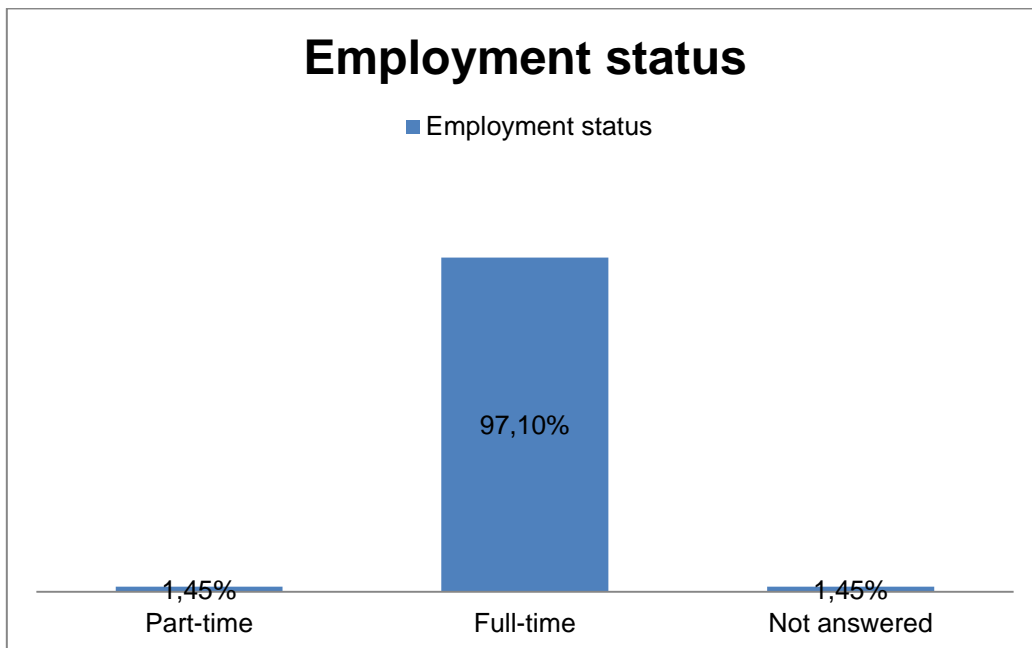


Figure 3-3: Employment status

Question 4 of the questionnaire assesses the nursing experience of the participants. Figure 3.4 indicates the years of nursing experience of the participants.

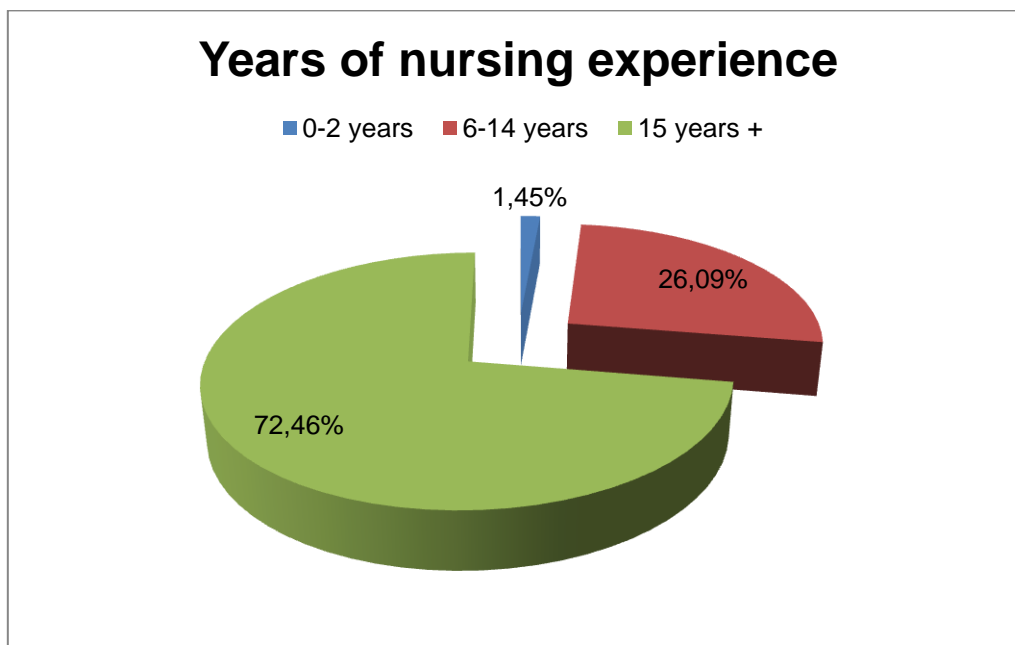


Figure 3-4: Years of nursing experience

One participant (1.45%) (n=1) indicated that she has less than two years of nursing experience. Eighteen participants (26.09%) (n=18) indicated that they have between six and 14 years of nursing experience and 50 participants (72.46%) (n=50) indicated that they have more than 15 years of nursing experience (Figure 3.4).

Question 5 referred to the years of experience as a nurse educator.

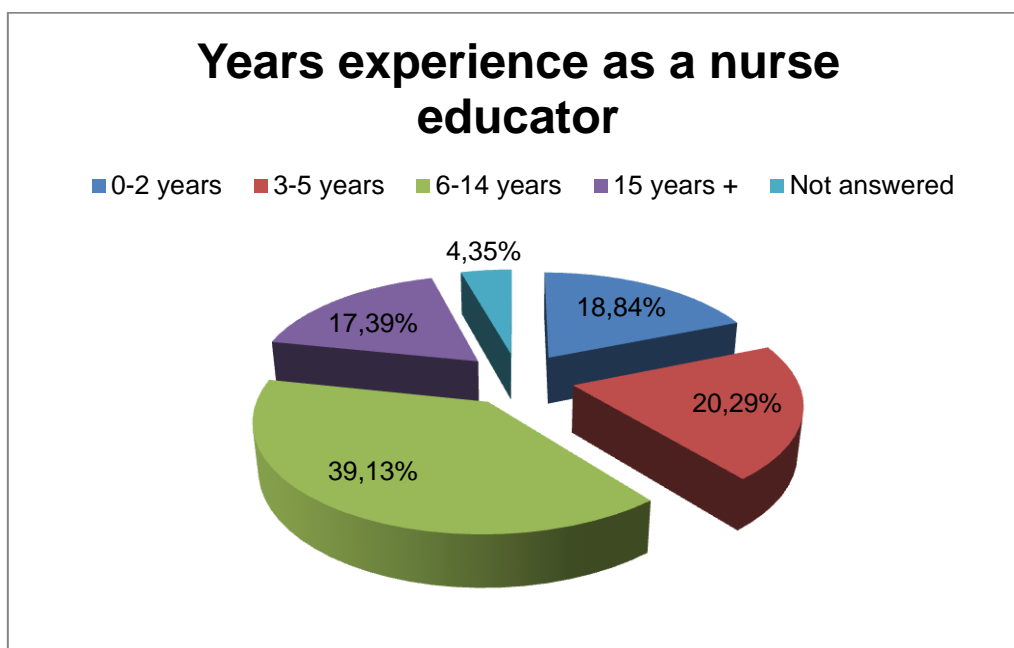


Figure 3-5: Years of experience as a nurse educator

As indicated in Figure 3.5, three participants (4.35%) (n=3) did not answer the question. Thirteen participants (18.84%) (n=13) indicated that they have less than two years of experience, while 14 participants (20.29%) (n=14) indicated that they have between three and five years of experience as a nurse educator. The majority of participants, (39.13%) (n=27) indicated experience between six and 14 years and only 17.39% (n=12) participants have more than 15 years of experience as a nurse educator (Figure 3.5).

The years of experience teaching at the learning centre or clinical facility (active participation in the theoretical instruction) was asked in question 6. A total of 15 participants (21.74%) (n=15) indicated that they have less than two years of teaching experiences, while 20 participants (28.99%) (n=20) indicated that they have between three to five years of teaching experiences. Altogether 26 participants (37.68%) (n=26) indicated that they have between six and 14 years of experience and eight participants (11.59%) (n=8) indicated that they have more than 15 years of teaching experience (Figure 3.6).

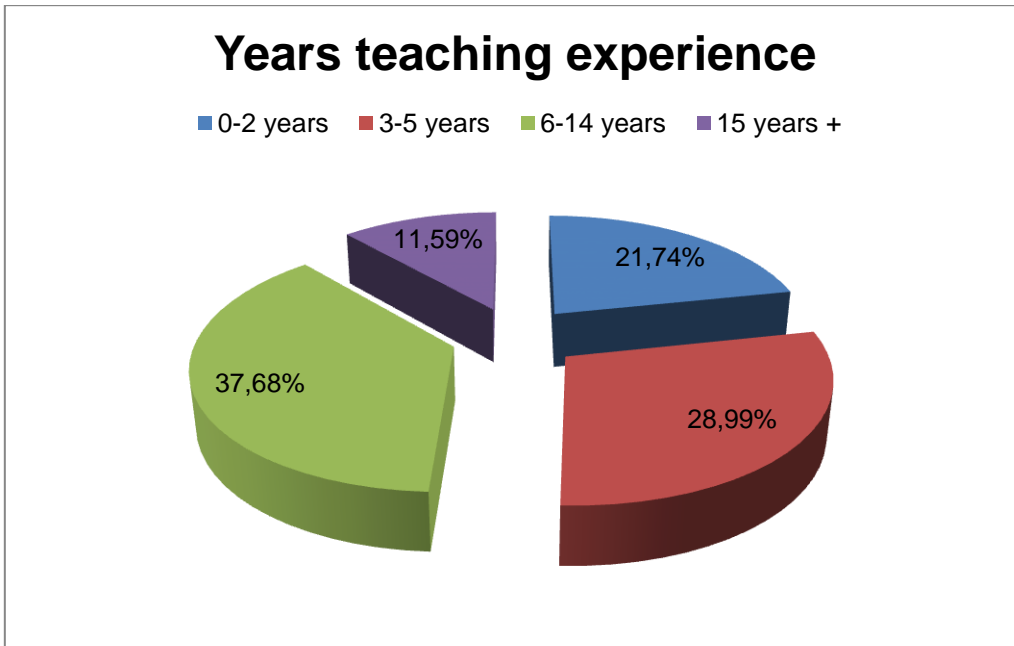


Figure 3-6: Years teaching experience

In question 7 the participants had to indicate their level of experience utilising HFS. Figure 3.7 indicates the scale that was used as well as a breakdown of the responses received from the participants.

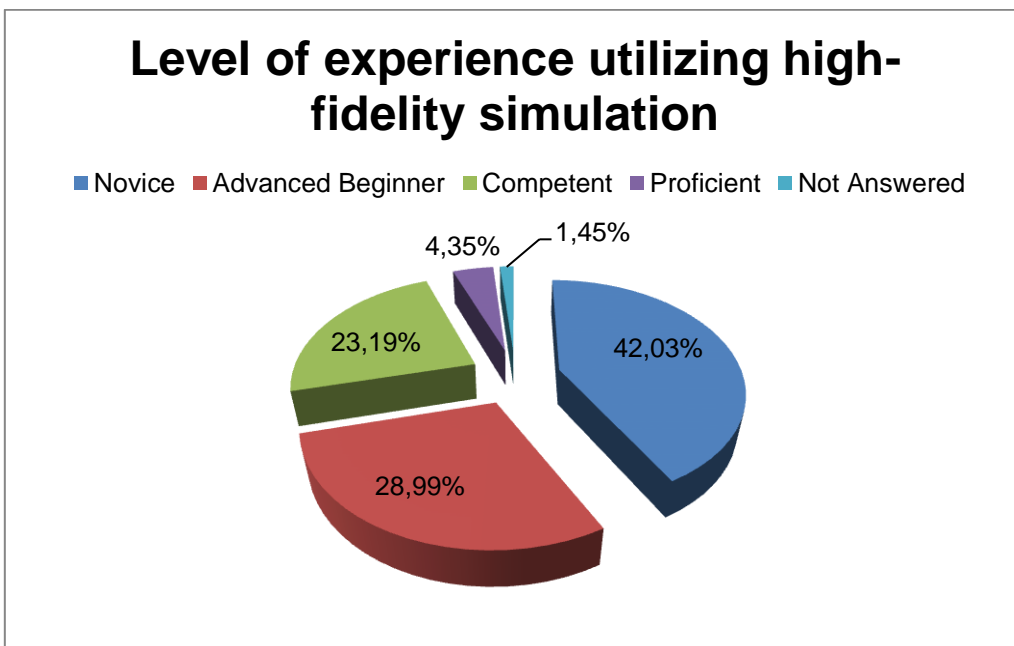


Figure 3-7: Level of experience utilizing high-fidelity simulation

The majority of the participants indicated that their experience with HFS range between being a novice (42.03%) (n=29) and an advanced beginner (28.99%) (n=20). Only 23.19% (n=16) of participants indicated that they are competent with using HFS and three participants (4.35%) (n=3) indicated that they were proficient in using HFS (Figure 3.7).

Question 8 referred to the participants' years of experience using HFS.

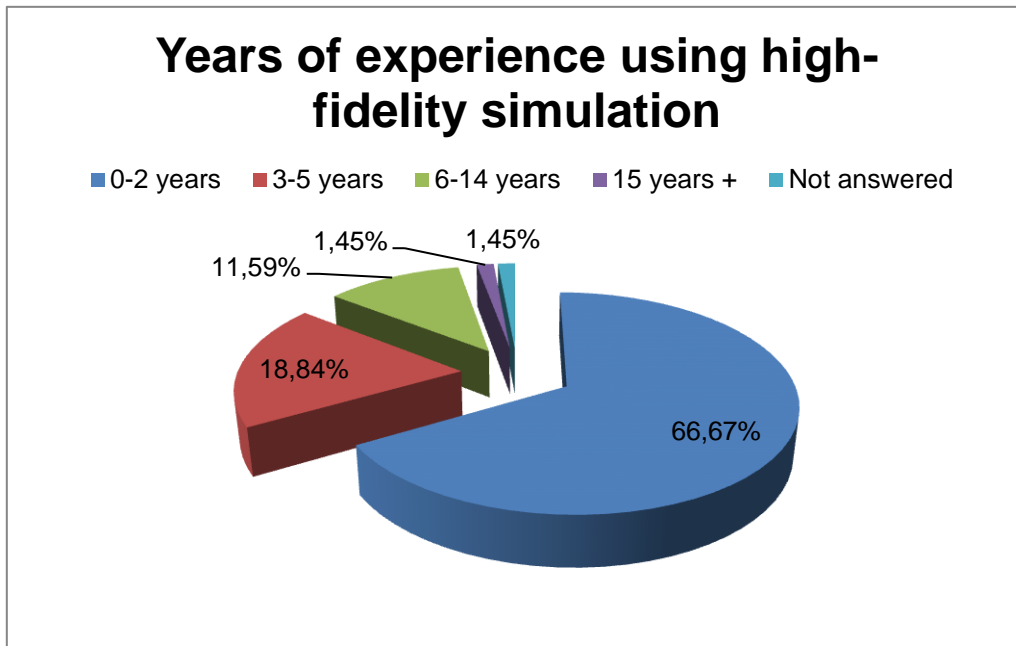


Figure 3-8: Years of experience using high-fidelity simulation

As illustrated in Figure 3.8, the majority of participants (66.67%) (n=46) had two years or less experience using HFS. A total of 13 participants (18.84%) (n=13) had between three and five years of experience and eight participants (11.59%) (n=8) had between six and 14 years of experience with HFS as a teaching-learning method. Only one participant (1.45%) (n=1) indicated that she had more than 15 years of experience using HFS as a teaching-learning method.

The participants had to rate their comfort level with integrating technology into the classroom, in question 9. Figure 3.9 indicates the scale that was used as well as a breakdown of the responses received from the participants indicating their comfort level during the use of technology during lectures.

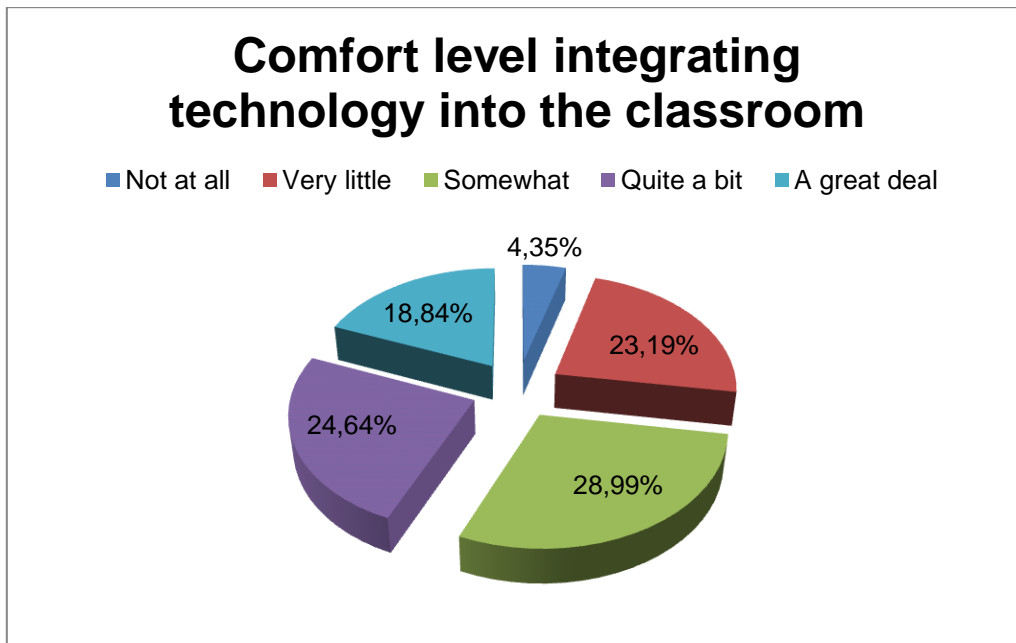


Figure 3-9: Comfort level integrating technology into the classroom

Only three participants (4.35%) (n=3) indicated that they are not comfortable at all using technology during lectures. A total of 16 participants (23.19%) (n=16) indicated that their comfort levels are rated 'very little' implementing technology into the classroom. A total of 20 participants (28.99%) (n=20) were somewhat comfortable using technology in the classroom, while 17 participants (24.64%) (n=17) indicated that they were 'quite a bit' comfortable and 13 participants' (18.84%) (n=13) comfort levels implementing technology into the classroom are 'a great deal' (Figure 3.9).

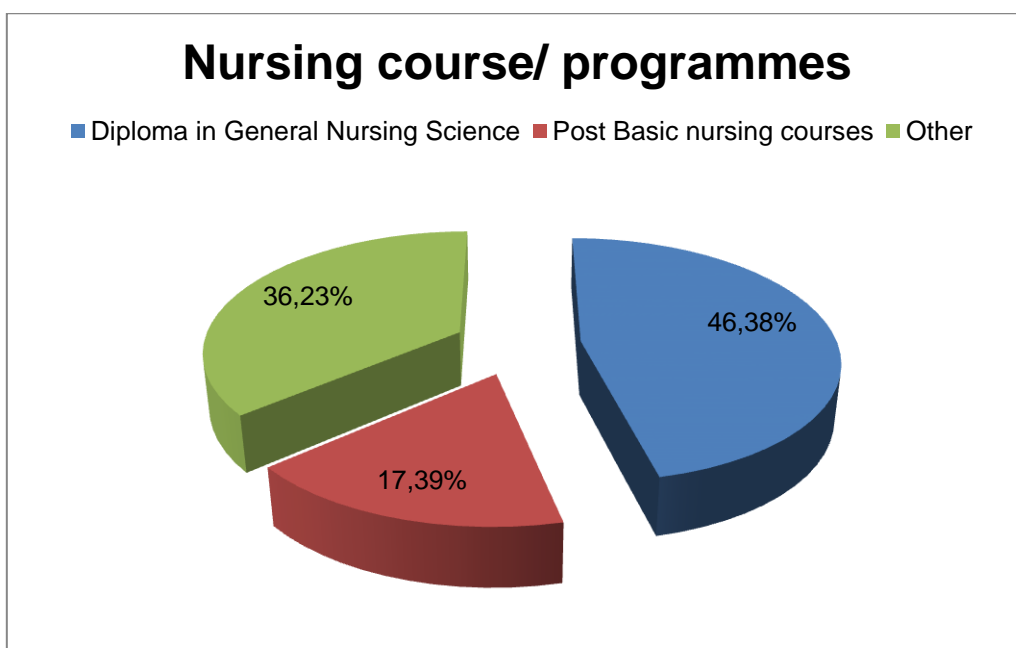


Figure 3-10: Nursing courses/programmes

In question 10 the participants had to identify the course they currently facilitate. A total of 32 of the participants (46.38%) (n=32) indicated that they were involved with the diploma in general nursing science, while 12 participants (17.39%) (n=12) indicated that they were involved with the facilitation of post-basic courses as in Diploma in Operating Theatre Science, Diploma in Intensive Care Nursing Science and Diploma in Emergency Nursing Science. Altogether 25 participants (36.23%) (n=25) were involved with other courses as in-house and short courses (Figure 3.10).

In question 11 the participants had to indicate which clinical skills they mostly facilitate. Table 3.3 indicates these clinical skills.

Table 3-3: Facilitation of clinical skills

Clinical skill	n	%
Theatre procedures	7	10.14
Basic life support	11	15.94
Comprehensive patient care	3	4.35
Intensive Critical Care procedures	7	10.14
Assessment of a patient	4	5.80
Aseptic technique	2	2.90
Administer blood and blood products	1	1.45
Basic procedures	13	18.84
Obstetric procedures	1	1.45
Professional behaviour/ethics/management rounds	4	5.80
Commencement of intravenous therapy	2	2.90
Electrocardiogram interpretation	1	1.45
Administration of oral medication	2	2.90
Infection prevention and control skills/hand hygiene	2	2.90

Five participants (7.25%) (n=5) did not answer this question. Two participants (2.90%) (n=2) did not indicate a clinical skill by writing none or not applicable. Four participants (5.80%) (n=4) did not write a clinical skill but referred to subjects, for example, 'experience', 'PowerPoint', 'workshops' and Integrated Nursing Science. Altogether 13 participants (18.84%) (n=13) demonstrated and taught basic nursing procedures, a total of 11 participants (15.94%) (n=11) were involved in basic life support training, and seven participants (10.14%) (n=7) taught theatre and intensive critical

care procedures. The rest of the clinical skills as set out in Table 3.3 refer to specific basic nursing procedures.

Questions 12 and 13 asked the participants their comfort level (question 12) and experience (question 13) using HFS. The following Likert scale (Table 3.4) was used in the questionnaire and reported on in 3.3.5.2:

Table 3-4: Likert scale: comfort level and experience using high-fidelity simulation

A great deal	Quite a bit	Somewhat	Very little	Not at all
1	2	3	4	5

Question 9 asked the participants their comfort level integrating technology into the classroom. The following Likert scale (Table 3.5) was used in the questionnaire and reported on in 3.3.5.2:

Table 3-5: Likert scale: comfort level integrating technology into the classroom

Not at all	Very little	Somewhat	Quite a bit	A great deal
1	2	3	4	5

Descriptive statistics were used on questions 9, 12 and 13 as follows in Table 3.6.

Table 3-6: Comfort level and experience

Question and description	n	Mean	Standard. Deviation
Question 9: Comfort level integrating technology into the classroom	69	3.30	1.15
Question 12: Comfort level utilising HFS:			
For your nursing courses to supplement lecture	69	2.94	1.37
In your nursing courses to replace lecture	68	3.46	1.38
In your nursing courses to replace lab hours	68	3.53	1.39
In your nursing courses as a clinical make-up experience	69	2.97	1.38
In your nursing courses as a replacement of clinical hours	68	3.85	1.30
In your nursing courses to provide active-learning	68	2.72	1.44
In your nursing courses to promote feedback	68	2.96	1.55
In your nursing courses to promote collaboration	68	2.90	1.49

Question and description	n	Mean	Standard. Deviation
In your nursing courses to provide high-expectations of student learning	68	2.90	1.51
Question 13: Experience utilising HFS:			
To improve diversity in teaching	69	2.93	1.39
To improve time-on-task for student learning	68	3.03	1.42
To improve student/faculty member interaction	69	2.99	1.51
For teaching nursing skills	69	2.77	1.38
To evaluate student performance of this skill	69	2.80	1.44

The most common measure of central tendency is the mean (Howell, 2017:66). The mean is calculated by summing all the values and dividing it by the number of observations, thus $n = 68(69)$ values. The sum of all 68(69) values for each question and sub-questions were added and divided by the total values per question or sub-question. The mean indicates the 'average' of the scores per line (Table 3.6). Variance is a measure of variation and is calculated as the mean of the squared differences between the observations and the mean (Howell, 2017:85). The standard deviation is the square root of the variance (Howell, 2017:87) and will be discussed in detail in section 3.3.5.3.

3.3.5.2 Factor analysis and reliability

An explanatory factor analysis was used to validate the questionnaire and Cronbach's Alpha was used to check the reliability of the scale.

The factor analysis was based on the correlation matrix. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to identify how suitable the data was for factor analysis. This test measures sampling adequacy for each variable (Williams *et al.*, 2010:5). Kaiser-Meyer-Olkin values between 0.8 and 1 indicate that the sampling is adequate. This method withdraws factors with an eigenvalue greater than 1 (Williams *et al.*, 2010:6). The Bartlett's test of sphericity was also done and should be significant ($p < 0.05$) for factor analysis to be suitable.

Question 12 consisted out of nine items to determine the comfort level of nurse educators utilising HFS. The scale used was divided into five categories (Table 3.4). The number of factors extracted was 1 and the cumulative percentage variance explained was 79.30% as outlined in Table 3.7.

Table 3-7: Factor analysis – Question 12

Value	Eigenvalues			
	Extraction: Principal components			
	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	7.14	79.30	7.14	79.30

There was sufficient data for the factor analysis to be conducted according to the KMO criterion as the KMO value is 0.93 as outlined in Table 3.8, which is between the adequate range of 0.8 and 1. Bartlett’s test has an appropriate p-value of 0% (Table 3.8).

Table 3-8: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett’s Test – Question 12

KMO Measure of Sampling Adequacy		0.93
Bartlett’s Test of Sphericity	Approximate Chi-Square	808.97
	Differentiation	36
	Significance /p-value	0.00

Only one factor was extracted for this question (utilising of HFS). Enough total variance was explained by the one factor. These communalities varied between 0.43 and 0.92 as outlined in Table 3.9.

Table 3-9: Comfort level with High-Fidelity Simulation – Question 12

Variable	Comfort levels with communalities	
	Communalities	Factor loadings
Comfort level in utilising HFS: For your nursing courses to supplement lecture	0.78	0.89
Comfort level in utilising HFS: In your nursing courses to replace lectures	0.82	0.91
Comfort level in utilising HFS: In your nursing courses to replace lab hours	0.71	0.84
Comfort level in utilising HFS: In your nursing courses as a clinical make-up experience	0.81	0.90

Variable	Comfort levels with communalities	
	Communalities	Factor loadings
Comfort level in utilising HFS: In your nursing courses to replacement of clinical hours	0.43	0.66
Comfort level in utilising HFS: In your nursing courses to provide active-learning	0.85	0.92
Comfort level in utilising HFS: In your nursing courses to promote feedback	0.90	0.95
Comfort level in utilising HFS: In your nursing courses to promote collaboration	0.92	0.96
Comfort level in utilising HFS: In your nursing courses to provide high-expectations of student learning	0.91	0.96

The factor scores were visualized using a Scree Plot as indicated in Figure 3.11, where the eigenvalues produced a departure from linearity indicating that one factor would be sufficient.

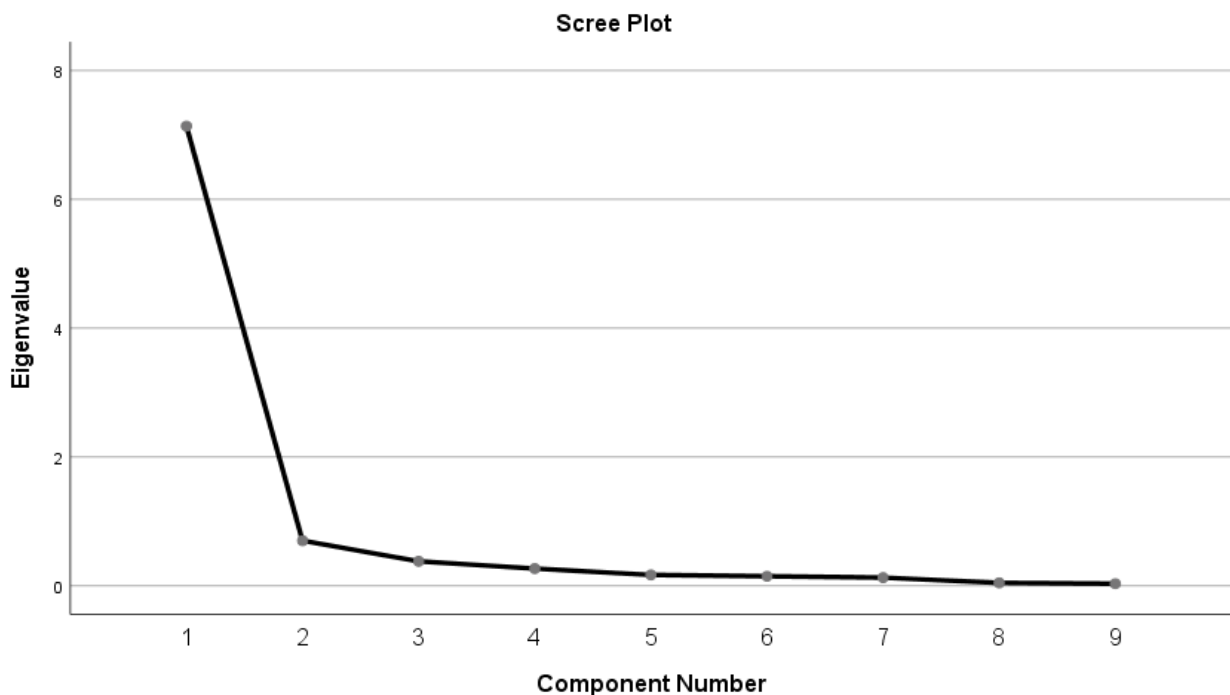


Figure 3-11: Scree Plot – Question 12

Question 13 consisted of five items to determine the experience of nurse educators with utilising HFS. The scale used was divided into five categories (Table 3.4). The number of factors extracted was one and the cumulative percentage variance was 91.87% as outlined in Table 3.10.

Table 3-10: Factor analysis – Question 13

Value	Eigenvalues Extraction: Principal components			
	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	4.59	91.87	4.59	91.87

There was sufficient data for the factor analysis to be conducted according to the KMO criterion as the KMO value is 0.86 as outlined in Table 3.11, which is between the adequate range of 0.8 and 1. Bartlett's test has an appropriate p-value of 0% (Table 3.11).

Table 3-11: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test – Question 13

KMO Measure of Sampling Adequacy		0.86
Bartlett's Test of Sphericity	Approximate Chi-Square	553.72
	Differentiation	10.00
	Significance/ p-value	0.00

Only one factor was extracted for this question (experience of HFS). Enough total variance was explained by the one factor. These communalities varied between 0.91 and 0.93 as outlined in Table 3.12.

Table 3-12: Experience with High-Fidelity Simulation – Question 13

Variable	Experience with communalities	
	Communalities	Factor loadings
Rate your experience utilising HFS: to improve diversity in teaching	0.91	0.95
Rate your experience utilising HFS: to improve time-on-task for student learning	0.93	0.96
Rate your experience utilising HFS: to improve student/faculty member interaction	0.91	0.96
Rate your experience utilising HFS: for teaching nursing skills	0.93	0.96
Rate your experience utilising HFS: to evaluate student performance of this skill	0.92	0.96

The factor scores were visualized using a Scree Plot as indicated in Figure 3.12, where the eigenvalues produced a departure from linearity indicating that one factor would be sufficient.

