DEVELOPMENT AND TESTING OF A COMPETENCE ASSESSMENT INSTRUMENT FOR UNDERGRADUATE NURSING STUDENTS

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Submitted in fulfilment of the requirements in respect of the
Master's Degree qualification in Nursing

in the School of Nursing,
Faculty of Health Sciences,
at the University of the Free State

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31 January 2017

The financial assistance of the National Research Foundation (NRF) towards this research is hereby gratefully acknowledged. Opinions expressed and conclusion arrived at, are those of the author and not necessarily to be attributed to the NRF.

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Nature of document: M SocSci Dissertation, School of Nursing, UFS

Date of this statement: 26 January 2017

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DECLARATION

1. I, Nicola Piek, declare that the master's research dissertation that I herewith submit at the University of the Free State, is my independent work and that I have not previously submitted it for a qualification at another institution of higher education.

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_____

Date

ACKNOWLEDGEMENTS

To my Heavenly Father; Abba, thank you so much for blessing me with the opportunity to complete this study. Thank you for giving me the strength to persevere. You have always been faithful to me and I have learned that I can do all things through You.

To my husband, Armand; we met when I had just started this journey and now we are already married. You are truly my best friend, the one who understands me the best. Thank you for allowing me to chase my dreams and to become the person the Lord intended me to be.

To my mom; thank you for all your support throughout my life and career. I know that you have been praying for me since I was a little girl. I would not have been the woman that I am today if it were not for your prayers and input in my life.

To my dad; thank you for all your encouragement throughout my life and career. You have taught me that hard work pays off and that there is always a plan to overcome a problem. I would not have been the woman that I am today if it were not for your guidance and input in my life.

To Antonette; thank you for your interest and support in my life and career. I appreciate your love and acceptance.

To my brothers and sisters in law, Philip and Joan; De Ville and Keyla; and little Anton; thank you for believing in me and encouraging me to finish this study.

To my extended family and grandmothers, *Ouma* Moira and also *Ouma* Miemie, who is not with us anymore; thank you for believing in me. I appreciate your support throughout my life and career.

To Professor Yvonne Botma; thank you Prof for being the best mentor a student could ever ask for. The way in which you guided me through this journey with compassion and patience is greatly appreciated. I will miss our coffee talks before each feedback session.

To each respondent who participated in this research study; thank you for the time and effort that you contributed during the data collection. In this everyday rat race, time is such a precious gift. Thank you that you sacrificed your precious time to participate in this study.

To the students of the School of Nursing whose video footage was used for this research study; thank you for trusting us as researchers to further empower the School of Nursing to prepare competent nursing practitioners.

To all my dearest friends, you are so many I am not able to name you all; my home cell group and running group; thank you for your encouragement, prayers and the laughter you bring into my life. Each one of you has imparted something special in my life. A special thank you to Suretha for your kindness, love and support.

To my unit managers and colleagues; thank you for your sustained support during this journey. Thank you that you kept things going when I was occupied with this study. Thank you Sister Rita for granting all my requests with regard to completing this dissertation.

To Lizemari Hugo and Cecilna Grobler, thank you for your guidance throughout this study, you were always willing to assist me.

To Jacques Raubenheimer; thank you for your assistance as my biostatistician.

To Elzabé Heyns, thank you for your assistance with regard to the technical aspects of this study. I appreciate your willingness and the work you did.

ABSTRACT

Nursing roles and responsibilities in South Africa are evolving, demanding nursing practitioners to become more autonomous, responsible and accountable. Competent nursing practitioners who are able to apply their knowledge, skill and attitude in clinical practice are in great demand. Competence is therefore regarded as a prerequisite for nursing students entering the workforce as nurse practitioners. Competent student nurses demonstrate thinking processes such as critical thinking, clinical reasoning, sound clinical judgment and metacognition as they assess, diagnose and treat patients. In order for competent student nurses to apply these thinking processes the basis of foundational knowledge, conditional knowledge, functional knowledge and metacognitive knowledge need to be in place. At present there is no assessment instrument based on the thinking processes to assess the competence of student nurses in South Africa.

The aim of this study was to develop a valid and reliable instrument to assess nursing students' competence through their demonstration of clinical judgment and metacognition in clinical settings

A quantitative methodological study was done to prove the developed assessment instrument as reliable. Sixteen existing competence assessment instruments were accessed and analysed. Consequently a thematic analysis of nine of the existing competence assessment instruments delivered an assessment instrument comprised of 38 items, classified according to thinking processes. A panel of experts enhanced face and content validity of the developed assessment instrument before the instrument was implemented. Twenty respondents each assessed 15 second-year undergraduate nursing students who participated in a standardised patient simulation activity via video footage. A Cronbach Alpha coefficient test, Intraclass correlation coefficient (ICC) test and a Kendall's coefficient of concordance (*W*) test determined reliability of the developed assessment instrument.

A Cronbach Alpha coefficient of .90 is indicative of good internal consistency and proves the developed assessment instrument as reliable. The ICC value of .85 indicates excellent inter-rater reliability as a continuum of all the respondents and further contributes to the reliability of the developed assessment instrument. However the *W* values of the developed assessment instrument were low and ranged between .04 and .40 per item. The low *W* values were attributed to the fact that some respondents were inconstant in assessing students, the fact that respondents could not validate the reasoning of students, and the large number of assessors (20) in comparison to other inter-rater studies that have three assessors at the most.

The competence of student nurses needs to be assessed in order to determine if they can apply their knowledge and reasoning in clinical practice. The value of this research is that the developed assessment instrument may aid nurse educators or preceptors to identify the specific learning need of a student. Furthermore the developed assessment instrument will give an indication of the competence of student nurses. This knowledge will encourage nurse educators to build in and expand teaching strategies that develop thinking processes into their pedagogies.

It is recommended that future research, such as an exploratory and confirmatory factor analysis, be done in order to determine the construct validity of the developed assessment instrument. This will significantly enhance the validity of the developed assessment instrument.

Key terms: competence, nursing students, assessment instrument, transfer of learning, theory-practice gap, knowledge domains, thinking processes, validity, reliability.

OPSOMMING

Die rolle en pligte van verpleegkundiges in Suid-Afrika ontwikkel voortdurend en noop verpleegkundiges om meer outonoom, verantwoordelik en verantwoordbaar te raak. Bevoegde verpleegkundiges wat in staat is om hulle kennis, vaardighede en benadering ten opsigte van kliniese praktyk toe te pas is in aanvraag. Bevoegdheid word gevolglik beskou as ’n voorvereiste vir verpleegkunde studente wat as verpleegkundiges die arbeidsmark betree. Bevoegde verpleegkundiges demonstreer denkprosesse soos kritiese denke, kliniese redenering, behoorlike kliniese oordeel en metakognisie wanneer hulle pasiënte assesseer, diagnoseer en behandel. ’n Stewige basis van fundamentele kennis, voorwaardelike kennis, funksionele kennis en metakognisie is nodig vir bevoegde studenteverpleegsters om hierdie denkprosesse toe te pas. Daar is tans geen assesseringsinstrument gebaseer op denkprosesse beskikbaar om die vaardigheid van studenteverpleegsters in Suid-Afrika te assesseer nie.

Die doel van hierdie studie was om ‘n geldige en betroubare instrument te ontwikkel om die bevoegdheid van student verpleegsters te assesseer deur die demonstrasie van hulle kliniese oordeel en metakognisie in kliniese areas.

’n Kwantitatiewe metodologiese studie is onderneem om die assesseringsinstrument wat ontwikkel is as betroubaar te bewys. Sestien bestaande assesserings-instrumente is bekom en ontleed. Gevolglik het ’n tematiese analise van nege van die bestaande bevoegdheidsassesserings ’n assesseringsinstrument opgelewer wat bestaan uit 38 items, geklassifiseer volgens denkprosesse. ’n Paneel van kundiges het die sigwaarde en inhoudelike geldigheid van die ontwikkelde assesseringsinstrument verbeter voordat die instrument in werking gestel is. Twintig respondente het elk 15 tweedejaarstudente in verpleegkunde (voorgraads) geassesseer wat aan ’n gestandardiseerde pasiëntsimulasie-aktiwiteit via video-dekking deelgeneem het. ’n Cronbach Alfakoëffisiënttoets, Intraklas-korrelasie-koëffisiënttoets (ICC) en Kendal se koëffisiënt van ooreenstemming (*W*) toets het die betroubaarheid van die ontwikkelde assesseringsinstrument bepaal.’n Cronbach

Alfakoëffisiënt van .90 dui op goeie interne konsistensie en bewys die ontwikkelde assesseringsinstrument as betroubaar. Die ICC-waarde van .85 dui op uitstekende intergradeerderbetroubaarheid as ’n kontinuum van al die respondente en dra verder by tot die betroubaarheid van die ontwikkelde assesseringsinstrument. Die *W*-waardes van die ontwikkelde assesseringsinstrument was egter laag en het gewissel tussen .04 en .40 per item. Die lae waardes word toegeskryf aan die feit dat sommige respondente inkonsekwent was in hul assessering van studente, die feit dat die respondente nie die redenasie van studente kon nagaan nie, en die groot aantal assessore (20) in vergelyking met ander intergraderingstudies wat op die meeste drie assessore gebruik.

Die bevoegdheid van studenteverpleegsters moet geassesseer word ten einde te bepaal of hulle hul kennis en redenering in kliniese praktyk kan toepas. Die waarde van hierdie navorsing lê daarin dat die ontwikkelde assesseringsinstrument opvoeders van verpleegkunde studente of preseptors kan help om die spesifieke leerbehoefte van ’n student te identifiseer. Voorts sal die ontwikkelde assesseringsinstrument ’n aanduiding gee van die bevoegdheid van studente-verpleegkundiges. Hierdie kennis kan verpleegkunde-opvoeders aanmoedig om onderrigstrategieë wat denkprosesse help ontwikkel in hul pedagogiek in te bou en uit te bou.

Dit word aanbeveel dat toekomstige navorsing, waaronder ’n ondersoekende en bevestigende faktoranalise, onderneem word ten einde die konstrukwaarde van die ontwikkelde assesseringsinstrument te bepaal. Dit sal die geldigheid van die ontwikkelde assesseringsinstrument grootliks verbeter.

Sleutelbegrippe: bevoegdhede, verpleegkunde studente, assesseringsinstrument, oordrag van leer, teorie-praktykgaping, kennisdomeine, denkprosesse, geldigheid, betroubaarheid.

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CHAPTER 1

Orientation to research study

1.1 INTRODUCTION

Nurse educators are responsible for the preparation of competent nursing students to enter a complex, uncertain and constantly evolving workplace (NLN Board of Governors, 2011:online). The South African Nursing Education Stakeholders (NES) Group (2012:50) emphasises that *"competence in nursing is based on the ability to integrate knowledge from all disciplines in order to identify the problem, understand the theory related to the problem and respond appropriately with treatment and care of the patient, as well as then applying all this integrated knowledge in a practical event or situation in a real-life setting or simulation".*

Competence is thus demonstrated when nursing students are able to apply in practice what they learned in class and in skills laboratories. The ability to transfer learning is associated with critical thinking, clinical reasoning skills and clinical judgments that are demonstrated by individual performance, as well as organisational performance (Donovan & Darcy, 2011:125; Tanner, 2006:208). Once transfer of learning has taken place and nursing students have mastered the skill of good clinical judgment they are competent in determining the best outcome for the patient. Chang, Chang, Kuo, Yang and Chou (2011:3224) therefore conclude that critical thinking, clinical reasoning and clinical judgment ability have a significance positive correlation with nursing competence.

Unfortunately transfer and application of knowledge alone is not enough to enable nursing students to make good clinical judgments and thus be competent in rendering safe patient care. Zhang, Luk, Arthur and Wong (2001:469) add skill and attitude to application of knowledge as requirements for being a competent student nurse. In order to demonstrate competence student nurses must integrate

knowledge, skills and attitude, all of which are aimed at an effective problem solving process (Chang *et al.*, 2011:3225).

To enable professional nurses to respond to the demands of the National Health System, Banning (2006:458) suggests that competence must be regarded as a pre-requisite for nursing students entering the workforce as professional nurses.

1.2 BACKGROUND OF THE STUDY

Nursing education and practice in South Africa are constantly evolving and thus create an unclear picture of what nursing will be in the years to come. The evolution of nursing roles and responsibilities require nurses to become more autonomous, responsible and accountable. The Minister of Health Republic of South Africa, Dr Aaron Motsoaledi, compiled a ministerial task team to compile the Nursing Education and Training Strategic plan 2012/2013-2016/2017 (Department of Health Republic of South Africa, 2012:online). The South African NES group (2012:50) recommended that a competency-based approach be developed and implemented as a new model for clinical teaching and training. The educational development of competence of students must be addressed in order for students to identify and solve problems effectively in clinical practice.

The clinical competence of newly registered nurses has become a crucial issue related to professional standards and public safety, as the on-going challenges of health workforce deficits and imbalances, combined with ageing populations and epidemiologic transformation, hinder the attainment of health goals (World Health Organization, 2015:online).

In order to pursue the objective of training competent student nurses, the competence of student nurses has to be assessed. Therefore, the assessment of the student nurse is a key issue for educators and clinical facilitators. A valid and reliable assessment instrument may allow an objective evaluation of nursing students' competence (performance) in clinical settings. This in return can serve as a

reference for nursing educators to improve nursing curricula and teaching strategies for preparing competent professional nurses.

In its document entitled Global Strategy on Human Resources for Health: Workforce 2030 the World Health Organization (WHO) (2015:online) mentions the need to adopt more effective and efficient strategies, as well as appropriate regulations for health workforce education, a more responsive skills mix, improved deployment strategies and an increase in continuous development opportunities.

1.3 PROBLEM STATEMENT

The assessment of competence is a complex task and according to Meretoja, Isoaho and Leino-Kilpi (2004:125) there is much controversy in the literature about the type of instrument to assess competence. No clear consensus exists about how the assessment of student nurses' competence may best be achieved (Cant, McKenna & Cooper, 2013:165; Middlemans & Hensal, 2009:110). Competency assessment instruments are a relatively new field of study with several researchers criticising the validity and reliability of current instruments (Khosravi, Pazargadi, Ashktorab & Alavimajd, 2013:36; Watson, Stimpson, Topping & Porock, 2002:223; Yanhua & Watson, 2011:832).

Watson *et al.* (2002:4290) published a systematic review of the assessment of clinical competence in nursing from 1980-2000 and came to the conclusion that the definition of competence is vague, the measurement of competence is disorganised, and the validity and reliability of assessment instruments are seldom reported. Ten years later Yanhua and Watson (2011:835) examined the state of clinical competence assessment and concluded that some improvement had been made with regard to more valid and widely applied assessment instruments for nursing competence; however, certain barriers were still reported as influencing the implementation of these assessment instruments, as well as the psychometric properties of existing assessment instruments that must be investigated further.