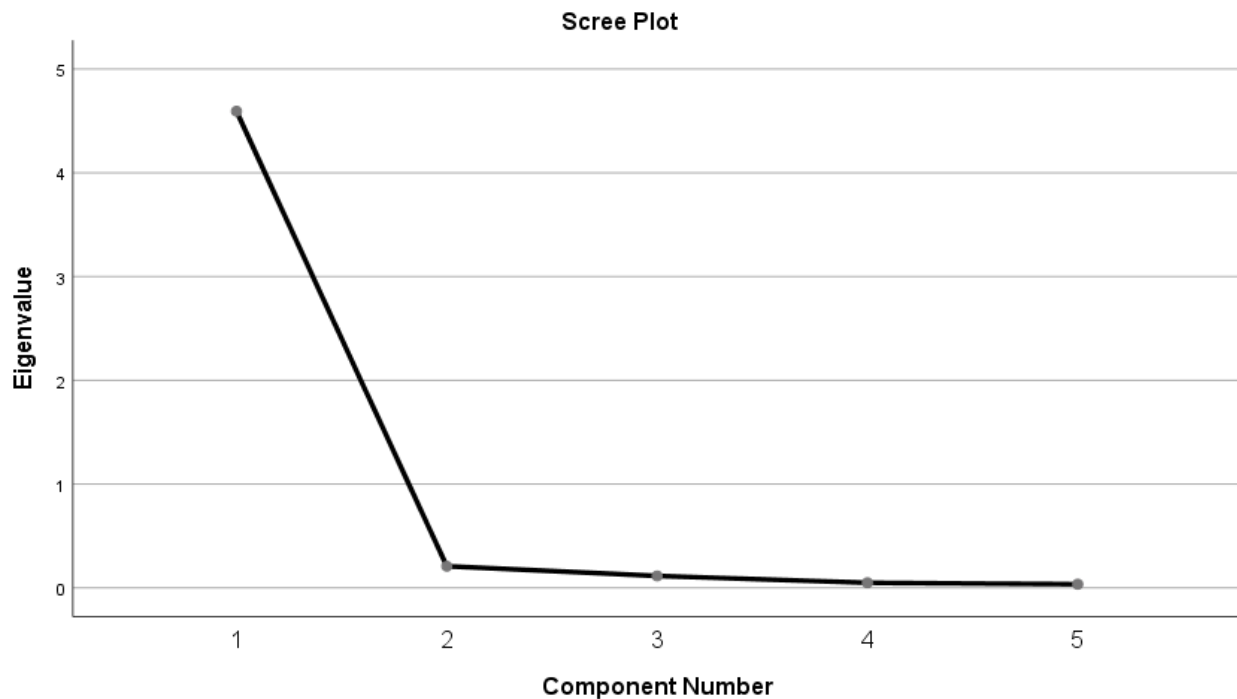


Figure 3-12: Scree Plot – Question 13

Based on the factor analysis, the questionnaire is shown to be valid.

The next section explores the reliability of the scale using Cronbach’s Alpha. Reliability means that a scale used in a questionnaire should consistently show the construct that it measures. Good reliability implies that a respondent should achieve the same score on a questionnaire if it is completed at different times (Brink *et al.*, 2015:169). Table 3.13 contains a summary of the questionnaire’s reliability measures.

Table 3-13: Cronbach’s Alpha

	Cronbach’s Alpha	Mean	Std. Deviation
Comfort level	0.97	3.14	1.26
Experience	0.98	2.90	1.37

According to Tavakol and Dennick (2011:54), Cronbach’s Alpha values between 0.70 and 0.95 are acceptable values. The value of 0.97 for the comfort level and the value of 0.98 for the experience (Table 3.13) are viewed as reliable.

The participants indicated that they are somewhat ($M = 3.14$) comfortable utilising HFS as teaching-learning method, while their experience utilising HFSs as teaching-learning method ranged between quite a bit of experience and somewhat experienced ($M = 2.90$) (Table 3.13).

3.3.5.3 Analysis of Variance

Almost all statistical analysis is focused on finding relationships between the variables and is therefore called variable-centred analysis (Fielding & Gilbert, 2009:8). Analysis of variance is used to determine whether there are any statistically significant differences between the means of two or more independent groups. Statistical inference draws conclusions about the population from which a sample was drawn, using the descriptive measures that have been calculated. Instead of only reporting descriptive statistics, effect sizes were determined. Practical significance can be understood as a large enough difference to have an effect in practice (Ellis & Steyn, 2003:52). In this research study, the practical significance of the statistics will be discussed using the effect sizes and not just focuses on the p -value due to a weak response of the planned population and all-inclusive sample. The effect size makes the difference independent of units and sample size and relates to the spread of the data. Practical significance is calculated by using the standardised difference between the means divided by the estimate for standard deviation. Table 3.14 illustrate Cohen's formula that was used to calculate the effect sizes for means (Ellis & Steyn, 2003:52).

Table 3-14: Cohen's formula for effect sizes for means (Ellis & Steyn, 2003:52)

Test	Conditions	Effect size
z or t	Population standard deviation's (SD's) σ_1 and σ_2 not necessarily equal. Take s_{\max} = maximum of s_1 and s_2 , the sample SD's.	$d = \frac{ \bar{x}_1 - \bar{x}_2 }{s_{\max}} \quad (2)$

The following scale is used for interpretation, e.g. (a) small effect: $d=0.2$, (b) medium effect: $d=0.5$ and (c) large effect: $d=0.8$ (Ellis & Steyn, 2003:53).

The ANOVA between the dependent and independent variables will be discussed next. In the following section, the researcher explains the statistically significant differences between the dependent variables; the comfort level integrating technology into the classroom, the comfort level using HFS, and the experience level using HFS, with the independent variable; the current position of the participants.

The statistically significant differences between comfort levels integrating technology into the classroom and the current positions are illustrated in Table 3.15.

Table 3-15: Current position: Effect sizes in correlation with biographical variables

Descriptive Statistics: Current position		Effect sizes		
Comfort level integrating technology into the classroom	Mean	Clinical Facilitator with	Head Nurse Educator with	Learning & Development Facilitator with
Clinical Facilitator	3.13			
Head Nurse Educator	3.20	0.07		
Learning and Development Facilitator	3.74	0.50	0.44	
Nurse Educator	3.00	0.10	0.16	0.58
Comfort level utilising high-fidelity simulation	Mean	Clinical Facilitator with	Head Nurse Educator with	Learning & Development Facilitator with
Clinical Facilitator	2.85			
Head Nurse Educator	3.18	0.28		
Learning and Development Facilitator	2.97	0.09	0.15	
Nurse Educator	3.70	0.72	0.45	0.53
Experience utilising high-fidelity simulation	Mean	Clinical Facilitator with	Head Nurse Educator with	Learning & Development Facilitator with
Clinical Facilitator	2.56			
Head Nurse Educator	2.84	0.21		
Learning and Development Facilitator	3.04	0.32	0.13	
Nurse Educator	3.17	0.45	0.25	0.09

Table 3.15 indicates that the learning and development facilitators are more comfortable integrating technology into the classroom in relation to the other positions as d -values ranged between 0.44 and 0.58. The means for each group are presented in Table 3.15. At a level of significance of 0.05, the analysis of variance revealed that there are no significant differences among the groups. The F-statistics is 1.75 with an associated p-value of 0.17 (Table 3.16).

Table 3.15 illustrates the comfort level utilising HFS among the different positions. The nurse educators are less comfortable using HFS in relation to the other positions as d -values ranged between 0.45 and 0.72. At a level of significance of 0.05, the analysis of variance revealed that there were no significant differences among the groups. F-statistics is 1.54 with an associated p-value of 0.16 (Table 3.16).

Table 3.15 illustrates the experience utilising HFS amongst the different positions. The nurse educators have less experience using HFS in relation to the clinical facilitator as the d -value = 0.45. There is not a significant difference in the experience between the nurse educators and other positions as the d -values ranged between 0.09 and 0.25. At a level of significance of 0.05, the analysis of variance revealed that there are no significant differences among the groups. F-statistics is 1.90 with an associated p-value of 0.51 (Table 3.16).

Table 3-16: Inferential statistics: Current position and the biographical variables

Source	Mean Square	F	p-value
Current position and the comfort level integrating technology into the classroom	1.29	1.75	0.17
Current position and the comfort level utilising HFS	1.77	1.54	0.16
Current position and experience utilising HFS	0.78	1.90	0.51

Although the comfort level of integrating technology into the classroom is different across the different groups [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$], effect sizes indicate practical significant differences between the comfort level integrating technology into the classroom of the learning and development facilitator and the head nurse educator, nurse educator and clinical facilitator (Table 3.16).

Although the comfort level utilising HFS is different across the different groups [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$], effect sizes indicate practical significant differences between the nurse educator and the clinical facilitator, head nurse educator and learning and development facilitator (Table 3.16).

The experience utilising HFS is not different across the different groups. [$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$].

Table 3.17 indicates that there were no significant differences between the group means as the p -value is larger than 0.05 for both the comfort level and experience utilising HFS. Comfort level utilising HFS p -value = 0.16 and experience utilising HFS p -value = 0.51.

Table 3-17: Test between subjects effects: Comfort levels and experience utilising high-fidelity simulation

	Means				Mean Square	p-value
	Clinical Facilitator	Head Nurse Educator	Learning & Development Facilitator	Nurse Educator		
Comfort level	2.85	3.18	2.97	3.70	1.54	0.16
Experience	2.56	2.84	3.04	3.17	1.90	0.51

In the following section, the statistically significant differences between the depended variables, the comfort level integrating technology into the classroom, the comfort level using HFS and the experience using HFS, with the independent variable, the type of degree of the participants will be discussed.

Table 3-18: Type of degree: Effect sizes in correlation with biographical variables

Descriptive Statistics: Type of degree		Effect sizes	
Comfort level integrating technology in the classroom	Mean	Bachelor Degree with	Master's Degree with
Bachelor Degree	3.17		
Master's Degree	3.23	0.05	
Other nursing qualifications	3.48	0.25	0.20
Comfort level utilising high-fidelity simulation	Mean	Bachelor Degree with	Master's Degree with
Bachelor Degree	3.20		
Master's Degree	3.22	0.02	
Other nursing qualifications	3.03	0.13	0.15
Experience utilising high-fidelity simulation	Mean	Bachelor Degree with	Master's Degree with
Bachelor Degree	2.90		
Master's Degree	2.85	0.04	
Other nursing qualifications	2.91	0.01	0.05

In Table 3.18 we see that there is no significant effect between the independent variables and the type of nursing qualification, as illustrated in the interpretation of the effect sizes (Table 3.19).

Table 3-19: Types of degree: *d*-value

Dependent variable	<i>d</i> -value range	Effect
Comfort level integrating technology into the classroom	0.05 - 0.25	Small effect
Comfort level utilising HFS	0.02 - 0.15	Small effect
Experience utilising HFS	0.01 – 0.05	Small effect

Table 3.20 indicates that there were no significant differences between the group means as the *p*-value is larger than 0.05.

Table 3-20: Types of Degrees: Comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

	Means			Mean Square	F	p-value
	B Degree	Master's Degree	Other nursing qualification			
Comfort level integrating technology into the classroom	3.17	3.23	3.48	1.35	0.53	0.59
Comfort levels utilising HFS	3.20	3.22	3.03	1.63	0.17	0.85
Experience levels utilising HFS	2.90	2.85	2.91	1.94	0.01	0.99

At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups. F-statistics is 0.53 with an associated *p*-value of 0.59 related to the comfort level integrating technology into the classroom. F-statistics is 0.17 with an associated *p*-value of 0.85 related to the comfort level utilising HFS. F-statistics is 0.01 with an associated *p*-value of 0.99 related to the experience utilising HFS (Table 3.20).

The years of experience as a nurse educator or facilitator and its significance towards the comfort level and experience utilising HFS as well as the comfort level integrating technology into the classroom will be explained.

Table 3-21: Years of experience as a nurse educator: Effect sizes in correlation with biographical variables

Descriptive Statistics: Years of experience as a nurse educator		Effect sizes		
Comfort level integrating technology in the classroom	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	3.08			
3-5 years	3.36	0.20		
6-14 years	3.07	0.01	0.21	
15 years +	3.83	0.56	0.36	0.57
Comfort level utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	2.81			
3-5 years	2.98	0.13		
6-14 years	3.52	0.58	0.44	
15 years +	2.98	0.11	0.00	0.35
Experience utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	2.63			
3-5 years	2.36	0.20		
6-14 years	3.33	0.52	0.70	
15 years +	2.68	0.03	0.23	0.45

Participants with more than 15 years of experience as nurse educators are more comfortable with integrating technology into the classroom. Table 3.21 indicates that the d -value for the effect sizes ranges between 0.36 and 0.57, thus indicating a practical significance between nurse educators with more than 15 years of experience and those with less than 15 years of experience.

Participants with six to 14 years of experience as a nurse educator are less comfortable to use HFS. Table 3.21 indicates that the d -value for the effect sizes ranges between 0.35 and 0.58,

indicating a practical significant difference between nurse educators with six to 14 years of experience and those with less than two years of experience.

The same result is evident in the experience utilising HFS as in the comfort levels utilising HFS. Participants with six to 14 years of experience as a nurse educator has less experience utilising HFS as indicated in Table 3.21 with the *d*-value for the effect sizes ranging between 0.45 and 0.70, thus indicating a practical significant difference between nurse educators with six to 14 years of experience utilising HFS and those with less than two years of experience, those with experience between three to five years and those with more than 15 years of experience utilising HFS.

Table 3-22: Years of experience as a nurse educator: Comfort levels integrating technology into the classroom, comfort levels and experience utilising high-fidelity simulation

	Means				Mean Square	F	p-value
	0-2 years	3-5 years	6-14 years	15 years +			
Comfort level integrating technology into the classroom	3.08	3.36	3.07	3.83	1.32	1.32	0.33
Comfort level utilising HFS	2.81	2.98	3.52	2.98	1.57	1.18	0.33
Experience utilising HFS	2.63	2.36	3.33	2.68	1.83	1.52	0.21

Table 3.22 indicates that there were no significant differences between the group means as the *p*-value is larger than 0.05. The independent variables are not different across the groups.

At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups. F-statistics is 1.32 with an associated p-value of 0.33 related to the comfort level integrating technology into the classroom. F-statistics is 1.18 with an associated p-value of 0.33 related to the comfort levels utilising HFS. F-statistics is 1.52 with an associated p-value of 0.21 related to the experience levels utilising HFS (Table 3.22).

Table 3-23: Years teaching at the learning centre/clinical facility: Effect sizes in correlation with biographical variables

Descriptive Statistics: Years teaching at the learning centre/clinical facility		Effect sizes		
Comfort level integrating technology in the classroom	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	3.13			
3-5 years	3.15	0.01		
6-14 years	3.38	0.21	0.20	
15 years +	3.75	0.44	0.43	0.26
Comfort level utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	3.01			
3-5 years	3.12	0.08		
6-14 years	3.19	0.13	0.06	
15 years +	3.26	0.14	0.08	0.05
Experience utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with	6-14 years with
0-2 years	3.04			
3-5 years	2.75	0.21		
6-14 years	2.94	0.07	0.13	
15 years +	2.85	0.12	0.06	0.05

Participants with more than 15 years of teaching experience at a learning centre or clinical facility were more comfortable with integrating technology into the classroom (Table 3.23). Table 3.23 indicates that the *d*-value for the effect sizes ranges between 0.26 and 0.44 (medium effect).

Years teaching at the learning centre or clinical facility had a small effect on the comfort level and experience implementing HFS (Table 3.23). The *d*-value for the effect sizes ranges between 0.05 and 0.14, indicating a small effect on the comfort level implementing HFS (Table 3.23). The *d*-

value for the effect sizes ranges between 0.05 and 0.21, indicating a small effect for the experience implementing HFS (Table 3.23).

Table 3.24 indicates that there were no significant differences between the group means as the p -value is larger than 0.05.

Table 3-24: Years teaching at a learning centre/clinical facility: Comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

	Mean Square	F	p-value
Comfort level integrating technology into the classroom	1.35	0.66	0.58
Comfort level utilising HFS	1.66	0.09	0.97
Experience utilising HFS	1.96	0.14	0.94

At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups' comfort level integrating technology into the classroom. The F-statistic is 1.35 with an associated p -value of 0.58, and thus the p -value is larger than 0.05. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].

Table 3.24 indicates that there were no significant differences between the group means of the comfort level and experience utilising HFS as the p -value is larger than 0.05. The independent variables are not different across the groups. At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].

In the following section the statistical significant differences between the level of expertise utilising HFS and the integration of technology into the classroom, the comfort level utilising and experience of utilising HFS will be discussed (Table 3.25).

Table 3-25: Level of expertise utilising high-fidelity simulation: Effect sizes in correlation with biographical variables

Descriptive Statistics: Level of expertise utilising high-fidelity simulation		Effect sizes		
Comfort level integrating technology in the classroom	Mean	Advanced beginner with	Competent with	Novice with
Advanced beginner	3.40			
Competent	4.00	0.58		
Novice	2.86	0.45	0.96	
Proficient	3.33	0.03	0.32	0.23
Comfort level utilising high-fidelity simulation	Mean	Advanced beginner with	Competent with	Novice with
Advanced beginner	2.65			
Competent	2.31	0.29		
Novice	3.93	1.11	1.50	
Proficient	2.78	0.06	0.23	0.56
Experience utilising high-fidelity simulation	Mean	Advanced beginner with	Competent with	Novice with
Advanced beginner	2.66			
Competent	1.69	0.77		
Novice	3.65	0.78	1.63	
Proficient	3.13	0.24	0.72	0.26

Participants who indicated that they are competently utilising HFS are more comfortable integrating technology into the classroom than the participants that indicate they are advanced beginners, novice and proficient with integrating technology into the classroom. The *d*-value for the effect sizes ranges between 0.32 and 0.96 (Table 3.25).

Participants who indicated that they are novice utilising HFS are less comfortable utilising HFS than the participants that indicate they are advanced beginners, competent and proficient with utilising HFS. The *d*-value for the effect sizes ranges between 0.56 and 1.11 (Table 3.25). Although the comfort level utilising HFS is not different across the different levels of experience utilising

HFS, effect sizes indicate practical significant differences between participants indicating that they are novice users of HFS and participants that indicated they are advanced beginners or competent in using HFS.

Participants who indicated that they are novice utilising HFS are less experienced utilising HFS than the participants who indicated they are advanced beginners, and competent and proficient with utilising HFS (Table 3.25). Although the experience utilising HFS is not different across the different level of experience utilising HFS, effect sizes indicate practical significant differences between participants indicating that they are novice users of HFS and participants that indicated they are advanced beginners or competent in using HFS. The *d*-value for the effect sizes ranges between 0.26 and 0.78 (Table 3.25).

Table 3-26: Level of expertise utilising high-fidelity simulation: Comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

	Means				Mean Square	F	p-value
	Advanced beginner	Competent	Novice	Proficient			
Comfort level integrating technology into the classroom	3.40	4.00	2.86	3.33	1.20	2.85	0.31
Comfort level utilising HFS	2.65	2.31	3.93	2.78	1.14	7.69	0.00
Experience utilising HFS	2.66	1.69	3.65	3.13	1.32	8.18	0.00

At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups. The F-statistic is 2.85 with an associated *p*-value of 0.31, and thus the *p*-value larger than 0.05 (Table 3.26). [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$]. Although the comfort level integrating technology into the classroom is not different across the different groups, effect sizes indicate practical significant differences between the comfort level of the participants indicating that they are competent in integrating technology into the classroom and the participants indicating they are advanced beginners and those indicating that they are novice in integrating technology into the classroom (Table 3.25).

At a level of significance of 0.05, the ANOVA revealed that there are significant differences among the groups' comfort level utilising HFS as the p -value is less than 0.05 (Table 3.26). The F -statistics is 7.69 with an associated p -value of 0.00, and thus the p -value is less than 0.05 (Table 3.26).

At a level of significance of 0.05, the ANOVA revealed that there are significant differences among the groups' experience level utilising HFS as the p -value is less than 0.05 (Table 3.26). The F -statistics is 8.18 with an associated p -value of 0.00, thus the p -value is less than 0.05 (Table 3.26).

The larger the F -value, the greater the variation of the difference between groups.

In the following section the statistical significant differences between the years of experience utilising HFS and the integration of technology into the classroom, the comfort level utilising and experience of utilising HFS will be discussed.

Table 3-27: Years of experience utilising high-fidelity simulation: Effect sizes in correlation with biographical variables

Descriptive Statistics: Years of experience utilising high-fidelity simulation		Effect sizes	
Comfort level integrating technology in the classroom	Mean	0-2 years with	3-5 years with
0-2 years	2.96		
3-5 years	3.62	0.60	
6-14 years	4.38	1.30	0.83
Comfort level utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with
0-2 years	3.51		
3-5 years	2.83	0.56	
6-14 years	1.89	1.33	0.93

Descriptive Statistics: Years of experience utilising high-fidelity simulation		Effect sizes	
Experience utilising high-fidelity simulation	Mean	0-2 years with	3-5 years with
0-2 years	3.38		
3-5 years	2.25	0.89	
6-14 years	1.58	1.42	0.62

The participants that indicated that they have between six and 14 years of experience utilising HFS were more comfortable integrating technology into the classroom (Table 3.27) in relation to the participants with less than two years of experience and those with three to five years of experience (Table 3.27). [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$]. Although the comfort level integrating technology into the classroom is not different across the different groups, effect sizes indicate practical significant differences between the comfort level of the participants indicating that they have between six and 14 years of experience utilising HFS and the participants with less than two years of experience and those with three to five years of experience (Table 3.27).

Table 3.27 indicate that participants with less than two years of experience utilising HFS are less comfortable implementing HFS as well as have less experience with implementing HFS.

Effect sizes indicate large practical significant differences between participants' comfort level implementing HFS when they have three to five years of experience utilising HFS and the participants with less than two years of experience and those with six to 14 years of experience (Table 3.27).

Table 3-28: Years of experience utilising high-fidelity simulation: Comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

	Mean Square	F	p-value
Comfort level integrating technology into the classroom	1.06	6.84	0.00
Comfort level utilising HFS	1.27	6.83	0.00
Experience utilising HFS	1.42	8.51	0.00

At a level of significance of 0.05 the ANOVA revealed that there are significant differences among the groups' comfort level utilising HFS as the p -value is less than 0.05 (Table 3.28). The F-

statistics is 6.84 with an associated p -value of 0.00, and thus the p -value is less than 0.05 (Table 3.28).

At a level of significance of 0.05, the ANOVA revealed that there are significant differences among the groups' comfort level utilising HFS as the p -value is less than 0.05 (Table 3.28). The F-statistics is 6.83 with an associated p -value of 0.00, and thus the p -value is less than 0.05 (Table 3.28).

At a level of significance of 0.05, the ANOVA revealed that there are significant differences among the groups' experience utilising HFS as the p -value is less than 0.05 (Table 3.28). The F-statistics is 8.51 with an associated p -value of 0.00, thus the p -value is less than 0.05 (Table 3.28).

The larger the F -value, the greater the variation of difference between groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].

Participants had to identify the clinical skills they reached in their major course assignment. They had to choose between the diploma in a general nursing science course, other courses and post-basic nursing courses.

Table 3-29: Course assignment: Effect sizes in correlation with biographical variables

Descriptive Statistics: Course assignment		Effect sizes	
Comfort level integrating technology in the classroom	Mean	Diploma with	Other with
Diploma in General Nursing Science	3.06		
Other	3.40	0.29	
Post-basic nursing courses	3.75	0.57	0.29
Comfort level utilising high-fidelity simulation	Mean	Diploma with	Other with
Diploma in General Nursing Science	3.49		
Other	2.87	0.49	
Post-basic nursing courses	2.75	0.58	0.10

Descriptive Statistics: Course assignment		Effect sizes	
Experience utilising high-fidelity simulation	Mean	Diploma with	Other with
Diploma in General Nursing Science	3.11		
Other	2.74	0.26	
Post-basic nursing courses	2.63	0.33	0.08

Participants that indicated that they are mostly involved in the development of clinical skills of the post-basic nursing students were comfortable in integrating technology into the classroom as the d -values ranged between 0.29 and 0.57 (Table 3.29). Although the comfort level integrating technology into the classroom is not different across the different groups, effect sizes indicate practical significant differences between nurse educators assigned to post-basic nursing courses and those assigned to facilitate the Diploma in General Nursing Science.

Participants who indicated that they are mostly involved in the development of clinical skills of the Diploma in General Nursing Science students were less comfortable utilising HFS as the d -values ranged between 0.10 and 0.58 (Table 3.29). Although the comfort level utilising HFS is not different across the different groups, effect sizes indicate practical significant differences between nurse educators facilitating the Diploma in General Nursing Science and those facilitating post-basic nursing courses.

The course assignment did not have any significant differences regarding the level of experience utilising HFS as the d -values ranged between 0.08 and 0.33 indicating a small effect (Table 3.29).

Table 3-30: Course assignment: Comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

	Mean Square	F	p-value
Comfort level integrating technology into the classroom	1.31	1.72	0.19
Comfort level utilising HFS	1.52	2.49	0.09
Experience utilising HFS	1.90	0.77	0.47

At a level of significance of 0.05, the ANOVA revealed that there are no significant differences among the groups. For the comfort level of integrating technology into the classroom the F-statistic is 1.72 with an associated p -value of 0.19; for comfort level utilising HFS, the F-statistic is 2.49 with an associated p -value of 0.09; and for experience utilising HFS the F-statistic is 0.77 with an associated p -value of 0.47. Thus the p -value is larger than 0.05 (Table 3.30). [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$].

3.3.5.4 T-test

The t-test is used to determine if two sets of data are significantly different from each other. It focussed on the t-statistic, the t-distribution and degrees of freedom to determine the probability of difference between populations (Howell, 2017:195). A t-test was conducted between the years of nursing experience and the dependent variables the comfort level utilising HFS and the experience level utilising HFS (Table 3.31).

Table 3-31: Years of nursing experience and the comfort level and experience utilising high-fidelity simulation

Dependent variable	Years of nursing experience	Mean	Standard deviation	p -value	Effect size: 15 years + with	Effect
Comfort level utilising HFS	6-14 years	2.80	1.18	0.16	0.39	Small effect
	15 years +	3.29	1.27			
Experience utilising HFS	6-14 years	2.79	1.55	0.76	0.07	Small effect
	15 years +	2.90	1.32			

Table 3.32 illustrates the results of the Levene's test for equality of variances that was conducted on the depended variables in relation to the years of nursing experience.

Table 3-32: Years of nursing experience and the comfort level integrating technology into the classroom, comfort level and experience utilising high-fidelity simulation

Variable	t-value	differentiation	p-value	Mean difference	Standard Error	Min	Max
Comfort level integrating technology into the classroom	0.10	66	0.92	0.03	0.32	-0.61	0.68
Comfort level utilising HFS	-1.44	66	0.16	-0.49	0.34	-1.18	0.19
Experience utilising HFS	-0.30	66	0.76	-0.12	0.38	-0.87	0.64

From the data illustrated in Table 3.32, the following conclusions were made:

- Comfort level integrating technology into the classroom had a *t*-value of 0.10 with 66 degrees of freedom, resulting in a 2-tailed *p*-value of 0.92 that is more than the alpha of 0.05, therefore we can accept the hypothesis (The comfort level integrating technology into the classroom is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$]);
- Comfort level utilising HFS had a *t*-value of -1.44 with 66 degrees of freedom, resulting in a 2-tailed *p*-value of 0.16 that is more than the alpha of 0.05, therefore the hypothesis can be accepted (The comfort level utilising HFS is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$]); and
- Experience utilising HFS had a *t*-value of -0.30 with 66 degrees of freedom, resulting in a 2-tailed *p*-value of 0.76 that is more than the alpha of 0.05, therefore the hypothesis can be accepted (The experience level utilising HFS is not equal across the different groups. [$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$]).

3.3.5.5 Correlation with ranked data

Spearman's correlation coefficient for ranked data was used to rank values on continuous variables (Howell, 2017:195) (Table 3.33).

Table 3-33: Correlation: comfort level integrating technology into the classroom with comfort level and experience using high-fidelity simulation

Spearman's rho			Comfort level integrating technology into the classroom	Comfort level	Experience
	Comfort level integrating technology into the classroom	Correlation Coefficient		1.00	-0.58
Sig. (2-tailed)				0.00	0.00
n			69.00	69.00	69.00
Comfort level	Correlation Coefficient		-0.58		
	Sig. (2-tailed)		0.00		
	n		69.00	69.00	69.00
Experience	Correlation Coefficient		-0.45		
	Sig. (2-tailed)		0.00		
	n		69.00	69.00	69.00

The significant (Sig.) Spearman correlation coefficient value of -0.58 confirms that there appears to be a moderate positive correlation between the comfort level integrating technology into the classroom and the comfort levels in using HFS (Table 3.33). The significant Spearman correlation coefficient value of -0.45 confirms that there appears to be a moderate positive correlation between the comfort level integrating technology into the classroom and the experience with using HFS (Table 3.33). In both instances the p-value was 0.00, which is very strong evidence that the alternative hypothesis is true.

3.3.5.6 Content analysis

Content analysis is a flexible method for analysing text data (Hsieh & Shannon, 2005:1277). Question 14 and Question 15 were essay type of questions. Participants answered the questions using text.

Question 14: Please provide any other feedback you have regarding utilization of HFS.

Question 15: Please provide any other feedback you have regarding your experience of HFS.

The following steps were followed to identify the key concepts that were used during the qualitative phase of the convergent mixed methods (Chapter 4):

1. The researcher read carefully through all the answers of question 14 and question 15 obtained from the participants to get a sense of the whole.
2. Words, phrases, statements that were related to 'HFS' were underlined and written as the potential concepts.
3. A list of all the concepts was made and similar topics were clustered together and arranged into key concepts and sub-concepts (Table 3.34).

An independent researcher who is experienced in qualitative research was appointed as a co-coder for analysis of the qualitative data (Annexure 12). The researcher arranged a meeting with the co-coder and consensus was reached on the key concepts and sub-concepts. The following key concepts and sub-concepts were used for the data analysis of the qualitative data as discussed in Chapter 4.

Table 3-34: Content analysis: Key concepts and sub-concepts

Key Concept 1: Experience using HFS	Key Concept 2: Comfort using HFS	Key Concept 3: Learning environment	Key Concept 4: Skill development	Key Concept 5: Theory practice integration
<p>Sub-concept 1.1: No experience/very little experience</p> <ul style="list-style-type: none"> • Not actively involved in simulation training • Very little exposure • Do not use at all • Attended a demonstration <p>Sub-concept 1.2: Use only low-fidelity simulation (LFS)</p> <ul style="list-style-type: none"> • No HFS manikins • Mimic patient scenarios with Low-fidelity simulation (LFS) • Experience with LFS only 	<p>Sub-concept 2.1: Equipment</p> <ul style="list-style-type: none"> • Do not have equipment • Only have LFS equipment • Do not have enough equipment/do not use often • Budget constraints • To expensive • Must be able to set realistic scenarios 	<p>Sub-concept 3.1: Safe environment</p> <ul style="list-style-type: none"> • Student is less anxious and nervous • Student experience less stress • Patient is safe from inexperienced learners • Invasive procedures are practiced in safe environment before attempting it on a patient 	<p>Sub-concept 4.1: Psychomotor/practical skills</p> <ul style="list-style-type: none"> • Demonstrations of skills • Not all skills are found at the patient's beds • Constant feedback/debriefing • Set goals to improve skills • Better understanding of goals • Should not replace clinical practice • Competent before going to patient • Assess competency • More approachable to attempt tasks • Refresh educator's skill 	<ul style="list-style-type: none"> • Blended learning • Students engaged in learning • Understand theory better because it is visual • Audio-visual stimulation

Key Concept 1: Experience using HFS	Key Concept 2: Comfort using HFS	Key Concept 3: Learning environment	Key Concept 4: Skill development	Key Concept 5: Theory practice integration
	<p>Sub-concept 2.2: Training</p> <ul style="list-style-type: none"> • Not enough training • Need follow-up training • Need trained facilitator to assist • Age must not be a stumbling block 	<p>Sub-concept 3.2: Clinical setting</p> <ul style="list-style-type: none"> • Realistic clinical setting/scenarios • Controlled environment with planned outcomes • Safe time due to no interruptions 	<p>Sub-concept 4.2: Cognitive skills</p> <ul style="list-style-type: none"> • Develop clinical reasoning/judgement <p>Sub-concept 4.3: Affective skills</p> <ul style="list-style-type: none"> • Effective communication • Share ideas • Encourage students to interact • Build student facilitator report • Must not replace communication with the patient 	

3.4 RIGOUR

The rigour for objective 1 was discussed in detail in chapter 2 under phase 1, step 1 (par d).

3.5 SUMMARY

In Chapter 3 the first objective, namely to explore nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI was discussed. It became evident that nurse educators' experience played an important role in their comfort level integrating technology into the classroom and the comfort level utilising HFS. Participants with more than 15 years of experience as nurse educators were more comfortable utilising HFS and integrating technology into the classroom.

The result of the second objective, namely to explore and describe the views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes at a SAPHEI, will be discussed in Chapter 4.

CHAPTER 4

VIEWS/ASSUMPTIONS AND BELIEFS OF NURSE EDUCATORS ON THE IMPLEMENTATION AND USE OF HIGH-FIDELITY SIMULATION IN THE NURSING PROGRAMMES AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

(Phase 1: Step 1)

4.1 INTRODUCTION

The research method including population and sampling, data collection, data analysis as well as rigour and the research findings of objective 2 are addressed in this chapter as follows:

Objective 2: To explore and describe the views/assumptions and beliefs of nurse educators on the implementation and use of high-fidelity simulation (HFS) in the nursing programmes at a South African private higher education institution (SAPHEI).

4.2 RESEARCH DESIGN

A convergent mixed-methods research design (Creswell, 2014:270) was used in phase 1 as discussed in chapter 2 (2.2-2.3). The quantitative phase was discussed in detail in Chapter 3. The research design used for objective 2 was a descriptive and contextual qualitative design (Mouton & Marais, 1996:43) (Chapter 2, objective 2 (par a)).

4.3 RESEARCH METHOD

The discussion of the research method in this chapter includes the population and sampling, data collection, as well as the data analysis of phase 1, step 1, objective 2.

Individual, semi-structured interviews via Vidyo were used as discussed (Chapter 2, objective 2 (par a)).

4.3.1 Population

The population consisted of all the nurse educators (permanently employed staff) at a SAPHEI (N=69) that participated in answering the questionnaire.

Inclusion criteria:

- Head nurse educators and nurse educators permanently employed at one of the remaining six learning centres at the SAPHEI (the learning centre where the researcher is employed as the manager, was excluded);
- Learning and development facilitators and clinical facilitators permanently employed at the clinical facilities affiliated with the seven learning centres at the SAPHEI;
- Had to give voluntary informed consent to participate in this research study (Annexures 3 and 4); and
- Participants who took part in the quantitative phase of the research study and voluntarily consented to take part in the individual semi-structured interview (Annexures 3 and 4).

Exclusion criteria:

Nurse educators employed at the learning centre where the researcher is the manager.

Only 69 participants of N=120 participants completed the questionnaire. The population for objective 2 is N=69. Table 4.1 gives a breakdown of the population for objective 2, in the seven learning centres. As previously explained the population consisted of all the nurse educators from the six learning centres (excluding the one learning centre the researcher is affiliated to) and all the training and development facilitators and clinical facilitators from the seven learning centres affiliated with the SAPHEI.

Table 4-1: Population

Population N=69				
Region	Nurse Educator (including Head Nurse Educator)	Learning and Development Facilitator	Clinical Facilitator	Total
Western Cape	8	8	6	22
Free State	4	3	2	9
Limpopo	2	0	0	2
Mpumalanga	2	1	4	7
Gauteng (Northern region)	0*	7	10	17
Northern Cape	1	1	0	2
Gauteng (Tshwane region)	7	3	0	10
Total				69

*Excluded from the research study

4.3.2 Sample

The sample used was randomised purposive sampling (Chapter 2, objective 2 (par c)) and 33 participants indicated and gave voluntary consent to participate in the individual, semi-structured interviews (n=33). The researcher selected a representative sample from each learning centre for the first round of the interviews (Table 4.2). Data saturation was obtained after 19 interviews in the first round and there was no need to have a second round of interviews (4.3.3).

Table 4-2: Sample

Sample n=33								
Participants willing to take part in the interview process					Participants randomly selected for the first interview round			
Region	Nurse Educator / Head Nurse Educator	Learning & Development Facilitator	Clinical Facilitator	Total	Nurse Educator / Head Nurse Educator	Learning & Development Facilitator	Clinical Facilitator	Total
Western Cape	4	1	4	9	2	1	2	5
Free State	2	1	1	4	2	0	1	3
Limpopo	1	0	0	1	1	0	0	1
Mpumalanga	0	1	2	3	0	1	1	2
Gauteng (Northern region)	0*	5	5	10	0	2	2	4
Northern Cape	0	1	0	1	0	1	0	1
Gauteng (Tshwane region)	3	2	0	5	2	1		3
Total				33	Interviews conducted			19

* Excluded

4.3.3 Data collection

As discussed in Chapter 2 (objective 2 (par d)), data were collected using individual, semi-structured Vidyo interviews (Creswell, 2014:235). A schedule for conducting the interviews was

drawn up according to the availability of the participants and an electronic invitation, confirming the date and time, was sent to each participant as a confirmation and reminder of the scheduled interview.

In the first round of interviews, 19 individual, semi-structured Vidyo interviews were conducted. As discussed above (4.3.2), the second round of interviews was not necessary. The following introduction and open-ended questions were asked:

“As nurse educators, our goal is to improve clinical competence of student nurses through various teaching methods. High-fidelity simulation is one of those teaching methods used to enhance clinical competence.”

1. What is your view about the implementation of HFS as a teaching method in nursing programmes at your institution?
2. What is your expectation of HFS as a teaching method?
3. What is your perception of HFS as a teaching method to enhance clinical competence of nursing students?
4. What is your opinion about the current practices and use of HFS in your institution?
5. What value does HFS add as a teaching method in a nursing programme?

4.3.4 Data analysis

As described in Chapter 2 (objective 2 (part e)), a direct content analysis was done using Hsieh and Shannon's approach (2005:1277).

An experienced qualitative researcher was appointed as an independent co-coder to analyse the data. After the co-coder and the researcher had analysed the data independently, a meeting was scheduled and consensus was reached on the key concepts and sub-concepts that emerged from the data outlined in Table 4.3.

4.4 RESULTS OF OBJECTIVE 2

With the individual, semi-structured Vidyo interviews the following key concepts and sub-concepts were identified as outlined in Table 4.3.

Table 4-3: Key concepts identified for the views/assumptions and beliefs of nurse educators on implementing and use of high-fidelity simulation in the nursing programmes

Key Concept 1: Experience using high-fidelity simulation	Key Concept 2: Comfort using high-fidelity simulation	Key Concept 3: Learning environment	Key Concept 4: Skill development	Key Concept 5: Theory and practice integration
<p>Sub-concept 1.1: No experience/Very little experience</p> <ul style="list-style-type: none"> • Not used as yet • Limited experience • Do not use effectively • No exposure <p>Sub-concept 1.2: Use of low-fidelity simulation</p> <ul style="list-style-type: none"> • Basic manikins/models • Not close to realism 	<p>Sub-concept 2.1: Equipment</p> <ul style="list-style-type: none"> • Larger groups need more equipment • Bigger simulation rooms • Equipment cannot be carried around • Do not have equipment • Expensive • IT support • User-friendly <p>Sub-concept 2.2: Training</p> <ul style="list-style-type: none"> • Upskilling of nurse educators • Do not have training or exposure 	<p>Sub-concept 3.1: Safe environment</p> <ul style="list-style-type: none"> • Patient safety • Safe environment for students • Safe environment for nurse educators <p>Sub-concept 3.2: Simulation setting</p> <ul style="list-style-type: none"> • Reflects the real thing • Enhance learning • Exposure to limited clinical procedures • Procedures accessible to students • Assessing students 	<p>Sub-concept 4.1: Psychomotor skills</p> <ul style="list-style-type: none"> • Create competence • Create confidence • Hands-on practitioners • Upgrade up to standard • Fill the gap • Developing skills • Practice over and over • Exposure <p>Sub-concept 4.2: Cognitive skills</p> <ul style="list-style-type: none"> • Develop higher cognitive skills • Improve knowledge 	<p>Sub-concept 5.1: Benefit of integration of theory into practice</p> <ul style="list-style-type: none"> • Scientific thinking will be applied • Transfer skills to clinical environment • Combine theoretical explanation with practical demonstration <p>Sub-concept 5.2: Critical thinking</p> <ul style="list-style-type: none"> • Develop critical thinking • Develop clinical judgement • Decision-making • Problem solving • Skills improvement

Key Concept 1: Experience using high-fidelity simulation	Key Concept 2: Comfort using high-fidelity simulation	Key Concept 3: Learning environment	Key Concept 4: Skill development	Key Concept 5: Theory and practice integration
	<ul style="list-style-type: none"> • Practical experience <p>Sub-concept 2.3: Concerns</p> <ul style="list-style-type: none"> • Financial constrains • Fear of the unknown <p>Sub-concept 2.4: Time</p> <ul style="list-style-type: none"> • Do not have time to explore what the manikin can do • Do not have time to develop scenarios • Curriculum too full – no time for simulation • Planning takes a lot of time 	<ul style="list-style-type: none"> • Improve learning experience • Not to be used as the only method • Practice before going to the patient • Create confidence • Ensure competence <p>Sub-concept 3.3: Knowledgeable accompaniment</p> <ul style="list-style-type: none"> • Responsible person • Guidance from facilitator • Nurse educators need to know how to facilitate 	<ul style="list-style-type: none"> • Reinforces understanding • Enforce theory practice integration <p>Sub-concept 4.3: Affective skills</p> <ul style="list-style-type: none"> • Difficult to interact with manikin • Not to replace clinical training • Affective skills can only be practiced on patients 	<p>Sub-concept 5.3: Teaching-learning methods</p> <ul style="list-style-type: none"> • Use of different methods and techniques • Use of senses • Collaboration of visual, auditory together with aesthetic • Enhance teaching • Make more sense

4.5 DISCUSSION OF THE RESULTS FOR OBJECTIVE 2

Each of the key concepts and their sub-concepts identified in Table 4.3 will now be discussed in detail.

4.5.1 Key concept 1: Experience using high-fidelity simulation

Two sub-concepts were identified under key concept 1, e.g. no or very little experience with HFS; and use of low-fidelity simulation (LFS).

Sub-concept 1.1: No or very little experience with high-fidelity simulation

Al-Ghareeb and Cooper (2016:285) state that HFS as a teaching tool is undervalued and underused. Walker *et al.* (2015:2) state that the challenge using HFS is the limited resources as simulation training is resource intensive. Venkatasalu *et al.* (2015:179) concur that simulation-based training is not yet widely used as its effectiveness in nursing schools is not understood.

In supporting the literature, the participants stated:

Participant 2 (59 years old; 12 years of experience as a nurse educator)

"I have limited experience".

Participant 4 (42 years old; 9 years of experience as a nurse educator)

"We do not have the exposure or the means to train on that equipment."

Participant 7 (53 years old; 15 years of experience as a nurse educator)

"I don't think we are utilising it optimally for various reasons."

Participant 14 (46 years old; 16 years of experience as a nurse educator)

"I have not been exposed."

Participant 18 (42 years old; 9 years of experience as a nurse educator)

"I just feel we are underutilising them."

Sub-concept 1.2: Use of low-fidelity simulation

Low-fidelity simulation was used in the past to provide opportunities to student nurses to acquire experience. Low-fidelity simulation creates a semblance of reality by using part-task trainers or static manikins with props and techniques such as role play (Sharpnack & Madigan, 2012:264; Winkelmann *et al.*, 2018:186). Eyikara and Baykara (2018:101) used the example of administration

of injections into oranges and suturing pieces of cloth. According to Zapko *et al.* (2018:28), simulation training must be used as alternative to face-to-face clinical experience in order to move away from the focus on tasks or skill performance. Simulation was implemented as a very useful education method that enabled student nurses to learn how to act effectively in various situations (Kim, 2018:258). Low-fidelity simulation is preferred due to the perception of nurse educators that the implementation of HFS is difficult and requires extensive content to development simulations for the classroom environment (Sharpnack & Madigan, 2012:264).

In supporting the literature, the participants stated:

Participant 1 (57 years old; 6 years of experience as a nurse educator)

"We make use of our manikins to do that kind of training [LFS]. The manikins are not HFS".

Participant 4 (42 years old; 9 years of experience as a nurse educator)

"We have a manikin in the simlab. It is really really basic."

Participant 10 (36 years old; 1 year experience as a nurse educator)

"We have a low-fidelity doll."

Participant 14 (46 years old; 16 years of experience as a nurse educator)

"I will say low-fidelity in terms of it is only the arm."

Conclusion with regard to key concept 1: Experience using high-fidelity simulation

Nurse educators have not been exposed or have limited experience using HFS as a teaching method due to not having the equipment or not using the equipment optimally. The equipment currently in use in the majority of the clinical settings is low-fidelity manikins.

4.5.2 Key concept 2: Comfort using high-fidelity simulation

Four sub-concepts were identified under key concept 2, namely equipment, training, concerns, and time.

Kim (2018:285) identified the following barriers that prevent the effective use of HFS as a teaching method in nursing education programmes: lack of time, the availability of sophisticated technology, costly equipment, faculty members' discomfort in using such technology, competence in utilising this teaching method, past experience, and the nurse educators' fear for the unknown.

Sub-concept 2.1: Equipment

Achieving high quality simulation experiences requires clear learning objectives to articulate with the curriculum, and sufficient high quality simulation resources including adequately prepared staff (Forber *et al.*, 2015:1117). According to Welman and Spies (2016:3) equipment needed for HFS includes full-bodied manikins with advanced technology and an environment that resembles a particular healthcare setting. These researchers stated that the simulation setting should be a 'believable' representation of reality. Setting up a HFS setting is costly according to Weller *et al.* (2015:44).

In supporting the literature, the participants stated:

Participant 7 (53 years old; 15 years of experience as a nurse educator)

"If I have larger groups of students, how many educators do you have and how many simulation dolls do you have?"

Participant 10 (36 years old; 1 year experience as a nurse educator)

"It is a really really big problem carrying our doll around. This doll is heavy."

Participant 12 (48 years old; 17 years of experience as a nurse educator)

"We did put it on the budget but it was so expensive to have the right equipment available."

Participant 13 (62 years old; 30 years of experience as a nurse educator)

"There must be enough equipment and IT support on the premises because it can happen at any time that the programme has power outage."

Sub-concept 2.2: Training

In order for simulation to add value as a teaching method it should include thoughtful and complex educational interventions that are focused on achieving specific clinical skills (Zapko *et al.*, 2018:28). Kim (2018:258), states that the use of simulation requires confidence, self-efficacy and the ability to organise. Welman and Spies (2016:3) contend that a few nurse educators have hands-on experience of incorporating simulation-based learning. Simulation places demands on the technological ability of nurse educators because it necessitates greater engagement than other passive forms of instruction (Al-Ghareeb & Cooper, 2016:282). Garden *et al.* (2015:300) emphasise that a skilled facilitator (nurse educator) is essential to the success of HFS. To implement HFS as a teaching-learning method in a nursing curriculum, nurse educators should be equipped with the necessary simulation-based teaching skills through workshops and skills training (Welman & Spies, 2016:2).

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

"I think one of the things we must look at is upskilling of the educators."

Participant 4 (42 years old; 9 years of experience as a nurse educator)

"We do not have the exposure or the means to train on that equipment."

Participant 10 (36 years old; 1 year experience as a nurse educator)

"The educator needs to be well trained."

Participant 13 (62 years old; 30 years of experience as a nurse educator)

"Your educators have to be taught how to work with the equipment."

Participant 15 (54 years old; 13 years of experience as a nurse educator)

"All educators should be able to use it."

Sub-concept 2.3: Concerns

Zapko *et al.* (2018:28) explain that there are some concerns regarding the use of simulation as it minimises the variability of hospital-based experiences. On the other hand, these researchers believe that when conducted well, simulation can lead to increased student nurse satisfaction and self-confidence (Zapko *et al.*, 2018:33). Berragan (2011:661) agrees that there are some concerns regarding simulation and its capacity to translate to practice. According to Berragan (2011:661) simulation may take over from or replace reality and the lack of interaction with a patient is a concern. Koivisto *et al.* (2018:115) stated that technical problems might be a challenge as well as frustration with using technology. Weller *et al.* (2015:44) emphasise that it is costly to set up HFS as the equipment and maintenance of the equipment is expensive.

In supporting the literature, the participants stated:

Participant 2 (59 years old; 12 years of experience as a nurse educator)

“There is a concern that we will allow robotics to taking over and we lose the personal touch.”

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“It is almost like fear of the unknown.”

Participant 4 (42 years old; 9 years of experience as a nurse educator)

“All that psychosocial aspects and psychological aspects are removed. It is not realistic in the sense that the ‘patient’ can’t speak back to you.”

Participant 7 (53 years old; 15 years of experience as a nurse educator)

“They [student nurses] think it’s a play area.”

Participant 17 (51 years old; 8 years of experience as a nurse educator)

“There is a very big financial layout with putting together a decent simlab.”

Sub-concept 2.4: Time

Al-Ghareeb and Cooper (2016:285) identified the lack of time as a barrier to integrate simulation into nursing curricula, with many participants in their study indicating that additional time would encourage them to use simulation more extensively. Sufficient time is needed during feedback for meaningful discussion and debriefing to ensure that student nurses understand what is expected of them during HFS training (Garden *et al.*, 2015:300). Well-written scenarios ensure effective simulation training (Welman & Spies, 2016:3). Developing well-written scenarios takes up a lot of time. Welman and Spies (2016:6) also state that planning and running HFS sessions are time-consuming and require meticulous preparation.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“I just did not have time to really go and learn how to use the equipment.”

Participant 7 (53 years old; 15 years of experience as a nurse educator)

“Our current planning does not include simulation time.”

Participant 10 (36 years old; 1 year experience as a nurse educator)

“Carrying it to the unit, putting it into a bed ... it takes a lot of time.”

Participant 17 (51 years old; 8 years of experience as a nurse educator)

“It takes a lot of preparation and I don’t think that we always spend enough time on that.”

Conclusion with regard to key concept 2: Comfort using high-fidelity simulation

The equipment and facility for HFS is not always available due to cost and availability of space to create a simulation environment effective enough to accommodate bigger classes. Facilities equipped with HFS manikins are not used optimally due to ‘fear of the unknown’ experienced by the nurse educators because of the nurse educator’s lack of training; and/or the lack of technological skills. Nurse educators expressed the need for technical support from experts and more available time in their programme to develop and plan simulation scenarios.

4.5.3 Key concept 3: Learning environment

Three sub-concepts were identified under key concept 3, e.g. safe environment, simulation setting, and knowledgeable accompaniment.

Sub-concept 3.1: Safe environment

Nurse educators are challenged with providing an engaging and motivating learning environment for clinical nursing education (Koivisto *et al.*, 2018:114). According to Eyikara and Baykara (2018:101), simulation provides an opportunity for student nurses to acquire experience in a safe environment by allowing them to make mistakes without causing harm to the patient. Al-Ghareeb and Cooper (2016:281) confirmed that simulation creates a safe environment where student nurses have the opportunity to practice and acquire knowledge and psychomotor skills. Berragan (2011:661) emphasises that the safe learning environment should be a structured and supportive environment.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“Simulation is a safe area for students. It develops their skills before they practice this on a patient.”

Participant 4 (42 years old; 9 years of experience as a nurse educator)

“You just have a better student in the sense of they’re more competent, they’re more secure. They are safe in their knowledge and skill.”

Participant 7 (53 years old; 15 years of experience as a nurse educator)

“In a sense give safety to the student for her to experiment and just get over her initial fear.”

Participant 11 (58 years old; 9 years of experience as a nurse educator)

“A safe environment, where my student can practice without feeling that they are putting a patient at risk. An environment where there is no judgement.”

Participant 12 (48 years old; 17 years of experience as a nurse educator)

“I think it’s got a safe environment where people can make mistakes.”

Sub-concept 3.2: Simulation setting

Student nurses gain confidence before providing patient care in the clinical practice through repeating practices in a more realistic learning environment where they can feel a pulse, observe chest movements, hear respiration sounds, measure blood pressure and evaluate results (Eyikara & Baykara, 2018:102). Koivisto *et al.* (2018:119) emphasised that through simulation, student nurses can practice identifying changes in patients’ clinical condition and recognising patient deterioration, and thus be more prepared for the real clinical situation after graduation. Zapko *et al.* (2018:29) agree by explaining that simulation as a teaching-learning method contributes to learning, development of competencies, safety, and self-confidence. Berragan (2011:660) states that the degree to which simulation depicts the real environment and equipment within which the student nurse is required to perform, is important as it can make the transition of the student nurse into the real setting as smooth as possible.

In supporting the literature, the participants stated:

Participant 1 (57 years old; 6 years of experience as a nurse educator)

“It will enhance the whole learning and training setup ... it reflects the real thing.”

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“Students view simulation as a much more appropriate way of learning skills before going to the actual clinical environment. Not all the procedures are available in the clinical environment”

Participant 5 (42 years old; 7 years of experience as a nurse educator)

“They practice on a manikin before going to the patient. The student will feel more confident.”

Participant 6 (59 years old; 29 years of experience as a nurse educator)

“I will say it’s a preparation for getting safe competent practitioners to get to go to the clinical setting.”

Participant 9 (48 years old; 5 years of experience as a nurse educator)

“The better the simulation environment the more accurate and competent the results will be for your student.”

Participant 12 (48 years old; 17 years of experience as a nurse educator)

“You can manipulate time. You can do demo, you can practice and you can assess.”

Sub-concept 3.3: Knowledgeable accompaniment

Several generations of student nurses are represented in classrooms and being taught by nurse educators from a different generation, thus placing pressure on nurse educators to change their way of teaching, including the use of technology (Erlam *et al.*, 2018:140). The authors state that in order to implement simulation as a teaching-learning strategy, educators need training in theory-based simulation methods (Erlam *et al.*, 2018:141). They identified a gap in simulation educator development along with resistance from nurse educators to change current delivery methods. Nurse educators should be skilled practitioners in order to integrate simulation appropriately into nursing programmes (Topping *et al.*, 2015:1109). According to Topping *et al.* (2015:1110), nurse educators should not just have knowledge of learning theories and how to integrate simulation into the curriculum, but should also demonstrate practical expertise and expert knowledge of the subject matter.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“You need to know exactly what you are talking about.”

Participant 5 (42 years old; 7 years of experience as a nurse educator)

“Facilitator is there to guide you.”

Participant 9 (48 years old; 5 years of experience as a nurse educator)

“Educators to know how to properly facilitate the HFS to ensure that we use it comprehensively to enable the students.”

Conclusion with regard to key concept 3: Learning environment

High-fidelity simulation is seen as a valuable training method in a safe environment where clinical skills are developed before the student nurse is exposed to the clinical environment. It enhances student nurses' confidence and competence, leading toward safe patient care. Nurse educators need to be hands-on and knowledgeable about HFS as a teaching method, demonstrating practical expertise and expert knowledge of the subject matter.

4.5.4 Key concept 4: Skill development

Three sub-concepts were identified under key concept 4, namely psychomotor skills, cognitive skills, and affective skills.

Sub-concept 4.1: Psychomotor skills

Zapko *et al.* (2018:28) state that clinical experiences often focus on tasks or skill performance. Due to more complex healthcare and difficulty in finding clinical placements for student nurses, simulation has been suggested as an alternative to face-to-face clinical experience (Zapko *et al.*, 2018:28). Eyikara and Baykara (2018:102) contend that by providing a realistic environment, simulation allows student nurses to improve their cognitive, affective and psychomotor skills and make fewer medical errors, thus contributing to the protection of the patients. Al-Ghareeb and Cooper (2016:281) state that nursing is a rehearsal profession in which student nurses are required to acquire numerous psychomotor skills through repeated practice to achieve the necessary skills during their education.

In supporting the literature, the participants stated:

Participant 1 (57 years old; 6 years of experience as a nurse educator)

“They will be hands-on after completion of their training.”

Participant 2 (59 years old; 12 years of experience as a nurse educator)

“Fill the gap where our students do not have the opportunity to either nurse patients with a particular condition or just because the patients are not being keen on being guinea pigs.”

Participant 4 (42 years old; 9 years of experience as a nurse educator)

“They will be better exposed and their skills will be much more advanced.”

Participant 17 (51 years old; 8 years of experience as a nurse educator)

“Some procedures such as invasive procedures, I do expect of them to be competent in first.”

Participant 18 (42 years old; 9 years of experience as a nurse educator)

“There must be improvement and competence in their skills and also it brings, you know, confidence.”

Sub-concept 4.2: Cognitive skills

Student nurses are expected to gain knowledge, critical thinking and psychomotor skills that will enable them to make clinical judgements about care and manage complex clinical situation (Al-Ghareeb & Cooper, 2016:281). Carter *et al.* (2018:169) agree with this statement stating that student nurses need well-developed cognitive skills to apply critical thinking in decision-making using intellectual independence. In the study done by Eyikara and Baykara (2018:103) on the effect of simulation on the ability of first-year student nurses to learn vital signs, they found that simulation improved the knowledge level of student nurses with regard to measuring blood pressure.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“High-fidelity simulation you are, you are definitely developing higher cognitive skills.”

Participant 5 (42 years old; 7 years of experience as a nurse educator)

“Improve their skills, umm and their knowledge because they are able to ask questions.”

Participant 6 (59 years old; 29 years of experience as a nurse educator)

“We know by doing, people develop more knowledge or gain more knowledge.”

Participant 15 (54 years old; 13 years of experience as a nurse educator)

“Set different type of scenarios for a student, so that you can test their knowledge. I think it can also assist in theoretical training, because now you get an enforcement of what you discussed maybe in a theoretical facilitation session.”

Sub-concept 4.3: Affective skills

The healthcare needs of a patient must always take priority over the education needs of the student nurse (Berragan, 2011:662), however, in simulation the student's needs are placed at the centre of attention. In a study done by Häggström *et al.* (2017:131) student nurses experienced the

lack of important human functions such as body language and facial expressions as a barrier to affective skill development in HFS training. Ensuring that simulation-based training addresses these affective issues is a key challenge for nurse educators (Berragan, 2011:662). According to Erlam *et al.* (2018:145) simulation can improve student nurses' current knowledge, skill performance, clinical judgement and affective skills if they receive the correct support including: 1) a facilitator in the simulation room, 2) supportive feedback, 3) role modelling of expected performance, 4) an opportunity to repeat their performance, and 5) communication tools.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

It will be difficult for a student to be able to empathise with the patient and reflect on what the patient is feeling when the patient is a manikin."

Participant 7 (53 years old; 15 years of experience as a nurse educator)

"Other students feel alienated from this doll and struggle to see it as a human being that can react and they know it's me speaking. So they constantly ignore the doll and speak to me."

Participant 8 (47 years old; 4 years of experience as a nurse educator)

"We must keep the one-to-one for especially the affective skills for the student. There is definitely a lack in interpersonal skills relationship ... patient relationship."

Participant 13 (62 years old; 30 years of experience as a nurse educator)

"If they never practice in the clinical setting themselves, then they cannot interact with a patient, because as the lecturer I speak for the doll, but I am telling the doll what I think the student should know."

Participant 17 (51 years old; 8 years of experience as a nurse educator)

"I have found, I don't know if it is because children don't play with dolls anymore so much and play with or interact with computer games, that they don't have the skill of playing doll."

Conclusion with regard to key concept 4: Skills development

High-fidelity simulation assists student nurses to obtain the necessary psychomotor and cognitive skills in a realistic environment that represents the clinical practice. It creates a safe environment for student nurses to practice their clinical skills as well as stimulating new knowledge through experiential learning. It can however not replace the real clinical practice. Affective skills should be learned and developed in the clinical setting through interaction with a patient.

4.5.5 Key concept 5: Theory-practice integration

Three sub-concepts were identified under key concept 5, namely benefits of integration of theory into practice, critical thinking, and teaching-learning methods.

Sub-concept 5.1: Benefits of integration of theory into practice

Student nurses should be able to transfer their theoretical knowledge during clinical practice (Botma, 2014:1). In the study conducted by Botma (2014:4) student nurses perceived simulation to be a tool that bridges the theory-practice gap. Bressington *et al.* (2018:47) state that theory-practice integration will only be possible if the learning environment (simulation) reflect the real-world. Simulation provides a safe environment where student nurses can experience different learning strategies that will allow them to integrate their knowledge and apply it to real patients (Eyikara & Baykara, 2018:101). Problem-based learning helps student nurses develop critical thinking to solve problems in their clinical setting, thus bridging the gap between theory and practice (Choi *et al.*, 2014:52).

In supporting the literature, the participants stated:

Participant 7 (53 years old; 15 years of experience as a nurse educator)

“You can combine your theoretical explanation with a practical demonstration. So it assists with theory, theory to the practice.”

Participant 14 (46 years old; 16 years of experience as a nurse educator)

“It provides room for integrating at a pace that the student can cope with and it’s more simulated, more real.”

Participant 15 (54 years old; 13 years of experience as a nurse educator)

“I think you can set up simulation scenarios, I don’t know if that is the correct word, to see how their theory-practice integration is.”

Participant 16 (44 years old; 4 years of experience as a nurse educator)

“Just, bringing theory and practice closer together.”

Participant 17 (51 years old; 8 years of experience as a nurse educator)

“I think we have students that are theoretically very strong, umm but maybe practically not that strong and I think that is a gap that can be breached with HFS.”

Sub-concept 5.2: Critical thinking

Botma (2014:1) contends that one of the characteristics of a competent nurse include the ability to think critically and to reason clinically in order to make sound clinical judgements by using learning strategies as case simulation as well as problem-based learning. Wosinski *et al.* (2018:67) explain that the healthcare context is very demanding on nurses as they are expected to develop complex clinical reasoning skills in order to solve clinical problems. These researchers believe that problem-based learning will prepare student nurses for clinical practice (Wosinski *et al.*, 2018:67) by letting student nurses solve problems during their clinical skills training, allowing them to integrate theory into practice. Koivisto *et al.* (2018:114) agree by suggesting that simulation-based learning can facilitate the acquisition of clinical reasoning skills because the student nurse reflects on her/his actions and discuss alternative actions. Peer review and feedback from the nurse educator will contribute to the enhancement of clinical reasoning skills.

In supporting the literature, the participants stated:

Participant 3 (41 years old; 10 years of experience as a nurse educator)

“It will create opportunities for students to develop their clinical skills as well as their critical thinking, clinical judgement. When you create a scenario you are allowing them to make decisions. So part of that decision-making process will end up in clinical judgement.”

Participant 10 (36 years old; 1 year experience as a nurse educator)

“It will help with the development of clinical judgement. It will help them with decision-making. “With problem solving, they have to think, but again I have to give them a proper scenario.”

Sub-concept 5.3: Teaching-learning methods

Eyikara and Baykara (2018:101), explain that nurses have to contend with rapid developmental changes in technology and a dynamic healthcare environment, thus the use of interactive learning methods to promote the learning experiences of student nurses is important. A variety of teaching methods are required in nursing education due to the different modalities of learning (visual, verbal, physical/kinaesthetic and auditory) (Buykx *et al.*, 2011:688). According to Eyikara and Baykara (2018:101), student nurses learn 10% of what they read, 20% of what they hear, 30% of what they see and 90% of what they hear, touch and tell. The integration of an interactive learning method, such as simulation in a nursing programme, is important as it results in the development of more qualified and skilled nursing practitioners (Eyikara & Baykara, 2018:106). Choi *et al.* (2014:52) contends that nurse educators should move away from traditional lectures and focus on student-centred methods of instruction, in which student nurses take responsibility for their own learning to enhance self-directed learning skills.

In supporting the literature, the participants stated:

Participant 9 (48 years old; 5 years of experience as a nurse educator)

“They use all types of learning as they go around. To collaborate all of that together, and having that visual and auditory together with the aesthetic.”

Participant 14 (46 years old; 16 years of experience as a nurse educator)

“To enhance teaching strategies.”

Participant 16 (44 years old; 4 years of experience as a nurse educator)

“It makes a lot more sense when you can actually visually see what the person is talking about. Be able to practice and I think more collaborative learning can take place. They can share their experiences a lot more.”

Participant 18 (42 years old; 9 years of experience as a nurse educator)

“For me it’s the visualising of everything that the student needs to know.”

Participant 19 (34 years old; 5 years of experience as a nurse educator)

“Most of the nursing students is visual learners.”

Conclusion with regard to key concept 5: Theory practice integration

High-fidelity simulation makes use of teaching-learning methods where student nurses can enhance their clinical judgement and problem-solving skills by engaging with a dynamic learning environment. It integrates theory into practice through a hands-on approach where student nurses exercise solving patient problems during HFS case studies which empower the student to be able to integrate their theoretical knowledge in the clinical practice by solving problems using their reasoning skills as well as reflection on nursing care done. It is a valuable teaching method to assist student nurses to develop their critical thinking skills, which would be evident in the student nurse’ ability to assess, identify and plan nursing action according to the patient’s needs and diagnoses. The student nurse should be able to immediately identify any abnormality presented in the patient as well as acting fast in order to prevent complications by implementing meaningful actions.

4.6 RIGOUR

The rigour for objective 2 was discussed in detail in Chapter 2 (objective 2 (par f)).

4.7 SUMMARY

In Chapter 4, objective 2 explored and described the views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes at a SAPHEI. It became evident that the nurse educators at a SAPHEI have not been exposed or have limited experience with HFS. This might be due to limited recourses or the lack of nurse educators having had training in HFS. The nurse educators agreed that HFS can contribute to the enhancement of student nurses' cognitive, affective and psychomotor skills while practicing their clinical skills in a safe environment. This dynamic learning environment can contribute to the development of critical thinking skills or clinical judgement if used optimally through teaching-learning methods,

In Chapter 5 the conceptual framework for the development of a practice model to implement HFS will be described.

CHAPTER 5

CONCEPTUAL FRAMEWORK

(Phase 1: Step 2)

5.1 INTRODUCTION

The conceptual framework of the research study is presented in this chapter following the identification of the concepts from the empirical data, concept classification, and the in-depth literature review. This chapter also indicates the beginning of step 2 of phase 1 to address the following objective:

Objective 3: To describe a conceptual framework for the development of a practice model to implement high-fidelity simulation (HFS) in the nursing programmes of a South African private higher education institution (SAPHEI).