Another factor that compounds the complexity of competence assessment is the global variation of nursing training programmes. South African registered nurses have a broad scope of practice and autonomy, especially where they function independently in remote and primary healthcare settings. The researcher is therefore hesitant to use an instrument that has not been tested in a South African context. There is thus a need to do a thematic analysis of the existing assessment instruments to measure competence of students that integrate all the cognitive domains, from critical thinking to metacognition.

Based on the findings of the thematic analysis of the existing assessment instruments the researcher will develop an assessment instrument for undergraduate nursing students and test the validity and reliability of the developed assessment instrument.

1.4 RESEARCH QUESTION

The research question is a concise, enquiring statement developed to conduct a research study (Grove, Burns & Gray, 2013:708).

The research question for this research study may be phrased as follows: *"How can the competence of undergraduate student nurses best be assessed?"*

1.5 AIM AND OBJECTIVES

The aim of a research study determines what the researcher wishes to achieve by conducting the research study. The term goal is often used interchangeably with the term aim (Fouché & De Vos, 2012:94). The aim is a broader statement than the objective (Botma, Greeff, Mulaudzi & Wright, 2010:93).

The objectives however are described as the plan to achieve the set aim or goal (Fouché & De Vos, 2012:94). Objectives are more specific statements that the researcher plans to achieve in order to attain the aim or goal of a research study (Botma *et al*., 2010:93). The aim of a research study is seen as the dream of the

researcher, whereas the objectives of the research study are seen as the steps the researcher has to take in order to attain the dream (Fouché & De Vos, 2012:94).

The aim of this study is to develop a valid and reliable instrument to assess nursing students' competence through their demonstration of clinical judgment and metacognition in clinical settings.

In order to attain the aim of the study the following objectives are set:

1. Conduct a thematic analysis of existing instruments on nursing competence and clinical judgment.
2. Develop a competence assessment instrument for underdgraduate nursing students.
3. Test the developed assessment instrument.
4. Determine and describe the validity of the developed assessment instrument.
5. Determine and describe the reliability of the developed assessment instrument.

1.6 CONCEPTUAL FRAMEWORK

The conceptual framework is a strategy for expressing the theoretical structure guiding a research study by means of a map or diagram including the concepts related to the research study (Grove *et al*., 2013:116). A short explanation of the conceptual framework for this research study will follow. The conceptual framework for this research study is an adapted systems framework of learning by Donovan and Darcy (2011:125), incorporated with the knowledge domains described by Botma (2016:online). Refer to Figure 1.1.

Competence in nursing is based on the ability to integrate foundational knowledge with conditional knowledge in a clinical setting, in order to identify a health problem and respond appropriately (NES group, 2012:50). An analysis of the definition of competence done by the NES group (2012:50) further indicates that foundational knowledge from all disciplines is used during critical thinking processes to demonstrate understanding and insight into the related theories. This means that a student will be able to explain why a patient presents with certain clinical manifestations and predict the progression of the related condition (Tanner,

2006:208). Critical thinking is a cognitive process consisting of the integration of knowledge, skills and attitude, which are aimed at an effective problem-solving process (Chang *et al.*, 2011:3225). At this stage the student typically demonstrates foundational knowledge.

Conditional knowledge refers to the integration of knowledge, skill and attitude in a clinical setting in order to demonstrate good clinical reasoning (Bruce, Klopper & Mellish, 2011:263). Clinical reasoning processes develop when the student brings foundational knowledge into context and uses conditional knowledge to make good clinical judgments (Botma, 2016:online). This indicates that it is now no longer only a theoretical case, but a real-life situation (Chang *et al.*, 2011:3225).

Critical thinking and clinical reasoning processes culminate in clinical judgment when students are able to demonstrate functional knowledge and choose treatment options that will be most beneficial to the patient (Chang *et al.*, 2011:3224; Tanner, 2006:208). The ability to make sound clinical judgment resonates closely with the definition of competence (Chang *et al.,* 2011:3224). Zhang *et al.* (2001:469) confirm this by defining nursing competence as *"sets of knowledge, skills, traits, motives and attitudes that are required for effective performance in a wide range of nursing jobs and various clinical settings".* Students acquire metacognitive knowledge as they reflect on their performance in a clinical setting. Metacognitive knowledge is new knowledge built on previous knowledge. It consists of knowledge that nurses gain from previous experiences, to contribute to their on-going clinical development and their capacity for becoming more competent in future situations (Tanner, 2006:209).

The word competence is often used in professional programmes but the depth and the complexity of the concept is rarely fully comprehended. Nursing students develop critical thinking and clinical reasoning skills to make sound clinical judgments, when transfer of learning takes place. Sound clinical judgment is the direct result of transfer of learning. The Institute of Medicine (2011:online) supports this statement by saying that clinical reasoning is the direct result of transfer of learning. Transfer of learning occurs when student nurses can apply in practice what they have learned in theory. Holton, Chen and Naquin (2003:460) state that student characteristics, educational design and transfer climate can operate together to act as a constellation of factors influencing the transfer of learning.

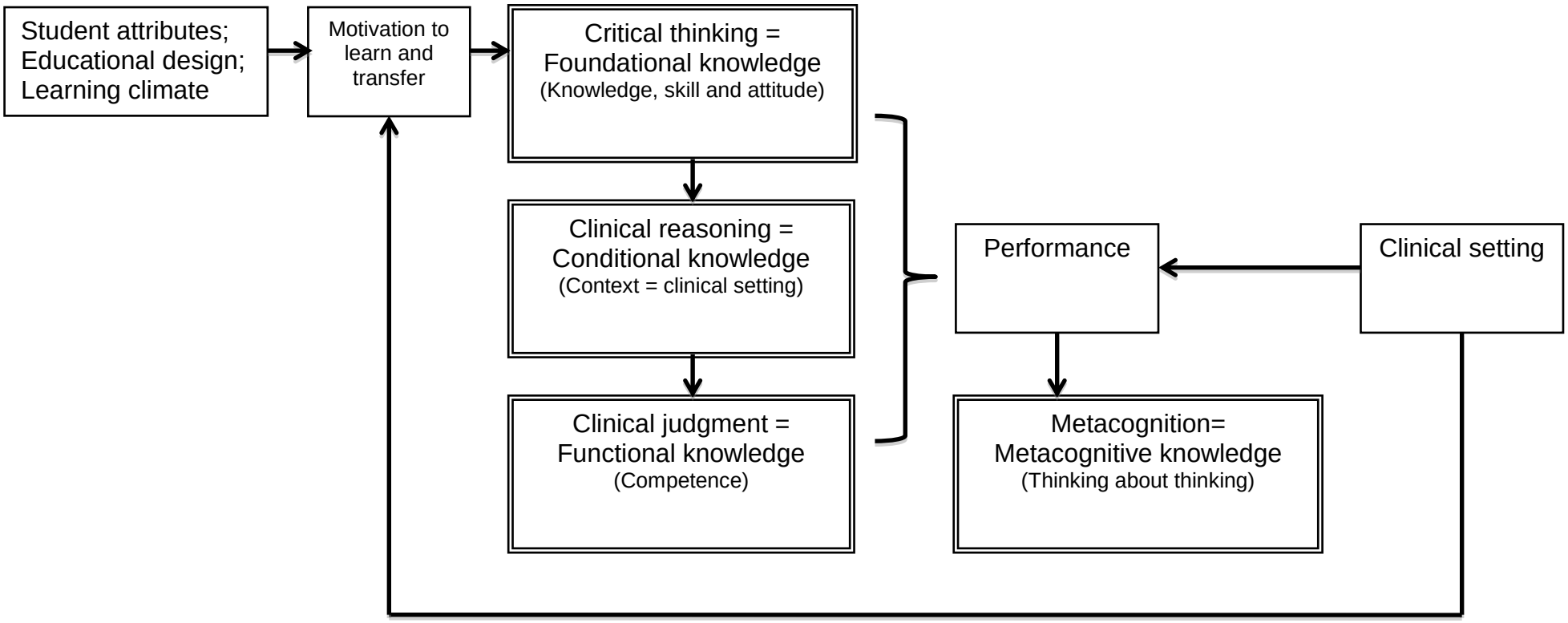

FIGURE 1.1 **Systemic model of transfer of learning, adopted and adapted from Donovan and Darcy (2011:125) incorporated with the knowledge domains of Botma (2016:online)**

1.7 CONCEPT CLARIFICATION

Conceptual definitions and where appropriate operational definitions are listed in alphabetical order. Conceptual definitions are theoretical descriptions of a variable, and operational definitions are descriptions of how variables or concepts will be measured (Botma *et al.,* 2010:272).

Concepts for clarification were selected from the title of the study, which also states the aim of the study, as well as from the conceptual framework of the study.

1.7.1 Assessment

Assessment is a data gathering strategy to measure knowledge, behaviour and values. The process of data gathering will help the assessor to make a value judgment on the progress of learning (Vasuthevan & Viljoen, 2003:74; Van der Horst & McDonald, 2005:170). For the purpose of this study the assessor will assess functional knowledge, which includes the competence and performance of undergraduate nursing students.

1.7.2 Assessment instrument

For the purpose of this study the researcher will refer to an assessment instrument in the form of a Lickert scale that respondents can use to assess the competence of undergraduate nursing students. Assessment instruments must include evidence criteria used to judge the quality of competence and performance (National Quality Council, 2009:online).

1.7.3 Clinical judgment

Clinical judgment is mastered when students are able to demonstrate functional knowledge and choose treatment options that will be the most beneficial to the patient, as a result of critical thinking and clinical reasoning processes (Botma, 2016:online; Chang *et al.*, 2011:3224; Tanner, 2006:208). For the purpose of this

study the researcher will aim to measure clinical judgment and metacognition by using the instrument that will be developed. See Addendum D1 and D2 for the final instrument.

1.7.4 Clinical setting

Clinical settings are those places where student nurses engage with patients from the community and apply practical skills, e.g. primary healthcare clinics, provincial hospitals, tertiary hospitals and private hospitals (NES group, 2012:50). The NES group (2012:50) also emphasises that clinical learning must take place in a clinical setting where patients are being cared for, families seen, and communities are supported and educated. In this study the clinical setting was a simulated primary healthcare setting with a simulated patient.

1.7.5 Competence

"Competence is the ability to integrate knowledge from all disciplines in order to identify the problem, understand the related theory to the problem, the response, treatment and care of the patient as well as then applying all of this integrated knowledge in a practical event or situation in a real life setting or simulation" (NES group, 2012:50). This equates to making sound clinical judgments and the development of metacognitive knowledge. For the purpose of this study, therefore, the researcher will aim to measure clinical judgment and metacognition, which equates to competence, by developing and testing an assessment instrument.

1.7.6 Knowledge

For the purpose of this study the researcher will refer to knowledge as functional knowledge. Functional knowledge implies thinking that is purposeful, useful and efficient (Biggs & Tang, 2011:82; Bruce *et al.*, 2011:146). It is demonstrated when a student has mastered clinical judgment and can provide the best possible management of a patient (Biggs & Tang, 2011:82; Botma, 2016:online). Conditional knowledge refers to clinical reasoning in a clinical setting in order to make a

diagnosis (Botma, 2016:2). Foundational knowledge implies linking theory with manifestations in practice by using critical thinking and consists of declarative and procedural knowledge (Botma, 2016:online). Declarative knowledge equates knowing about things and enables students to notice relevant information in order to make associative links (Biggs & Tang, 2011:82). Procedural knowledge equates to knowing how to do something and implies a student's skills acquisition (Botma, 2017: n.p.).

1.7.7 Skill

Skill relates to student nurses' ability to use motor skills, such as their muscles, together with cognitive skills, such as applying a number of rules, with any nursing procedure (Bruce *et al.*, 2011:84).

1.7.8 Student performance

Performance is the result of student nurses, who mastered the skill of clinical judgment and who are competent in rendering safe patient care (Chang *et al.*, 2011: 3224; Holton *et al.*, 2003:460). Student healthcare performance during patient interaction shows the student's level of competence.

1.7.9 Undergraduate student

An undergraduate student registered for the four year integrated Bachelor's degree in Nursing at the University of the Free State in the first, second, third or fourth study year. In terms of the South African Nursing Act (33 of 2005) student nurses must be registered with the South African Nursing Council (South Africa, 2006:36).

1.7.10 Transfer of learning

Transfer of learning is the ability of students to apply in clinical practice what they learned in class and skills laboratories. This encompasses the integration of knowledge, skill and attitude learned in theory and applied in practice, in order to

develop critical thinking and clinical reasoning skills -- thus exercising good clinical judgment (Bruce *et al.*, 2011:264). Transfer of learning manifests in the performance of students in clinical practice.

1.8 RESEARCH DESIGN

The research design is the proverbial backbone of the research study. The decisions that were taken to plan the research study and the research methods that were used during the research study conclude the research design (Botma *et al.*, 2010:108).

The researcher had to develop an assessment instrument to assess the competence of undergraduate student nurses. It is of utmost importance that a developed assessment instrument must first be standardised by determining the validity and reliability of the instrument before it may be used to measure (assess) a construct (competence). For this reason the researcher conducted a quantitative methodological research study.

Methodological studies address the development and testing of research instruments. The goal of a methodological research study is to develop an effective instrument that will be tested for validity and reliability in order for others to use a proven, trustworthy instrument and to evaluate the researcher's attempt in developing the instrument (LoBiondo-Wood & Haber, 2010:207; Mouton 2001:173; Polit & Beck, 2012:268). The researcher will follow the steps as described by LoBiondo-Wood and Haber (2010:208) to develop the assessment instrument. These steps will be explained in detail in Chapter 3 and include the following:

1. Define the construct or behaviour to be measured
2. Formulate items
3. Develop instructions for users and respondents
4. Test the reliability and validity of the instrument.

1.9 CONSTRUCTION OF ASSESSMENT INSTRUMENT

The researcher developed a new instrument to assess the competence of undergraduate nursing students based on existing instruments.

1.9.1 Thematic analysis

An extensive literature review rendered 16 instruments that assess competence. However, only nine defined competence in a similar fashion to this research and could therefore be used for item extraction.

1.9.2 Item extraction

Each item out of the nine selected assessment instruments were classified in a category identified during the literature review to compile the draft assessment instrument. The categories consisted of six thinking processes, namely:

1. Critical thinking (notice)
2. Clinical reasoning (interpret)
3. Clinical Judgment (respond)
4. Attitude
5. Communication
6. Metacognition (thinking about thinking)

After the classification of the items, the researcher with the assistance of her supervisor further refined the instrument by eliminating ambiguous and duplicated items in each category and changed the sequence of the items to enhance the logical flow of the instrument. Items in an instrument should be characterised by valid and reliable measurement values, therefore the researcher subjected the developed assessment instrument to several processes in order to enhance the validity and reliability of the developed assessment instrument. The validity of the developed assessment instrument will be discussed first.

1.9.3 Face and content validity

The purpose of validating an instrument, according to Delport and Roestenburg (2012a:173) is twofold, namely that it confirms the measurement of the construct in the research question and that the instrument measures this construct accurately. Content validity *"is concerned with the representativeness or sampling adequacy of the content (e.g. topics or items) of an instrument"* (Delport & Roestenburg, 2012a:173). Face validity *"concerns the superficial appearance or face value of a measurement procedure"* (Delport & Roestenburg, 2012a:173).