Mouton and Marais (1996:136) explain that concepts are structured in certain types of statements and that these statements are arranged according to regulative interests or orientations to form a conceptual framework, which can be presented as a model.

In phase 1, step 2, a conceptual framework for the development of a practice model to implement HFS in the nursing programmes of a SAPHEI was described. All the information gathered from objectives 1 and 2 as well as a literature review were used to develop and describe the conceptual framework.

As explained by Chinn and Kramer (2011) and Walker and Avant (2011), the steps to develop a conceptual framework are:

1. Selecting and defining concepts;
2. Developing statements relating the concepts;
3. Expressing the statements hierarchically; and
4. Developing a conceptual map that expresses the framework.

Concepts were selected for the framework based on their relevance to the phenomenon. The statement of the problem, which describes the phenomenon, is a rich source of concepts for the framework. Each concept included in the framework was defined conceptually (Chinn & Kramer, 2011:164).

The next step in the framework development was to link all the concepts through relational statements by providing evidence from the literature for the validity of each relational statement whenever available (Creswell, 2014:97; Mouton & Marais, 1996:139). The last step was to construct a conceptual map and the steps indicated were followed for the development of the conceptual map (Burns & Grove, 2009:149-150):

1. Arrange the concepts on the page in a sequence of occurrence (or causal linkage) from left to right, with the concepts reflecting the outcomes located on the far right;
2. Using arrows, link the concepts in a way that is consistent with the statement diagrams that were previously developed;
3. Examine the map for completeness.

The above steps will be discussed throughout this chapter.

An outline of constructivist theory and HFS, as a means of positioning the practice model that evolved in this research study, will be discussed subsequently.

5.2 CONSTRUCTIVIST THEORY AND HIGH-FIDELITY SIMULATION AS A PHILOSOPHICAL UNDERPINNING TO TEACHING AND LEARNING

The philosophical underpinning to the practice model's teaching and learning, namely constructivist theory and HFS will now be discussed.

5.2.1 Constructivist theory

The essence of constructivist theory is the idea that student nurses will create their reality or interpretation of their day-to-day experiences, thus constructing knowledge within the framework of their own experience (Kretchmar, 2015:1). Knowledge, from a constructivist perspective, is not a representation of external reality or objective truth, but rather is 'truthful' to the extent that it is viable and adaptive (Kretchmar, 2015:2). Constructivism asserts that one sees the world through previous experiences and therefore a student is not seen as a blank slate (Kretchmar, 2015:2). Everything they experience in a classroom is interpreted in the light of what they already know. As a result, nurse educators should recognise that student nurses possess knowledge and they should use that source of knowledge to build on new understandings as an active participant in this process (Kretchmar, 2015:2). Constructivism is therefore seen as a student-centred approach. The implication for nursing education is that nurse educators cannot use traditional teaching methods because lecture-based classrooms do not acknowledge the student nurse as either active or as an individual with pre-established cognitive structures (Kretchmar, 2015:2). The nurse educator as a facilitator is responsible for creating a conducive learning environment within which learning will be

facilitated (Klopper, 2009:14). These student nurses are adult learners and they take responsibility for their learning as they are generally self-motivated, goal orientated and relevancy orientated (Botma *et al.*, 2014:79).

Facilitation of student nurses' learning requires constant interaction between the nurse educator and the student nurse. Interaction between the nurse educator and the student nurse is based on reflection and this requires dialogue (exchanging ideas by employing reflection), discourse (discussion, debating) and narrative (relating a series of events within a specific context). The aim of both is to strive towards deep-holistic lifelong learning. The nurse educator focuses on the student nurse and on methods to create a situation whereby the student nurse can build on his/her current knowledge by practising new skills (Klopper, 2009:14).

Learning implies a qualitative change in a person's view of reality. Each individual creates his/her own reality or interpretation of day-to-day experiences. The model for constructivist learning (Klopper, 2009) supports this view of learning as an assumption. Learning is the process whereby knowledge is created through the transformation of experience (Lisko & O'Dell, 2010:106). Student nurses construct knowledge within the framework of their present and past experiences. The nurse educator (facilitator) is responsible for creating a learning environment where the student nurse can gain new experiences by interacting with this environment. The nurse educator's role is supportive and he/she acts as a facilitator of learning leading towards an interactive process between the nurse educator (facilitator) and the student nurse (Klopper, 2009).

As already stated in Chapter 1, the researcher utilises the cognitive theorists' beliefs that are based upon several core assumptions (Kretchmar, 2015:2-3; Dudovskiy, 2014:1; Clapper, 2010:7; Bland *et al.*, 2011-664; Botma *et al.*, 2014:18):

- Learning as an active process; student nurses actively construct knowledge and therefore knowledge is not passively accumulated;
- That student nurses' understanding is formed by reflecting on their present and past personal experiences, which allows them to relate new knowledge into the knowledge that they already have;
- That the meaningfulness of knowledge determines how well it can be applied in new situations;
- That student nurses' motivation, personality, intelligence, learning styles and expectations can impact the learning process;
- The importance of social interaction and collaboration in the learning process; and

- That positive reinforcement in the form of support, encouragement and feedback will enhance a change in behaviour that will lead to new knowledge generation and clinical competence.

As a summary it can be stated that constructivist emphasised the interactive relationship between the student nurse and his/her conducive teaching-learning environment/situation, the active role the student nurse plays in the co-construction of knowledge, and the significance of social, cultural and historical influences on the construction of knowledge (Kretchmar, 2015:3).

5.2.2 High-fidelity simulation

High-fidelity simulation can be defined as a complex, realistic and interactively challenging experience enhanced by the use of programmed manikins that present abnormal or normal breathing sounds and patterns, heart sounds, pulses, bowel sounds and computer-generated dialogues that provide subjective data (Billings & Halstead, 2009:323; Grant & Cheng, 2016:232). This simulation environment mimics the real world with real patient problems where student nurses can better integrate theory and practice principles (Bambi *et al.*, 2009:79). Collaboration between the nurse educator and the student nurse occur in such an environment (Berragan, 2011:662) where the student nurse is an active participant in his/her learning experience (Kretchmar, 2015:2). The nurse educator plays an active role in facilitating the implementation and the use of HFS as she/he must create scenarios and program the equipment to simulate serious and real-life clinical settings, thus the responsibility to create new experiences for student nurses in a safe environment.

Simulation training was added to the traditional models of learning in an attempt to enhance cognitive learning and improve clinical competence (Nehring & Lashley, 2016:528). Over the past 20 years, there has been a steady growth in simulation as a clinical teaching-learning method in nursing education (Garden *et al.*, 2015:300). Learning occurs when the student nurse makes sense of the simulated experience and develops new understanding, skills and practices as a consequence (Nestel & Bearman, 2015:35). An important step for HFS to be effective is for the nurse educator to develop evidence-based clinical simulation scenarios and guidelines (Waxman, 2010:29). The focus on a realistic patient scenario facilitates the inclusion of clinical and interactive skills (Berragan, 2011:660). Berragan (2011:660) emphasises the importance of creating a simulated environment that depicts the real clinical environment by using the correct equipment, thus creating an environment, which the student nurse is required to work in. This can play an essential part in making the transition to the real setting as smooth as possible to reduce the reality shock when entering a clinical practice (Berragan, 2011:660). The successful implementation of simulation training depends on the support of nurse educators (Jones, 2005:4) and the interactive support given to the student nurse by the nurse educators in the form of encouragement and constructive feedback (Berragan, 2011:661).

A HFS creates a safe and supportive environment where the student nurse can experience 'the real world' allowing them to form lived experience that will construct new personal knowledge enhancing their clinical skills (Botma *et al.*, 2014:79). The implementation of simulation into a curriculum will be challenging, but will enable student nurses to develop competence in clinical skills (Berragan, 2011:661).

5.3 PROCESS OF IDENTIFICATION OF CONCEPTS

The method used to identify the key concepts and sub-concepts was justified with literature primarily from Hsieh and Shannon (2005), Mouton and Marais (1996), Walker and Avant (2011) and Chin and Kramer (2011). The key concepts and sub-concepts emerged from the participants' responses in chapters 3 and 4. An in-depth review was done to ensure consistency and congruency in the process of identifying concepts:

- Mouton and Marais (1996:126) defined concepts as "the most elementary symbolic constructions by means of which people classify or categorize reality". A concept is, therefore, a symbol of meaning. Chinn and Kramer (2011:158) defined a concept as a complex mental formulation of experience or perceptions of the world. Walker and Avant (2011:59) agree that a concept is a mental image of a phenomenon. According to Chinn and Kramer (2011:188) concepts are identified by searching out words or group of words that represent objects, properties, or events within the theory.
- The concepts synthesis was based on empirical evidence obtained by quantitative and qualitative evidence (chapters 3 and 4) and literature (Walker & Avant, 2011:107). Key concepts and sub-concepts were identified during phase 1, step 1 (chapters 3 and 4) by using a direct content analysis approach (Hsieh & Shannon, 2005:1281). Each key concept and sub-concept was described and concluding statements formulated in Chapter 4.
- The concluding statement of each key concept was read to identify what has emerged in the summary and how related action is described therein (Mouton & Marais, 1996:7).
- A list was generated that tentatively identifies key- and sub-concepts that appear to be interrelated (Chinn & Kramer, 2011:188).
- The list of tentative key- and sub-concepts was correlated with the list identified in Chapter 4. These key- and sub-concepts were reviewed by asking questions about the nature of the concepts and their interrelated organisation (Chinn & Kramer, 2011:188).
- From these lists of concepts a combined list was made with tentative key- and sub-concepts. Key concepts were highlighted in one colour and related sub-concepts were highlighted with a

different colour. The key- and sub-concepts were evaluated to determine if they constituted a single related entity by their relationships and interrelationships (Chinn & Kramer, 2011:188). This process is referred to as identifying “major concepts” with “sub-concepts” (Chinn & Kramer, 2011:188).

- A revised list of key- and sub-concepts was generated and further reviewed to ensure rigour in the finalisation of the concepts and to confirm the identification of the key- and sub-concepts. Mouton and Marais (1996:126) suggested that each concept should be described by their meaning, namely connotation and denotation.
 - **Connotations** of concepts refer to its subjective meaning (theoretical connotation), which should be clearly articulated and unambiguous; and
 - **Denotations** of concepts refer to statements about the characteristics, actions, behaviours or processes that are linked to the phenomenon under study, which should be related and be an accurate reference of the connotations (operational connotation).

In the finalisation of the list of key- and sub-concepts that are identified, Chinn and Kramer (2011:188) advised to focus on the qualitative features of the concepts and not the number of main and related concepts, to ensure that the central idea that links the identified concepts is consistent.

Table 5.1 and Table 5.2 represents the outcome of the above method of concept identification with the listed empirical concepts that were identified in chapters 3 and 4 (refer to the results of objectives 1 and 2).

Table 5-1: Conclusion statements of key concepts

CONCLUSION STATEMENTS OF KEY CONCEPTS
1. The nurse educators have not been exposed or have limited experience using HFS as a teaching method.
2. The nurse educators do not have the available equipment or do not use it optimally.
3. The equipment currently used in the simulation environment is low-fidelity and not high-fidelity manikins.
4. The equipment and facility for HFS are not always available due to the cost and availability of space.
5. The environment is not big enough to accommodate bigger classes.

CONCLUSION STATEMENTS OF KEY CONCEPTS

6. Facilities equipped with high-fidelity manikins are not used optimally due to 'fear of the unknown'; the nurse educator's lack of training; or technological skills.
7. Technical support is needed with regard to the setup of the technology and maintaining it.
8. Nurse educators do not have enough time for developing and planning scenarios for HFS.
9. High-fidelity simulation is seen as a valuable training method in a safe environment where clinical skills are developed before the student nurse is exposed to the clinical environment and work with a patient.
10. It enhances student nurses' confidence and competence leading toward safe patient care.
11. The nurse educator needs to be hands-on and knowledgeable about HFS as a teaching method, demonstrating practical expertise and expert knowledge of the subject matter.
12. High-fidelity simulation assists student nurses to obtain the necessary psychomotor and cognitive skills in a realistic environment that represent the clinical practice.
13. It creates a safe environment for student nurses to practice their clinical skills as well as stimulating new knowledge through experiential learning.
14. High-fidelity simulation cannot replace real-life patients in clinical practice.
15. Affective skills should be learned and developed in the clinical setting through interaction with a patient.
16. High-fidelity simulation makes use of a teaching-learning method where student nurses can enhance their clinical judgement and problem-solving skills.
17. High-fidelity simulation integrates theory into practice through a hands-on approach.
18. High-fidelity simulation is a valuable teaching method to assist the nursing student to develop critical thinking skills.

Table 5-2: Concept identification from empirical data

CONCEPTS IDENTIFIED	CONCLUSION STATEMENTS (TABLE 5-1)
<p>HIGH-FIDELITY SIMULATION</p> <ul style="list-style-type: none"> • Equipment • Environment/simulation room • Financial restrains • Technical support • Preparation (not replacement) • Teaching-learning methods • Theory practice integration • Clinical judgement 	<p>(Table 5.1: Statements 2-5, 7, 9-10, 13-18)</p> <ul style="list-style-type: none"> • The nurse educators do not have the available equipment or do not use it optimally. • The equipment currently used in the simulation environment is low-fidelity and not high-fidelity manikins. • The equipment and facility for HFS are not always available due to the cost and availability of space. • The environment is not big enough to accommodate bigger classes. • Technical support is needed with regard to the setup of the technology and maintaining it. • High-fidelity simulation is seen as a valuable training method in a safe environment where clinical skills are developed before the student nurse is exposed to the clinical environment and work with a patient. • It enhances student nurses' confidence and competence leading toward safe patient care. • It creates a safe environment for student nurses to practice their clinical skills as well as stimulating new knowledge through experiential learning. • High-fidelity simulation cannot replace real-life patients in clinical practice. • Affective skills should be learned and developed in the clinical setting through interaction with a patient.

CONCEPTS IDENTIFIED	CONCLUSION STATEMENTS (TABLE 5-1)
	<ul style="list-style-type: none"> • High-fidelity simulation makes use of a teaching-learning method where student nurses can enhance their clinical judgement and problem-solving skills. • High-fidelity simulation integrates theory into practice through a hands-on approach. • High-fidelity simulation is a valuable teaching method to assist the nursing student to develop critical thinking skills.
<p>NURSE EDUCATOR</p> <ul style="list-style-type: none"> • Training / exposure • Planning / time • Knowledgeable • Active facilitator 	<p>(Table 5.1: Statements 1, 6, 8, 11)</p> <ul style="list-style-type: none"> • The nurse educators have not been exposed or have limited experience using HFS as a teaching method. • Facilities equipped with high-fidelity manikins are not used optimally due to 'fear of the unknown'; the nurse educator's lack of training; or technological skills. • Nurse educators do not have enough time for developing and planning scenarios for HFS. • The nurse educator needs to be hands-on and knowledgeable about HFS as a teaching method, demonstrating practical expertise and expert knowledge of the subject matter.

CONCEPTS IDENTIFIED	CONCLUSION STATEMENTS (TABLE 5-1)
<p>STUDENT NURSE</p> <ul style="list-style-type: none"> • Psychomotor skills • Patient safety • Competence • Confidence • Cognitive skills • Active participant • Affective skills • Critical thinking skills 	<p>(Table 5.1: Statements 9, 10, 12-13, 15-16)</p> <ul style="list-style-type: none"> • High-fidelity simulation is seen as a valuable training method in a safe environment where clinical skills are developed before the student nurse is exposed to the clinical environment and work with a patient. • It enhances student nurses' confidence and competence leading toward safe patient care. • High-fidelity simulation assists student nurses to obtain the necessary psychomotor and cognitive skills in a realistic environment that represent the clinical practice. • It creates a safe environment for student nurses to practice their clinical skills as well as stimulating new knowledge through experiential learning. • Affective skills should be learned and developed in the clinical setting through interaction with a patient. • High-fidelity simulation makes use of a teaching-learning method where student nurses can enhance their clinical judgement and problem-solving skills.

5.4 THE PROCESS OF CONCEPT CLASSIFICATION

The researcher utilised the work of Dickoff *et al.* (1968) for the concept classification. According to Dickoff *et al.* (1968:415), theory is born in practice, refined in research and must return to practice. The researcher used the work of Dickoff *et al.* (1968) due to their explanation of isolating concepts within the practice arena, which is applicable to achieve the aim of this research study.

This research study aimed to develop a practice model aligned to the level of theory development as explained by Dickoff *et al.* (1968). Dickoff *et al.* (1968:421) refer to three essential components on the nature of a situation-producing theory. These are:

- Goal content must be specific as the aim of the activity;
- Prescriptions for an activity to realise the goal content; and
- A survey list to classify the activities or elements aimed at achieving the goal content.

The goal was to develop a practice model for nurse educators at a SAPHEI, to facilitate the implementation of HFS as a teaching-learning method in a nursing curriculum and thus enhancing clinical skills development of student nurses. The nurse educator is an active participant in facilitating the high-fidelity teaching method and therefore the researcher explored and described the nurse educator's use of and experience as well as their views/assumptions and beliefs regarding HFS as a teaching method in a nursing curriculum.

In this research study, activities and elements were represented by and have been identified as concepts arising from empirical data related to HFS as a teaching method and therefore the survey list was justified as appropriate and relevant for use in classifying the emerging concepts.

To support the process of concept classification, Dickoff *et al.* (1968:421) call attention to the following two actions:

- A survey list must be used to group factors, aspects of activity and facets that are found to be relevant to achieve conditions in practise that are simple and complex but that are still at the conceptual level without a relational statement; and
- Knowledge obtained through a literature review should be used to appraise the concepts at whatever level deemed necessary or as a possibility for achieving the overall aim of producing a practice model.

The purpose of using a survey list is to articulate a conceptual awareness in a situation-producing theory. The goal content that caused the initial activity and the prescriptions of activity to understand the goal content are not necessarily elements of the practice model that emerges.

Therefore the need to use the survey list to classify concepts so that all related and significant characteristics are studied as to how activities and features adjust distinctively within a particular situation to realise the goal content (Dickoff *et al.*, 1968:421).

The survey list used the following six modified questions for concept classification about activities and their features (Dickoff *et al.*, 1968:422-423):

1. Agent: Who or what performs the activity?
2. Recipient: Who or what benefits from the activity?
3. Context: In what context is the activity performed?
4. Target/Goal (Terminus): What is the targeted outcome of the activity?
5. Procedure: What is the procedure, protocol or technique of the activity?
6. Dynamics: What is the energy source for the activity?

Figure 5.1 illustrates the coherent generation by use of deductive logic from concept identification to concept classification using the modified survey list of Dickoff *et al.* (1968). A discussion of the outline follows to articulate the application of the process to concept classification in this research study.

Concepts Identified (from the empirical data)	Arrows illustrating logic arrangement from concept identification to classification	Concept classification (using the survey list from Dickoff <i>et al.</i> , 1968:423)
HIGH-FIDELITY SIMULATION Equipment Environment/simulation room Financial constrains Technical support Preparation (not replacement) Teaching-learning methods Theory-practice integration Clinical judgement		Agent: Nurse educator
NURSE EDUCATOR Training/exposure Planning/time Knowledgeable Active facilitator		Recipient: Student nurse
STUDENT NURSE Skills: psychomotor, cognitive, affective and critical thinking skills Patient safety Competence Confidence Active participant		Context: High-fidelity simulation as a teaching–learning method at a SAPHEI
		Goal: Clinical skills development through the use of HFS as a teaching-learning method to facilitate critical thinking skills and clinical judgement
		Procedure: High-fidelity simulation embedded in constructivist theoretical framework
		Dynamic: Collaboration

Figure 5-1: Illustration of concept identification and concept classification using the modified survey list from Dickoff *et al.* (1968:423).

Figure adapted from Bodrick (2012:201).

5.4.1 Agent: Nurse Educator

Dickoff *et al.* (1968:425) indicate that the agent can be a person or point of service that carries out activities within an organisation. The nature of the agent stimulates activities that are creative, constructive and significant within the performance that is aimed at goal achievement. The agent in this research study is the nurse educator who facilitates theoretical and clinical components of a nursing curriculum at a SAPHEI. He/she is an active participant in the process of ensuring the clinical competence of student nurses through the facilitation of theory-practice integration and deep-holistic lifelong learning. The term nurse educator used in this research study includes nurse educators, learning and development facilitators, and clinical facilitators (chapter 1, 1.2.2).

5.4.2 Recipient: Student nurse

The recipient according to Dickoff *et al.* (1968:427) can be any person or an unspecified object that is the receiver of the activity by the agent. Interestingly, it is noted that the recipient is not passive in receiving the agent's activity because there always is a reaction, although perhaps not perceived by the agent. The recipient in this research study is the student nurse who is an adult learner and affiliated with a SAPHEI.

5.4.3 Context: High-fidelity simulation as a teaching-learning method at a South African private higher education institution

Dickoff *et al.* (1968:428) refer to the context as including the setting, location, the physical structure of the classroom, time, space or structure that constitute different elements of the situation in which the activity occurs. They noted that the physical elements are arranged in a manner to support a student-centred approach that unifies all activities in which the nurse educators as agents are functioning towards the goal for the benefit of the student nurse as the recipient. High-fidelity simulation at a SAPHEI is the context in this research study where the interactive teaching-learning activities are happening.

5.4.4 Goal: Clinical skills development through the use of high-fidelity simulation as a teaching-learning method to facilitate critical thinking skills and clinical judgement

Dickoff *et al.* (1968:428) referred to the goal as the endpoint ('terminus') of the activity whereby it is accomplished. The authors (Dickoff *et al.*, 1968:428) expand on the characteristics of the goal as unifying all activities as achievable through organisation and structure so that the agent acts by visualising the end product. They elaborate on visualising the goal whereby it facilitates the performance of the agent to consider how best to describe an activity's endpoint (Dickoff *et al.*, 1968:430). The goal in the research study is clinical skills development of student nurses through

the use of HFS as a teaching-learning method to facilitate critical thinking skills and clinical judgement.

5.4.5 Procedure: High-fidelity simulation embedded in a constructivist theoretical framework

Dickoff *et al.* (1968:430) view the procedure as features along a path and/or emphasis of steps, instructions or patterns on how the activity is to be performed. The procedure includes principles, sets of rules, routine or particular features that contribute a series of actions aimed at the goal that is to the advantage of the recipient (Dickoff *et al.*, 1968:430). Although the procedure does not determine the activities in detail, it offers to guide or safeguard phenomena such as procedures and the teaching-learning method within a SAPHEI. The procedure in this research study is HFS embedded in constructivist theory.

5.4.6 Dynamic: Collaboration

The dynamics are taken by Dickoff *et al.* (1968:431) to comprise of the impact of influence as an energy origin and an attribute associated with the capacity to execute activities. The possible origin or functioning could be physical, physiological or psychological and is relevant only to persons functioning as agents, recipients, or within the context. In relation to merely functioning, Dickoff *et al.* (1968:431) specify that it must be purposeful, goal-directed, and be driven by impetus or direction. For the dynamics in this research study, collaboration is essential for propelling the activity to goal attainment.

5.5 CONDUCTING A LITERATURE REVIEW TO SUPPORT THE CONCEPTUAL FRAMEWORK

Dickoff *et al.* (1968:546) refer to a literature review as embracing openness to relevant empirical reality as it exists in the literature and/or evidence. Before an in-depth discussion of each concept concerning the reviewed literature was undertaken, a search strategy approach was used for conducting the literature search in support of the conceptual framework.

Polit and Beck (2017:661) support this notion that is based on rapid technological and electronic advances, whereby the focus is not on finding information but how the access to information is performed logically. They highlighted four approaches (Polit & Beck, 2017:90), namely:

- Searching for references in bibliographic databases;
- Using references cited in relevant studies to track down earlier research on the same topic (ancestry approach); and

- Finding a pivotal early study and search forward in citations indexes to find more recent studies (descendancy approach).

The researcher integrated the three approaches above with the three modified principles by Silverman and Marvasti (2008:368) for application during the literature review:

- Broad-mindedness in pursuit of literature that embraces classical/earlier work whereby a connection is shown in transmitting old knowledge to create new knowledge that embraces scholarship heritage within a professional discipline;
- Being focused and critical while exploring the literature with a sense of scholarship to advance knowledge by employing a critical perspective; and
- Avoiding mere description in the use of literature by upholding the purpose of the literature review by balancing topics that are central to the research focus with the aim of critique and support instead of reporting.

In this research study, the process of the literature review was informed by the above approaches and principles and was set out in the steps described in Table 5.3 that embraces combinations of work by Creswell (2014:97), Silverman and Marvasti (2008:365), and Holloway and Wheeler (2010:35).

Table 5-3: Steps used in the process of literature searching and review

Step	Activities for engagement for each step
1	Identify keywords that relate to the search topic
2	From initial scanning, identify further recurring concepts or words that are reoccurring in the literature abstracts
3	Define the keywords and concepts using dictionaries or the glossaries of textbooks
4	Finalise the search profile including the scope of the search and parameters
5	Use search engines of electronic literature sources, select publications that have supportive and non-supportive contributions on the search topics, keywords and concepts
6	Review the selected literature specifically for: <ul style="list-style-type: none"> • perspectives that discuss key concepts;

Step	Activities for engagement for each step
	<ul style="list-style-type: none"> • clear descriptions for the research approaches used; • defined theoretical components; and • expert opinions
7	Consider the analysis of the selected literature within the specified and related context of the research study
8	<p>While analysing literature be aware of:</p> <ul style="list-style-type: none"> • areas that would require further clarification or more research; • gaps in knowledge or unanswered questions; • controversy or inconsistency in the literature; • aspects from experience or logic that are possibly relevant to the phenomenon under study; and • perspectives that are common or uncommon in occurrence
9	Make a judgement on the elements that are analysed, then utilise them to generate justifications and arguments using deductive and inductive reasoning about the points of focus
10	Synthesise the ideas by combining points, opinions and arguments into a logical complex whole that integrates judgement and theory into a single flow of reasoning in response to the dimensions of the search topics that comprise the keywords and concepts

The specialised electronic search engines that were used in this research study included MEDLINE, CINAHL, EBSCO host and ProQuest. Multiple Boolean operators of the 'AND', 'OR' and 'NOT' functions were used that included keywords and concepts in a recognisable arrangement for an advanced level of searching. During the literature review process the researcher noted the experts who were repeatedly quoted by authors, thus leading to the activity of purchasing and borrowing a wide range of textbooks on a mixed-methods of qualitative and quantitative research, theory development in nursing and other relevant topics associated with the practice of nursing, nursing education, and research and HFS. Parallel acquisitions of dictionaries of the English language and thesauri were attained, which were helpful in the analysis of the literature and the synthesis of arguments.

The literature search strategy was not exclusive to the conceptual framework, but was used in the early design and conceptual stage of this research study, during data collection and data analysis in the results phase, which included the conceptual framework and model development and description. Chinn and Kramer (2011:222), assert that in theory-generating research the literature review is a comprehensive and continues process. They suggest that as concepts emerge from the data, the researcher uses the data to guide further explorations in the literature, which contribute to the model development process of refining and describing central concepts and the relationships between them.

Walker and Avant (2011:110) state that a careful examination of literature is required and termed it as a literary synthesis aimed at acquiring new insights about phenomena. They offer two techniques within literary methods for statement synthesis in theory construction (Walker & Avant, 2011:133):

- Making the meanings of the concepts included in a statement more general; or
- Expanding the boundaries to include a wider variety of situations.

The approaches above were used in the literature searches and review to converge the requirements of a conceptual framework developed from the concepts that were derived from the empirical data obtained in this research study. Mouton and Marais (1996:136) refer to a conceptual framework as functional for the classification of characteristics of the phenomenon being studied. The three major characteristics in Table 5.4 that follows were used to guide the activity of generating a conceptual framework.

Table 5-4: Defining characteristics of a conceptual framework and related activities

Major characteristics	Activities of engagement
1. Description of the ideal type as a basic unit of typology	<ul style="list-style-type: none"> • Exclusion of insignificant or incidental characteristics • Retention of the most common or outstanding characteristics by abstraction from the most concrete levels of experience to the most abstract • Identification of the most common characteristics and emphasise the specific

Major characteristics	Activities of engagement
2. Consequence of abstraction in that no single type of characteristic of the phenomenon can be exactly reproduced	<ul style="list-style-type: none"> • Validation of the process of selection by the uniqueness of abstraction • Involvement of references of abstraction and the relationship that combines the concept and the typified phenomenon
3. Criteria for good classification, which are exhaustiveness and mutual exclusiveness	<ul style="list-style-type: none"> • Inclusion of all the relevant characteristics associated with the phenomenon • Distinction of difference between characteristics by mutual exclusiveness • Where overlapping is noted, a further process of refinement occurs for distinctiveness

(Mouton & Marais, 1996:137)

Mouton and Marais (1996:137) state that the identification of the above major characteristics contributes to a conceptual framework in which phenomena are classified in terms of their concepts. Polit and Beck (2017:119) support the definition of a conceptual framework adding that the concepts are arranged by virtue of their relevance to a common theme.

The following sections provide an in-depth literature-based description of each of the classified concepts according to their order on the previous survey list as shown in Figure 5.1, and a discussion in section 5.4 on concept classification. Each of the classified concepts will also be displayed visually after each section to show the building of the conceptual framework for the implementation of HFS in the nursing programmes at a SAPHEI (refer to Figures 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7).

5.6 AGENT: NURSE EDUCATOR

To identify the nurse educator as an agent for facilitating HFS at a SAPHEI, it is necessary to determine the professional foundations of this role.

5.6.1 Nurse educator

In this research study, the nurse educator is a qualified registered nurse with an additional qualification in nursing education that will facilitate clinical and theoretical teaching-learning method

for student nurses at a SAPHEI as described in Chapter 1. Therefore, a nurse educator can be defined as a qualified person skilled in transferring knowledge on nursing as well as an administrator in education (Oxford advanced learner's dictionary, 2010:1009; Merriam-Webster online dictionary, 2016).

According to Bruce *et al.* (2011:14) a nurse educator facilitates, guides, assists and gives 'means to learn' to student nurses for them to learn the art and science of nursing and thus apply theory into practice. This view is shared by Botma *et al.* (2014:340) in addition to their view that a nurse educator's task is to motivate, provide examples and discuss, support and challenge student nurses using a constructivist learning approach.

5.6.2 Characteristics and skills of an educator

Bruce *et al.* (2011:107) accentuate the important role that the nurse educator plays in the development of a student nurse. Depending on the competence, attitude, approach and skill of a nurse educator, he/she can either promote or discourage learning.

Klopper (2001:22) describes the following characteristics and skills of an effective nurse educator:

- The ability to establish a motivating climate for learning;
- Knowledgeable and skilled in the best teaching strategies to facilitate clinical skills development;
- Involve student nurses to participate in the planning and implementation of learning experience;
- The ability to evaluate and improve teaching strategies and learning programmes; and
- Implement suitable evaluation procedures and give constructive feedback.

Bruce *et al.* (2011:108-110) grouped the characteristics in four main areas:

- **Knowledge and clinical competence:** Knowledge is continuous, lifelong learning and it is important for nurse educators to improve their knowledge and understanding not exclusively focused on their clinical discipline and theoretical modules, but including facilitation skills and teaching-learning methods.
- **Teaching of skills:** Teaching of skills involves diagnosing learning needs, planning learning experiences, presenting information in an organised way, facilitating deep-holistic learning, and assessing and evaluating learning. Motivation and constructive feedback are important aspects.

- **Relationship with student nurses:** Commitment to teaching-learning is an important aspect of being a nurse educator. To ensure a good interactive relationship with a student nurse, a nurse educator should have compassion and patience with student nurses. Mutual trust and respect, and support and encouragement form part of a good relationship between a nurse educator and student nurse.
- **Personal characteristics:** Studies of educator behaviour that facilitates learning showed that the following characteristics are important for successful learning: confidence in themselves and their student nurses; being dynamic and enthusiastic, being fair, open-minded and non-judgemental, display a sense of humour, admitting to mistakes and limitations, being co-operative and patient, and being flexible.

Botma *et al.* (2014:50) concur with the above-mentioned characteristics and skills and added that in a simulation environment the nurse educator must function as a coordinator of learning resources and activities as well as being a learning facilitator. According to Botma *et al.* (2014:50), the facilitator should:

- Enhance the learning experience by the use of technology;
- Let student nurses construct and acquire new knowledge;
- Assist student nurses to make connections between facts;
- Facilitate the formation of new understanding; and
- Create curiosity for self-directed exploration.

Teaching practice changed dramatically from a teacher-centred paradigm to a learning-centred paradigm, thus influencing the role of a nurse educator from a traditional role as being the main source of knowledge to one of facilitating learning (Hugo & Fakude, 2015:124). Hugo and Fakude (2015:124) explain the change by emphasising that the nurse educator's new role includes:

- To design conducive teaching-learning environments and opportunities;
- Collaboration and interaction between nurse educators and student nurses improve teamwork; and
- Nurse educators facilitate the development of student nurses' competencies and abilities.

5.6.3 Conclusion statement on the agent: nurse educator

The following deductive conclusion statements relate to the agent concept of the nurse educator:

- The nurse educator is a person who facilitates clinical skills development of student nurses at a SAPHEI.
- The nurse educator's attitude towards student nurses consists of compassionate, respectful, fair and non-judgemental acknowledgement of the uniqueness of each student nurse to ensure effective teaching-learning to take place.
- The characteristics and skills of an effective educator are to be knowledgeable, clinical competent, organised, share information/interact and collaborate, patience and co-operative, to support and encourage others with confidence, to be dynamic and enthusiastic, have a sense of humour, admitting mistakes and limitations and to be flexible to promote effective implementation and facilitation of HFS as a teaching-learning method to improve the clinical skills development of student nurses.

The nurse educator as the agent is displayed visually in Figure 5.2 below.



Figure 5-2: A nurse educator as an agent for the implementation of high-fidelity simulation at a South African private higher education institution

5.7 RECIPIENT: STUDENT NURSE

The Oxford advanced learner's dictionary (2010:1484) defines a student as a person who is studying at a university or college to enter a particular profession. In this research study the student nurse is a pre-registered diploma student, studying towards a qualification in the nursing profession at a SAPHEI (Chapter 1, 1.2.3).

5.7.1 Characteristics of a student nurse

Student nurses entering the nursing profession, come from a range of backgrounds informed by differences in education, language, religion, socio-economic circumstances, culture, ethnicity, value systems and many more (Bruce *et al.*, 2011:115), hence the reference from Quinn and Hughes (2007:7) and Clapper (2010:7) that student nurses differ widely from each other. In nursing, students are mainly adult learners (Klopper, 2001:43) entering a new demanding profession. According to Botma *et al.* (2014:9), several factors contribute to the characteristics of a student nurse: 1) age or generation; 2) emotional intelligence; and 3) individual learning styles.

In addition to adult learning theories and characteristics of adult learners, nurse educators recognise that emotional intelligence is an important factor in learning, referring to the ability of student nurses to recognise their feelings, use these feelings as motivation and to manage them effectively (Botma *et al.*, 2014:12; Alconero-Camarero *et al.*, 2018:97). Traits of emotional intelligence are resilience; initiative; optimism; adaptability; empathy; and persuasiveness. Emotional experiences assist in retention and reinforce the application of knowledge (Botma *et al.*, 2014:12).

There has been a variety of learning theories, models and frameworks focusing on adult learning (Leone, 2014:4). The characteristics of adult learners mostly referred to and relevant to this research study (Klopper 2001:44-49, Bruce *et al.*, 2011:116-119, Knowles, 1980, Leone, 2014:3) are as follows:

- **Self-concept:** adult learners are independent learners taking responsibility for their learning. According to Bruce *et al.* (2011:117), nursing students have varying degrees of dependence. Leone (2014:4) agrees with this statement referring to the stages of self-directed learning: 1) dependent; 2) interested; 3) involved; and 4) self-directed. Knowles (1980:44) refers to these stages as the process that a person's self-concept changes from dependence to increased self-direction during the process of maturing. Self-direction implies that the student nurse wants to make his/her own decisions and take control of his/her own life, thus taking responsibility of their self-learning.

- **Experience:** adult learners build up experiences through life roles and tasks that they have to perform daily. These experiences can serve as rich resources of learning. Some experiences can obstruct learning, especially if they have caused beliefs, attitudes and thinking patterns to become entrenched (Bruce *et al.*, 2011:117). Learning takes place when student nurses can make 'meaning' of new learning by integrating new knowledge with existing mental frameworks (Roessger, 2017:211) contributing to theory-practice integration.
- **Learning readiness:** adult learners are ready for learning when achieving a particular goal becomes important or when they identify the need to learn to fill a knowledge or skills gap (Bruce *et al.*, 2011:118). Adults have various reasons for improving their cognitive skills (Houle, 1981:148):
 1. Personal growth and intellectual development;
 2. Achieving a personal goal that is only possible by further education;
 3. Improved fulfilment of a social role in a community;
 4. Fulfilling a religious purpose;
 5. Fulfilling the formal requirements of a profession or membership of a certain group;
 6. The social interaction of learning activities; and
 7. Escaping from boring activities.
- **Learning orientation:** adult learners adopt a problem-solving and task-centred approach to learning (Bruce *et al.*, 2011:119), and they show a need to apply the study content immediately (Klopper, 2001:49). Student nurses reflect on what they have learned and how to apply new knowledge into their daily activities.
- **Self-motivated:** adult learners are goal orientated and thus more motivated and self-directed to learn (Leone, 2014:8). According to Bruce *et al.* (2011:119) adult learners' motivation is largely internal referring to intangible aspects of life such as self-esteem, quality of life and career satisfaction. Korengel (2018:93) explains that the expectation of adult learners depend on their internal locus of control, referring to the adult student nurses' believes that they have control over a life situation. According to this author an internal locus of control leads to individuals with high self-efficacy, which generally resembles the level of competence an individual feels (Korengel, 2018:94).

Literature on the generalised characteristics of adult learners provides valuable insights into ways in which adult learners can be assisted in their learning undertakings. The important aspect of

student nurses as adult learners is that although they might share characteristics, they remain individuals with unique experiences and backgrounds.

5.7.2 Conclusion statements on the recipient: student nurse

The following deductive conclusion statements relate to the recipient concepts of the student nurse:

- The student nurse is a pre-registered diploma student, studying towards a qualification in the nursing profession at a SAPHEI.
- The student nurse is an adult learner who displays emotional intelligence, self-direction, has experience, demonstrates learning readiness and learning orientation that is task-orientated and problem-directed, approaches learning intentionally, is self-motivated, an active participant of own learning endeavours and acquires meaning and understanding through reflection.

The student nurse as the recipient is displayed visually in Figure 5.3 below.

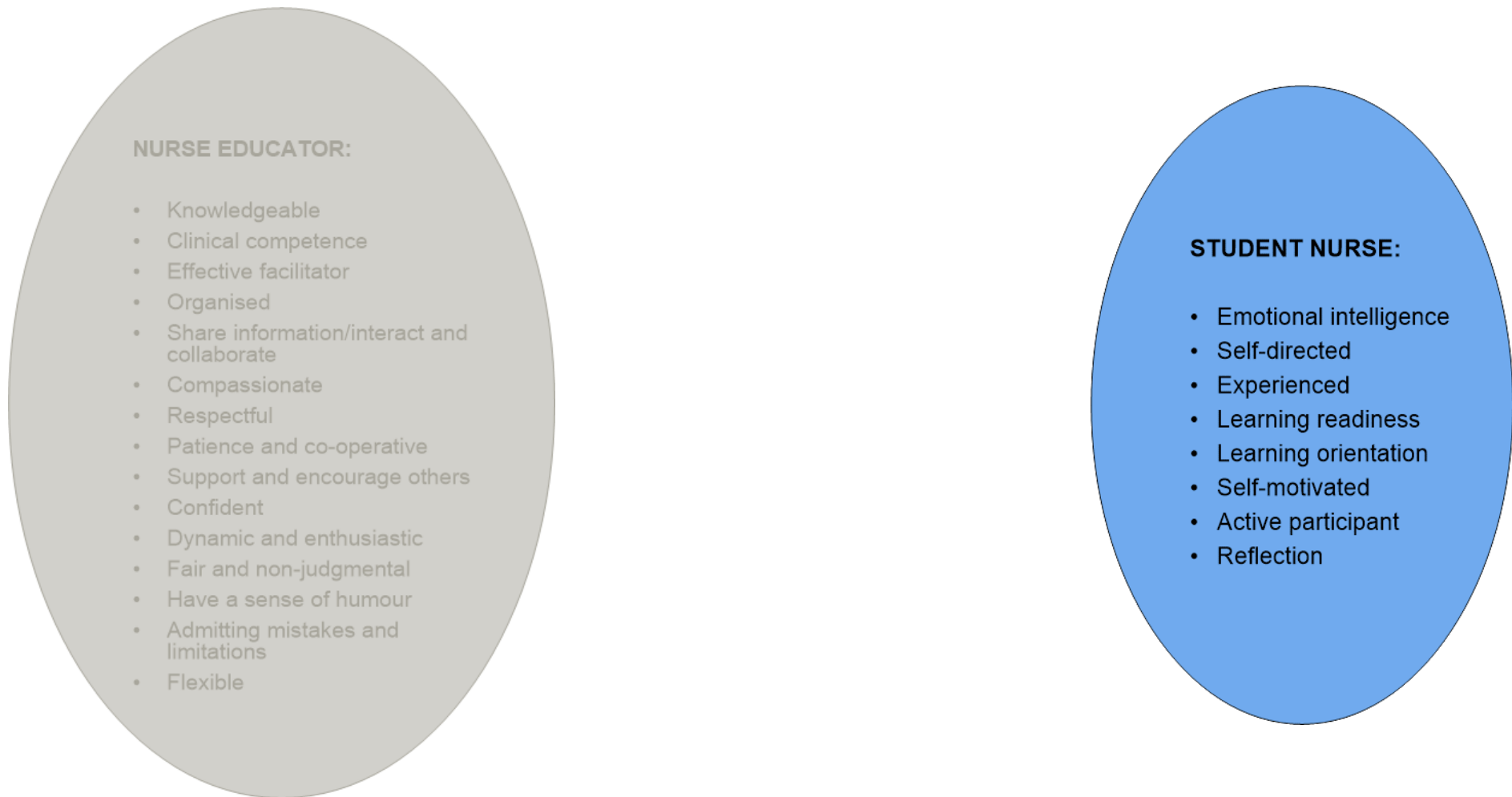


Figure 5-3: A student nurse as the recipient of high-fidelity simulation as a teaching-learning method to develop clinical skills at a South African private higher education institution

5.8 CONTEXT: HIGH-FIDELITY SIMULATION AS A TEACHING-LEARNING METHOD AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

The context of this research study is HFS as a teaching-learning method at a SAPHEI. The concepts of HFS and private higher education (PHEI) institution will now be discussed.

5.8.1 High-fidelity simulation

High-fidelity simulation is a complex, realistic and interactive teaching experience enhanced by the use of programmed manikins that present abnormal and normal breathing sounds and patterns, heart sounds, bowel sounds, and computer-generated dialogues that provide real-time subjective data (Grant & Cheng, 2016:232) (Chapter 1, 1.2.4.1). In this research study, HFS refers to a teaching method used at a SAPHEI to facilitate clinical skills development of student nurses.

5.8.2 Private higher education institution

Higher education refers to formal education at a university, college or school (Bruce *et al.*, 2011:11). The core concept of a university remains recognisable almost anywhere but substantial differentiation does exist especially between higher education institutions and PHEI's (Curaj *et al.*, 2015:1). According to these authors the differentiation may lie in the nature of the student population, the focus of the curriculum, the degree of research intensity, the form of governance, financial viability, the scale of activity, the degree of autonomy and the extent to which it is embedded in one or more locations. One of the most remarkable global higher education developments of the last half-century has been the growth of the private sector (Levy, 2012:178). According to Levy (2012:185), there is not a major difference between public and PHEI's in Europe because the PHEI would provide more of a good service but not offer anything different. The biggest difference relates to finance. The PHEI relies on private finance while the public higher education institution relies on government funds (Levy, 2012:186).

In South Africa, the formal national education system consisted out of three bands: General Education and Training (GET), Further Education and Training (FET) and Higher Education and Training (HET) (Bruce *et al.*, 2011:55). The South African education system had, however, undergone major changes and restructuring since 1994 (Bruce *et al.*, 2011:55). In 2009 a split between the National Department of Education into the Department of Basic Education and the Department of Higher Education and Training took place. The focus of this research study was on the Department of Higher Education and Training. In the case of the Department of Higher Education and Training, there existed one directorate each for Further Education and Training (FET colleges) and Higher Education (universities). In 1995 the government established the South African National Qualifications Framework (SANQF) to facilitate the necessary changes. The National Qualifications Framework (NQF) Act of 2008 (Act 67 of 2008) provided an alternative to

the SANQF (Bruce *et al.*, 2011:11). Table 5.5 summarises the Higher Education Qualifications Framework.

Table 5-5: The Higher Education Qualification Framework

Band	School grades	NQF level	Type of qualification
HET		10	Doctoral degree
		9	Master's degree
		8	Postgraduate diploma; Bachelor's honours degree and professional bachelor's degree
		7	Bachelor's degree and advanced diploma
		6	Diploma and advanced certificate
		5	Higher certificate
FET	12	4	Senior certificate adult; National senior certificate and senior certificate (vocational)
	11	3	Occupation-directed
	10	2	Occupation-directed
GET	Senior phase:	1	Abet level 4
	9		
	8		
	7		
	Intermediate phase	1	Abet levels 2 and 3
	6		
	5		
	4		
	Foundation phase	1	Abet level 1
	3		
	2		
	1		
	R		

(Bruce *et al.*, 2011:11)

The Council on Higher Education (CHE) is responsible for the quality of the higher education and training those universities, universities of technology and registered higher education institution offer. No unified system for quality assurance for nursing programmes exists in South Africa at present. Thus nursing institutions need to meet the criteria set by the CHE and the South African Nursing Council (SANC).

The PHEI is an institution registered in accordance with the Higher Education Act (101 of 1997) to offer learning programmes that result in the award of a qualification at levels 5-8 of the NQF (Chapter 1, 1.2.1). Private higher education institutions are therefore granted the legal authority to offer higher education programmes and qualifications accredited by the Higher Education Quality Committee (HEQC) of the CHE and approved by the Registrar of PHEI's. In this research study, the SAPHEI is a private nursing school with seven learning centres (campuses) in South Africa, approved as a PHEI in 2008.

The SAPHEI comply with the legislation stipulated by the SANC for each accredited nursing programme and offered the last intake of one SANC accredited course during this research study, which was the two year diploma for a bridging course for enrolled nurses leading to registration as a general nurse (SANC Regulation 683 of 1989) (SANC, 1989:1). All nursing programmes were reviewed and the legacy nursing qualification referred to above was gradually phased out so that the new nursing programmes, that are in line with current legislation both in nursing and higher education, could be phased in from 2020.

5.8.3 Conclusion statements on the context: high-fidelity simulation at a South African private higher education institution

The context in which the agent and recipient engage is HFS at a SAPHEI. The following deductive conclusion statements relate to the context of HFS at a SAPHEI:

- High-fidelity simulation forms part of the nursing student's curriculum to prepare them for clinical practice by creating a safe environment for clinical skills development.
- Private higher nursing education institutions are private learning institutions that focus on formal nursing education (NQF level 5-8).

High-fidelity simulation as a teaching-learning method at a SAPHEI as the context is displayed visually in Figure 5.4 that follows.



Figure 5-4: The application of the context concept for high-fidelity simulation as a teaching-learning method at a South African private higher education institution

5.9 GOAL: CLINICAL SKILLS DEVELOPMENT THROUGH THE USE OF HIGH-FIDELITY SIMULATION AS TEACHING-LEARNING METHOD TO FACILITATE CRITICAL THINKING AND CLINICAL JUDGEMENT

Healthcare is an increasingly demanding environment that expects nurses to apply complex clinical reasoning skills to solve clinical problems, making difficult decisions that will influence the health outcomes of patients (Wosinski *et al.*, 2018:67). In order to keep up with this demand, nurses are expected to be kept abreast of new technology and trends in healthcare, hence the need for deep-holistic lifelong learning in order to become clinical competent practitioners.

5.9.1 Clinical competence

The acquisition of clinical competence is the main objective of nursing education (Agea *et al.*, 2019:62). Clinical experience often focuses on tasks or skills performance, such as administration of medication (Zapko *et al.*, 2018:28), yet it does not predict the standard of clinical competence, therefore the need for clinical skills development. Clinical skills referred to cognitive, affective and psychomotor skills needed by student nurses to perform daily nursing tasks in the clinical practice (Botma *et al.*, 2014:20).

Competence can be described as “having the required skills for an acceptable level of performance (Merriam-Webster online thesaurus, 2019). According to Merriam-Webster’s online thesaurus (2019), the medical definition of competence refers to a person having the capacity to function or develop in a particular way. Competence can be considered as the ability to perform a task with desirable outcomes (Agea *et al.*, 2019:62). In nursing education, learning outcomes are set as standards to measure the progress of student nurses. Learning outcomes are brief and well defined at a high cognitive level but not as narrowly detailed as learning objectives (Botma *et al.*, 2014:20). It indicates what the student nurse needs to do to be found competent within their defined scope of practice. The characteristics of a competent nurse include (Botma, 2014:1; Agea *et al.*, 2019:62) the following:

- the use of knowledge and skills;
- the ability to think critically;
- the ability to reason clinically; and
- the ability to make a sound clinical judgement.

Student nurses are found competent when they display their capacity to apply knowledge and skills (cognitive and psychomotor skills) with an appropriate attitude (affective skills) in various environments and circumstances (Botma *et al.*, 2014:21). Clinical competence refers to the student

nurses' skills in clinical procedures as well as their ability to show empathy and communicate effectively (Brady *et al.*, 2015:528). According to Agea *et al.* (2019:62), simulation is one of the main methods used for improving the development of clinical competence. Simulation-based education allows student nurses to practice clinical situations in a safe environment that represents the real clinical practice (Botma *et al.*, 2014:56).

Within the fast-changing landscape of healthcare, nurses need to continually upskill themselves in order to keep their clinical competence up to date (Girling & Pierce, 2019:126). In order to fulfil the needs of the demanding workforce, nurses need to be competent in complex clinical skills and critical thinking.

5.9.2 Clinical judgement/critical thinking

According to Merriam-Webster online thesaurus (2019) judgement refers to the process of forming an opinion or evaluation by discerning and comparing. Clinical refers to a place or setting (Merriam-Webster online thesaurus, 2019), therefore the conclusion that clinical judgement refers to the process of forming an opinion or evaluate a situation in the clinical field by discerning and comparing information gathered from the clinical environment. The student nurse is expected to generalise the concepts learned in all course content and apply them to a real-life work situation beyond the training context and maintain this behaviour over a long time. Clinical judgement is the logical outcome of critical thinking (Botma, 2014:1).

It is essential for student nurses to develop critical thinking skills, which involves in-depth and higher-order thinking that facilitates knowledge development (from all disciplines), contextual decision-making and problem-solving skills (Wosinski *et al.*, 2018:68), understand the theory related to the problem and predict the progression of the problem and consequences of the treatment or omission of treatment (Botma, 2014:1; Carter *et al.*, 2018:169). The student nurse will only be able to achieve this by taking control of new information and internalise it to transform existing knowledge and create new knowledge (Botma, 2014:1).

Klopper (2001:39) states that critical thinking is both an attitude and a process of reasoning concerned with intellectual skills. Hyytinen *et al.* (2018:133) state that critical thinking refers to self-disciplined thinking during which a student nurse assesses, evaluates, synthesises and interprets relevant information. Critical thinking involves (Hyytinen *et al.*, 2018:133):

- open-minded thinking about alternative solutions;
- effective communication;
- problem-solving skills;

- evaluating the reliability and relevance of evidence;
- analysing information;
- addressing opposing viewpoints;
- reasoning;
- making decisions;
- drawing inferences; and
- producing arguments.

According to Wilkenson (1991) the characteristics of critical thinking are as follows:

- **Conceptualisation:** Critical thinking includes conceptualisation, which is the intellectual process of forming concepts;
- **Rational and reasonable:** Critical thinking is rational and reasonable, which refer to thinking based on reasons rather than on bias, self-interest, preference or fears;
- **Reflective:** Critical thinking is reflective in the sense that the thinker does not hastily draw conclusions but collects data, thinks it through and weigh up the facts and evidence;
- **Attitude:** Critical thinking is inherently and attitude of enquiry;
- **Autonomous:** Critical thinking is autonomous in the sense that the thinker thinks for himself/herself and do not accept the views of others but rather validate a matter or viewpoint;
- **Creative:** Critical thinking includes creative thinking, which can be described as a productive mental skill that creates original ideas by determining relationships between thoughts and concepts;
- **Fair:** Critical thinking is fair in that it is never one-sided. Critical thinkers acknowledge the views of others; and
- **Focuses on the decision:** Critical thinking focuses on the decision of what to believe or what to do. Critical thinking is used to evaluate arguments and conclusions in developing new ideas, and to reach a clear conclusion and solve problems.

Extensive research on the effectiveness of HFS demonstrates that it does help to significantly improve three abilities that are integral to clinical reasoning (Botma *et al.*, 2014:56):

1. critical thinking;
2. the acquisition of knowledge; and
3. the ability to identify deteriorating patients.

5.9.3 Conclusion statements on the goal: clinical skills development through the use of high-fidelity simulation as a teaching-learning method to facilitate critical thinking and clinical judgement

The following deductive conclusion statements relate to the goal concept of clinical skills development:

- Clinical competence is the capacity to apply knowledge and skills (cognitive and psychomotor skills) with an appropriate attitude (affective skills) in various environments and circumstances and can only be enhanced by the development of clinical skills.
- High-fidelity simulation as a teaching-learning method supports the development of critical thinking skills and clinical judgement, therefore enhancing clinical competence.

Clinical skills development through the use of HFS as a teaching-learning method to facilitate critical thinking and clinical judgement as the goal is displayed visually in Figure 5.5.

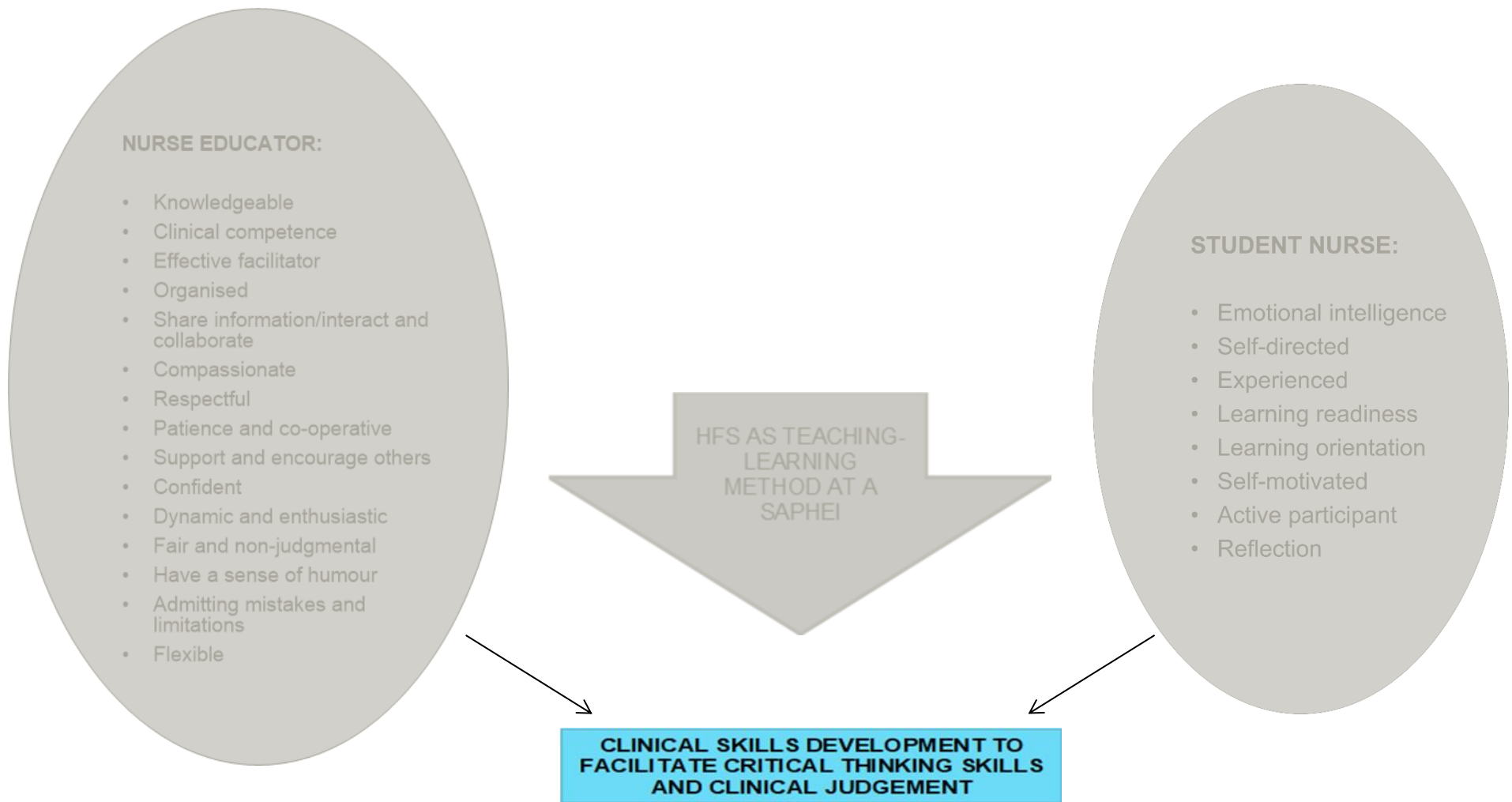


Figure 5-5: The application of the goal concept of clinical skills development through the use of high-fidelity simulation as a teaching-learning method to facilitate critical thinking skills and clinical judgement

5.10 PROCEDURE: HIGH-FIDELITY SIMULATION EMBEDDED IN CONSTRUCTIVIST THEORETICAL FRAMEWORK

Research is conducted to seek the best ways in which student nurses can train in real and simulated clinical environments (Agea *et al.*, 2019:62) with the main objective of the acquisition of clinical competence. In simulation, student nurses learn by 'doing' in a simulated environment (Agea *et al.*, 2019:62), which is an active process of knowledge construction through reflection and abstraction (Botma *et al.*, 2014:16). The process that was used in the conceptual framework and ultimately the practice model was HFS embedded in constructivist theory. These two concepts will now be discussed.

5.10.1 High-fidelity simulation

Simulation is a supportive clinical teaching-learning method (Li *et al.*, 2018:235) used in health care education to safely develop effective clinical skills before undertaking real-life health care environment/clinical practice. In simulation 'fidelity' is the term used to describe the 'realness' of the experience (Brady *et al.*, 2015:524). In this research study, the focus was on HFS, which according to Brady *et al.* (2015:525) refer to a **safe environment** that attempts to replicate the real environment as closely as possible (Li *et al.*, 2018:235).

High-fidelity simulation provides a realistic and sophisticated alternative to a real-life healthcare environment (Al-Ghareeb *et al.*, 2016:281, Zapko *et al.*, 2018:29), allowing the student nurse to practice and acquire knowledge in a safe environment that closely resembles reality, enabling them to explore assumptions and develop their skills (Al-Ghareeb *et al.*, 2016:282, Kumar *et al.*, 2017:220) without harming any patients (Kowitlawakul *et al.*, 2015:894). Simulation provides an opportunity for student nurses to acquire experience by making mistakes without causing harm to patients (Eyikara & Baykara, 2018:101). An immersive simulation forces student nurses to actively engage with the learning material, which supports the retention of knowledge by being hands-on (Botma, 2014:4, Kumar *et al.* 2017:220). According to Zapko *et al.* (2018:29), HFS provides valuable active learning experiences that can be substituted for real-life clinical experiences.

Al-Ghareeb *et al.* (2016:282-285) and Brady *et al.* (2015:525) identified the following concerns regarding the implementation of HFS:

- High-fidelity simulation place demands on the **technological ability** of student nurses and nurse educators due to the advanced technology used in HFS **equipment** and manikins;
- The integration of HFS as a teaching-learning method is **time-consuming** as the nurse educators need to plan and develop scenarios to address specific training needs;

- Equipment, on the other hand, is **expensive** and needs to be maintained, therefore creating a lack of appropriate resources; and
- Nurse educators need to be **up-skilled** to implement HFS due to the advanced technological equipment used.

Brady *et al.* (2015:525) state that effective interactive communication and feedback is essential for successful HFS training. Botma *et al.* (2014:31) agree by stating that **feedback** should:

- be as soon as possible after the simulation session;
- start with positive encouraging comment;
- balance negative with positive comments;
- include a summary of the educator's view of the performance;
- relate specifically to learning outcomes and assessment criteria;
- make general suggestions on how to address the next session;
- explain all comments made;
- ask questions that encourage reflection and self-assessment;
- use informal conversational language;
- suggest follow-up work and references;
- explain the mark or grade and why it is not better or worse;
- offer help with specific problems; and
- offer the opportunity to discuss the performance and comments.

Garden *et al.* (2015:300) emphasise that feedback should be given in a non-threatening environment that fosters the student nurses and nurse educators' reflection on the performance, identifying training gaps, strategies for improvement, and strengths in the existing performance. Feedback should be meaningful and should be given in a private location with sufficient time allowed for reflection.

Kumar *et al.* (2017:220) emphasise that high fidelity simulation enhance the safety of student nurses by enabling them to acquire **confidence** and **competence** in a safe learning environment

before clinical exposure, **reducing the risk of patient injury**. Decision-making informed by sound knowledge and confidence is important for a nurse to respond to changing conditions of patients (Letcher *et al.*, 2017:284). Letcher *et al.* (2017:290) contend that enhanced knowledge and clinical judgement strengthens decision-making during the delivery of nursing care and that the use of reflection-in-action and on-action simulation training debriefing can enhance knowledge development and clinical judgement skills of student nurses.

5.10.2 Constructivist theory

Constructivism as a learning theory accepts that learning is an active process of knowledge construction through reflection and abstraction (Botma *et al.*, 2014:16). According to Bressington *et al.* (2018:47), student nurses fragment large amounts of new knowledge into lesser parts and then rearrange them as part of the learning process. They then develop further logical connections between these smaller concepts until knowledge is integrated with their existing understanding. Based on constructivism a student nurse would build his/her knowledge based on a range of learning experience combining theoretical knowledge with clinical experience (Girling & Pierce, 2019:126; Kretchmar, 2015:1).

Constructivism can be applied to simulation because it allows the student nurse to use her/his existing knowledge during a simulated training experience to build on their previous knowledge in developing new knowledge and experiences (Reynolds *et al.*, 2018:181).

High-fidelity simulation utilising a constructivist theory enhance theory-practice integration, which is essential for clinical skills development (Brady *et al.*, 2015:525). Theory-practice integration as well as teaching-learning methods will subsequently be discussed.

5.10.3 Theory-practice integration

The separation between a classroom and clinical practice makes it difficult for student nurses to relate theory to the nursing practice (Bressington *et al.*, 2018:47). According to Kolb (1984), learning is a process during which experience is analysed and new meaning is derived that will influence future action, thus applying David Kolb's experiential learning theory. Learning takes place by doing and by listening (Poore *et al.*, 2014:241, Kumar *et al.*, 2017:220). Kgafele *et al.* (2015:233) state that clinical skills can only be grasped if it is repeatedly practised and that student nurses indicate that they need a demonstration of the practical skills and time to practise these skills before they are exposed to the clinical setting.

High-fidelity simulation contributes to theory-practice integration as the student nurse apply in practice what has been learnt in the classroom through experiencing it first in a safe simulated environment. Student nurses can practise applicable skills until they feel competent and confident

in transferring these new skills into practice. Li *et al.* (2018:235) confirm this by stating that simulation provides ideal learning conditions for student nurses to acquire clinical skills by integration of theory and practice with decision-making without harming actual patients, which leads to confidence and competence.

5.10.4 Teaching-learning methods

In order to prepare student nurses for the demanding healthcare environment, various teaching and learning methods are used. According to Wosinski *et al.* (2018:67), **problem-based learning** was developed to prepare student nurses for clinical practice in this complex environment. Problem-based learning helps student nurses to develop critical thinking skills to solve problems in their clinical settings (Kong *et al.*, 2014:459), and it bridges the gap between theory and practice (Kgafele *et al.*, 2015:235). It increases the student nurses' critical thinking and **self-directed learning**, which are needed to solve clinical problems (Choi *et al.*, 2014:52, Kong *et al.*, 2014:468). It is also one of the teaching methods used to build professional skills essential to nursing such as self-directed and collaborative learning (Wosinski *et al.*, 2018:67). Self-directed learning is defined as the student nurses' ability to study independently and to take responsibility for their learning, including the planning, implementation and evaluation of their work (Wosinski *et al.*, 2018:68). According to Wosinski *et al.* (2018:68) student nurses develop collaborative learning skills by working with colleagues in small groups whereby they share, compare and debate information found, thus developing their clinical reasoning skills.

One of the goals of self-directed learning is to help student nurses to recall information learned. It is an essential component of evidence-based practice (Wosinski *et al.*, 2018:68; Agea *et al.*, 2019:62). Self-directed learning includes the identification of self-learning needs; what is important to learn, and learning resources. Self-evaluation and reflection on what was learned are important aspects of a successful self-directed learning method.