A panel of experts in the field of transfer of learning and nursing competence, who are knowledgeable regarding instrument construction, evaluated the instrument for content- and face validity.

1.9.4 Pilot study

The pilot study is a trial run done in preparation for the major study, where problems regarding the assessment instrument, data gathering process and effectiveness of the technology involved are identified and solved before the formal data gathering process (Strydom 2012b:244; Polit & Beck, 2012:737).

A pilot study was done in order to identify challenges relating to the assessment instrument, as well as to logistical issues. It also offered the researcher the opportunity to determine the time it would take to assess a student.

Some sampled respondents participated in the pilot study. Old video footage from the University of the Free State's School of Nursing simulation laboratory was used for the pilot study. No problems or uncertainties were raised during the discussion of the assessment instrument. However, a number of challenges pertaining to the video footage were identified, namely poor sound and poor visibility. A second pilot study was done to test the success of the adjustments made.

1.9.5 Population and sample

A study population includes all individuals that meet the sample criteria for inclusion in a study (Grove *et al.*, 2013:703). The study sample differs from the population in that it is a subset of the population that was selected for a study (Grove *et al.,* 2013:708). The population is refined to a subset by means of different sampling methods. This research study consists of two populations, namely students and the assessors who will be the respondents. Sampling of these populations was done separately and will therefore be discussed respectively.

1.9.6 Student population and sample

The student population consisted of 60 second-year undergraduate nursing students at the School of Nursing, who participated in the prescribed standardised patient simulation activities, as stipulated in the UFS curriculum for second-year nursing students.

The biostatistician by means of simple random sampling selected 15 of the 60 students to be assessed with the developed assessment instrument. Simple random sampling entails the process of establishing a sampling frame from where one can blindly place one's finger at some point on the frame and selects that subject for the sample, ensuring that each participant in the population has an equal chance of being selected (Polit & Beck, 2012:275).

1.9.7 Assessor population and sample

The assessor population, also referred to as the respondents of the study, included professional nurses from all over South Africa who are known to the researcher and who are interested in the fields of preceptorship, transfer of learning, clinical judgment or primary health care.

The researcher selected 20 assessors by means of purposive sampling. Botma *et al.* (2010:126) refer to purposive or judgmental sampling as the researcher's prerogative to select respondents based on the most typical characteristics required by the research purpose.

1.10 DATA GATHERING

The data gathering process is a precise process and it must be done accurately in order to resolve the research purpose (Botma *et al*., 2010:131). The following steps were implemented in order to gather data:

Step 1: Permission was obtained from all relevant authorities of the University to conduct the research, namely the Vice-Rector of Academic Affairs, Dean of Student Affairs, Dean of Faculty of Health Sciences and the Head of the School of Nursing.

Step 2: Approval was requested from the Health Sciences Research Ethics Committee (HSREC). See Addendum A1 and A2 for copies of the approval of the study and developed instrument by the HSREC.

Step 3: Arrangements were made with the second-year nursing coordinator and staff of the simulation laboratory to capture the students' performance on video during a simulated primary healthcare learning experience.

Step 4: The respondents were trained how to use the assessment instrument.

Step 5: An assessment package consisting of demographic sheet, assessment instruments, simulation footage of students and record keeping notes of students was distributed to the respondents.

Step 6: Data were coded and captured on an *Excel* spread sheet to hand to the biostatistician.

1.11 DATA ANALYSIS

Data were analysed to determine the reliability of the developed assessment instrument in order to further refine the instrument for assessing the competence of undergraduate nursing students. Proving reliability of an instrument portrays the accuracy of an instrument.

Three tests were done in order to prove the reliability of the developed assessment instrument, namely a Cronbach alpha coefficient test, which is aimed at the internal consistency of the developed instrument; an Intraclass correlation coefficient test; as well as a Kendall's coefficient of concordance test which measured the inter-rater reliability value of the respondents using the developed assessment instrument (Grove *et al.,* 2013:391; LoBiondo-Wood & Haber, 2010:298).

1.12 ETHICAL CONSIDERATIONS

The Department of Health Republic of South Africa (2015:online) sets out three guiding principles to consider during any research study involving human participants. These principles are:

1. Respect for persons (autonomy and dignity)
2. Beneficence and non-maleficence
3. Distributive justice (equality).

The researcher adhered to these guiding principles throughout the study. Chapter 3 provides a full discussion of the application of each of these principles.

1.13 VALUE OF THE STUDY

The value of this study and the benefits posed to relevant stakeholders are multi-faceted. The knowledge generated by this study will contribute to the existing body of knowledge in nursing and evidence-based practice.

Assessing the competence of nursing students will give an indication regarding the clinical judgment levels of student nurses and encourage nurse educators to build on and expand teaching strategies that develop thinking processes into their pedagogies. As mentioned earlier, the development of a competence assessment instrument may aid nursing institutions to evaluate implemented education strategies and regulations in order to prepare competent professional nurses (WHO, 2015:online). A valid and reliable assessment instrument may allow nursing institutions to determine if they are on the right track with regard to the deployment of competent professional nurses to the clinical setting.

Although the students who participated in this study will not directly benefit from the study, future students will benefit from the adjustments that can be made with regard to teaching strategies. Respondents of this study may gain more insight into the qualities and skills that are required in order to be regarded as a competent student nurse.

Professor Yvonne Botma of the School of Nursing at the University of the Free State is currently conducting a case-control group randomised study to determine if undergraduate nursing students in South Africa who are accompanied by trained preceptors demonstrate a higher level of clinical judgment than those who are accompanied by untrained preceptors. The researcher will work in collaboration with her to develop and test a competence assessment instrument, which will measure clinical judgment of undergraduate nursing students. In a global context preceptors may provide the tool to develop thinking processes of students. However, to reshape this tool (preceptors), nursing students' competence must be assessed first in order to see how strategies to train preceptors must be expanded.

By developing the thinking process of students and aiding them to bridge the theory-practice gap, students become more motivated to learn and apply what they learned in practice. They are able to pass sound clinical judgments and become competent in rendering safe patient care. This raises the standard of care delivered to the patient and benefits the patient in return. The improved quality of care reflects positively on the service provider.

The School of Nursing will benefit nationally and internationally by raising its profile with regard to transfer of learning, thinking processes of students and the assessment of nursing competence. This assessment instrument may be used by nursing schools nationally and internationally, and may also be translated to other healthcare disciplines.

1.14 CHAPTER OUTLINE

The chapter outline for this research study is set out as:

- Chapter 1: Orientation to research study
- Chapter 2: Literature review
- Chapter 3: Methodology
- Chapter 4: Results and discussion
- Chapter 5: Recommendations and limitations
- References

In conclusion, this chapter gave the reader an overview of the whole research process that will be discussed. Next the researcher will provide an in-depth discussion of what the literature reveals about the various dimensions of competence.

CHAPTER 2

Literature review

2.1 INTRODUCTION

The fact that nursing education and practice in South Africa are constantly evolving creates much uncertainty with regard to what nursing will encompass in the years to come. Nursing roles and responsibilities continually evolve and nurses become more autonomous, responsible and accountable (Moskaliuk, Bertram & Cress, 2013:210; Peek, 2015:94). This is due to the fact that their duties become more complex and demanding as medical technology advances, disease severities intensify and symptoms of disease vary (Chang *et al.*, 2011:3224; Clarke, 2014:52; Sagasser, Kramer & Van der Vleuten, 2012:2). Emphasis is no longer on patient care alone, but on identifying problems and resolving these problems effectively. Nurses have limited time available to identify problems and make decisions about appropriate diagnoses as well as about strategies to address diagnoses (Sedgwick, Grigg & Dersch, 2014:1). In other words, it is nowadays required of nurses to think and respond quickly to solve problems (Sedgwick *et al*., 2014:1; Simmons, 2010:1151).

Dudley-Brown (1997:76) and Takase, Teraoka and Kousuke (2014:806) emphasise the likelihood of graduates to change their jobs at least five times during their careers and even if they do not change jobs, their jobs will change. Nurses must possess the skill of adapting to different contexts by optimising their knowledge in a logical, analytical and systematical manner to solve problems (Gibson, Dickson, Kelly & McMillan, 2015:536; Hassan & Madhum, 2007:362; Waite & McKinny, 2016:101). The last mentioned skills distinguish professional nurses from ancillary healthcare providers (Simmons, 2010:1151) or expert competent nurses from novice nurses (Benner, 1994:127; Botma, Van Rensburg, Coetzee & Heyns, 2015:507; Jewell, 2013:324). Professional nurses who can identify and solve problems effectively, with prompt and thorough decision-making skills, also distinguish themselves from those nurses in a purely technical role who make use of only psychomotor skills.

A perceived obstacle to realising the Millennium Developmental Goals of improving global health and well-being is the scarcity of qualified competent professional nurses who may also be able to support students on their journey to become competent professional nurses (Chan, 2013:326). Banning (2006:458) and Clarke (2014:52) suggest that competence must be regarded as a pre-requisite for innovative, professional decision-making and competent practice, as it will enable professionals to respond to the demands of the national health system, which may involve a rapidly evolving and demanding professional environment (Chang *et al.*, 2011:3224; Clarke, 2014: 52; Sagasser *et al*., 2012: 2).

Nursing education is responsible for the preparation of competent nursing students to enter a complex, uncertain and constantly evolving workplace (Gibson *et al*., 2015:536; Waite & McKinny, 2016:101; Tedesco-Schneck, 2013:58). The South African Nursing Education Stakeholders (NES) group (2012:48) supported this statement in a South African context at the 2011 Nursing Summit. A proposed model for clinical nursing education in South Africa was developed to address the following problems as identified by the NES group:

- Loss of clinical nurse educators;
- Barriers between those who teach the classroom components and those who engage with students in the clinical practice environment;
- Nursing shortages, leading to higher expectations of new graduates;
- Limited exposure to role models in the clinical areas;
- Complexity of clinical areas due to higher acuity levels, greater treatment sophistication and shorter care periods; and
- Clinical areas can only cope with a limited number of students at any one time (NES group, 2012:48-56).

The South African NES group (2012:50) recommended that a competency-based approach must be implemented, which recognises that knowledge and skills have to be combined into a competency to be useful in a clinical setting. If nurse educators are to prepare nursing students to become leaders in their profession, the educational development of competence in these students must be addressed

(Gibson *et al*., 2015:536; Waite & McKinny, 2016:101; Tedesco-Schneck, 2013:58). However, this is a rather complex task that needs to be practised and taught.

2.2 COMPETENCE IN NURSING

The word competence is often used in professional nursing programmes but the depth and the complexity of the concept is rarely fully comprehended (Botma, 2016:online; Yanhua & Watson, 2011:832). Watson *et al.* (2002:429) published a systematic review of competence in nursing as measured from 1980 to 2000 and argued that the definition of competence was obscure. Since the review by Watson *et al*. (2002:429), progress towards the consensus and clarity of the concept has increased (Yanhua & Watson, 2011:833). Cowan, Norman, Vinoda and Coopamah (2005:355) conducted a focused review of the literature on competence in nursing practice in 2005. They came to the same conclusion as previous authors on this topic, stating that literature defining nursing competence was found to lack consensus, being full of controversy, ambiguity, confusion and contradiction about the definition of competence (Audètat, Lubarsky, Blais & Charlin, 2013:43; Cowan *et al*., 2005 358).

Fernandez, Dory, Ste-Marie, Chaput, Charlin and Boucher (2012:361) mention that there is consensus among researchers that competence enables practitioners to do something adequately or successfully. The problem with regard to consensus about the definition of a competent practitioner however is the fact some researchers feel a competent practitioner equates someone who utilises sound interpersonal skills and judgment in order to provide better care for patients, while other researchers will focus on the competent practitioner's ability to utilise appropriate resources and behave appropriately in a complex situation (Fernandez *et al*., 2012:361).

Despite the little consensus on the definition of competence, Chiffi and Zanotti (2015:4) and Cowan *et al.* (2005:361) came to the conclusion that a holistic conceptualisation of competence appears to be largely overlooked. Nursing practice requires the application of varying combinations of performance, knowledge skills, attitudes and values; thus a definition focusing on the holistic conceptualisation of

competence should be agreed upon and utilised (Chiffi & Zanotti, 2015:4; Cowan *et al.,* 2005:361). This consensus would enable nurse educators to accept the concept of competence and would underpin research that is needed for the development of more precise competence standards, as well as identify the instruments required for its assessment (Cowan *et al.*, 2005:361).

Besides academic debate, regulatory bodies and researchers have been trying to unify the definition of competence by accepting it as a holistic concept (Chiffi & Zanotti, 2015:4; Meretoja *et al.,* 2004:125; Yanhua & Watson, 2011:832). Several researchers continued to advocate the application of competence as a holistic conception, which includes performance, knowledge, skills, attitudes and values (Ahn & Kim, 2015:706; Botma, Brysiewicz, Chipps, Mthembu & Phillips, 2014:124; Cowan, Wilson-Barnett & Norman, 2007:454; Fernandez *et al*., 2012:360).

The UK Nursing and Midwifery Council (2010:online) defines competence as *"the overarching set of knowledge, skills and attitudes required to practise safely and effectively without direct supervision."* In the Australian National Competency Standards for the Registered Nurse (2010:online), competence is defined as *"a combination of skills, knowledge, attitudes, values and abilities that underpin effective and/or superior performance in a professional/occupational area."* In Canada the concept of competence is defined by ten nursing regulatory bodies cooperatively as *"the ability of the registered nurse to integrate and apply knowledge, skills and judgments and personal attributes required to practise safely and ethically in a designated role and setting"* (Black, Allen & Redfern, 2008:173).

In South Africa, the NES group (2012:50) emphasises that competence in nursing is based on the *"ability to integrate knowledge from all disciplines in order to identify the problem, understand the theory related to the problem and respond appropriately with treatment and care of the patient, as well as then applying all this integrated knowledge in a practical event or situation in a real-life setting or simulation."*

To summarise the mentioned definitions and perceptions of competence Fernandez *et al*. (2012:361) state that competence:

- is composed of knowledge, skills and a serious of components related to personal abilities and attributes;
- allows the professional to select or combine components in order to maintain standards of performance;
- includes the specific complex situation or context in which it is deployed; and
- constitutes a guarantee for the community or society that the possessor will be able to perform to acceptable standards.

The definition of competence by the South African NES group is accurate, concise and resonates closely with the ability to make sound clinical judgments. Once nursing students have mastered the skill of good clinical judgment they are competent in determining the best outcome for the patient (Botma, 2016:online; Chang *et al*., 2011:3224; Clarke, 2014:52; Waite & McKinny, 2016:101; Zuriguel Pérez, Canut, Pegueroles, Llobet, Arroyo & Merino, 2014:2). A competent nurse will be able to recognise a problem pertaining to a patient and respond appropriately with thoughtful nursing interventions to address the problem (Ahn & Kim, 2015:706; Botma *et al*., 2014:124). Refer to Figure 2.1 for a schematic explanation of competence by Botma (2014b).