Experiential learning is one of the key drives for a simulation learning experience due to the importance of inquiry and exploration (Reynolds *et al.*, 2018:181; Garden *et al.*, 2015:300). The focus of the study done by Reynolds *et al.* was on creating experiences of real-time responsibilities and accountabilities in simulation for student nurses to gain valuable experiences, which they could not obtain in the clinical practice.

5.10.5 Conclusion statements on the procedure: high-fidelity simulation embedded in constructivist theory

The following deductive conclusion statements relate to the procedure concepts of HFS embedded in constructivist theory:

- High-fidelity simulation can enhance clinical skills development if and when used correctly.
- The nurse educator should be a skilled and competent facilitator of teaching-learning methods by using HFS to facilitate theory-practice integration through problem-based learning and self-directed learning strategies.
- Feedback and debriefing are important after simulation training for the student nurse to reflect on her/his progress.
- Problem-based learning and experiential learning approaches will develop clinical judgement of student nurses.

The procedure of HFS embedded in constructivist theory is displayed visually in Figure 5.6.

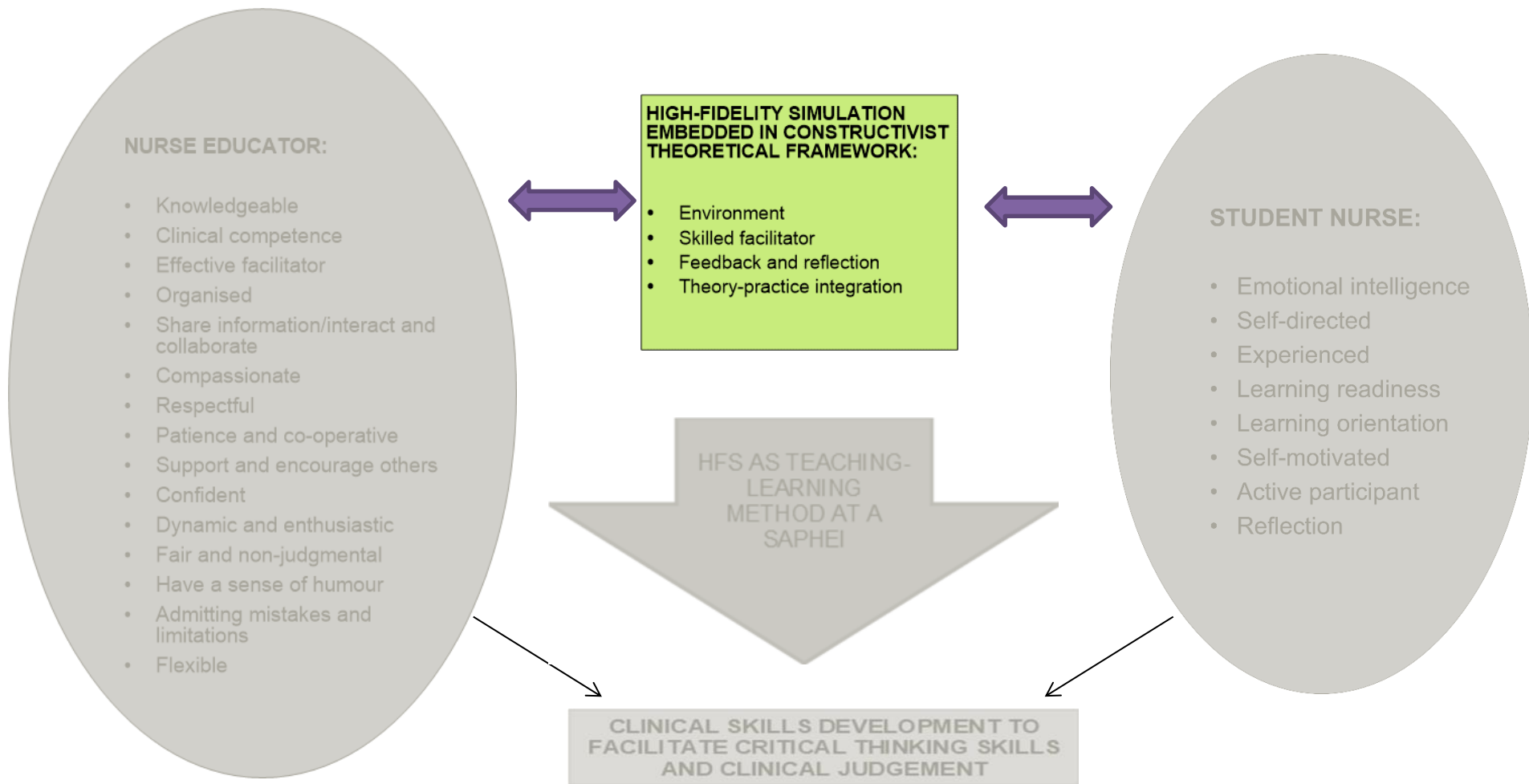


Figure 5-6: The application of the procedure concept of high-fidelity simulation embedded in constructivist theoretical framework

5.11 DYNAMIC COLLABORATION

Collaboration is a dynamic process of working together to achieve a common goal (Oxford advanced learner's dictionary, 2010:277). Klopper (2001:13) refers to the interaction between the student nurse, peer group and the nurse educator, which takes place through communication in the form of reflection and exchange of ideas to construct new understanding and meaning of what was learned.

Learning clinical skills in a simulated environment can drive engagement/collaboration between the student nurse, colleagues and the facilitator/nurse educators (Winkelmann *et al.*, 2018:186, Kumar *et al.*, 2017:218). Feedback between peers as well as from the nurse educator is important and enhances active collaboration between all parties involved during the simulation process. Feedback can be in the form of a debriefing session, which allows for self- and facilitator critique (Winkelmann *et al.*, 2018:186). Peer tutoring allows student nurses to enhance their learning experience in a simulation training environment (Li *et al.*, 2018:235). It provides student nurses with the opportunity to learn from their peers through observation, feedback and self-reflection. Peer tutoring also enhance the opportunity for collaborative learning (Li *et al.*, 2018:239).

In a HFS the interaction changes its emphasis in accordance with the following four phases (Hugo & Fakude, 2015:133):

1. **Presentation phase:** the nurse educator is an active participant during this phase while the student nurse is passive. Communication is seen as a one-way communication whereby the nurse educator presents the theoretical content or lecture while the student nurse listens.
2. **Motivating phase:** during this phase, there is more interaction between the nurse educator and the student nurse as the nurse educator needs to motivate the student nurse to participate in the learning process. The educator motivates the student nurse to engage with the content. The nurse educator demonstrates clinical procedures to the student nurse using high-fidelity equipment.
3. **Engaging phase:** during this phase, there is equal sharing and participation. The nurse educator becomes a facilitator of learning. The student nurse becomes an active participant in learning while practising clinical skills on a manikin. The student nurse takes the lead by demonstrating the clinical procedure to the nurse educator and receives feedback and guidance from the nurse educator.
4. **Individualised phase:** the nurse educator becomes a mentor while the student nurse is an active participant gaining more confidence and clinical competence while practising clinical

skills in the simulation laboratory. The nurse educator can evaluate the student nurse during this phase to establish the level of competence.

Wosinski *et al.* (2018:68) state that student nurses develop collaborative learning skills by working with colleagues in small groups. Group activities allow student nurses the opportunity to share, compare and debate new information or experiences, thus developing clinical reasoning skills as well as positive interpersonal relationships and effective teamwork (Wosinski *et al.*, 2018:68). Harvey and Uren (2019:38) agree by stating that collaborative learning develops critical thinking and decision-making skills alongside leadership and clinical skills. According to Kumar *et al.* (2017:224) team-based learning builds trust between groups, which will lead to effective teamwork.

5.11.1 Conclusion statements on the dynamic: collaboration

The following deductive conclusion statements relate to the dynamic concept of collaboration:

- Collaboration involves the exchange of information between healthcare professionals to ensure safe and comprehensive patient care.
- Collaboration between the nurse educator, student nurse and content changes continuously according to the phase of teaching-learning interaction.

The dynamic concept of collaboration for HFS at a SAPHEI is represented visually in Figure 5.7.

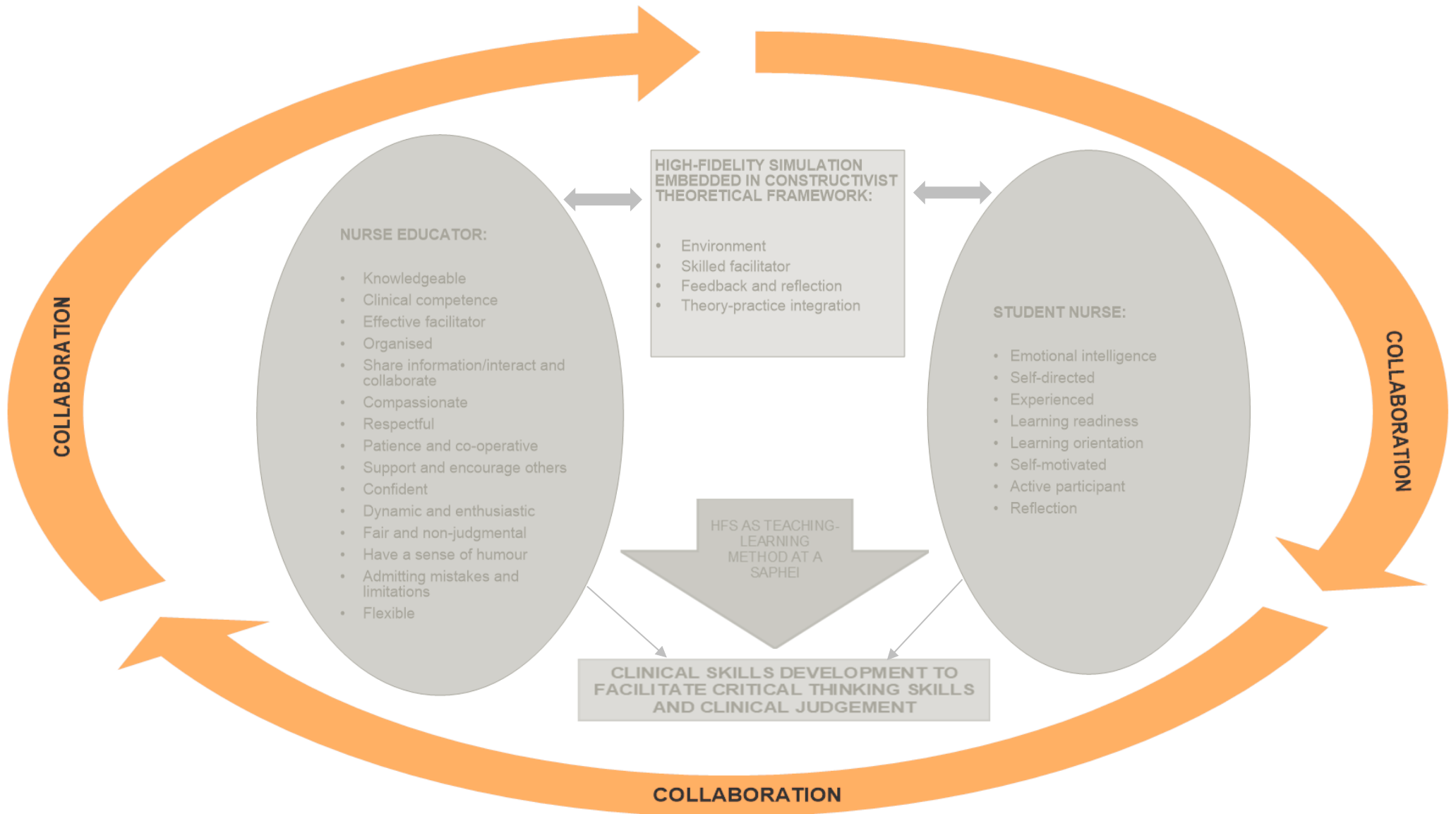


Figure 5-7: Conceptual framework for high-fidelity simulation at a South African private higher education institution

5.12 SUMMARY

In this chapter, the approach to generating a conceptual framework was positioned in the scientific context of the existence of knowledge. The identification of concepts was described from critical incidents and empirical data from nurse educators' feedback regarding their current use of and experience of HFS in Chapter 3, and the views/assumptions and beliefs of nurse educators on implementation and use of HFS in the nursing programmes in Chapter 4. In Chapter 5 the concepts were classified and a comprehensive literature review was presented to support arguments on the concepts and relationships on the functional role of HFS as a teaching-learning method to enhance clinical skills development at a SAPHEI. Chapter 6 that follows includes the process of model description, evaluation and theory critique.

CHAPTER 6

PRACTICE MODEL FOR THE IMPLEMENTATION OF HIGH-FIDELITY SIMULATION AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

(Phase 2: Step 1 and 2)

6.1 INTRODUCTION

The main aim of this research study was to develop a practice model for nurse educators at a South African private higher education institution (SAPHEI) to facilitate the implementation of high-fidelity simulation (HFS) in clinical skills development of student nurses and is presented in this chapter. This chapter signifies phase 2 (model construction), step 1 (to construct the relational meaning of main and related concepts), and step 2 (model construction through theory synthesis) to address the following objective:

Objective 4: To develop a practice model to implement HFS in the nursing programmes at a SAPHEI.

Chapter 6 commences with the science philosophy underpinning the research design and process of model description, the assumptions of the model was followed by a comprehensive discussion and presentation on the description of the model. Finally, the model is critiqued using present evaluation criteria.

6.2 SCIENCE PHILOSOPHY UNDERPINNING THE RESEARCH DESIGN AND THE PROCESS OF MODEL DESCRIPTION

Science philosophy refers to aspects that focus on the scientific development of a professional discipline (Meleis, 2012:27; Bruce *et al.*, 2011:39; Alligood, 2018:574). Therefore, the researcher developed a construction to organise the concepts and their interrelationships in ways that allow the construction both to explain their meaning and relevance for a professional discipline, and to communicate it to others (Lincoln & Guba, 2013:29).

The concept that conveys the components of science philosophy is referred to as a paradigm (Meleis, 2012:27; Bruce *et al.*, 2011:39). A paradigm is a world view or general perspective on the complexities of the world around us, including beliefs, assumptions, values and practices (Polit & Beck, 2017:738; Bruce *et al.*, 2011:39; Walker & Avant, 2011:7; De Vos *et al.*, 2015:41).

The science philosophy that guided this research study was a constructivist paradigm. The constructivist enquiry was presented in the form of reasonable conjectures from a small number of metaphysical presumptions: ontological, epistemological, methodological (Lincoln & Guba, 2013:28; Denzin & Lincoln, 2011:102-115), teleological, sociological, and ethical (Chinn & Kramer, 2011:93) (Table 6.1).

Table 6-1: Scientific philosophy dimensions in the constructivist paradigm that guided this research study

Dimension	Constructivist paradigm applications
<p>Ontological:</p> <p>Focus on a specific aspect of reality.</p> <p>Answer: "What is?"</p>	<p>Exploration, description and interpretation of the research done on the current use of and experience, views/assumptions and beliefs of nurse educators on implementation of HFS in the nursing programmes to facilitate clinical skills development (chapters 3 and 4).</p> <p>Description of the practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development (6.4).</p>
<p>Epistemological:</p> <p>The quest for truth.</p> <p>Answer: "What can be known?"</p> <p>Answer: "What is the relationship between the researcher and the research?"</p>	<p>Concept identification and classification.</p> <p>Conceptual framework of HFS in the nursing programmes of a SAPHEI (Chapter 5).</p> <p>Practice model that describes the implementation of HFS in the nursing programmes of a SAPHEI.</p> <p>The researcher's relationship with the setting is described (6.4.2).</p>

Dimension	Constructivist paradigm applications
<p>Methodological:</p> <p>Refers to the planning, structure and implementation of procedures and processes.</p> <p>Answer: “How can this be done?”</p>	<p>Data collection employing a teaching-learning feedback questionnaire and individual semi-structured interviews (chapters 3 and 4).</p> <p>The process of a practice model development that utilised empirical data derived from the participants (Chapter 5).</p>
<p>Teleological:</p> <p>Focus on the goals of the research.</p> <p>Answer: “What and why?”</p>	<p>Model evaluation and theory critique of the practice model developed in this research study (6.5).</p>
<p>Sociological:</p> <p>Refers to collaboration.</p> <p>Answer: “Who is involved?”</p> <p>Answer: “Who is influenced?”</p>	<p>Relational statements that illustrate the link between concepts (6.4.4.3).</p> <p>Interaction between the researcher and the nurse educators (participants); the researcher, promoter and co-promoter; the researcher and the co-coder (6.4.5).</p>
<p>Ethical:</p> <p>Concerns morality, reasoning and human purpose.</p> <p>Answer: “Who and why?”</p>	<p>Ethics consent was obtained from the NWU HREC (Annexure 1)</p> <p>Informed consent was obtained from the participants (Annexures 3 and 4)</p>

6.3 ASSUMPTIONS OF THE MODEL

Assumptions are systematically generated empiric evidence of truth (Chinn & Kramer, 2011:245). Therefore, assumptions are statements of truth obtained through theoretical reasoning, which is disclosed in this research so that the reader is informed of what the researcher accepts as truth.

The assumptions of the model, as discussed in Chapter 1 (1.6) on the science philosophy that guided this research study, are best aligned with the constructivist paradigm as well as HFS as a clinical teaching-learning methods in which the researcher assumes a relativist ontology (there

are multiple realities), a subjectivist epistemology (the researcher and participant co-create new understandings), and a naturalistic (in the practical natural field of nursing) set of methodological procedures (Denzin & Lincoln, 2013:27).

The departure point of this research study was based on Klopper's model of constructivist learning in nursing science (2001, 2009), HFS as clinical teaching-learning strategy (Billings & Halstead, 2009:323; Grant & Cheng, 2016:232; Garden *et al.*, 2015:300), and constructivist theoretical framework (Kretchmar, 2015). This research study aimed to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development. The researcher aimed to develop a deep understanding of how the participants relate to HFS through a convergent mixed-methods research design. The methodology used in this research study delivered empirical data that was explored, described and interpreted to develop a practice model for the implementation of HFS in a SAPHEI.

The following assumptions are suggested about the model:

- The nurse educator facilitates theoretical and clinical outcomes of a nursing programme at a SAPHEI;
- The student nurse is an adult learner that needs to be exposed to clinical learning opportunities;
- The nurse educator uses HFS as a teaching-learning method that is embedded in the constructivist theoretical framework to enhance clinical skills development;
- The main goal of this practice model is to develop clinical skills through the use of HFS as teaching-learning method to facilitate critical thinking and clinical judgement; and
- Effective collaboration between the nurse educator and student nurse in a HFS environment is essential for the facilitation of clinical skills development.

Table 6.2 summarises the statements concluded from the conceptual framework in Chapter 5 that lead to the model depicted as Figure 6.1.

Table 6-2: Summary of conclusion statements from the conceptual framework

Nurse educator (Agent)
<ol style="list-style-type: none"> 1. A nurse educator is a person who facilitates clinical skills development of student nurses at a SAPHEI. 2. The nurse educator's attitude towards student nurses consists of compassionate, respectful fair and non-judgemental acknowledgement of the uniqueness of each student nurse to ensure effective teaching-learning to take place. 3. The characteristics and skills of an effective educator are to be knowledgeable, clinically competent, organised, share information/interact and collaborate, patience and co-operative, to support and encourage others with confidence, to be dynamic and enthusiastic, have a sense of humour, admitting to mistakes and limitations and to be flexible to promote effective implementation and facilitation of HFS as teaching-learning method to improve clinical skills of student nurses.
Student nurse (Recipient)
<ol style="list-style-type: none"> 4. A student nurse is a pre-registered diploma student, studying towards a qualification in the nursing profession at a SAPHEI. 5. The student nurse is an adult learner who displays emotional intelligence, self-direction, has experience, demonstrates learning readiness and learning orientation that is task-orientated, and problem-directed, approaches learning intentionally, is self-motivated, an active participant of their own learning endeavours and acquires meaning and understanding through reflection.
High-fidelity simulation as a teaching-learning method at a South African private higher education institution (Context)
<ol style="list-style-type: none"> 6. High-fidelity simulation forms part of the nursing student's curriculum to prepare them for clinical practice by creating a safe environment for clinical skills development. 7. Private higher nursing education institutions are private learning institutions that focus on formal nursing education (NQF level 5-8).

Clinical skills development through the use of high-fidelity simulation as a teaching-learning method to facilitate critical thinking skills and clinical judgement (Goal)

8. Clinical competence is the capacity to apply knowledge and skills (cognitive and psychomotor skills) with an appropriate attitude (affective skills) in various environments and circumstances and can only be enhanced by the development of clinical skills.
9. High-fidelity simulation as a teaching-learning method supports the development of critical thinking skills and clinical judgement, therefore enhancing clinical competence.

High-fidelity simulation embedded in constructivist theoretical framework (Procedure)

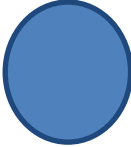

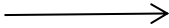



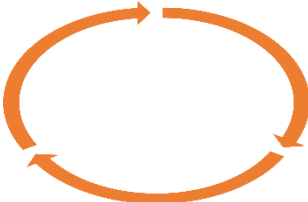
10. High-fidelity simulation can enhance clinical skills development if and when used correctly.
11. The nurse educator should be a skilled and competent facilitator of teaching-learning methods by using HFS to facilitate theory-practice integration through problem-based learning and self-directed learning strategies.
12. Feedback and debriefing are important after simulation training for the student nurse to reflect on her/his progress.
13. Problem-based learning and experiential learning approaches will develop clinical judgement of student nurses.

Collaboration (Dynamic)

14. Collaboration involves the exchange of information between healthcare professionals to ensure safe and comprehensive patient care.
15. Collaboration between the nurse educator, student nurse and content changes continuously according to the phase of teaching-learning interaction.

The legends that are used in the practice model are presented in Table 6.3 below.

Table 6-3: Legends used for the practice model as described in Figure 6.1

	<p>Agent and recipient: nurse educator and student nurse with their own set of characteristics</p>
	<p>Goal: clinical skills development through the use of HFS as a teaching-learning method to facilitate critical thinking skills and clinical judgement</p>
	<p>The nurse educator and student nurse work towards the same goal, namely clinical skills development</p>
	<p>Procedure: High-fidelity simulation embedded in the constructivist theoretical framework used by both the nurse educator and student nurse in their interaction with each other</p>
	<p>Context: High-fidelity simulation as teaching-learning method at a SAPHEI</p>
	<p>Interaction between the nurse educator, HFS teaching-learning method and the student nurse</p>
	<p>Continuous collaboration</p>

The depiction of the practice model for HFS at a SAPHEI follows in Figure 6.1.

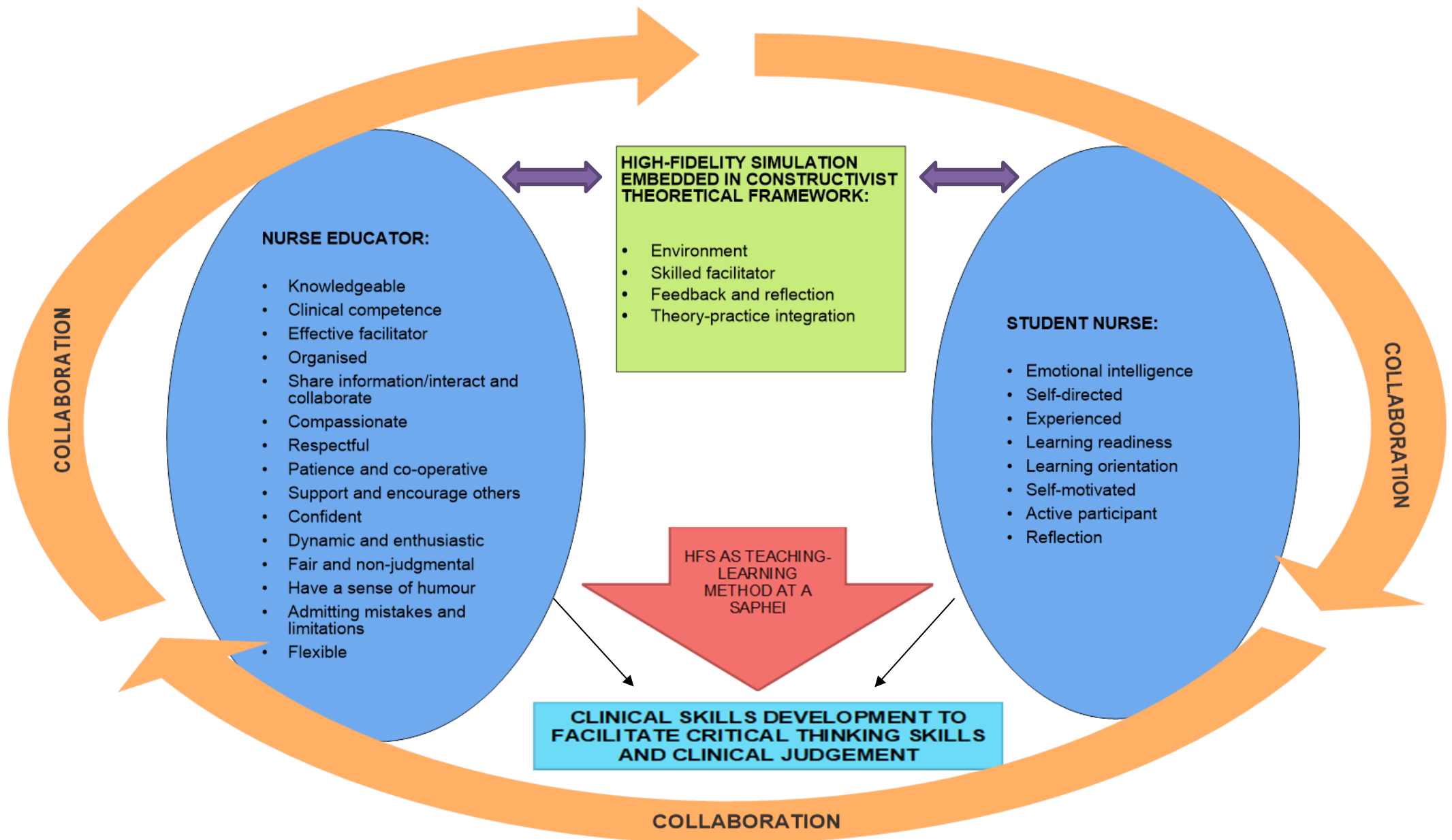


Figure 6-1: Practice model for nurse educators at a South African private higher education institution to facilitate the implementation of high-fidelity simulation in clinical skills development

6.4 DESCRIPTION OF THE MODEL

The description of the model was done by utilising the following components (Chinn & Kramer, 2011:185): purpose of the model, context, overview, structure, and the process of the model. The description of the model and relational statements are in fulfilment of the research objectives of this research study as stated in Chapter 1.

6.4.1 Purpose of the model

The purpose of the development of this practice model was to provide a schematic outline that represents HFS as a teaching-learning method at a SAPHEI to facilitate clinical skills development of student nurses. The purpose of the model is important because it specifies the context and situations in which the model is useful (Chinn & Kramer, 2011:186). This practice model for HFS will be useful in the development of clinical skills of student nurses at a SAPHEI within a larger context of higher education institutions that will form part of a curriculum in nursing education. The model could be applicable and applied in practice.

6.4.2 Context of the model

Chinn and Kramer (2011:186) explain that the context of the practice model might not be directly useful for a practice, but an understanding of a phenomenon. These purposes can contribute to the achievement of a practice purpose although they are not directly relevant to the practice goals (Chinn & Kramer, 2011:186).

In this research study, and for the application of the practice model, the context is a SAPHEI offering nursing education programmes for undergraduate student nurses. The SAPHEI where this practice model could be implemented consists of seven learning centres (campuses). After the implementation of this practice model in the above-mentioned context, the practice model might guide future research in other higher education institutions in South Africa.

6.4.3 Overview of the model

The overview of the model is intended for descriptive purposes of the model in the practical setting. The researcher will, therefore, present an overview of the main attributes of the practice model (Figure 6.1).

The nurse educator forms the core attribute of the practice model as he/she acts as a facilitator for the HFS teaching-learning method whereby the student nurse can, through active participation and collaboration, develop their clinical skills. The nurse educator (with his/her own

set of characteristics) is in interaction with the student nurse (with his/her own set of characteristics) through HFS that is embedded in a constructivist theoretical framework. The nurse educator and student nurse strive towards the development of clinical skills by implementing HFS as a teaching-learning method. Collaboration encircles the model to show that it is a continuous and interactive process (Figure 6-1).

6.4.4 Structure of the model

The structure of the model presents an overall form to all the conceptual relationships within it (Chinn & Kramer, 2011:191), therefore illustrating the relationships within the model. According to Chinn and Kramer (2011:191) there is an identifiable relationship between the individual and the setting that is portrayed as the environment of the model, and therefore all structural elements of the model are to be depicted aimed at determining the strength, direction and quality of the model, which indicates the concepts and relational statements.

6.4.4.1 Definition of the concepts

The definition of the concepts as described below is based on the main concepts outlined in chapter 1 and related concepts identified from the empirical data and concept classification as shown in Table 5.1 and Table 5.2 that was undertaken by using the survey list of Dickoff *et al.* (1968:422-423).

Main concepts

The main concepts identified are as follow:

- **Private higher education institution (PHEI's):** a South African private education institution registered to offer learning programmes that result in the award of a nursing qualification at level 5-8 of the NQF (Higher Education Act, Act 101 of 1997).
- **Nurse educator:** a qualified registered nurse with an additional qualification in nursing education who facilitates theoretical and clinical components of a nursing curriculum at a SAPHEI.
- **Student nurse:** a pre-register diploma student studying towards a nursing qualification at a SAPHEI.
- **Simulation training:** an event or situation that reflects clinical practise as closely as possible to teach procedures and facilitate critical thinking in a SAPHEI.

- **High-fidelity simulation:** simulation training enhanced by the use of complex, realistic and interactively challenging experience utilising programmed manikins that present with abnormal and normal breath sounds and patterns, heart sounds, pulses, bowel sounds and computer-generated dialogues that provide subjective data.
- **Clinical teaching-learning:** the learning experiences obtained in clinical practice that are considered to be essential to become competent nurse practitioners after completing a nursing programme.

Related concepts



The related concepts identified are:

- **Clinical competence:** the ability of the student nurse to perform a task with desirable outcomes as set out in the objectives in a nursing programme.
- **Clinical judgement/critical thinking:** the process of forming an opinion or evaluate a situation in the clinical field by discerning and comparing information gathered from the clinical environment.
- **Collaboration:** involves interaction between the student nurse, peer group and the nurse educator by means of communication in the form of reflection and exchange of ideas to construct new understanding and meaning to what was learned.

6.4.4.2 Structural form of the model



Chin and Kramer (2011:192) describe the structural forms of models as powerful devices for shaping our perceptions, leading to a description of a model that may not necessarily fit into one structure as theory could be expressed in several competing structures that cannot be reconciled into a single distinct structure. Therefore, all concepts may not predictably fit into a clear structure to represent all concepts and the relational components. Figure 6.1 illustrates a HFS as a clinical teaching-learning method in the nursing curriculum diagrammatically in the context of a SAPHEI, because the interchanges between the nurse educator, HFS and the student nurse are fundamental to the dynamics of collaboration used to facilitate the development of clinical skills towards competence. In this research study, the visual presentation of the model is in colour to simplify the model presentation without adding any meaning to the use of colour. The model presentation was formulated by using circular-, square and linear structures.

Circular structures in the model




Circular structures in the model represent parts of the model that is a unit with defined boundaries and continuous activity. The nurse educator, student nurse and collaboration are circular structures (as illustrated by  and ).

The nurse educator is presented as a circular structure with his/her own set of characteristics, e.g. knowledgeable, clinical competence, effective facilitator, organised, share information/interact and collaborate, compassionate, respectful, patience and co-operative, support and encourage others, confident, dynamic and enthusiastic, fair and non-judgemental, have a sense of humour, admitting mistakes and limitations and are flexible. The student nurse is another circular structure with his/her own set of characteristics, e.g. the student nurse is an adult learner with emotional intelligence, is self-directed, experienced, ready to learn, has a learning orientation, is self-motivated, an active participant and reflect on what was learned. The nurse educator and student nurse are constantly in interaction with each other, leading us towards the last circular structure, which is collaboration. Collaboration forms a border around the model indicating the constant interaction between the nurse educator, HFS and the student nurse in order to facilitate the development of clinical skills.

Square structures in the model

The square structures in the model represent parts of the model that illustrate HFS (as illustrated by a ) embedded in the constructivist theoretical framework used by both the nurse educator and student nurse in their interaction with each other. High-fidelity simulation has its own aspects, e.g. a unique environment, a skills facilitator, appropriate feedback and reflection strategies and the use of teaching-learning methods to enhance theory-practice integration. The square structure at the bottom of the model represents the clinical skills development through the use of HFS as a teaching-learning method to facilitate critical thinking skills and clinical judgement (as illustrated by a ).

Linear structures in the model

The use of lines and arrows are described as linear structures in this model. The two-way linear structure running between the nurse educator and HFS and between HFS and the student nurse (as illustrated by ) , indicate the interaction between the nurse educator, HFS and the student nurse. The arrow (as illustrated by ) indicates the use of HFS as teaching-learning method at a SAPHEI. The one-way linear structure (as illustrated by ) running between the nurse educator and the clinical skills development and the clinical skills

development and the student nurse indicate that the nurse educator and student nurse works towards the same goal, namely the development of clinical skills.

6.4.4.3 Relational statements

According to Walker and Avant (2011:59), relational statements are an important aspect in model development as it states an association between two or more concepts during the process of constructing a scientific body of knowledge. The process of constructing relational statements starts with identifying, examination and analyses of major concepts, whereby relational linkage between these concepts will be done through a process of deductive reasoning (Walker & Avant, 2011:197). The relational statements should be assessed and indicated according to empirical support (Walker & Avant, 2011:198).

The relational statements are derived from deductive reasoning from the empirical conclusion statements, which are aimed at the interpretation of associations between the major concepts. Each relational statement will be supported in comments commencing with the abbreviation 'v.' indicating 'vide' in reference to the conclusion statement numbers indicated by cross-referencing Table 6.2 wherein the empirical statements are given (Merriam-Webster online dictionary, 2019). The relational statements are as follows:

- The nurse educator as a facilitator of clinical skills development in student nurses should possess certain characteristics and skills (knowledgeable, clinically competent, effective facilitator, organised, share information/interact and collaborate, be compassionate and respectful, patience and co-operative, to support and encourage others with confidence, to be dynamic and enthusiastic, fair and non-judgemental, have a sense of humour, admitting mistakes and limitations and to be flexible), acknowledging the uniqueness of each student nurse in order to ensure an effective teaching-learning environment, which will facilitate clinical competence of student nurses by the integration of theory into practice, stimulating clinical judgement (v: 1, 2, 3, 6, 8, 9, 10, 11, 12).
- The student nurse as an adult learner displays emotional intelligence, self-directed learning, has experience, demonstrates learning readiness and learning orientation, which leads to them being task-orientated and problem-directed, approaches learning intentionally, is self-motivated, an active participant of their own learning, who acquires meaning and understanding through reflection and continuous collaboration with the nurse educator and peer group in order to gain clinical competency through the use of HFS as teaching-learning method (v: 4, 5, 8, 9, 10, 13, 15).

- The nurse educator prepares the student nurses for clinical practise as part of the student's curriculum, by creating a safe and conducive environment for clinical skills development through the use of HFS as a teaching-learning method and continuous collaboration with the student nurse towards clinical competence (v: 6, 8, 9, 10, 11, 15).
- High-fidelity simulation as a teaching-learning method and collaboration between the nurse educator and student nurse supports the development of clinical skills towards clinical competence (v: 6, 8, 9, 10, 15).
- High-fidelity simulation embedded in constructivist theoretical framework enhances clinical skills development towards clinical competence if and when applied by a skilled facilitator using the correct equipment, resources and through proper planning using teaching-learning methods, which will lead to theory-practice integration and the development of clinical skills, critical thinking and clinical judgement (v: 6, 8, 9, 10, 11, 12).
- Collaboration is a continuous process between the nurse educator and student nurse to ensure safe and comprehensive patient care by applying HFS as a teaching-learning method to develop clinical skills towards clinical competence (v: 8, 15).

6.4.5 Process description

The process description of the practice model for HFS at a SAPHEI is a series of events that reveals a course of action as illustrated in Figure 6.1.

As previously described in this chapter (6.4.2) the context for this practice model is a SAPHEI offering nursing education programmes for undergraduate student nurses. Clinical skills development forms part of the curriculum to ensure safe and competent nurse practitioners at the completion of a nursing programme. Due to various challenges, the teaching and learning of clinical skills became challenging and therefore the need for alternative teaching-learning methods to ensure safe and competent nurse practitioners.

The nurse educator facilitates the clinical skills training for student nurses at the SAPHEI and should display the following characteristics and attributes: knowledgeable, clinical competent, effective facilitator of clinical skills, organised, an effective communicator that share information and collaborate, compassionate and respectful, patience and co-operative, supportive and encourage others with confidence, dynamic and enthusiastic, fair, non-judgemental, have a sense of humour, admit her mistakes and limitations and flexible. The nurse educator is in constant interaction with the student nurse and must acknowledge the uniqueness of each student nurse.

The student nurse, a pre-registered diploma student at a SAPHEI studying towards a qualification in the nursing profession, is an adult learner who displays emotional intelligence, self-direction, has experience, demonstrates learning readiness and learning orientation, which is task-orientated and problem-directed, approaches learning intentionally, is self-motivated, an active participant of their own learning, endeavours and acquires meaning and understanding through reflection. The student nurse is in constant interaction with the nurse educator and their peer group.

The nurse educator and student nurse enter the teaching-learning context with the same aim, striving towards the development of clinical competence. High-fidelity simulation as a teaching-learning method, embedded in constructivist theoretical framework, forms the interaction method used between the nurse educator and the student nurse to facilitate critical thinking skills and clinical judgement, which would lead to clinical competency. Clinical competence is the capacity to apply knowledge and skills (cognitive and psychomotor skills) with an appropriate attitude (affective skills) in various environments and circumstances. High-fidelity simulation as a teaching-learning method supports the development of clinical skills, critical thinking skills and clinical judgement, therefore enhancing clinical competence.

High-fidelity simulation as teaching-learning method at a SAPHEI forms part of the nursing student's curriculum to prepare them for clinical practice by creating a safe environment for clinical skills development. The nurse educator should take certain aspects into consideration when creating a context conducive to teaching-learning. The HFS environment, equipment used and other resources should be planned and organised for learning to take place. The nurse educator should be skilled and competent in facilitating teaching-learning methods, such as problem-based learning and self-directed learning strategies, to be able to integrate theory into practice by means of experiential learning strategies, constructive feedback and reflection on the learning that took place in order for the student nurse to develop critical thinking skills and clinical judgement. The nurse educator should be skilled in technological developments to facilitate a HFS session. Clinical competence of the nurse educator is important to ensure a safe and conducive environment for the student to gain experience and thus new knowledge. The student nurse as an active participant, enter the learning environment guided by the nurse educator. After repetitive practice and facilitation from the nurse educator, constructive feedback from the nurse educator as well as through peer group discussions and reflective practices, the student nurse becomes an independent practitioner by gaining confidence and competence, developing critical thinking skills and clinical judgement by using self-directed learning and problem-based learning strategies to gain clinical competence.

Effective collaboration between the nurse educator and the student nurse in the HFS environment is essential for achieving clinical competence. Collaboration between the nurse educator and student nurse continuously changes according to the phase of teaching-learning interaction.

6.5 EVALUATION OF THE MODEL

The credibility of a practice model is ensured by evaluating it in accordance with certain concepts to analyse its applicability to the clinical practice (Alligood, 2008:46). Chinn and Kramer (2011:228) concur with this statement by emphasising the importance of validation of the practice model to determine whether the content is appropriate not just for the clinical situation but also relevant to the clinical population. Alligood (2018:46) and Chinn and Kramer (2011:197) concur that the five components for use when evaluating a model are:

1. Clarity of the model;
2. Simplicity of the model;
3. Generality of the model;
4. Accessibility of the model; and
5. Importance of the model.

The evaluation tool is provided in Annexure 13 that illustrates the array of questions denoting the criteria used to evaluate the model in this research study. A review of this evaluation of the model as outlined in chapter 2 (2.3.2.2) are now discussed.

6.5.1 Self-evaluating synopsis using the criteria of Chinn and Kramer (2011)

Dickoff *et al.* (1968:415-435) state that if a practice model is developed and operational, the theory is seen as 'true'. Therefore Dickoff *et al.* (1968) did not deem it necessary to evaluate the model but rather implement the model and if it is functional the purpose with the model had been achieved.

The evaluation is provided as a synopsis using the criteria of Chinn and Kramer (2011:197) (Annexure 13). The evaluation of the practice model was an iterative process with section 6.4 on the model description as a process of refinement. The aspects that were addressed in the model description in section 6.4 are indicated in Table 6.4 that follows. The revisions and changes were effected iteratively and directly with the text on model description aimed at the outcome of having a model in this research study that would be operationalized and will be

discussed in section 6.7 of this chapter that provides guidelines and activities for the implementation of the model.

Table 6-4: Synopsis of the self-evaluation of the model using the criteria of Chinn and Kramer (2011)

CHINN AND KRAMER (2011:198-204) EVALUATION CRITERIA FOR A NURSING MODEL	
Criteria for evaluation with trigger questions	Evaluator comments
<p>1. Clarity of the model:</p> <p>a. Semantic clarity:</p> <ul style="list-style-type: none"> • Are the concepts clearly defined? • Are the definitions understandable and coherent? 	<ul style="list-style-type: none"> • Concepts were defined from empirical data as well as literature review (Chapter 5).
<p>b. Semantic consistency:</p> <ul style="list-style-type: none"> • Are the concepts congruent and in harmony with the definitions, purpose and aligned to the relationships featured in the practice model? 	<ul style="list-style-type: none"> • All main concepts required a greater depth of text through a literature review to portray a descriptive richness (Chapter 5).
<p>c. Structural clarity:</p> <ul style="list-style-type: none"> • Are the illustrated connections and logical reasoning coherent with the descriptive elements of the practice model? 	<ul style="list-style-type: none"> • Changes were made to the text after the professional editing of this thesis, which enhanced the clarity.
<p>d. Structural consistency:</p> <ul style="list-style-type: none"> • Do the structural forms used for illustration as a conceptual map enhance clarity and comprehension of the descriptive elements of the practice model? 	<ul style="list-style-type: none"> • All figures illustrate the relationships between the concepts (chapters 5 and 6).

Criteria for evaluation with trigger questions	Evaluator comments
<p>2. Simplicity of the model:</p> <ul style="list-style-type: none"> • Are the number and differentiation of concepts and interrelationships least in simplicity or acceptable in complexity? • Does the contextual situation warrant the various concepts to enhance understanding of the concepts and their interrelatedness in the practice model? • Does the practice model serve to describe, explain and/or predict concepts or their interrelatedness in practice? 	<ul style="list-style-type: none"> • Chapter 5 shows the figures from a single diagram in figure 5.2 with progressive and incremental concepts and their relationships in figures 5.3, 5.4, 5.5, 5.6, 5.7 including the final and complete version of the practice model in figure 6.1.
<p>3. Generality of the model:</p> <ul style="list-style-type: none"> • Do the breadth of scope and specificity of purpose appraise the broad empirical experiences of concepts for the purpose of nursing? • Are ideas arranged to facilitate application to practice and the health care team while embodying nursing as a discipline? • Are the concepts of the individual health, environment and society featured broadly in the general application of the model? 	<ul style="list-style-type: none"> • The text describing the main concepts and relationships were refined in an iterative process as figures and tables were added incrementally for clarity (chapters 5 and 6). • The model may also guide future research and be used for implementation in the South African context on the facilitation of HFS as a teaching-learning method for clinical skills development.
<p>4. Accessibility of the model:</p> <ul style="list-style-type: none"> • Would the concepts be identifiable as empirical indicators in practice within the realm of nursing? • Do the definitions of the concepts adequately manifest their meanings in the nursing practice setting that is specified? 	<ul style="list-style-type: none"> • The concepts in this practice model can be used as empirical indicators for clinical education practice in HFS as a teaching-learning method (Chapter 5).

Criteria for evaluation with trigger questions	Evaluator comments
<ul style="list-style-type: none"> • Despite either the simplicity or complexity of the model, do the concepts create conceptual meanings in the clinical practice setting? 	<ul style="list-style-type: none"> • The definitions and meanings of the concepts, although contextualized in education practice, are specified for SAPHEI (chapters 5 and 6). • The practice model can be made accessible to other higher education institutions through the publishing of articles and presentations at conferences.
<p>5. Importance of the model:</p> <ul style="list-style-type: none"> • Does the model have clinical value or practical significance in the targeted area of clinical nursing practice? • Is there futuristic and pragmatic value in the applicability to lead future practise of nursing in the targeted area? • Does the practice model create understanding and the potential for nursing education and research? • Does the practice model differentiate the focus or nature of nursing as a discipline separate to other service professions? 	<ul style="list-style-type: none"> • This is the first model for HFS as a teaching-learning method in clinical skills development at a SAPHEI. This practice model has the potential for further research, especially when implemented in the education practise setting.

Criteria for evaluation with trigger questions	Evaluator comments
<p>Summary comments:</p>	<ul style="list-style-type: none"> • This practice model would be applicable and related while minor revisions to the description could be embraced on the condition that the entire practice model must always be evaluated for comprehensiveness using the evaluation criteria as set out in Annexure 13.

6.6 THEORY TESTING

Theory testing is an important step as it ensures continuous development and advancement of a theory (Chinn and Kramer, 2011:199). According to Walker and Avant (2011:194), theory testing allows one to examine both the strengths and the weaknesses, leading to the development or refinement of such a theory.

Theory testing is outside the scope of this research study and will be done as part of further research studies within the SAPHEI.

6.7 GUIDELINES AND ACTIONS FOR IMPLEMENTATION OF THE MODEL

The guidelines and actions for operationalisation are divided into three categories, namely the micro-, meso-, and macro-levels. These levels are briefly described followed by guidelines for operationalisation of this model.

6.7.1 Micro-level guidelines and actions for operationalisation

The micro-level refers to the psycho-social dimension of the nurse educator and student nurse. The psychological dimension refers to the intra-personal dynamics present within the nurse educator and student nurse. The social dimension refers to the interpersonal dynamics between the nurse educator and student nurse as well as the student nurse with his/her peer group. The guidelines and actions will be presented in Table 6.5.

Table 6-5: Guidelines and actions for operationalisation on micro-level

GUIDELINES	ACTIONS
<p>Include HFS in the micro-curriculum as a teaching-learning method for the enhancement of clinical skills development</p>	<ol style="list-style-type: none"> 1. The clinical portfolio of evidence must be structured to guide the student for specific outcomes obtained through HFS. 2. Clinical learning opportunities should include HFS sessions.
<p>Enhance the teaching-learning dynamics between the nurse educator and student nurse</p>	<ol style="list-style-type: none"> 1. The nurse educator's attitude towards student nurses should consist of compassionate, respectful, fair and non-judgemental behaviour, acknowledging the uniqueness and learning style of each student nurse. 2. The nurse educator should create a positive learning environment where he/she can facilitate clinical learning opportunities through HFS methods. 3. Planned meaningful learning events should include collaboration and interaction between the nurse educator, the student nurse and their peer group. 4. The nurse educator must share his/her clinical expertise by demonstrating procedures to the student nurse using HFS as a method. 5. During facilitation sessions, the nurse educator must make effective use of teaching-learning methods to encourage student nurses to be active participants in their learning process.

GUIDELINES	ACTIONS
	<ol style="list-style-type: none"> <li>6. There must be continuous interaction between the nurse educator and student nurse to ensure clarification and feedback is received, which is essential for the student to make new associations in the development of clinical skills. <li>7. The nurse educator must encourage group participation and peer feedback as reflective practices on what was learned during the simulation session. <li>8. The adult student nurse should display emotional intelligence, self-direction, and current experiences, demonstrate readiness to learn and should be learning-orientated, task-orientated and problem-directed, should approach learning intentionally, be self-motivated, and an active participant of their learning, endeavours and acquires meaning and understanding through reflection. <li>9. Peer evaluation should take place after planned HFS sessions to identify the areas of incompetence to enhance learning. <li>10. Motivation, teamwork and collaboration should be enforced by the nurse educator during simulation sessions by means of conflict management, use of interpersonal skills and constructive feedback.

GUIDELINES	ACTIONS
Enhance collaboration between the nurse educator, training and development facilitator and clinical facilitator, the nurse educator and student nurse, and between the student nurses and themselves.	<ol style="list-style-type: none"> 1. The focus of collaboration should be on cooperation, which will be obtained through regular planning and feedback meetings. 2. Enhance mechanisms to ensure effective communication between all the stakeholders by implementing policies and procedures.

6.7.2 Meso-level guidelines and actions for operationalisation

The meso-level refers to the context of a SAPHEI level and the clinical setting in which the nurse educator and student nurse are occupied with healthcare. This implies that PHEI's factors are taken into consideration in the formation of the guidelines. The following organisational factors are found on the meso-level:

- Organisational structure;
- Organisational governance;
- Organisational mission and vision;
- Organisational culture and values;
- Specific organisational issues; and
- Organisational policies and procedures.

Table 6.6 summarises the guidelines and actions for the meso-level operationalisation of this practice model.

Table 6-6: Guidelines and actions for operationalisation on meso-level

GUIDELINES	ACTIONS
<p>Enhance the development of a meso-curriculum for the implementation of HFS as a clinical teaching-learning method for the student nurse.</p>	<ol style="list-style-type: none"> 1. Establish policies and guidelines for HFS within the PHEI. 2. Present workshops to share the practice model and to empower the nurse educators to use HFS as a teaching-learning method to enhance/promote the clinical skills of student nurses towards competence. 3. Have feedback meetings to monitor the progress of the implementation of the practice model.
<p>Establish collaboration and trust between nurse educators, training and development facilitators and clinical facilitators in the PHEI.</p>	<ol style="list-style-type: none"> 1. Establish an atmosphere where nurse educators feel empowered and motivated to work. 2. Performance appraisals should be done twice a year whereby the nurse educator takes responsibility for personal empowerment. 3. Empower nurse educators by means of in-service and formal training.

6.7.3 Macro-level guidelines and actions for operationalisation

The macro-level refers to the national context for operationalisation of this practice model. The following factors were taken into consideration with regard to the macro-level:

- National social and political climate and rival philosophies;
- Social partnerships and coalitions;
- National education and health sector and the National Education and Health Plan;

- South African civil society; and
- Corporate governance.

Table 6.7 summarises the guidelines and actions for the macro-level operationalisation of this practice model.

Table 6-7: Guidelines and actions for operationalisation on macro-level

GUIDELINES	ACTIONS
Enhance the development of a macro-curriculum for the implementation of HFS as a clinical teaching-learning method.	<ol style="list-style-type: none"> 1. Develop policy guidelines for the implementation of HFS as a clinical teaching-learning method on government level, e.g. on educational level working with the advisor of the Minister of Higher Education and Training, Minister of Health, the SANC; the Nursing Education Association and team members from other PHEI in South Africa. 2. Develop a macro-curriculum with input from educators, health professionals and other applicable members of the public.
Establish collaboration and trust between higher education institutions in South Africa.	<ol style="list-style-type: none"> 1. Effective result-based communication by means of publishing scientific articles and presentations at conferences and/or workshops.

6.8 SUMMARY

The practice model was presented in a graphical description in this chapter. The evaluation of the model was reviewed using the selected evaluation criteria developed by nursing theory experts. The approach to the operationalisation of the practice model in a SAPHEI was discussed. The evaluation of the research study, limitations and recommendations for research, education and practice will follow in Chapter 7.

CHAPTER 7

EVALUATION OF THE RESEARCH STUDY, LIMITATIONS AND RECOMMENDATIONS FOR RESEARCH, EDUCATION AND PRACTICE

7.1 INTRODUCTION

The evaluation of the research study, the limitations, recommendation and transferability of the research study are presented before the penultimate personal reflection that leads to the summary of this thesis.

7.2 EVALUATION OF THE RESEARCH STUDY

In this section, each chapter is separately evaluated.

7.2.1 Chapter 1: Overview of the research study

In chapter 1 an overview of the research study was given to familiarise the reader with the introduction and the description of concepts central to this research study, including the background and rationale for this research study leading to the description of the statement of the problem. This research aimed to develop a practice model for nurse educators at a South African private higher education institution (SAPHEI) to facilitate the implementation of high-fidelity simulation (HFS) for future use in clinical skills development of student nurses. The researcher's approach to this research study was clarified by deliberating the meta-theoretical, theoretical and methodological assumptions applicable to this research study. The ethical considerations and universal standards for trustworthiness, validity and reliability applicable to this research study were also discussed.

7.2.2 Chapter 2: Research methodology

An in-depth discussion of the research methodology was given in chapter 2. This research study's research design utilised a convergent mixed methods, theory-generative and contextual research design (Creswell, 2014:8; Polit & Beck, 2017:735) to explore and describe the implementation of HFS with the aim of developing a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development of student nurses. The research process consisted of two phases and four objectives. Inductive and deductive research strategies were used to achieve these objectives, which includes:

Objective 1: to explore nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI;

Objective 2: to explore and describe the views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes at a SAPHEI;

Objective 3: to describe a conceptual framework for the development of a practice model to implement HFS in the nursing programmes at a SAPHEI; and

Objective 4: to develop a practice model to implement HFS in the nursing programmes at a SAPHEI.

Phase 1 entailed two steps. Step 1 of phase 1 consisted out of the concept identification of key- and sub-concepts, addressing objectives 1 and 2 and was discussed in chapters 3 and 4. All data gathered, synthesized and concepts identified from objectives 1 and 2 lead to step 2 of phase 1. Step 2 of phase 1 consisted out of the concept description and definition that was completed through objective 3 as discussed in chapter 5.

Phase 2 entailed two steps. Step 1 of phase 2 consisted out of the construction of the meaning of main and related concepts from the concept description and definitions identified from phase 1. Step 2 of phase 2 consisted out of the model construction through theory synthesis to address objective 4 as discussed in chapter 6.

The relevant research methods for each objective were discussed in each chapter.

7.2.3 Chapter 3: Nurse educators' current use of and experience of high-fidelity simulation in the nursing programmes at a South African private higher education institution

(Phase 1: Step 1: Objective 1)

In chapter 3 the research method, including population and sampling, data collection, data analysis as well as rigour and the research findings of objective 1 was described. Objective 1 explored and described nurse educators' current use of and experience of HFS in the nursing programmes at a SAPHEI employing statistical and content analysis. Five key concepts and nine sub-concepts were identified during the content analysis done in chapter 3.

7.2.4 Chapter 4: Views/assumptions and beliefs of nurse educators on implementation and use of high-fidelity simulation in the nursing programmes at a South African private higher education institution

(Phase 1: Step 1: Objective 2)

Objective 2 of step 1 in phase 1 explored and described the views/assumptions and beliefs of nurse educators on the implementation and use of HFS in the nursing programmes of a

SAPHEI. The research method including the population and sampling, data collection, data analysis as well as rigour and the research findings was described. In chapter 4, five key concepts and fifteen sub-concepts were outlined in Table 4.3.

7.2.5 Chapter 5: Conceptual framework

(Phase 1: Step 2: Objective 3)

Objective 3 of phase 1, step 2 presented the conceptual framework for the development of a practice model to implement HFS in the nursing programmes of a SAPHEI. Concepts were identified from the empirical data (Chapters 3 and 4), concept classification and an in-depth literature review. The survey list of Dickoff *et al.* (1968:423) was used for concept classification and was outlined in Figure 5.1.

7.2.6 Chapter 6: Practice model for the implementation of high-fidelity simulation

(Phase 2: Steps 1 and 2: Objective 4)

The practice model was developed, explained and evaluated in chapter 6. Guidelines and actions for operationalization were also outlined. The practice model is unique as it was the first practice model for the implementation of HFS at a SAPHEI in clinical skills development of student nurses. An in-depth literature review was conducted on the concepts identified from the empirical data (chapter 5); deductive and inductive reasoning strategies were used to describe the conceptual framework and ultimately the practice model.

7.3 LIMITATION OF THE RESEARCH STUDY

The limitation of the research study relates to the contextual aspects of the research setting and some methodological considerations:

- The research study was conducted at one SAPHEI, consequently limiting the findings to one SAPHEI. However, it is foreseen that this model is transferable to other private and public higher education institutions.

Regardless of the limitation of this research study, its purpose to develop a practice model for nurse educators at a SAPHEI to facilitate the implementation of HFS in clinical skills development of student nurses was achieved.

7.4 RECOMMENDATIONS OF THE RESEARCH STUDY

The recommendations for research, education and practice are given below:

7.4.1 Recommendations for research

- The practice model should be evaluated after implementation to evaluate the application and to make changes, if necessary; and
- To present this practice model at conferences and/or workshops as well as the publishing of articles.

7.4.2 Recommendations for nursing education

- The practice model must first be implemented and its application evaluated in the SAPHEI where the researcher is working;
- High-fidelity simulation, as a clinical teaching-learning method, should be added to the curriculum of the nursing programmes presented at the SAPHEI; and
- After successful implementation at the SAPHEI, the practice model can be implemented by other higher education institutions in South Africa.

7.4.3 Recommendations for practice

- The guidelines and actions for the operationalisation of the practice model should be made available to all affiliated clinical facilities in South Africa; and
- Nurse educators and student nurses should be trained to use HFS as a clinical teaching-learning method to enhance clinical skills development through theory-practice integration, which will lead to patient safety.

7.5 PERSONAL REFLECTION

As a nurse educator I identified the need for alternative teaching methods to enhance clinical skills development of student nurses, therefore the investigation in HFS during my masters' degree. It became evident that nurse educators did not use HFS due to 'fear of the unknown' and the limitation in technical skills. Therefore, the development of a practice model to make the 'unknown' 'known' and to assist nurse educators employing a practice model to facilitate the implementation of HFS. I believe that this practice model can bridge a gap between theory and practice, leading to theory-practice integration as well as clinical judgement and critical thinking skills development, consequently enhancing clinical competence and confidence of student nurses in the absence of clinical opportunities due to overcrowding of clinical facilities, patient turnover and lack of trained mentors or facilitators in the clinical environment.

7.6 SUMMARY OF THE RESEARCH STUDY

In this final chapter, the operationalisation of the practice model was described, and the evaluation of the research study, its limitations and recommendations as well as the reflexivity of the research process. The conclusion of the research study and this thesis is the end of this research journey. Implementing the practice model will be the beginning of a new adventure in nursing education at the SAPHEI selected for this research study. Nursing educators are standing on the brink of a new era in nursing education in South Africa and, therefore, the perfect timing for the implementation of the recommended practice model to facilitate the clinical skills development of student nurses, leading to competent, skilled and confident nurses who will enhance quality patient care and patient safety.

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ANNEXURE 1: HREC ETHICAL APPROVAL CONFIRMATION LETTER



Dr B Scrooby
Nursing
NuMIQ

Private Bag X8001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

**Health Sciences Ethics Office for Research,
Training and Support**

Health Research Ethics Committee (HREC)

Tel: 018-285 2291
Email: wayne.towers@nwu.ac.za

14 August 2018

Dear Dr Scrooby

APPROVAL OF DOCUMENTS SUBMITTED DURING THE PROGRESS OF THE STUDY

Ethics number: NWU-00011-18-A1

Kindly use the ethics reference number provided above in all future correspondence or documents submitted to the administrative assistant of the Health Research Ethics Committee (HREC).

Study title: High-fidelity simulation: a practice model for nurse educators at a South African private higher education institution

Study leader: Dr B Scrooby

Student: EM Powell-12604119

You are kindly informed that the documentation submitted to the HREC, as per the conditions set in your approval letter, was reviewed by the designated reviewers. The reviewers have indicated that the submitted documents are acceptable and that you as the researcher can proceed with implementing the aforementioned documentation in your approved project. They do, however, suggest that the questionnaire be sent for proofreading before implementation.

We wish you the best as you conduct your research. If you have any questions or need further assistance, please contact the Faculty of Health Sciences Ethics Office for Research, Training and Support at Ethics-HRECAppl@nwu.ac.za.

Yours sincerely

Prof Wayne Towers
HREC Chairperson

Prof Minnie Greeff
Ethics Office Head

ANNEXURE 2: PERMISSION TO CONDUCT STUDY FROM SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

RESEARCH APPLICATION – E POWELL

Date: 29/06/2018

FOR APPROVAL



Chief Human Resources Officer

G VAN WYK

NOTES

- Locality • [redacted] Learning Centres
- Value of Study • Enhance simulated training in the company
- Employee • Yes
- Impact • Educators
- Supported by hospital • Supported by: Learning Centre Managers (LC Nelspruit, Limpopo, Central Region, Northern Cape, Tshwane Region, Cape Region) and Estelle Coustas

ANNEXURE 3: INFORMED CONSENT – LEARNING AND DEVELOPMENT FACILITATORS AND CLINICAL FACILITATORS

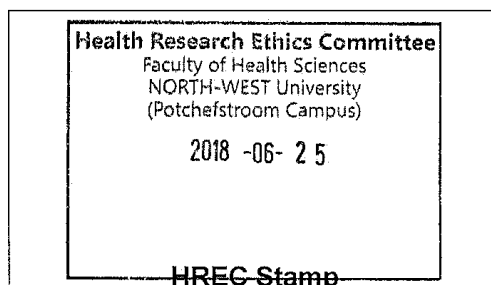


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INFORMED CONSENT DOCUMENTATION FOR LEARNING AND DEVELOPMENT FACILITATORS AND CLINICAL FACILITATORS AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

TITLE OF THE RESEARCH STUDY: HIGH-FIDELITY SIMULATION: A PRACTICE MODEL FOR NURSE EDUCATORS AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION.

ETHICS REFERENCE NUMBERS: NWU-00011-18-S1

PRINCIPAL INVESTIGATOR: DR B. SCROOBY & DR A. VAN GRAAN

POST GRADUATE STUDENT: MRS E.M. POWELL

ADDRESS: CR MAIN ROAD AND PETER PLACE, BRYANSTON, 2021

CONTACT NUMBER: 082 6727 696

You are being invited to take part in a **research study** that forms part of a Degree Philosophy Doctor (PhD). Please take some time to read the information presented here, which will

explain the details of this study. Please ask the researcher or person explaining the research to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is **entirely voluntary** and you are free to say no 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 now.