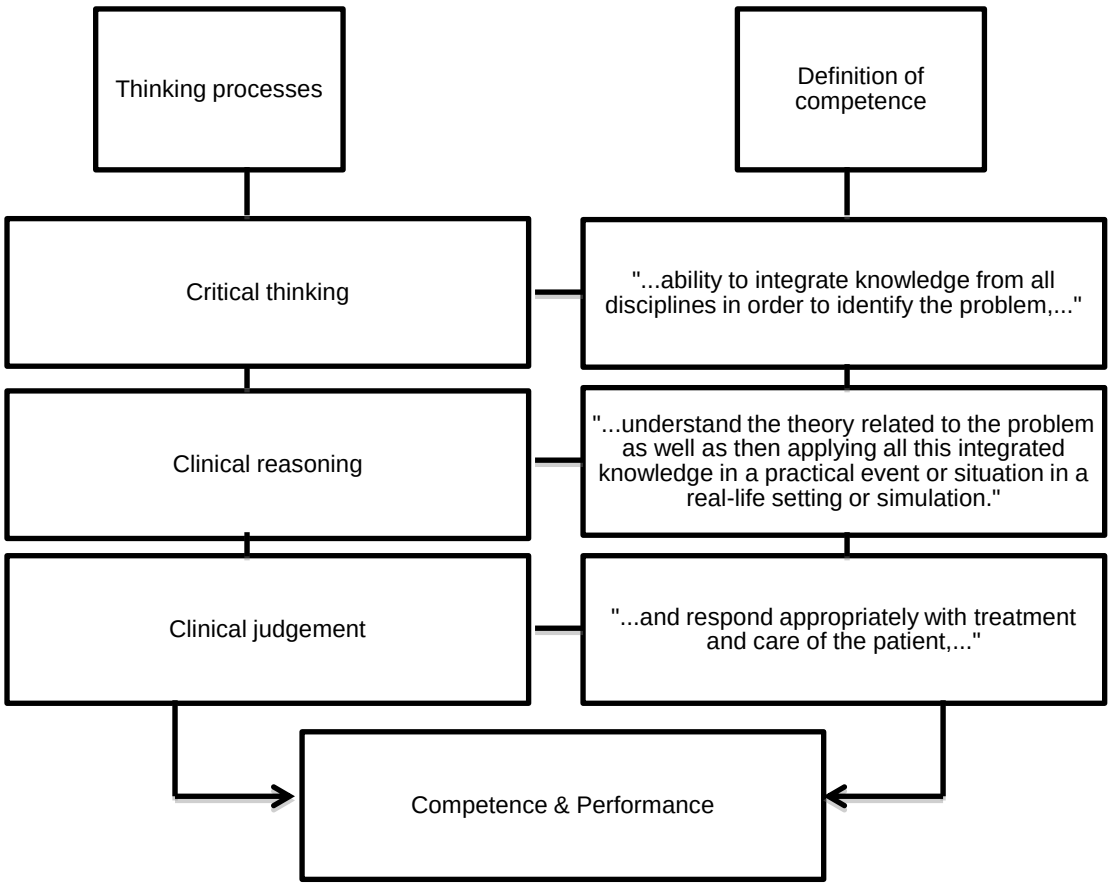

FIGURE 2.1: Competence explained schematically adapted from Botma (2014b)

Furthermore the concept of competence is closely related to performance (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Meretoja *et al*. 2004:125). Performance is the result of competent behaviour through demonstrating constant application of knowledge, skill and attitude in clinical settings (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Barret & Myrick, 1998:366; Kirwan & Birchall, 2006:253). Competence in nursing emphasises the performance of nursing students in terms of the application of knowledge, skills and attitude (Kandasamy & Vijayakumar, 2010:22). Zhang *et al.* (2001:469) confirm this statement by defining nursing competence as sets of knowledge, skills and attitudes that are required for effective performance if applied correctly in clinical settings.

Holton, Bates and Ruona (2000:335) state that several studies have established that competence can significantly affect an individual's performance. Subsequent to Baldwin and Ford's (1988:61) learning transfer system inventory, models developed by Yamnill and McLean (2001:195) and Kontoghiorghes (2004:213), have attempte do describe the correlation of competence and performance. Most recently Donovan and Darcy's model of training transfer (2011:125) suggests performance as a measurement of competence. The student's performance will indicate *"competent"* or *"not yet competent"* (Botma *et al*., 2013:32; Botma *et al*., 2015:500).

For the purpose of this study, performance will be regarded as the result of students who mastered the skill of clinical judgment and are competent in rendering safe patient care (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Chang *et al.*, 2011:3224; Donovan & Darcy, 2011:125). Poor performance or incompetence is often due to the inability to transfer learning to the clinical setting as a result of the theory-practice gap.

2.3 THEORY-PRACTICE GAP

It is expected of nursing students in the clinical setting to be competent in rendering safe patient care and as a result perform better in conveying good clinical judgment, but it is clear that this is not happening (Botma *et al*., 2013: 32; Chan, Chan & Liu, 2012:1039). Failure to rescue and consequent patient death may be due to the inability of nurses to transfer what they have learned in class to the clinical setting (Botma, 2014a:1). One reason for inability to transfer is a gap between theory and practice.

According to Gallagher (2004:264) the theory-practice gap means that theory and practice are separated, with a mismatch between nursing as taught and nursing as practised. Landers (2000:1554) report that the theory-practice gap is a multifaceted problem where students experience learning from a theoretical perspective as distinct from the clinical perspective. Theory as taught in the classroom and practised in the clinical setting are separate and not integrated. Musker (2011:67) comments that, as an undergraduate student, she learned nursing theories as

abstract concepts and could not make it applicable to nursing practice in clinical settings. When she began to work in a medical-surgical unit for the first time, she was extremely frustrated and had to focus on learning a new way of knowledge and skill application.

Botma *et al*. (2013:32) and Maben, Latter and Macleod Clark (2006:466) may be correct in stating that the theory-practice gap issue appears to be a global phenomenon. The gap between theory and practice is firmly established in nursing education and contributes to student nurses missing opportunities to apply theory in a practical context (Gallagher, 2004:263; Peek, 2015:94). Botma (2014a:1) and Moskaliuk *et al*. (2013:210) argue that this may be because nurse educators do not use teaching strategies that will enable students to bridge the gap between theory and practice. Transfer failure is potentially one of the most costly shortfalls in the education and training of students.

2.4 TRANSFER OF LEARNING

Transfer of learning occurs when student nurses can apply in a specific practical situation what they had learned in theory. The term *integration of theory with practice* is interchangeably used with *transfer of learning*. Transfer of learning therefore is regarded as the application of knowledge, skill and attitude in a real life situation in order to identify and solve a problem, and determines the performance of a student as competent or not yet competent (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Chang *et al.*, 2011:3224; Kirwan & Birchall, 2006:253).

Kolb (1984:n.p.) developed an experiential learning theory to explain the connection between abstract generalisation and concrete experiences, in other words between theory and practice. This is particularly important to bear in mind when stimulating the ability of students to apply their knowledge and skills in practice, as the student will greatly benefit from transfer of learning in the clinical setting. Self-directed learning is one way to aid the development of the student's ability to transfer learning, as self-directed learning is commonly associated with better long term memory retention because it is focused on student-centred learning (Markant, DuBrow,

Davachi &Gureckis 2014:1211). Self-directed learning is described as a process in which individuals take initiative in diagnosing their learning needs, formulating learning goals, identifying and implementing resources and strategies for achieving learning goals and implementing and consequently evaluating learning outcomes (Klunklin, Viseskul, Sripusanapan & Turale, 2010:177). With self-directed learning the student's emphasis is on detecting errors (monitoring) and on the changing of behaviour (control) after detecting the errors (Frith, 2012:2213).

Knowledge and acquired skill must be encoded in such a way that it can be retrieved when the student has to make a diagnosis and decide on treatment options with the best outcome for the patient. Transfer of learning is believed to be a means of getting back to basics and offers the way forward into the unknown where nursing roles and responsibilities continue to evolve (Moskaliuk *et al.* 2013:210; Peek, 2015:94). The purpose of nursing education is therefore to improve student nurses' transfer of learning, which in return will have a direct effect on the performance of the student nurse and the organisation where the student nurse is utilising his/her knowledge and skills (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Chang *et al.*, 2011:3224; Donovan & Darcy, 2011:123; Kirwan & Birchall, 2006:253). The result of successful nursing education is transfer of learning, which will result in individual and organisational performance. Individuals whose performance is labelled as competent also contribute to the performance of the organisation as a healthcare facility (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Chang *et al.*, 2011:3224; Donovan & Darcy, 2011:123; Kirwan & Birchall, 2006:253; Kontoghiorghes, 2004: 13; Yamnill & McLean, 2001:195).

The definite correlation between performance, competence and clinical judgment has been discussed in the first part of this chapter. Consequently the importance of the effect that transfer of learning has on competence has been established; this also explains the relevance of transfer of learning for this study.

Since Baldwin and Ford's (1988:61) research on the factors affecting transfer of learning, researchers have generally viewed transfer as being affected by a system of influences (Donovan & Darcy, 2011:125; Holton *et al*., 2000:333; Kirwan & Birchall, 2006:300; Kontoghiorghes, 2004:214). Holton *et al*. (2000:333) examined this

system of influences to develop a generalised transfer of learning system inventory from Baldwin and Ford's model (1988:61). They concluded that these influences can be seen as a function of four sets of factors, namely:

- student characteristics;
- educational design;
- educational transfer climate; and
- workplace environment.

Drawing from this research, Kontoghiorghes (2004:214) used the work of Holton *et al.* (2000:333) on transfer of learning to develop a more holistic model of transfer of learning. This model provides a view of the transfer of learning process that is broadly inclusive of the previous work on transfer of learning. Kirwan and Birchall (2006:300) agree with previous research on the four factors influencing transfer of learning. Holton *et al.* (2003:460) state that these influences operate together to act as a constellation of factors influencing transfer of learning. It is of the utmost importance that one would understand and predict transfer of learning only by examining the entire system of influences (Holton *et al*., 2000:336). Donovan and Darcy (2011:125) illustrate the transfer of learning process with the most recent system inventory of transfer of learning – refer to Figure 2.2. Each of the four factors (student characteristics, educational design, educational transfer climate and workplace environment) influencing transfer of learning will be discussed below.

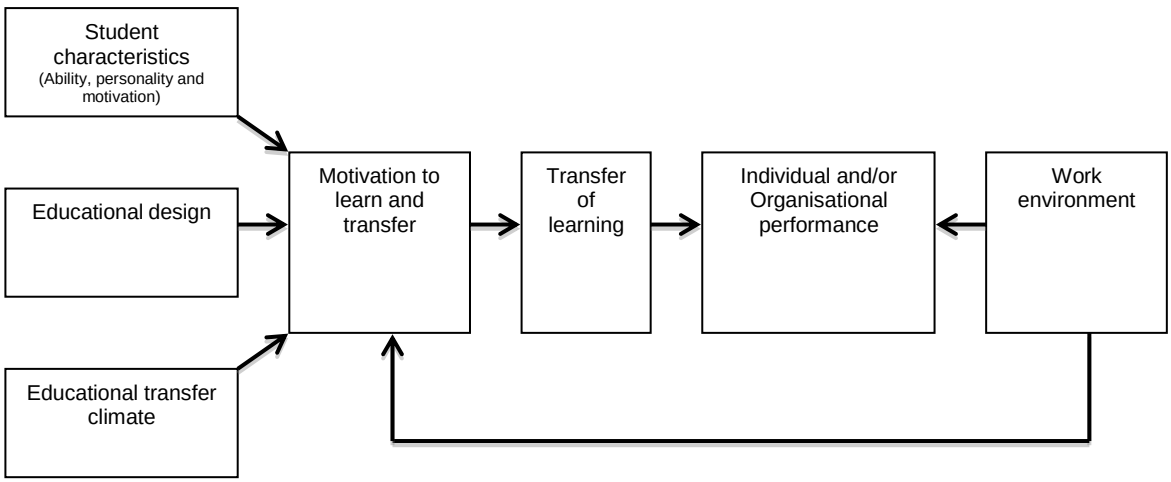

FIGURE 2.2: Systemic model of transfer of learning, adapted from Donovan and Darcy (2011:125)

2.4.1 Student characteristics

The characteristics of students who can transfer knowledge, skill and attitude in order to demonstrate clinical judgment and perform accordingly include: ability, personality and motivation (Chan, 2013:238; Donovan & Darcy, 2011:123; Zuriguel Pérez *et al*., 2014:6). Each of these elements will now be discussed separately.

2.4.1.1 Ability

Ability as a characteristic of a good thinker may include cognitive and psychomotor abilities, which are also referred to as foundational knowledge (Botma, 2016:online, Zuriguel Pérez *et al*., 2014:6). Cognitive ability is the ability to perform skills that demonstrate the reasoning of a nursing student. It refers to applying a number of appropriate cognitive skills to address and identify a nursing problem (Bruce *et al.* 2011:84). According to the College of Nurses in Ontario (2012:online), cognitive skills include:

- Remembering information from past experiences
- Demonstrating problem solving skills
- Demonstrating concentration skills
- Exercising critical thinking skills to develop professional judgment
- Using reasoning skills to develop professional judgment
- Applying arithmetic skills.

One can clearly see the correlation of cognitive ability and reasoning. As discussed earlier in this chapter, clinical judgment resonates closely with competence and the relevant performance of a nursing student (Botma *et al*., 2013:32; Botma *et al*., 2015:500; Chang *et al.*, 2011:3224; Donovan & Darcy, 2011:123; Kirwan & Birchall, 2006:253). It follows that cognitive ability as a student characteristic is of utmost importance for this study.

Psychomotor ability refers to using the body and its muscles to complete a nursing procedure (Bruce *et al.,* 2011:84). It is also referred to as procedural knowledge, which concerns having the ability to complete a certain task with accuracy and precision given a certain amount of time (Biggs & Tang, 2011:81; Botma, 2017:n.p.; Lasater, 2007:500, Schraw, 1998:114). It is assessed on the accuracy of the task done in a given period of time (Biggs & Tang, 2011:81; Botma, 2017:n.p.; Lasater, 2007:500, Schraw, 1998:114).

2.4.1.2 Personality

Personality as a student characteristic is also referred to as attributes, virtues or dispositions and must equate those of a good thinker. In order to make the right decisions and judgments, one must be a good thinker and possess the skill of good reasoning. Good reasoning will transform the thought processes for the better and results in better decision-making and judgment skills when applying transfer of learning. Good thinkers who can apply their reasoning in any situation have specific dispositions that make them extraordinary in the development and application of thinking strategies and processes. Good thinkers are distinctive in a group of students and can be distinguished from the rest of the group by their open-mindedness, inquisitiveness, flexibility, desire to seek reason and be well informed, as well as their willingness to accept diverse viewpoints to learn from (Botma *et al*., 2013:41; Chan, 2013:238; Lai, 2011:42; Zuriguel Pérez *et al*., 2014:6).

Good thinking is a prerequisite to critical thinking, which is needed to apply foundational knowledge into context and make good clinical judgments. Therefore it is important to also consider the personality of critical thinkers, as this will influence transfer of learning and clinical judgment. Facione (1990:online) defines critical thinking dispositions as consistent internal motivations to respond to a situation either out of habit or as a result of influence.

Facione (1990:online) states that critical thinkers have several dispositions that distinguish them from good thinkers:

- Open-mindedness;
- Inquisitiveness, curiousness and enthusiasm;
- Honesty and truth-seeking;
- Analyticity and anticipative when making judgments;
- Systematicity and value organisation;
- Self-confidence; and
- Maturity.

Many authors that agree with Facione (1990:online) on the listed dispositions are among others Banning (2006:458), Lai (2011:9), Papathanasiou, Kleisiaris, Fradelos, Kakaou and Kourkouta (2014:283) and Rudd and Baker (2000:137). Using the organisation of the these authors, each disposition will now be explained.

Open-minded critical thinkers examine their beliefs under new scientific evidence as they acquire new knowledge and experience (Papathanasiou *et al.*, 2014:283). They are open-minded in terms of considering different interventions (Botma *et al*., 2013:41; Chan, 2013:238; Papathanasiou *et al.*, 2014:283). Open-minded thinkers appreciate alternative perspectives, respect different opinions and seek to understand other cultural traditions, in order to gain more perspective on self and others, but still think independently (Banning, 2006:459). The open-minded thinker respects the rights of others to differing opinions and considers alternative perspectives, being sensitive of one's own possibility of prejudice and knowledge limitations (Rudd & Baker, 2010:137; Banning, 2006:459). Lastly open-mindedness and flexible thinking are characteristics of creative thinking that enable one to critically evaluate intellectual products (Lai, 2011:43). Therefore open-minded creative thinkers are well advised when making judgments because they are critically aware of the multiple facets of a complex problem.

Inquisitive, curious and enthusiastic thinkers are eager to gain information and knowledge to know more. They want to acquire knowledge about how things work even when the application is not immediately apparent (Banning, 2006:459). Inquisitive thinkers values being well informed and are thus always well informed, without provocation for the intrinsic benefit of knowing (Rudd & Baker, 2000:137). Curious critical thinkers are always full of questions; they consider traditions, but do not hesitate to confirm their validity and reliability (Papathanasiou *et al.*, 2014:283).

Honest thinkers seek and face the truth of their own biases, prejudices, stereotypes and egocentric and sociocentric tendencies (Rudd & Baker, 2000:135). Truth-seeking thinkers are those who are courageous to ask questions, to obtain the best knowledge, even if the findings do not support their own interests, opinions and beliefs (Banning, 2006:459; Botma *et al*., 2013:41). The truth-seeking thinker would rather pursue the truth than win the argument (Rudd & Baker, 2000:137).

Analytical thinkers use verifiable information to analyse arguments, claims or evidence (Banning, 2006:459; Lai, 2011:9). They demand the application of reason and evidence and have the tendency to anticipate consequences when making judgments (Banning, 2006:459). Analytical thinkers have a disposition of being alert to potentially problematic situations, either conceptual or behavioural, anticipating effective ways to resolve matters (Rudd & Baker, 2000:136). Consequently they consistently anticipate for preventative interventions as an effective way to resolve matters.

Systematicity targets the characteristics of being organised, orderly and diligent in enquiring, planning and implementing (Rudd & Baker, 2000:137). Systematic thinkers are persistent and diligent in seeking relevant results suitable to the circumstances of inquiry and tend to avoid quick and simple answers. These thinkers value good organisation and approach complex problems in a focused manner in order to anticipate challenges that may arise (Banning, 2006:459; Rudd & Baker, 2000:137). Students who demonstrate systematicity will always present a project that is orderly, well organised and coherent (Lai, 2011:39).

Self-confidence refers to the level of trust one places in one's own reasoning process (Rudd & Baker, 2000:137; Zuriguel Pérez *et al*., 2014:6). Self-confident thinkers trust their own reasoning skills, as well as using these skills to respond to problems (Banning, 2006:459). They do not hesitate to disagree and explain their reasons and arguments with confidence (Papathanasiou *et al.*, 2014:285). Since self-confident critical thinkers believe that others look to them to resolve problems and bring closure to reasonable enquiry, they trust themselves to make good judgments based on scientific evidence and their consideration of the societys' values and interests (Rudd & Baker, 2000:137).

Maturity addresses cognitive maturity, which includes knowing that some situations may have more than one reasonable option and realising that certain judgments must be made without having the benefit of knowing all information about the situation (Rudd & Baker, 2000:137). Mature thinkers consider epistemology when inquiring and reasoning (Rudd & Baker, 2000:137).

2.4.1.3 Motivation

Motivation to transfer may be explained as the direction, intensity and persistence of effort toward application of knowledge, skill and attitude, in a clinical setting (Holton *et al*., 2003:464; Entwistle & McCune, 2013:268). Motivated students are more likely to persist in tasks that require reasoning. In turn, situations that require reasoning may stimulate student motivation, as they are more challenging.

Motivation to transfer learning is influenced by education strategies (Botma, 2014a:1; Donche, de Maeyer, Coertjens, Van Daal & Van Petegem, 2013:239; Moskaliuk *et al*., 2013:210). As mentioned earlier, self-directed learning is often associated with better long-term memory retention as it focuses on student-centred learning and motivates students to apply their knowledge and skill in practice (Klunklin *et al.*, 2010:177; Markant *et al*., 2014:1211). Self-directed learning gives students a sense of responsibility as the student takes his/her own initiative to diagnose and address learning needs (Klunklin *et al*., 2010:177).

Ahn and Kim (2015:707) and Merriam and Leahy (2005:15) suggest that students must be part of planning the proposed outcomes of the course. By setting outcomes students have a goal to pursue and once the goal has been achieved, the student feels motivated to pursue the next goal (Ahn & Kim, 2015:707). A further problem with regard to motivation is lack of support. A student nurse may find support from preceptors, the staff that they are working with and from their peers (Kirwan & Birchall, 2006:255). Being of feeling unsupported inhibits a student nurse's motivation to transfer learning (Houghton, 2014:2).

Pre-training motivation refers to a student nurse who voluntarily chooses nursing as career (Rust, 2002:146; Waite & McKinny, 2016:101). Such a student is interested in the field of nursing and willing to learn and transfer in order to become a competent expert nurse later in his/her career. However, a student who is obliged to choose nursing as a career for whatever reason will have no motivation to learn and transfer the learning to practice.

2.4.2 Educational design

Educational design refers to the relationship between the curriculum of the education programme and the actual requirements of the clinical setting (Donovan & Darcy, 2011:123). Ensuring that the content of the curriculum is consistent with the requirements of the clinical setting can positively influence transfer of learning (Botma *et al*., 2013:32; Botma *et al*., 2015:499; Holton *et al*., 2000:335). Nursing students should be able to transfer their foundational knowledge in clinical practice whilst they are being educated (Botma, 2014a:1). Nursing education institutions should be aware of the factors influencing transfer of learning whilst compiling education programmes.

According to Ahn and Kim (2015:707) and Merriam and Leahy (2005:15) including students in the planning of the educational design may aid the students with transfer of learning. Engaging students in the planning of the programme includes enquiring about their prior knowledge or experience of the proposed learning content and adjusting the learning content accordingly (Merriam & Leahy, 2005:15). What is most

important in the planning of the educational design is that all the stakeholders should have input in the programme content.

Strategies in the education design that will enhance transfer of learning include the following:

- Advance organisers;
- Segmenting the content into manageable portions;
- Using content and activities that enhance reasoning of students;
- Assuring that learning content is evidence based and applicable;
- Learning students how to anticipate and plan for the application of knowledge, skill and attitude in order to address problems;
- Active learning that is aimed at providing the appropriate activities to address planned outcomes;
- Using instructional techniques such as immersive simulations;
- Providing feedback; and providing effective facilitation of reflection and debriefing in order to develop metacognition (Ahn & Kim, 2015:707; Biggs & Tang, 2011:22; Botma, 2014a:1; Kirwan & Birchall; 2006:254; Merriam & Leahy, 2005:15).

Immersive simulation should be a key element in the educational design of nursing programmes, because simulation serves as a strong motivator to learn and apply knowledge and skills in clinical practice (Botma, 2014a:3; Moskaliuk *et al*., 2013:210; Wilson, Klein & Hagler, 2014:17). The appeal of simulation is rooted in its capacity to offer learners exposure to real-life scenarios in a safe environment (Moskaliuk *et al*., 2013:210; Moule, 2011:645, Wilson *et al*., 2014:17). Moule (2011:645) and Wilson *et al*. (2014:17) suggest that different simulation techniques can be used to support psycho-motor skill development and also help learners with the development of cognitive ability by achieving critical thinking, decision making and problem-solving skills.

Blum, Borglund and Parcells (2010:11) conducted a study to examine the impact of high-fidelity nursing simulation on student self-confidence and clinical competence with the help of the Lasater Clinical Judgment Rubric. Improvement in self-confidence and competence are results of high-fidelity nursing simulation (Blum *et al*., 2010:11; Botma, 2014a:3). Through the process of practice, feedback and reflection with simulation students are assisted to develop both confidence and competence prior to delivering care in real-life clinical settings (Botma, 2014a:3; Moule, 2011:645). Simulation also provides facilitators with another way to support learner assessment. Using standardised scenarios and grading rubrics facilitate the assessment of student competencies in preparation for skill delivery in clinical practice (Moule, 2011:645; Yang, Thompson, Hamm, Bland & Foster: 2013:1).

There is no real preference for either standardised patients or high-fidelity patient simulators as long as each simulated learning experience is relevant to the topic the students are studying; authentic; and that it engages the students emotionally and at a high cognitive level (Botma, 2014a:1; Wilson *et al*., 2014:17).

2.4.3 Educational transfer climate

Educational transfer climate refers to individuals' attitudes and behaviours in the workplace context, which can either inhibit or support transfer of learning (Holton *et al*., 2000:335). Student nurses and newly qualified nurses experience significant challenges when entering the workplace (Department of Health Republic of South Africa, 2012:online). These challenges may be attributed to the sociotechnical design within the workplace environment that includes social aspects such as information sharing, employee involvement, multiskilling work environment, team environment and company satisfaction (Kontoghiores, 2004:214).

Because of staff shortages, permanent employees must function in exhausting circumstances and experience stress, fatigue and lack of motivation (Department of Health Republic of South Africa, 2012:online). As a result, student nurses and newly qualified nurses are not supported and experience an education transfer climate that is not conducive to transfer of learning (Houghton, 2014:2). Student nurses and

newly qualified nurses are classified as novice nurses and are not yet competent to function on their own, although permanent employees expect them to function independently (Jewell, 2013:324).

The ministerial task team recommends in the Nursing Education and Training Strategic plan of South Africa for 2012/2013-2016/2017 that clinical education and training be strengthened by re-establishing clinical teaching facilities at all clinical practical areas, supported by a coordinated system of clinical preceptors (Department of Health Republic of South Africa, 2012:online).

The South African NES group (2012:15) defined a preceptor as *"an experienced and competent professional nurse who is positive about nursing, students and herself, who serves as clinical teacher in the clinical setting and is employed by a Higher Education Institution".* These preceptors must give the nursing students task cues and motivate them to achieve job and career utility (Kontoghiores, 2004:214). The preceptors must ensure that nursing students get intrinsic and extrinsic rewards for using new skills and knowledge. It is of the utmost importance that nursing students must have a sense of training accountability, whether towards a preceptor or supervisor in the clinical facility (Kontoghiores, 2004:214).

However, the Department of Health Republic of South Africa (2012:online) states that currently there is a great need for trained preceptors and that training of preceptors to aid students with transfer of learning is a priority that must be addressed.

2.4.4 Workplace environment

Workplace environment refers to the environment itself, which may either be conducive or hindering for transfer of learning to take place. The degree to which the student nurse has the opportunity to use and practise in the workplace environment itself what has been learned in theory, points to the workplace environment being conducive or hindering for transfer of learning (Donovan & Darcy, 2011:123). Kontoghiores (2004:214) emphasisees that opportunities to practise and use

foundational knowledge have a direct influence on transfer of learning. Nursing students who use these opportunities will transfer their foundational knowledge to the clinical setting and develop reasoning processes in return.

The workplace environment should always strive towards a continuous learning environment, where student nurses are provided with learning and growth opportunities (Kontoghiores, 2004:214). Other workplace environment factors include the availability of resources and supplies to do what is expected from the student nurse (Botma *et al*., 2013:41).

Education design, education transfer climate and workplace environment are important factors influencing motivation to transfer learning. However, it is not the purpose of this study to examine these factors in detail.

As a result of all of the above-mentioned systemic influences, performance and thus competenc of the nursing students, included in this research study, will not be measured in the clinical practical area. The competence of nursing students included in this research study will be measured during a standardised patient simulation. This was done to eliminate some of the above-mentioned variables and constitutes one of the limitations of the study.

2.5 THINKING

According to the Oxford Dictionary (2015:online) thinking is described as *"using thought or rational judgment"* or *"the process of using one's mind to consider or reason about something."* Thinking is so much part of who human beings are and how we function daily, that we would not be able to survive if we did not think. Thinking, in other words, is a mental activity that includes the search of finding meaning. Whether it is to make sense out of something, solving something or deciding about something, one must first think carefully about it. Meaning-making is the result of thinking and therefore thinking can be used to reason. We accept that thinking is also a process of the mind to consider something carefully in order to form an opinion and make a judgment.

According to Beyer (1987:n.p.) and Entwistle and McCune (2013:268) thinking is made up of three components, namely:

- dispositions of good thinkers (willingness to apply strategies). This component was discussed earlier in the chapter because it may be seen as a pre-requisite for effective thinking;
- knowledge domains (ability to apply cognition during reasoning); and
- thinking processes (alertness to apply reasoning to respond appropriately).

The disposition to think critically differs from the ability to do so. The role that dispositions play in critical thinking has been established, but there is agreement that only those who acquire the disposition and are able to think can truly think critically (Entwistle & McCune, 2013:268; Lai, 2011:9). Acquiring only the disposition to think is not enough to critically think about a situation; one must also acquire the ability to do so. Rudd and Baker (2000:133) argue that thinking is not inherited, it is not an outcome of experience or a habitual result of study in a specific discipline for many years, but that thinking processes must be deliberately taught by educators and learned by students. Therefore it is of utmost importance for nurse educators to develop and assess the thinking of nursing students.

Individuals differ with respect to how they prefer to think and which thinking strategy they will employ (Fletcher, Marks, Hine & Coventry, 2014:526). Nurse educators should therefore teach nursing students different thinking strategies to solve problems.

2.6 THINKING STRATEGIES

As stated previously, the aim of thinking is to conceptualise new information in order to make a decision and solve a problem. In order to process information of whatever kind, various thinking strategies may be implemented during the process of thinking. These thinking strategies include:

- Reflexive comparison
- Heuristics (rule of thumb)

- Inductive reasoning
- Deductive reasoning
- Socratic reasoning
- Prescriptive reasoning
- Critical analysis
- Intuition

2.6.1 Reflexive comparison

This refers to making a judgment on the state of the current situation against standards developed through theoretical and experiential knowledge that created prototypical case reasoning during thinking (Frith, 2014:2213; Banning, 2008:180). Each particular experience has been a learning experience (Biggs & Tang, 2011:45). For example the exact type of patient with an established illness is used as a reference case.