This study has been approved by the Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00011-18-S1) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

1.1 What is this research study all about?

- *We plan to develop a practice model to facilitate the implementation of high-fidelity simulation. In order to reach this objective we need to:*
 - *Explore the current use of and experience you have with high-fidelity simulation as an educator and*
 - *To explore your views/assumptions and beliefs regarding the use and implementation of high-fidelity simulation as a teaching method.*
- *This study will be conducted in a venue of your choice and will involve completing an electronic questionnaire with 15 questions, via a link that will be sent to you in an e-mail. A semi-structured interview, via Vidyio, with experienced health researchers trained in interviewing skills will form the second part of the data collection process. Hundred and twenty (N=120) participants will be included in this study.*

1.2 Why have you been invited to participate?

- *You have been invited to be part of this research because you are permanently employed as a learning and development facilitator or clinical facilitator at a clinical facility that formed part of one of the seven (7) learning centres of the private higher education institution.*
- *You also fit the research because you are involve in clinical accompaniment of student nurses and will add value to the study as your opinion can contribute to the development of the practice model.*

- *You will not be able to take part in this research if you are not a learning and development facilitator or clinical facilitator at a approved clinical facility that form part of the private higher education institution as this study will focus on nursing programmes.*

1.3 What will be expected of you?

- *You will be expected to answer a questionnaire via an internet link that will be sent to you. The questionnaire will not take longer than 20 minutes to complete and consist out of four (4) parts; demographics, course identification, using of and experience with simulation as teaching method and general feedback.*
- *And individual, semi-structured interview via Vidyo (internet/Skype), aimed at exploring and describing the views/assumptions and beliefs of nurse educators on the implementation of high-fidelity simulation, will be conducted if you indicated that you would like to take part in this interview process. The interview consists out of five questions and will not take longer than 90 minutes. The interview will be recorded to ensure accurate transcribing of the interview.*
 - *Interview questions:*
 - *What is your view about the implementation of high-fidelity simulation as teaching method in nursing programmes at your institution?*
 - *What is your expectation of high-fidelity simulation as teaching method?*
 - *What is your perception of high-fidelity simulation as teaching method to enhance clinical competence of nursing students?*
 - *What is your opinion about the current practices and use of high-fidelity simulation in your institution?*
 - *What value does high-fidelity simulation add as teaching method in a nursing programme?*

1.4 Will you gain anything from taking part in this research?

- *There is no direct benefit to you if you take part in this study.*
- *The other gains of the study are for researchers to gain new knowledge regarding high-fidelity simulation and an indirect gain for nurse educators in future.*

1.5 Are there risks involved in you taking part in this research and what will be done to prevent them?

- *The risks to you in this study are as tabulated below:*

Possible risks and preventive measures: questionnaire

Possible Risk	Preventive Measures
<i>Physical discomfort in the form of fatigue, boredom or discomfort. In this study fatigue or boredom will only be possible during the completion of the questionnaire.</i>	<i>The questionnaire will take 20 minutes to complete. You can withdraw from the study at any time. Fatigue and discomfort will be limited as you can answer the questionnaire when suited to you.</i>
<i>Loss of work time during the questionnaire.</i>	<i>You can complete the questionnaire at any time convenient to you. This can be done from home or at work. The questionnaire will not take longer than 20 minutes to complete.</i>
<i>Economic harm due to financial cost incurred for completing the questionnaire online.</i>	<i>There will be no cost to you as the researcher has permission to conduct the study from the higher education institution and you can use the resources available to you to complete the questionnaire at work.</i>

Possible risks and preventive measures: interview

Possible Risk	Preventive Measures
<i>Physical discomfort in the form of fatigue or discomfort. In this study fatigue will only be possible during the interview.</i>	<i>The interview will be conducted during a convenient time for you by means of a Video interview. You can withdraw from the study at any time during the research process. Fatigue and discomfort will be limited as you can inform the researcher at any time during the interview if you need to take a break.</i>
<i>Loss of privacy due to the one-on-one semi-structured interview.</i>	<i>Confidentiality and privacy will be adhered to during this study by the researcher. The researcher will ensure privacy and confidentiality of responses by being the only person working with the data, coding the data and store the data in a secure and safe place. A co-coder will be used for triangulation of data.</i>

	<i>The co-coder will receive the data without the identification of the participants and she will sign a confidentiality agreement.</i>
<i>Psychological or emotional distress due to self-disclosure or introspection or fear of the unknown is possible in this research study.</i>	<i>Privacy and confidentiality will be upheld. The data will be used to describe high-fidelity simulation and will not test you're your knowledge or at any stage have a negative inference to you.</i>
<i>Loss of work time during the interview.</i>	<i>You can choose to be part of the study. The interviewed will be at a time that is convenient for you. This will be done at work with permission of the direct line manager (head educator/gatekeeper).</i>
<i>Economic harm due to financial cost incurred for traveling.</i>	<i>Due to the Vidyo interview there will be no cost incurred by you or the researcher. Cost of using the internet and Vidyo is for the company and not you. The researcher has permission to use the equipment.</i>

1.6 How will we protect your confidentiality and who will see your findings?

- *Anonymity of your findings will be protected by keeping the information you share strictly confidential. The questionnaire is completed via a link on the private institution's intranet. Your information will not be traced if you answer the questionnaire via the link. Your privacy will be respected by adhering to your anonymity and confidentiality. The independent researcher will sign a confidentiality agreement. Your results will be kept confidential by ensuring anonymity; your name will not be recorded with your responses or identified in any way. No names of participants will be made public at any point during the study. The questionnaire was designed in such a way as to ensure you will not be recognised through completion of the questionnaire. Only the researchers and co-coder will be able to look at your findings. The co-coder will receive the data obtained through the interviews without any names. She will also sign a confidentiality agreement. Findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. (As soon as data has been transcribed it will be deleted from the recorders.) Data will be stored for five (5) years.*

1.7 What will happen with the findings or samples?

- *The findings of this study will only be used for this study.*
- *The hard copies of the completed informed consent forms as well as the quantitative data will be locked away in the researcher's office after data collection till data analysis. Only the researcher will have access to this data until data collection is done. No personal information will be captured (questionnaires is completed anonymously via the link sent to you).*
- *On completion of the study the hard copies (informed consent forms as well as quantitative data) will be safely stored in a locked cupboard in the director's office of NUMIQ, School of Nursing Science- NWU, Potchefstroom Campus for a period of 5 years from completion of the study. These research materials (informed consent and quantitative data) will be destroyed after 5 years in accordance with the university's policy and regulation on data and record management.*

1.8 How will you know about the results of this research?

- *We will give you the results of this research at completion of the study.*
- *You will be informed of any new relevant findings by the researcher through two (2) articles that will be submitted for publication in a scientific journal; a copy of the thesis will be available in the library of the private higher education institution and the researcher will present the results at the training conference.*

1.9 Will you be paid to take part in this study and are there any costs for you?

This study is not funded.

No, you will not be paid to take part in the study because the data collection will take place during your normal working hours and in the learning centre that you are working.

There will thus be no costs involved for you, if you do take part in this study.

1.10 Is there anything else that you should know or do?

- *You can contact Elize Powell (researcher) at 011 709 2296/082 6727 696 or elize.powell@medilclinic.co.za if you have any further questions or have any problems.*

- You can also contact the Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 1206 or carolien.vanzyl@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and consent form for your own purposes.

1.11.1 Declaration by participant

By signing below, I agree to take part in the research study titled: **High-fidelity simulation: a practice model for nurse educators as a South African private higher education institution**, as indicated: (please indicate if you would be willing to be part of the interview process as well).

I will only complete the questionnaire:

I will complete the questionnaire and be willing to be part of the interview process:

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the consent from me, as well as the researcher and all my questions have been 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 handled in a negative way if I do so.
- I may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if I do not follow the study plan, as agreed to.

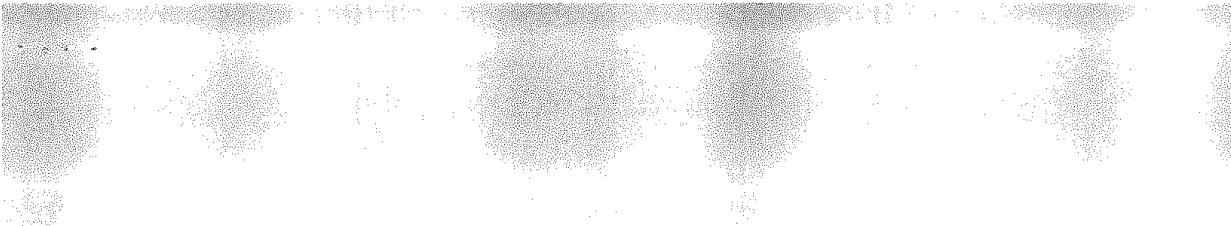
Signed at (*place*) on (*date*) 20....

.....

Signature of participant

.....

Signature of witness



1.11.2 Declaration by person obtaining consent

I (*name*) declare that:

- I clearly and in detail explained the information in this document to
.....
- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (*place*) on (*date*) 20....

.....

Signature of person obtaining consent

1.11.3 Declaration by researcher

I Elizabeth Maria Powell declare that:

- I had the information on this document explained by who I trained for this purpose.
- I was available should he/she want to ask any further questions via phone or e-mail.
- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them or I was available should he/she want to ask any further questions.
- The informed consent was obtained by an independent person (mediator).
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

I (*name*) declare that:

- I explained the information in this document to or I had it explained by who I trained for this purpose.

Signed at (*place*) on (*date*) 20....

.....
Signature of researcher

.....
Signature of witness

ANNEXURE 4: INFORMED CONSENT – NURSE EDUCATORS

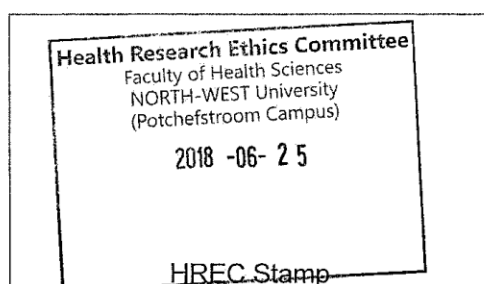


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INFORMED CONSENT DOCUMENTATION FOR NURSE EDUCATORS AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION

TITLE OF THE RESEARCH STUDY: HIGH-FIDELITY SIMULATION: A PRACTICE MODEL FOR NURSE EDUCATORS AT A SOUTH AFRICAN PRIVATE HIGHER EDUCATION INSTITUTION.

ETHICS REFERENCE NUMBERS: NWU-00011-18-S1

PRINCIPAL INVESTIGATOR: DR B. SCROOBY & DR A. VAN GRAAN

POST GRADUATE STUDENT: MRS E.M. POWELL

ADDRESS: CR MAIN ROAD AND PETER PLACE, BRYANSTON, 2021

CONTACT NUMBER: 082 6727 696

You are being invited to take part in a **research study** that forms part of a Degree Philosophy Doctor (PhD). Please take some time to read the information presented here, which will explain the details of this study. Please ask the researcher or person explaining the research

to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is **entirely voluntary** and you are free to say no 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 now.

This study has been approved by the Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00011-18-S1) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

1.1 What is this research study all about?

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 - *Explore the current use of and experience you have with high-fidelity simulation as an educator and*
 - *To explore your views/assumptions and beliefs regarding the use and implementation of high-fidelity simulation as a teaching method.*
- *This study will be conducted in a venue of your choice and will involve completing an electronic questionnaire with 15 questions, via a link that will be sent to you in an e-mail. A semi-structured interview, via Vidyio, with an experienced health researcher trained in interviewing skills will form the second part of the data collection process. Hundred and twenty (N=120) participants will be included in this study.*

1.2 Why have you been invited to participate?

- *You have been invited to be part of this research because you are permanently employed as an educator at one of the seven (7) learning centres of the private higher education institution.*
- *You also fit the research because you are involve in clinical accompaniment of student nurses and will add value to the study as your opinion can contribute to the development of the practice model.*
- *You will not be able to take part in this research if you are not a nurse educator at the private higher education institution as this study will focus on nursing programmes.*

1.3 What will be expected of you?

- You will be expected to answer a questionnaire via an internet link that will be sent to you. The questionnaire will not take longer than 20 minutes to complete and consist out of four (4) parts; demographics, course identification, using of and experience with simulation as teaching method and general feedback.
- And individual, semi-structured interview via Vidyo (internet/Skype), aimed at exploring and describing the views/assumptions and beliefs of nurse educators on the implementation of high-fidelity simulation, will be conducted if you indicated that you would like to take part in this interview process. The interview consists out of five questions and will not take longer than 90 minutes. The interview will be recorded to ensure accurate transcribing of the interview.
 - Interview questions:
 - What is your view about the implementation of high-fidelity simulation as teaching method in nursing programmes at your institution?
 - What is your expectation of high-fidelity simulation as teaching method?
 - What is your perception of high-fidelity simulation as teaching method to enhance clinical competence of nursing students?
 - What is your opinion about the current practices and use of high-fidelity simulation in your institution?
 - What value does high-fidelity simulation add as teaching method in a nursing programme?

1.4 Will you gain anything from taking part in this research?

- There is no direct benefit to you if you take part in this study.
- The other gains of the study are for researchers to gain new knowledge regarding high-fidelity simulation and an indirect gain for nurse educators in future.

1.5 Are there risks involved in you taking part in this research and what will be done to prevent them?

- The risks to you in this study are as tabulated below:

Possible risks and preventive measures: questionnaire

Possible Risk	Preventive Measures
<i>Physical discomfort in the form of fatigue, boredom or discomfort. In this study fatigue or</i>	<i>The questionnaire will take 20 minutes to complete. You can withdraw from the study at</i>

boredom will only be possible during the completion of the questionnaire.	any time. Fatigue and discomfort will be limited as you can answer the questionnaire when suited to you.
Loss of work time during the questionnaire.	You can complete the questionnaire at any time convenient to you. This can be done from home or at work. The questionnaire will not take longer than 20 minutes to complete.
Economic harm due to financial cost incurred for completing the questionnaire online.	There will be no cost to you as the researcher has permission to conduct the study from the higher education institution and you can use the resources available to you to complete the questionnaire at work.

Possible risks and preventive measures: interview

Possible Risk	Preventive Measures
Physical discomfort in the form of fatigue or discomfort. In this study fatigue will only be possible during the interview.	The interview will be conducted during a convenient time for you by means of a Video interview. You can withdraw from the study at any time during the research process. Fatigue and discomfort will be limited as you can inform the researcher at any time during the interview if you need to take a break.
Loss of privacy due to the one-on-one semi-structured interview.	Confidentiality and privacy will be adhered to during this study by the researcher. The researcher will ensure privacy and confidentiality of responses by being the only person working with the data, coding the data and store the data in a secure and safe place. A co-coder will be used for triangulation of data. The co-coder will receive the data without the identification of the participants and she will sign a confidentiality agreement.

<i>Psychological or emotional distress due to self-disclosure or introspection or fear of the unknown is possible in this research study.</i>	<i>Privacy and confidentiality will be upheld. The data will be used to describe high-fidelity simulation and will not test you're your knowledge or at any stage have a negative inference to you.</i>
<i>Loss of work time during the interview.</i>	<i>You can choose to be part of the study. The interviewed will be at a time that is convenient for you. This will be done at work with permission of the direct line manager (head educator/gatekeeper).</i>
<i>Economic harm due to financial cost incurred for traveling.</i>	<i>Due to the Vidyo interview there will be no cost incurred by you or the researcher. Cost of using the internet and Vidyo is for the company and not you. The researcher has permission to use the equipment.</i>

1.6 How will we protect your confidentiality and who will see your findings?

- *Anonymity of your findings will be protected by keeping the information you share strictly confidential. The questionnaire is completed via a link on the private institution's intranet. Your information will not be traced if you answer the questionnaire via the link. Your privacy will be respected by adhering to your anonymity and confidentiality. The independent researcher will sign a confidentiality agreement. Your results will be kept confidential by ensuring anonymity; your name will not be recorded with your responses or identified in any way. No names of participants will be made public at any point during the study. The questionnaire was designed in such a way as to ensure you will not be recognised through completion of the questionnaire. Only the researchers and co-coder will be able to look at your findings. The co-coder will receive the data obtained through the interviews without any names. She will also sign a confidentiality agreement. Findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. (As soon as data has been transcribed it will be deleted from the recorders.) Data will be stored for five (5) years.*

1.7 What will happen with the findings or samples?

- *The findings of this study will only be used for this study.*
- *The hard copies of the completed informed consent forms as well as the quantitative data will be locked away in the researcher's office after data collection till data analysis. Only the researcher will have access to this data until data collection is done. No personal information will be captured (questionnaires is completed anonymously via the link sent to you).*
- *On completion of the study the hard copies (informed consent forms as well as quantitative data) will be safely stored in a locked cupboard in the director's office of NUMIQ, School of Nursing Science- NWU, Potchefstroom Campus for a period of 5 years from completion of the study. These research materials (informed consent and quantitative data) will be destroyed after 5 years in accordance with the university's policy and regulation on data and record management.*

1.8 How will you know about the results of this research?

- *We will give you the results of this research at completion of the study.*
- *You will be informed of any new relevant findings by the researcher through two (2) articles that will be submitted for publication in a scientific journal; a copy of the thesis will be available in the library of the private higher education institution and the researcher will present the results at the training conference.*

1.9 Will you be paid to take part in this study and are there any costs for you?

This study is not funded.

No, you will not be paid to take part in the study because the data collection will take place during your normal working hours and in the learning centre that you are working.

There will thus be no costs involved for you, if you do take part in this study.

1.10 Is there anything else that you should know or do?

- *You can contact Elize Powell (researcher) at 011 709 2296/082 6727 696 or elize.powell@medilclinic.co.za if you have any further questions or have any problems.*

- You can also contact the Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 1206 or carolien.vanzyl@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and consent form for your own purposes.

1.11.1 Declaration by participant

By signing below, I agree to take part in the research study titled: **High-fidelity simulation: a practice model for nurse educators as a South African private higher education institution**, as indicated: (please indicate if you would be willing to be part of the interview process as well).

I will only complete the questionnaire:

I will complete the questionnaire and be willing to be part of the interview process:

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the consent from me, as well as the researcher and all my questions have been 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 handled in a negative way if I do so.
- I may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*) 20....

.....

Signature of participant

.....

Signature of witness

1.11.2 Declaration by person obtaining consent

I (*name*) declare that:

- I clearly and in detail explained the information in this document to
.....
- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (*place*) on (*date*) 20....

.....

Signature of person obtaining consent

1.11.3 Declaration by researcher

I Elizabeth Maria Powell declare that:

- I had the information on this document explained by who I trained for this purpose.
- I was available should he/she want to ask any further questions via phone or e-mail.
- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them or I was available should he/she want to ask any further questions.
- The informed consent was obtained by an independent person (mediator).
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

I (*name*) declare that:

- I explained the information in this document to or I had it explained by who I trained for this purpose.

Signed at (*place*) on (*date*) 20....

.....
Signature of researcher

.....
Signature of witness

ANNEXURE 5: PERMISSION TO USE THE QUESTIONNAIRE

Powell, Elize

To: Powell, Elize
Subject: RE: use of Jones comfort instrument

From: Amy Jones [mailto:amy.jones@wgu.edu]
Sent: 03 January 2017 04:28 PM
To: Powell, Elize
Subject: use of Jones comfort instrument

Good Morning Elizabeth,

Best wishes for 2017. I would be delighted if you would use the instrument I developed regarding the experience of nurse educators of High Fidelity simulation for your PhD studies. Please keep me posted on how things are going and if you have any questions.

Thank-you,

Amy

Amy Jones, RN, EdD
Evaluation Faculty
Western Governor's University
4001 South 700 East, Suite 700
Salt Lake City, UT 84107
Toll-free -1-877-435-7948 ext. 6681 (CST)



ANNEXURE 6: PERMISSION TO CHANGE THE QUESTIONNAIRE

From: Amy Jones [<mailto:amy.jones@wgu.edu>]
Sent: 04 April 2018 04:34 PM
To: Powell, Elize
Subject: RE: use of Jones comfort instrument
Importance: High

Hello Elize,

It is so good to hear from you. You most certainly have my permission to change the questionnaire.

Best wishes,

Amy

Amy Jones, RN, EdD
Evaluation Faculty
Western Governor's University
4001 South 700 East, Suite 700
Salt Lake City, UT 84107
Toll-free -1-877-435-7948 ext. 6681 (CST)



ANNEXURE 7: QUESTIONNAIRE

NURSING FACULTY SURVEY: CURRENT USE OF AND EXPERIENCE OF HIGH-FIDELITY SIMULATION

Your perceptions are important to nursing education. Your responses will be confidential and only used in group reports. Completing this survey indicates that you have read and understand the informed consent and that you give permission to take part in this research study.

For the purposes of the survey high-fidelity simulation are used interchangeably for terminology.

High-fidelity simulation can be defined as a realistic and interactive experience enhanced by the use of manikins that presents with abnormal and normal breath sounds and patterns, heart sounds, pulses, bowel sounds and computer-generated dialogues that provide subjective date (Billings & Halstead, 2009:323).

Part A: Demographics (Please select one)

1 of 15

Current Position

- Head Nurse Educator
- Nurse Educator
- Learning and Development Facilitator
- Clinical Facilitator

2 of 15

Type of degree

- B Degree
- Masters Degree
- PhD
- Other

3 of 15

Employment status

- Part-time (all faculty not considered permanent status)
- Full-time (those faculty considered permanent status)

4 of 15

Years of nursing practice experience

- 0-2 years
- 3-5 years
- 6-14 years
- 15 years +

5 of 15

Years as a nurse educator/facilitator

- 0-2 years
- 3-5 years
- 6-14 years
- 15 years +

6 of 15

Number of years teaching at the learning centre/clinical facility

- 0-2 years
- 3-5 years
- 6-14 years
- 15 years +

7 of 15

Describe your level of expertise utilizing high-fidelity simulation

- Novice
- Advanced Beginner
- Competent
- Proficient

8 of 15

Number of years experience utilizing high-fidelity simulation

- 0-2 years
- 3-5 years
- 6-14 years
- 15 years +

9 of 15

Please rate your comfort level with integrating technology into the classroom (e.g. Web training or Smart Board)

- Not at all
- Very little
- Somewhat
- Quite a bit
- A great deal

Part B: Simulation Course Identification

Please enter one of the dominant clinical skills you teach in your major course assignment.

10 of 15

Course

- Diploma in general nursing science (Bridging)
- Post basic nursing courses
- Other

11 of 15

Skill:

Part C: Using of and experience with Simulation as a Teaching Method

Please rate your comfort level in utilizing high-fidelity simulation:

12 of 15

	Not at all	Very little	Some what	Quite a bit	A great deal
for your nursing courses to supplement lecture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your nursing courses to replace lecture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your nursing courses to replace lab hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your nursing courses as a clinical make-up experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your nursing courses as a replacement for clinical hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your courses to provide active-learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your courses to promote feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your courses to promote collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in your courses to provide high-expectations of student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13 of 15

Please rate your experience utilizing high-fidelity simulation...	Not at all	Very little	Some what	Quite a bit	A great deal
to improve diversity in teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to improve time-on-task for student learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to improve student/faculty member interaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
for teaching nursing skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to evaluate student performance of this skill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part D:

14 of 15

Please provide any other feedback you have regarding utilization of high-fidelity simulation.

15 of 15

Please provide any other feedback you have regarding your experience of high-fidelity simulation.

If you indicated on the informed consent document that you would not like to participate in the semi-structured interview process and you have changed your mind, you can e-mail the researcher to inform her regarding your willingness to participate at elize.powell@mediclinic.co.za.

THANK YOU

ANNEXURE 8: STATISTICAL CONSULTATION



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

Statistical Consultation Services
Tel: +27 18 285 2016
Fax: +27 0 87 231 5294
Email: suria.ellis@nwu.ac.za

26 October 2018

Re: Thesis, Ms EM Powell, student number 12604119

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

A handwritten signature in black ink, appearing to read 'SM Ellis', is written over a horizontal line.

Prof SM Ellis (Pr. Sci. Nat)

Associate Professor: Statistical Consultation Services

ANNEXURE 9: LETTER OF ATTENDANCE: QUALITATIVE DATA COLLECTION STRATEGIES WORKSHOP



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

AUTHeR (Africa Unit for Transdisciplinary Health Research)
Tel: 018-299 2094
Email: petra.bester@nwu.ac.za

8 September 2017

Mrs Elizabeth M Powell
North-West University
Potchefstroom Campus
Private Bag X6001
Potchefstroom
2520

Dear Elize

LETTER OF ATTENDANCE: QUALITATIVE DATA COLLECTION STRATEGIES WORKSHOP

This letter serves as confirmation that you attended the Qualitative Data Collection Strategies workshop held on 31 July 2017 and 1 August 2017. This workshop was presented by Prof Minnie Greeff in collaboration with Prof Petra Bester and it covered individual interviews (in-depth and semi-structured) as well as focus groups.

Yours sincerely

Prof Petra Bester
Research Director
AUTHeR

Prof AF Kotzé
Executive Dean
Faculty of Health Sciences

Original details: (11311738) C:\Users\NWUSER\Documents\AUTHeR\Qualitative methodology workshop\Qualitative research strategies workshop letter of attendance_full workshop.docm
2 August 2017

ANNEXURE 10: DATA FOR OBJECTIVE 2

I: Interviewer

P: Participant

PARTICIPANT 1

Personal notes	Transcription	Concepts
<p>Observations: Participant appears relaxed and calm. She struggled with the English and I did encourage her to speak in Afrikaans if she feels that it is better for her to express herself. Participant does have a lot of experience with simulation, but not that much with HFS.</p> <p>Personal notes: This interview was conducted in both English and Afrikaans. The participant did not respond with confidence due to the English and was more willing to respond in Afrikaans. I should have switch to Afrikaans sooner. Technical problem was also a big interference with the interview. I listen tentatively and nod to show that I listen.</p>	<p>I: The other manikins? They can (participant interrupted).</p> <p>P: The other manikins, no they can't. We're in the process of of changing over to that feedback device that we need to purchase now so that is something that we are going to do in the future, umm you, you ... I think it's from January next year we're going to start with that. Umm, ja so so ... the others is not HF, umm but, but we are ... we would be. It would be wonderful if we could have something like that to simulation, like umm different noises for instance in in a chest where you do, umm where you can listen to your, your lungs or whatever.</p>	<p>Use LFS</p>

PARTICIPANT 2

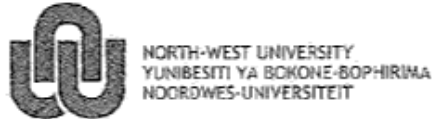
Personal notes	Transcription	Concepts
<p>Observations: She used a lot of hand signs to express herself. She holds her head at one stage. I picked up that I should move on and that that was a sign that she is done with the question. She is concerned about HFS and her lack of experience. She verbalised this during the interview: lack as educator; ignorance. Overall she was relaxed and comfortable.</p> <p>Personal notes: This was the 1st interview and I felt like I did not do well. I was afraid that I will not summarise or probe enough. After transcribing I realised that I did not do bad at all and that I got all I could from her. I must stop saying “Ja” and “ahemmm”.</p>	<p>I: I would like to know what is your view about the implementation of HFS (HFS), as teaching method in nursing programmes at your institution:</p> <p>P: Ok..ammm.. it is something that we haven't used as yet.</p> <p>I: Ok</p> <p>P: So I can't speak about it from the educators' point of few.</p> <p>I: Yes?</p> <p>P: But I have been the student in situations where HFS has been used and I found it incredibly beneficent ... mmmm...I don't know how much you would want me to elaborate here? I was just chatting in the office about this the other day and some of the other facilitators were a little concerned that it not the way to go, but I think with us being in the private sector ... I trained many moons ago...</p>	<p>Experience</p> <p>Beneficent</p> <p>Concern</p>

PARTICIPANT 16

Personal notes	Transcription	Concepts
<p>Observations: Participant nod head after each sentence. Smile and are comfortable</p> <p>Personal notes: Participant was comfortable during the interview. There was no need for silences as the participant interacted well and is familiar with HFS.</p>	<p>I: Just to clarify. You don't see HFS as a replacement for clinical exposure? You see it as an enhancement, before they go to practice?</p> <p>P: Yes, I think definitely sort of as a bridging or umm, umm just preparing them for what they can expect in the real-life situation, but definitely giving them more confidence and also making sure we keep our patient's safe so that they don't make mistakes on real-life patients, but rather make a mistake in the simulation area. Ja that will be valuable to patient's as well.</p>	<p>Confidence</p> <p>Patient safety</p>

Examples of transcription of data for objective 2.

ANNEXURE 11: CONFIDENTIALITY AGREEMENT FROM CO-CODER



CONFIDENTIALITY UNDERTAKING

entered into between:

I, the undersigned

Prof / Dr / Mr / Ms Mrs_Andrea Hayward_____

Identity Number: 4808170082087_____

Address: _19 Strandloper Avenue, Rooihuiskraal, Centurion

hereby undertake in favor of the NORTH-WEST UNIVERSITY, a public higher education institution established in terms of the Higher Education Act No. 101 of 1997

Address: Office of the Institutional Registrar, Building C1, 53 Borchard Street, Potchefstroom, 2520

(hereinafter the "NWU")

1 Interpretation and definitions

1.1 In this undertaking, unless inconsistent with, or otherwise indicated by the context:

1.1.1 "Confidential Information" shall include all information that is confidential in its nature or marked as confidential and shall include any existing and new information obtained by me after the Commencement Date, including but not be limited in its interpretation to, research data, information concerning research participants, all secret knowledge, technical information and specifications, manufacturing techniques, designs, diagrams, instruction manuals, blueprints, electronic artwork, samples, devices, demonstrations, formulae, know-how, intellectual property, information concerning materials, marketing and business information generally, financial information that may include remuneration detail, pay slips, information relating to human capital and employment contract, employment conditions, ledgers, income and expenditures and other materials of whatever description in which the NWU has an interest in being kept confidential; and

1.1.2 "Commencement Date" means the date of signature of this undertaking by myself.

1.2 The headings of clauses are intended for convenience only and shall not affect the interpretation of this undertaking.

2 Preamble

2.1 In performing certain duties requested by the NWU, I will have access to certain Confidential Information provided by the NWU in order to perform the said duties and I agree that it must be kept confidential.

2.2 The NWU has agreed to disclose certain of this Confidential Information and other information to me subject to me agreeing to the terms of confidentiality set out herein.

3 Title to the Confidential Information

I hereby acknowledge that all right, title and interest in and to the Confidential Information vests in the NWU and that I will have no claim of any nature in and to the Confidential Information.

4 Period of confidentiality

The provisions of this undertaking shall begin on the Commencement Date and remain in force indefinitely.

5 Non-disclosure and undertakings

I undertake:

5.1 to maintain the confidentiality of any Confidential Information to which I shall be allowed access by the NWU, whether before or after the Commencement Date of this undertaking. I will not divulge or permit to be divulged to any person any aspect of such Confidential Information otherwise than may be allowed in terms of this undertaking;

5.2 to take all such steps as may be necessary to prevent the Confidential Information falling into the hands of an unauthorised third party;

5.3 not to make use of any of the Confidential Information in the development, manufacture, marketing and/or sale of any goods;

5.4 not to use any research data for publication purposes;

5.5 not to use or disclose or attempt to use or disclose the Confidential Information for any purpose other than performing research purposes only and includes questionnaires, interviews with participants, data gathering, data analysis and personal information of participants/research subjects;

5.6 not to use or attempt to use the Confidential Information in any manner which will cause or be likely to cause injury or loss to a research participant or the NWU; and

5.7 that all documentation furnished to me by the NWU pursuant to this undertaking will remain the property of the NWU and upon the request of the NWU will be returned to the NWU. I shall not make copies of any such documentation without the prior written consent of the NWU.

6 Exception

The above undertakings by myself shall not apply to Confidential Information which I am compelled to disclose in terms of a court order.

7 Jurisdiction

This undertaking shall be governed by South African law be subject to the jurisdiction of South African courts in respect of any dispute flowing from this undertaking.

8 Whole agreement

8.1 This document constitutes the whole of this undertaking to the exclusion of all else.

8.2 No amendment, alteration, addition, variation or consensual cancellation of this undertaking will be valid unless in writing and signed by me and the NWU.

Dated at Pochefstroom this ____ 10 October 2017 ____

Witnesses:

- 1 J Hanakon
- 2 A. Krot Heever

(Signatures of witnesses)

Alley

(Signature)

ANNEXURE 12: CO-CODER'S CONFIRMATION OF CO-CODING

From: Andrea Hayward BLS
Sent: Monday, 16 September 2019 15:10
To: Powell, Elize
Subject: Re: Emailing: letter

16 September 2019.

To whom it concerns.

This email confirms that I assisted Mrs E Powell with data collection (co-coding of qualitative data) for her Doctorate.

Yours sincerely
Andrea Hayward
Lecturer
Dept Nursing, Faculty of Health Sciences,
University of Witwatersrand.

ANNEXURE 13: EVALUATION TOOL FOR A NURSING MODEL

EVALUATION TOOL FOR A NURSING MODEL

CHINN AND KRAMER (2011:198-204) EVALUATION CRITERIA FOR A NURSING MODEL	
Criteria for evaluation with trigger questions	Evaluator comments
<p>1. Clarity of the model:</p> <p>a. Semantic clarity:</p> <ul style="list-style-type: none"> • Are the concepts clearly defined? • Are the definitions understandable and coherent? 	
<p>b. Semantic consistency:</p> <ul style="list-style-type: none"> • Are the concepts congruent and in harmony with the definitions, purpose and aligned to the relationships featured in the practice model? 	
<p>c. Structural clarity:</p> <ul style="list-style-type: none"> • Are the illustrated connections and logical reasoning coherent with the descriptive elements of the practice model? 	
<p>d. Structural consistency:</p> <ul style="list-style-type: none"> • Do the structural forms used for illustration as a conceptual map enhance clarity and comprehension of the descriptive elements of the practice model? 	
<p>2. Simplicity of the model:</p> <ul style="list-style-type: none"> • Are the number and differentiation of concepts and interrelationships least in simplicity or acceptable in complexity? 	

Criteria for evaluation with trigger questions	Evaluator comments
<ul style="list-style-type: none"> • Does the contextual situation warrant the various concepts to enhance understanding of the concepts and their interrelatedness in the practice model? • Does the practice model serve to describe, explain and/or predict concepts or their interrelatedness in practice? 	
<p>3. Generality of the model:</p> <ul style="list-style-type: none"> • Do the breadth of scope and specificity of purpose appraise the broad empirical experiences of concepts for the purpose of nursing? • Are ideas arranged to facilitate application to practice and the health care team while embodying nursing as a discipline? • Are the concepts of the individual health, environment and society featured broadly in the general application of the model? 	
<p>4. Accessibility of the model:</p> <ul style="list-style-type: none"> • Would the concepts be identifiable as empirical indicators in practice within the realm of nursing? • Do the definitions of the concepts adequately manifest their meanings in the nursing practice setting that is specified? • Despite either the simplicity or complexity of the model, do the concepts create conceptual meanings in the clinical practice setting? 	

Criteria for evaluation with trigger questions	Evaluator comments
<p>5. Importance of the model:</p> <ul style="list-style-type: none"> • Does the model have clinical value or practical significance in the targeted area of clinical nursing practice? • Is there futuristic and pragmatic value in the applicability to lead future practice of nursing in the targeted area? • Does the practice model create understanding and the potential for nursing education and research? • Does the practice model differentiate the focus or nature of nursing as a discipline separate to other service professions? 	
<p>Summary comments:</p>	

ANNEXURE 14: LANGUAGE EDITING

Dr Eddie Bain
D. Litt et Phil (UNISA)
SATI Membership No: 1002582

93 Republic Street
Baillie Park
Potchefstroom
2531
Mobile: 0824905009
Email: eddie.e.bain@gmail.com

Dear Ms Powell

This serves to confirm that your thesis has been submitted to me for language editing. The in-text edits have been made in Track Changes. While I have suggested a limited number of changes in the margin of the script, I cannot guarantee that these have been implemented, nor can I take responsibility for any other subsequent changes that may have been made.

Yours sincerely

Eddie Bain

2 August 2019