2.6.2 Heuristics

Heuristics enable a person to reduce the time taken to make a judgment by recognising a pattern, judging the value, providing explanations, recognising relationships and drawing conclusions (Banning, 2008:181). This type of reasoning is referred to as *rule of thumb* that is used unconsciously in most cases and may result in reasoning shortcuts (Audètat *et al*., 2013:43; Banning, 2008:181).

2.6.3 Inductive reasoning

Inductive reasoning skills are used to form a tentative hypothesis that culminates in a final conclusion of the data as interpreted by making judgments based on case reports, clinical studies, prior experiences and simulations (Banning, 2008:178; Burns, Mendle, Fisher, Cooper, Fisher, 2013:88). Tentative hypotheses are formed from knowledge and experience, and when considered together, yield specific pieces of information to constitute a special interpretation (Papathanasiou *et. al.*, 2014:284).

With inductive reasoning, specific observations are used to form a clinical picture or diagnosis (Delany, Golding & Bialocerkowski, 2013:44).

Initial patient information is systematised and categorised to determine if a specific pattern emerges that fits an illness description. Through application of foundational knowledge the tentative hypothesis is confirmed, deleted or refined to formulate a hypothesis based on the interpretation of initial patient information. Inductive reasoning goes from the particular to the general (Walton, 2015:9).

2.6.4 Deductive reasoning

With deductive reasoning a general hypothesis is tested with specific observations (Delany *et al*., 2013:45). The general initial hypothesis is either confirmed or rejected by a final conclusion drawn from specific information and observations (Banning, 2008:178). Deductive reasoning is equivalent to clinical reasoning, where cues are eliminated with accurate questioning in order to come to a final conclusion (Sedgwick *et al*., 2014:5).

The student nurse will ask specific questions to eliminate some differential diagnoses in order to come to a final conclusion or working diagnosis (Chiffi & Zanotti, 2014:4). The clinical data of the patient is used to make a final conclusion or decide on a working diagnosis and is the key to the reasoning process (Banning, 2008:179; Delany *et al*., 2013:52). A conceptual framework is used to give a descriptive interpretation of the patient's condition (Papathanasiou *et al.*, 2014:284). Deductive reasoning goes from the general to the particular (Walton, 2015:9).

2.6.5 Socratic reasoning

Socratic reasoning requires appropriate questioning that will subtly lead to solving a problem (Biggs & Tang, 2011:150). It is a method where the answer to a problem is sought. According to Papathanasiou *et al.* (2014:284) socratic reasoning refers to the thinker asking appropriate questions to investigate below the surface, recognise a condition, examine the condition, look for the consequences, investigate the

multiple data views and distinguish between what is known and what are assumptions.

2.6.6 Prescriptive reasoning

Protocols, clinical guidelines and clinical policies are used during prescriptive reasoning and include guidelines that outline operational information and procedures (Sagasser *et al*., 2012:5; Shaban, 2012:5). These prescriptive tools were compiled by researchers to improve practitioners' judgments and therefore the researcher and not the practitioner who is using the prescriptive tool performs the reasoning. The practitioner makes use of the guidelines and follows the algorithm in order to improve healthcare, but may not realise that the problem is more complex than what is mentioned in the guidelines and only see the prescribed answer to a complex problem (Sagasser *et al*., 2012:5; Shaban, 2012:5). However, some practitioners will make a decision and use the prescriptive tool only to check their reasoning and judgment (Sagasser *et al*., 2012:5).

2.6.7 Critical analysis

During a critical analysis relevant and valid information is selected from the original patient information, compared with different information and related to variables such as context (Biggs & Tang, 2011:346). When critically analysing the main ideas of an event, the main idea is firstly identified and secondly compared for a relation, while unnecessary ideas are omitted (Biggs & Tang, 2011:346; Papathanasiou *et al*., 2014:283).

Critical analysis gives insight into an event by critiquing information that is available with applicable questioning. Critical analysis can therefore be regarded as a set of questions used to justify an idea, where one must know all the questions but select the appropriate question for a specific context (Papathanasiou *et al*., 2014:283).

2.6.8 Intuition

Intuition is the understanding of an event or situation without the conscious use of reasoning and is often being referred to as a gut feeling (Banning, 2008:180; Papathanasiou *et al*., 2014:285). This understanding of the event or situation cannot be explained logically but is the result of extensive knowledge gained through experience of reasoning in similar situations (Papathanasiou *et al*., 2014:285). The knowledge and experienced gained allows an individual to recognise certain cues and approach the right conclusion (Papathanasiou *et al*., 2014:285). Student or novice nurses are however not recommended to make use of intuition as they have not yet gained enough experience (Sedgwick *et al*., 2014:2).

2.7 KNOWLEDGE DOMAINS

In addition to strategies of thinking, one needs knowledge to reason with in order to solve a problem. As mentioned earlier a student who uses knowledge and skills from various disciplines and applies it in a specific situation will be able to solve a problem (NES group, 2012:50). It is thus clear that reasoning requires basic knowledge from natural and social sciences. Information in books, on the internet or presented by educators as facts become knowledge once it has been grasped by the student (Biggs & Tang, 2011:81). A student who really understands a concept and does not merely paraphrase the definition of the concept, behaves differently by demonstrating good reasoning and problem solving skills (Biggs & Tang, 2011:81).

Botma (2017:n.p.) mentions three dimensions of knowledge:

- Knowledge is based on principles developed from experience that usually leads to a desired outcome, for example considering all the facts and information before drawing a conclusion.

- The nature of knowledge is interpretive, ever-changing, tentative, fragmentary and highly selective. In today's world of freely available information, new knowledge only has a three-month life cycle before becoming outdated.

- Knowledge of a specific discipline or subject, which we often refer to as ‘domain-specific knowledge’, including generating, organising and making sense of information in particular fields.

As a result of the organisation of knowledge, different types of knowledge exist and each type demands specific thinking strategies and thinking processes. Four specific knowledge domains can be distinguished, namely:

- Foundational knowledge
- Conditional knowledge
- Functional knowledge
- Metacognitive knowledge

2.7.1 Foundational knowledge

Foundational knowledge consists of declarative and procedural knowledge. Declarative knowledge defines *“what”* or is about things, while procedural knowledge is knowing *“how to”* do things (Botma *et al*., 2015:502). Foundational knowledge involves the integration of knowledge and skill in order to demonstrate good critical thinking and is predominantly a cognitive process *(*Botma *et al*., 2013:41; Bruce *et al*., 2011:263; Chang *et al.*, 2011:225).

Declarative knowledge is public knowledge that is verifiable once it has been subjected to rules of evidence; replicable and logically consistent (Biggs & Tang, 2011:81). Declarative knowledge, also referred to as propositional knowledge or content knowledge, is found in books, on the internet and in the classroom from the educator (Biggs & Tang, 2011:81; Botma *et al*., 2015:502; Bruce *et al*., 2011:146). The student’s role is to receive the knowledge, while the student’s understanding of the knowledge is tested declaratively, by asking the student to declare the knowledge back (Biggs & Tang, 2011:82). It is recommended that a student nurse should have a good foundation of knowledge pertaining to anatomy, physiology, pathophysiology, pharmacology, microbiology and psychology, to mention only a few.

At the foundational knowledge level students memorise facts without reasoning about it and therefore finds it difficult to solve problems as they only make use of memorised routine solutions and procedures. The assessment of declarative knowledge is done with methods such as pen and paper tests or oral examinations (Charlin, Lubarsky, Millette, Crevier, Audètat, Charbonneau, Fon, Hoff & Bourdy, 2012:454; Levett-Jones, Hoffman, Dempsey, Jeong, Noble, Norton, Roche & Hickey, 2010:516).

According to Botma (2017:n.p.) and Zuriguel Pérez *et al*. (2014:6) declarative knowledge enables students to notice relevant information and make associative links among illnesses and their attributes. Declarative knowledge also entails understanding the relationship between all the relevant information that has been gathered. Lack of declarative knowledge inhibits critical thinking, as the student has no information on which to base findings (Chan, 2013:237). The student nurse will therefore not be able to apply foundational knowledge to clinical practice in order to interpret the findings (Chan, 2013:237). Some students possess declarative knowledge, but anxiety, (lack of) confidence and time pressures influence the utilisation of declarative knowledge (Botma, 2014a:3).

An example of declarative knowledge is:

Student nurses are able to explain that organisms cling to the skin. When you touch an area the organisms are rubbed off and the objective you touched will be contaminated. One way of reducing the number of organisms clinging to your hands is to wash them with soap and water or to spray an alcohol hand rub on your hands and rub them together until the alcohol has evaporated. Therefore, student nurses should cleanse their hands before they touch a patient in order to prevent or reduce nosocomial infections. Hand cleansing is an infection prevention measure and contributes to your own safety as well as the safety of the patient.

Procedural knowledge is knowing how to complete a task and is on the same cognitive level as declarative knowledge (Botma *et al*., 2015:502; Bruce *et al.,* 2011:84). Students demonstrate procedural knowledge if they are able to demonstrate a certain skill, for example aseptic hand washing. The procedural

knowledge of a student is influenced by accuracy and time on task (Botma, 2107:n.p.; Biggs & Tang, 2011:81; Lasater, 2007:500, Schraw, 1998:114). The assessment of procedural knowledge is done with a skills test in clinical practice or during an objective structured clinical examination (OSCE) and involves the accuracy of the task done in a given period of time (Botma, 2017:n.p.; Yang *et al*., 2013:1). Students with a high level of procedural knowledge perform tasks more automatically, have a large repertoire of strategies and sequence strategies effectively (Schraw, 1998:114).

To conclude, according to the NES group (2012:50) foundational knowledge is used to demonstrate understanding and insight into related theories and sciences during critical thinking processes. For example the student can relate the vectors and micro-organisms with infections and infection prevention measures. Foundational knowledge forms the basis of a nurse's perceptual grasp of the situation at hand. In other words, the nurse will use her foundational knowledge to notice what situation is at hand (Tanner, 2006:208). Tanner's Clinical Judgment Model states that a nurse's perception of any situation is rooted in his/her declarative knowledge and is strongly shaped by his/her procedural knowledge (Tanner, 2006:208).

2.7.2 Conditional knowledge

A second type of knowledge is conditional knowledge. At the conditional knowledge level the student often reasons *"why"* and *"when to"* according to his/her existing foundational knowledge (Botma *et al*., 2015:502; Schraw, 1998:114). When the patient and context of the situation are added to the scenario the student needs to consider all relevant aspects and will use conditional knowledge to demonstrate clinical reasoning (Botma *et al*., 2013:36; Botma *et al*., 2015:502; Sedgwick *et al*., 2014:2). The student encounters a real-life situation and no longer bases decisions only on theory (Chang *et al.*, 2011:3225).

Clinical reasoning occurs when students have to take the subjective data (symptoms) and objective data (signs and laboratory data) into consideration in order to guide them in making a differential diagnosis (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Van de Mortel, Whitehair & Irwin, 2014:462). Through the process of elimination and confirmation the student can make a final diagnosis (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:208). Knowledge about the patient and context are the basis upon which healthcare professionals will interpret data or findings (Tanner, 2006:208). The initial grasp is then either confirmed or refuted by definitive biological evidence. The context (situation/condition/person) guides the student in selecting the correct use of resources and strategies in order to interpret data or findings (Chiffi & Zanotti, 2015:5; Schraw, 1998:114).

Example of conditional knowledge:

A coughing patient probably inhaled an organism that lodged in the airways and caused a disease process. Coughing distributes organisms through droplets that remain in the air and deposits on surfaces within the room. Some organisms might remain dormant for a long period. Raised temperature indicates an inflammatory process and the discoloration of sputum indicates infection. Yellow sputum indicates bacterial infection and red spots may be indicative of blood. Thus, the patient has an upper and/or lower airway infection, which might be sinusitis, cold, flu, bronchitis, pneumonia, TB etc. If untreated, an upper airway infection might spread to the lungs. If one lung is infected the other might also become infected. A physical examination and perhaps culture and sensitivity should be done to determine the causative organism and treatment options.

Conditional knowledge helps students to selectively allocate their resources and use strategies more effectively (Sedgwick *et al*., 2014:6; Schraw, 1998:114). According to Tanner's Clinical Judgment Model (2006:208) and Sedgwick *et al*. (2014:6) the student will use conditional knowledge to develop a better understanding of the situation at hand and interpret what is happening. Demonstrating the use of conditional knowledge implies that the student has applied theory in practice and therefore indicates that transfer of learning has occured (Donovan & Darcy, 2011:123). Failure to utilise conditional knowledge will result in poor clinical judgment,

which can lead to unwanted outcomes such as complications or death (Gibson *et al*., 2015:537; Papathanasiou *et al.*, 2014: 286).

2.7.3 Functional knowledge

Functional knowledge advises the student how to respond in a specific situation and therefore indicates the level of understanding the student has of that situation (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Gibson *et al*., 2015:536). The student is actively putting foundational and conditional knowledge to work and therefore transfer of learning is taking place (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan & Darcy, 2011:123; Zuriguel Pérez *et al*., 2014:2). Functional knowledge travels externally as the student implements actions, while foundational knowledge travels internally as the student receives the information (Biggs & Tang, 2011: 82). Biggs and Tang (2011:82) further emphasise that functional knowledge requires a solid platform of foundational knowledge.

With functional knowledge the student does not only notice and interpret the situation at hand, but also responds appropriately (Gibson *et al*., 2015:536; Lasater, 2007:4960; Tanner, 2006:208). Levett-Jones *et al*., (2010: 518) describes functional knowledge as the behaviour following a judgment. Functional knowledge is thus demonstrated when the student is able to decide on treatment options that will address all healthcare needs, including the root cause of the condition, that will be most beneficial to the patient (Botma, 2016:online). When making a judgment with functional knowledge the student takes into consideration more than only the initial situation. Decisions of treatment options are based on holistic patient care that include all subjective and objective information, advantages and disadvantages of treatment, patient preferences, responses to treatment already given, as well as best practice guidelines (Botma, 2016:online; Lasater, 2007:500). Finally, also, the decision the student makes must always be in collaboration with the patient (Botma, 2016:online).

This is an example of functional knowledge:

Based on the clinical manifestations mentioned above and the results from the laboratory, the patient, in collaboration with the student nurse, decides to commence TB treatment. The student nurse explains the standard treatment protocol to the patient and initiates treatment accordingly.

The student has mastered the skill of clinical judgment when functional knowledge is applied correct and the treatment plan holistically addresses the needs of the patient (Botma, 2016:online). Functional knowledge can only be assessed through performance that is inspired by declarative, procedural and conditional knowledge and is equivalent to clinical judgment (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan & Darcy, 2011:123; Zuriguel Pérez *et al*., 2014:2).

2.7.4 Metacognitive knowledge

Metacognitive knowledge is new knowledge that builds on previous knowledge. It is knowing about what you know or knowledge of own cognition (Frith, 2012:2212; Schraw, 1998:114). Through the process of *"thinking about thinking",* metacognitive knowledge (new knowledge) is constructed (Botma, 2016:online). Metacognitive knowledge is knowledge that students gain from previous experiences that contributes to the development of their ongoing clinical knowledge (Botma, 2016:online; Bruce *et al*., 2011:84; Tanner, 2006:209).

Competent student nurses reflect on their thinking processes to identify flaws in their reasoning and plan to avoid repeating the errors, thus refining their functional knowledge (Frith, 2012:2213). With metacognitive knowledge a better course of action will be formulated and thus the student's capacity for clinical judgment is improved (Frith, 2012:2213). Formulating strategies that are more responsive is the result of metacognitive knowledge; therefore it is also referred to as strategic knowledge (Frith, 2012:2213; Schraw, 1998:114).

Botma (2016:online); Bruce *et al*. (2011:84) and Tanner (2006:209) state that each situation is an opportunity for the growth of clinical learning if students are encouraged to develop the skill of reflection. Metacognitive knowledge is also referred to as self-knowledge and every nursing student must monitor his/her own learning by asking the following questions as mentioned by Biggs and Tang (2011:61):

- *"How am I doing?"*
- *"What am I doing correct?"*
- *"Am I making mistakes here?"*
- *"Any patterns in my error?"*
- *"If so, what can I do to improve it in the future?"*
- *"Is there any way I can approach this situation more effectively than I am now?"*

Example of metacognitive knowledge:

During a lull in the clinic, the student nurse thought about the patient with the TB and realised that although she had explained the treatment to the patient she had not checked if he had clearly understood it all correctly. She realised that she omitted checking questions while giving information to the patient. Although it will not endanger the life of the patient immediately, it might have an effect on his treatment adherence. However, she was not concerned about it because the patient was well educated and her senior by many years. On his follow-up visit, she realised from her discussion with the patient that he had some misconceptions and clarified them immediately. Thinking back on the situation the student nurse realised that she had assumed that the patient would know certain facts about TB because he was well educated and much older than she was. The student nurse decided that even if she was treating a very important, well educated patient she should always check the patient's understanding when sharing information.

Metacognitive knowledge is used to control cognitive processes and the regulation of cognitive processes improves performance in a number of ways, including prompt identification and interpretation of problems, better use of resources, better use of existing strategies and a greater awareness of shortfall in addressing the problem (Frith, 2012:2213; Schraw, 1998:114).

2.8 THINKING PROCESSES

Just as there are different domains of knowledge, thinking consists of different processes in order to address each knowledge domain. Banning (2006:458) and Zuriguel Pérez *et al*. (2014:2) mention that thinking is a cognitive or intellectual disciplined processes of actively and skillfully conceptualising, applying, synthesising or evaluating information gathered from observation. The different thinking processes are:

- Critical thinking
- Clinical reasoning
- Clinical Judgment
- Metacognition.

Figure 2.3 shows the thinking processes with their related knowledge domains and the main purpose of the respective thinking process as described by Botma (2016:online).

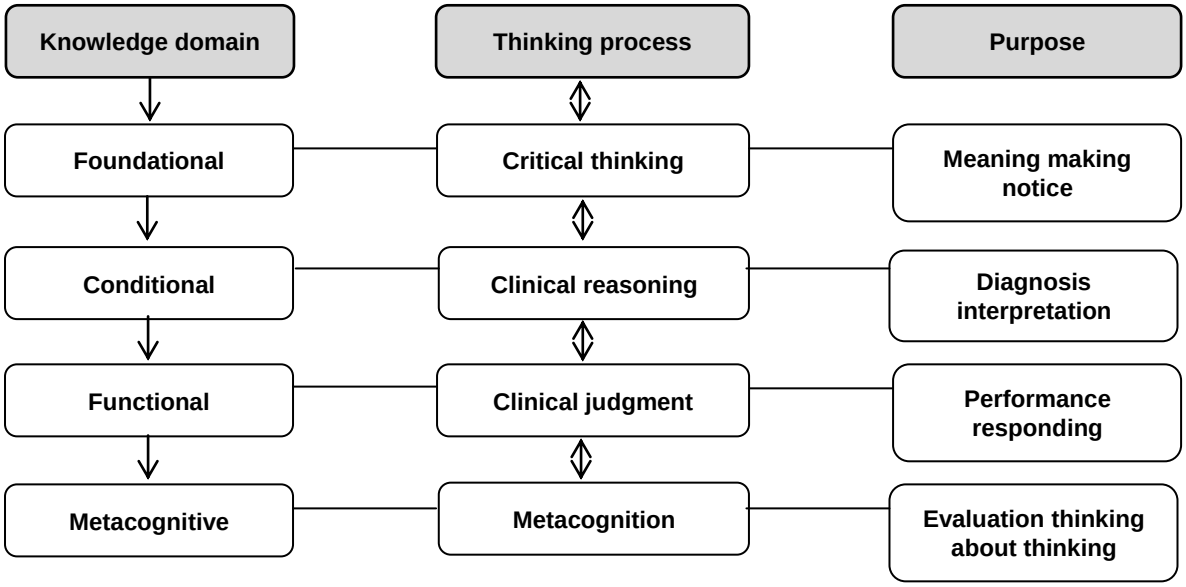

FIGURE 2.3: Figure of thinking process and knowledge domains by Botma (2016:online)

2.8.1 Critical thinking

Critical thinking is the integration of knowledge (declarative knowledge) and skill (procedural knowledge) in order to identify a problem and determine the validity of specific appropriate evidence to solve the problem (Botma *et al*., 2013:41; Bruce *et al*., 2011:63; Chang *et al.*, 2011:3225). According to Tanner (2006:208) critical thinking is involved with the perceptual grasp of a situation and is referred to as *"noticing".* Critical thinking is a crucial process of reasoning for nurses, as failure to notice will result in failure to rescue (Gibson *et al*., 2015:537).

Critical thinking involves focused observation of a wide variety of subjective and objective data to identify valid information and recognise deviation patterns from baseline data. Critical thinking must include assertive information seeking to aid the student with the interpretation of findings, whether by obtaining objective data from observing and examining the patient or by obtaining subjective data from interacting with the patient and family members (Lasater, 2007:500). Objective data signifies procedural knowledge and include observation techniques such as inspection, palpation, percussion, auscultation and sideroom investigations (Botma, 2017:n.p.;

Bruce *et al*., 2011:84; Schraw, 1998:114). Subjective data are akin to history taking and also signify procedural knowledge (Botma, 2017:n.p.; Bruce *et al*., 2011:84; Schraw, 1998:114). History taking should address all domains of living, including physical, emotional, psychosocial, social, cultural, spiritual and developmental needs.

Critical thinking includes identifying a problem, determining the validity of appropriate information and making accurate associations through cognitive thinking (Chang *et al.*, 2011:3225; Zuriguel Pérez *et al*., 2014:2). This means that students are able to explain certain manifestations and make predictions of the progression of a situation at hand (Gibson *et al*., 2015:537; Tanner, 2006:208). Critical thinking is regarded as a cognitive process supporting the ability to analyse the essential components of a problem in order to respond appropriately to the problem (Banning 2006:461; Zuriguel Pérez *et al*., 2014:2). Thus critical thinking is a cognitive process of integration of knowledge, skills and attitude, which is aimed at an effective problem solving process (Botma *et al*., 2013:41; Bruce *et al*., 2011:263; Chang *et al.*, 2011:3225).

During the critical thinking process the student nurse must integrate foundational knowledge in such a way that his/her understanding of findings is scientifically based (Chang *et al.*, 2011:3225; NES group, 2012:50). Furthermore, all assessment data must be associated with relevant theories and sciences in order to identify deviations (Chang *et al.*, 2011:3225; NES group, 2012:50). During critical thinking the student nurse's expectations of the situation at hand is made explicit from either his/her knowledge of the patient, the response patterns of the patient, the student nurse's ability to utilise foundational knowledge and the student nurse's knowledge of similar patients drawn from previous experience ormetacognitive knowledge (Botma, 2016:online; Bruce *et al*., 2011:84; Tanner, 2006:208).

Simmons (2010:1152) states that critical thinking skills enable nurses to make decisions under conditions of uncertainty, risk and complexity as they guide the nurse in assessing, retrieving or discarding components of information that may affect the decision or response. Zuriguel Pérez *et al*. (2014:2) suggest that critical thinking as a cognitive process is vital to facilitate clinical reasoning and clinical judgment. Through critical thinking the student nurse will be able to identify and

grasp whether he/she must respond in order to improve the outcome of a situation (Gibson *et al*., 2015:537; Papathanasiou *et al.*, 2014:283). Lai (2011:4) and Chan (2013:236) remark that nurse educators have long been aware of the importance of critical thinking skills as an outcome of nursing education, as they enable nursing students to initiate reasoning processes in order to address and solve problems.

2.8.2 Clinical reasoning

Clinical reasoning as thinking process builds on critical thinking (Botma, 2016:online). Clinical reasoning encompasses conditional knowledge and is context-specific which makes it difficult for students to grasp through teaching and observation alone (Botma *et al*., 2013:36; Botma *et al*., 2015:502; Chang *et al.*, 2011:3225; Sedgwick *et al*., 2014:2). The processes of collecting and evaluating data in a specific context through reasoning in order to make a diagnosis are key characteristics of clinical reasoning (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:208). Formulating a diagnosis based on the interpretation of relevant and valid findings equates clinical reasoning because it involves the inferential process of deductive reasoning in a specific context in order to solve an identified problem (Banning, 2006:459; Botma, 2016:online; Chiffi & Zanotti, 2015:5; Van de Mortel *et al*., 2014:462).

A student nurse's initial grasp (notice) of a situation triggers the clinical reasoning process by providing cues in the form of the main complaint and health history (Botma, 2016:online). These triggers aid the student nurse with the interpretation of information in order to determine an appropriate response (Chiffi & Zanotti, 2015:5; Gibson *et al*., 2015:537; Tanner, 2006:208). Foundational knowledge therefore needs to be in place and utilised in order to recognise cues (Biggs & Tang, 2011:81). During clinical reasoning a number of differential diagnoses are formed through the interpretation of relevant data (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Van de Mortel *et al*., 2014:462). Each differential diagnosis must be substantiated with evidence from the assessment information (Banning, 2006:459; Chang *et al.*, 2011:3225).

Asking specific questions will either confirm or refute the differential diagnoses (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:208). Further appropriate investigations are performed to rule out differential diagnoses until an interpretation is reached that supports the relevant information of the specific situation the best (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:209). Through the validation process some of the differential diagnoses are discarded until a working diagnosis or final diagnosis remains (Botma, 2016:online; Charlin *et al.*, 2012:457; Chiffi & Zanotti, 2015:5; Tanner, 2006:209). A working or final diagnosis is used for therapeutic and prognostic recommendations and is adequate if one is able to explain all the positive, negative and normal clinical findings of the situation (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:209).

Other processes identified as relevant to clinical reasoning include asking and answering questions to validate information, identifying assumptions, explaining deviations and clarifying uncertainties (Lai, 2011:9). It has been evident from as early as the age of Florence Nightingale that an observation and its interpretation must be the hallmarks of educated nurses (Botma, 2016:online; Chiffi & Zanotti, 2015:5; Tanner, 2006:204).

Once the diagnosis has been made it is expected that the student nurse will respond appropriately to the needs of the patient. This response (intervention) is known as clinical judgment. The novice nurse is now progressing on his/her journey in becoming an expert nurse as he/she is not dependent on rules and regulations to guide performance any more, but performance is based on reasoning and judgment (Benner, 1994:127; Botma *et al*., 2015:505). Benner (1994:127) explains that the expert nurse operates from a deep understanding of the total situation as a contextual whole; he/she is able to accurately identify a pattern of deviation or a problem without wasting time; he/she makes correct decisions about appropriate interventions and is extremely flexible regarding the treatment of a patient, according to the patient's response to treatment. Jewel (2013:324) and Sedgwick *et al*. (2014:2) claim the main difference between a novice nurse and an expert nurse relates to their use of intuition as a result of many years of experience. Expert nurses' experience allow them a deep understanding of the situation at hand and therefore it is not necessary for them to rely on analytical principles any more.

2.8.3 Clinical judgement

Clinical judgment is defined by Tanner (2006:204) as *"an interpretation or conclusion about a patient's needs, concerns, or health problems, the decision to take action (or not), using or modifying standard strategies, or improvising new ones as deemed appropriate by the patient's response".* Bambini, Washburn and Perkins (2009:81) support this definition by stating that clinical judgment is *"the ability to identify and prioritise abnormal findings, and to make a decision about how/when to intervene."* Critical thinking and clinical reasoning culminate into clinical judgment that leads to a response (intervention) from a nurse (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan & Darcy, 2011:123; Tanner, 2006:209). Critical thinking and clinical reasoning are vital to make clinical judgments and are considered as essential competencies every nurse must possess in order to perform efficiently in the clinical setting (Donovan & Darcy, 2011:123; Gibson *et al*., 2015:536; Lasater, 2007:4960; Tanner, 2006:204; Zuriguel Pérez *et al*., 2014:2).

Tanner (2006:205) and Gibson *et al*. (2015:536) further argue that clinical judgment is a complex competency that requires recognition, interpretation and appropriate response. Clinical judgment is mastered when students are able to use and integrate the most valid information that is available and choose treatment options that will be the most beneficial to the patient (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan & Darcy, 2011:123; Tanner, 2006:209). Once the student is able to decide on treatment options that will be the most beneficial to the patient, based on the most valid information available, the student has mastered the skill of clinical judgment and transfer of learning has taken place (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan Darcy, 2011:23; Zuriguel Pérez *et al*., 2014:2).

During the process of clinical judgment the student prioritises the correct sequence in which all nursing interventions should be implemented; the student executes all interventions that demonstrate foundational knowledge and the student's time-on-task is appropriate throughout (Biggs & Tang, 2011:81; Lasater, 2007:500, Schraw, 1998:114). Treatment options that are most beneficial to the patient are comprehensive in nature and include promotion of health, prevention of disease, and

are curative and rehabilitative (Botma, 2016:online; Lasater, 2007:500). Furthermore treatment options must include treatment for all health care needs (signs and symptoms) and treat the root cause if applicable (Botma, 2016:online; Lasater, 2007:500).

Of utmost importance during the process of clinical judgment is monitoring the patient's reaction to treatment and adapting treatment accordingly (Benner, 1994:27, Banning, 2006:458; Gibson *et al*., 2015: 36; Lasater, 2007:500). It is important that the student nurse will demonstrate clinical judgment by rather seeking assistance when care is beyond his/her level or scope of practice.

Clinical judgment incorporates all types of knowledge (Botma, 2016:online; Zuriguel Pérez *et al*., 2014:2). As a result of effective application of all the knowledge domains through the thinking processes the student nurse now has the ability to respond to a patient appropriately and transfer of learning has taken place (Biggs & Tang, 2011:82; Botma *et al*., 2015:502; Donovan & Darcy, 2011:123; Tanner, 2006:209). The ability to transfer learning is associated with individual performance and organisational performance (Donovan & Darcy, 125:2011;Tanner, 2006:208).

In addition to excellent reasoning processes, Lasater (2007:500) and Clarke (2014:52) describe a competent nurse with clinical judgment as one who can communicate effectively. Todd, Manz, Hawkins, Parsons and Hercinger (2008:6) support this statement by identifying effective communication as an expected behaviour of nursing students during simulation activities. A study by Hsu and Hsei (2013:493) to develop and evaluate a competency inventory for nursing students confirmed effective communication as a core competency for nurses. Effective communication skills are required for establishing patient and interdisciplinary relationships in order to improve patient safety and care (Clarke, 2014:52; Todd *et al*., 2008:3). Communicating in clinical practice occurs in various ways such as written documentation, listening, verbal and non-verbal communication (Clarke, 2014:56; Todd *et al*., 2008:3).

According to Bourbonnias, Langford and Giannantonio (2008:64) and Chan (2013:239) an effective communicator understands the complex cognitive, behavioural and cultural factors that influence communication and uses a broad variety of communication skills. According to Al-Kandari, Vidal and Thomas (2009:262) the communicator must assess his/her own non-verbal behaviour, as well as of the patient. Communications skills such as focusing, stating and clarifying are important during interaction with patients and other healthcare professionals (Al-Kandari *et al*., 2009:262). Clarke (2014:55) and Todd *et al*. (2008:3) suggest using ISBAR (identify, situation, background, assessment and recommendations) consistently when communicating with other healthcare professionals.

The effective communicator ensures that communication is clear by applying the following principles of effective communication as mentioned by Al-Kandari *et al*. (2009:262); Bourbonnias *et al*. (2008:64); Clarke (2014:56); Hsu and Hsei (2013:493); Lasater (2007:500) and Todd *et al*. (2008:6):

- explain findings and applicability of all nursing actions to the patient and family;
- assess the patient's and family's concerns and expectations;
- calm and reassure the patient and family;
- direct team members by giving clear orders;
- use ISBAR consistently during interprofessional communication;
- always ask checking questions or use relevant methods to ensure understanding of information provided; and
- keep clear and concise written documentation.

Lastly, competence and thus clinical judgment also encompass attitude (Black *et al*., 2008:173; Botma *et al*., 2013: 32; Chang *et al.*, 2011: 3225; Clarke, 2014:52; Cowan *et al*., 2007:454; Meretoja *et al*., 2004:125). Attitude has to do with the behaviour of the student nurse that can either be portrayed as professional or unprofessional (Clarke, 2014:52). Todd *et al*. (2008:6) emphasise the importance of professionalism as essential in clinical practice. Bourbonnias *et al*. (2008:64) define a professional student nurse as "one who provides, facilitates and promotes the best possible

professional service, continually acquires and strives to improve professional knowledge and accepts accountability and responsibility for actions." Professional behaviour further includes ethical awareness and respect for the beliefs of patients and their families (Al-Kandari *et al*., 2009:262; Chan, 2013:239; Löfmark & Thorell-Ekstrand, 2000:91).

Several aspects of professional behaviour mentioned by Al-Kandari *et al*. (2009:262); Bourbonnias *et al*. (2008:64); Botma *et al*. (2013:36); Clarke (2014:56); Hsu and Hsei (2013:496); Löffmark and Thorell-Ekstrand (2000:91) and Todd *et al*. (2008:6) include:

- assuming primary responsibility for the care of the patient;
- demonstrating interest in the patient and family of the patient;
- demonstrating sensitivity towards the patient and family of the patient;
- involving the patient and family of the patient in decision-making;
- preparing for each clinical exposure by demonstrating in-depth foundational knowledge, psychomotor competence and an acceptable attitude;
- considering ethical issues; and
- confidence in own behaviour.

2.8.4 Metacognition

Students who evaluate their own thought processes by means of meta-cognition are more likely to demonstrate good reasoning as they benefit from self-directed learning (Frith, 2012:2213). All healthcare professionals should be able to apply metacognition because it provides an evaluation of one's practice (Botma, 2016:online; Bruce *et al*., 2011:84; Frith, 2012:2213; Tanner, 2006:209). Metacognition is not a natural product of domain knowledge but needs to be cultivated (Frith, 2012:2214; Schraw, 1998:118). Metacognition refers to high order thinking and involves the active control of thinking processes and the assessment of to what extent thinking outcomes have been achieved in relation to learning situations (Banning, 2008:8; Frith, 2012:2213). Metacognition differs from cognition in that cognition is required to complete a task; metacognition is required to

understand how the task was done (Botma, 2016:online; Frith, 2012:2214; Schraw, 1998:113).

Botma (2016:online) mentions that a prime ability involved in metacognition is that it allows the student to identify similarities between the new situation and previous situations in order to act differently if any discrepancies were identified or to continue with the same action if the outcome was positive. Schraw (1998:113) describes two components of metacognition, namely knowledge and regulation of cognition. Knowledge of cognition refers to awareness of own cognition or cognition in general, for example awareness of foundational, conditional and functional knowledge (Frith, 2012:2215; Schraw, 1998:113). Regulation of cognition comprises of several activities to control learning, for example use of attentional resources, use of existing strategies and awareness of comprehension breakdowns (Frith, 2012:2215; Schraw, 1998:113).

Metacognition equates reflecting about one's thinking; in other words,thinking about thinking (Botma, 2016:online). According to Lasater (2007:501) and Frith (2012:2214) reflective thinkers independently analyse and evaluate personal clinical performance; accurately identifies strengths and weaknesses; build on strengths; develop plans to eliminate weaknesses; and demonstrate commitment to ongoing improvement. Engaging in reflection requires a great deal of responsibility where one must honestly connect nursing actions with outcomes and be aware that what has happened is a result of nursing actions (Tanner, 2006:209).

Two types of reflection can be distinguished, namely reflection-in-action and reflection-on-action (Tanner, 2006:209). Reflection-in-action refers to the nurse's ability to evaluate a patient's response to a nursing intervention and to adjust nursing interventions accordingly, whereas reflection-on-action refers to how nurses gain insight and knowledge from previous experiences that will contribute to their ongoing clinical knowledge development (Tanner, 2006:209).

A major challenge in the teaching, learning and assessment of thinking is that educators need to be informed regarding the predispositions, strategies, knowledge domains and processes of thinking (Stedman & Adams, 2012:9). It was mentioned earlier that the definition of competence by the South African Nursing Education Stakeholders resonates closely with the ability to think, reason and make clinical judgments. It therefore explains the challenging process of assessing competence in nursing, as educators do not have in-depth knowledge of thinking and its many dimensions (Middlemans & Hensal, 2009:110; Stedman & Adams, 2012:9).

2.9 ASSESSMENT OF COMPETENCE IN NURSING

Assessing a student nurse is an evaluation process that is aligned with the learning outcomes of the student determined at the beginning of a new clinical learning experience (Löfmark, Thorkildsen, Raholm & Natvig, 2012:165). According to Sanderson and Lea (2012: 334) the assessment of a student nurse is defined as the evaluation of a student's competence and thus performance by observing his/her actions and interactions in a clinical setting. The student nurse must be judged as competent or incompetent on what is observed of the student (Ullrich & Haffer, 2009:137).

The literature identifies issues relating to the assessment of competence as early as 1992 and no clear consensus exists about how the assessment of student nurses' competence could best be achieved (Cant *et al.,* 2013:165; Middlemans & Hensal, 2009:110). The main concern is that the assessment instrument does not measure the construct of competence, including all the knowledge domains and thinking processes, but only some lower order thinking process such as the recall of facts (Middlemans & Hensal, 2009:110). Dolan (2002:132) and Meretoja *et al.* (2004:125) support Middlemans and Hensal (2009:110) by stating that assessing competence in nursing continues to be a complex process that has undergone many changes as a result of controversy.

A variety of assessment instruments have been designed, but none appear as proof of serious thought, they appear unsystematic and the reliability, as well as the validity of these assessment instruments iare seldom reported (Khosravi *et al.,* 2013:36; Watson *et al.,* 2002:223; Yanhua & Watson, 2011:832).

The complexity of assessing competence in nursing may be due to the obstacles with regard to defining competence. The definition of competence lacks consensus, is contradictory and vague, therefore the measurement of competence is disorganised (Watson *et al*., 2002:4290; Yanua & Watson, 2011:832). Cowan *et al*. (2007:454) suggest that applying the holistic definition of competence that includes knowledge, skills, performance, attitudes and values, may enable nurse educators to accept the definition and develop more precise competence standards, as well as better assessment instruments.

Further contributing to the complexity of assessing competence in nursing are the barriers influencing the implementation of competence assessment instruments. It was recommended by Yanhua and Watson (2011:832) that these barriers must be investigated further. Another factor that compounds the complexity of competence assessment is the variation of nursing education programmes on a global Scale. The specific outcomes of nursing education programmes differ worldwide (Middlemans & Hensal, 2009:110). Some registered nurses have a broad scope of practice and autonomy, especially where they function independently in remote settings, whereas other registered nurses work more under supervision and therefore have a smaller scope of practice (Sedgwick *et al*., 2014:2).

Methods employing simulated patients or observed clinical situations in order to assess the student nurse's ability to assess, diagnose and provide appropriate care for a patient (clinical judgment and competence) were identified in the literature as positive measures (Botma 2014a:1; Middlemans & Hensal, 2009:114; Yang *et al*., 2013:9). The latest patient simulators are able to provide educators with the ability to obtain objective data when assessing higher risk skills and proficiencies without endangering the life of the patient (Middlemans & Hensal, 2009:114; Moule, 2011:645; Yang *et al*., 2013:9). Simulated patients and observed clinical situations are thought to best assess the critical thinking, clinical reasoning, clinical judgment

and problem solving processes of student nurses (Botma, 2014a:1; Middlemans & Hensal, 2009:114).

Despite the complexity of competence assessment in nursing there are many established instruments and methods to assess the competence of student nurses. While each has its limitations that may affect the result of an assessment, there are also advantages and it is therefore important for the nurse educator to weigh the positives and the negatives of the various instruments and methods before selecting the instrument and method that will best assess the competence of a student nurse (Middlemans & Hensal, 2009:110). The researcher is, however, hesitant to use an instrument that has not been tested in a South African context. There is thus a need to do a thematic analysis of existing assessment instruments to measure competence of students that integrate all the knowledge domains and thinking processes from critical thinking to metacognition.

2.10 CONCLUSION

Now that an in-depth discussion of what the literature reveals about the various dimensions of competence have been provided, the researcher will share the entire strategy of the study with the reader in the methodology chapter. The researcher will aim to share information regarding the strategy of the study in such a way that the reader would be able to replicate the study.

CHAPTER 3

Methodology

3.1 INTRODUCTION

Research methodology is seen as the entire strategy for a research study (Grove *et al*., 2013:195). Polit and Beck (2012:733) concur with Grove *et al*. (2013:195) as they view methodology as: *"The steps, procedures and strategies for gathering and analysing data in a research investigation".* These steps, procedures and strategies should be addressed in the methodology chapter in such detail that another person will be able to replicate the original study (Botma *et al.*, 2010:311). It is important to continuously refer to the research question, as well as the aim and objectives of the research study throughout the methodology chapter.

The aim of this study was to develop a valid and reliable instrument to assess undergraduate nursing students' performance by showing competence with good clinical judgment in clinical settings. Therefore the main focus of the researcher was to develop an instrument and test its validity and reliability.

In order to achieve the aim of the study the correct method and design had to be chosen for the research process (Botma *et al.*, 2010:108). The overall research approach that was used to achieve the aim of the study, namely a quantitative methodological research design, will be discussed during the methodology chapter (Hofstee, 2011:113). How the research process was applied will also be explained in detail for two reasons: to justify the chosen design and enable any reader of the dissertation to perform a similar research study (Hofstee, 2011:115).

3.2 RESEARCH DESIGN

The research design is the proverbial backbone of the research study. In addition to describing the decisions that were taken to plan the research study and the research methods that were used, the research design should include clearly defined structures within which the study was implemented (Botma *et al.*, 2010:108; Grove *et al*., 2013:195). The research design is seen as an overall plan to conduct a research study in order to answer the research question (Polit & Beck, 2012:740). Strategies that were used to enhance the integrity of the study should be addressed.

The researcher conducted a quantitative methodological research study in order to address the research question: *"How can the competence of undergraduate student nurses best be assessed?"*

Quantitative research is a formal, objective and systematic process implemented in order to obtain numerical data to explain certain aspects of society (Grove *et al*., 2013:23). In quantitative research numbers are the basic element of analysis; the research focuses on statistical analysis of the data and strives to generalise research results to larger contexts (Botma *et al.*, 2010:83). Leedy and Omrod (2005:94) state that quantitative researchers make use of structured guidelines to objectively measure a variable of interest. Measurement equates assessment and in the case of this research study the variable of interest to be assessed was the competence of undergraduate student nurses.

Assessment entails assigning numbers to objects by abiding to specific rules to characterise quantities of some feature (Polit & Beck, 2012:268). Respondents were asked to assess the competence of undergraduate nursing students by responding to a list of items. Each item was given a numerical number in order to assess the competence of the undergraduate student nurse. Botma *et al.* (2010:3) conclude that instruments may be developed and implemented through quantitative research.

Methodological studies address the development and testing of research instruments. The goal of a methodological research study is to develop an instrument that will be tested for validity and reliability in order for others to use a trustworthy proven instrument and to evaluate the researcher's attempt in developing the instrument (Polit & Beck, 2012:269).

The growing demand for reliable outcome measures and sophisticated procedures for obtaining data have led to an increased interest in methodological research (Polit & Beck, 2012:268). LoBiondo-Wood and Haber (2010:208) emphasise that methodological research is associated with the fact that many of the assessment instruments used by nurse researchers have been developed by other disciplines and may not necessarily be totally appropriate for use in nursing. Nurse practitioners have become more sophisticated in their investigations and knowledge of research; therefore the development of appropriate instruments has increased (Polit & Beck, 2010:269). Methodological studies can verify sources of error in first-hand research but may be limited by the restriction to apply these results in other settings or countries (Mouton, 2001:173).

The most significant and critically important aspect of methodological research, which is addressed in the development of instruments, is called psychometrics. It deals with the theory and development of assessment instruments (e.g. rubrics or scales) and assessment techniques (observational techniques) through the research process (LoBiondo-Wood & Haber, 2010:207).

Psychometric measurement equals the evaluation of the quality of instrument, based primarily on evidence of its validity and reliability (Polit & Beck, 2012:739). Therefore to attain the aim of this study, namely to develop a valid and reliable instrument to assess undergraduate nursing students' performance by showing competence with good clinical judgment in clinical settings, the following objectives were set:

1. To conduct a thematic analysis of existing instruments on nursing competence and clinical judgment.
2. To develop a competence assessment instrument for underdgraduate nursing students.

3. To test the developed assessment instrument.
4. To determine and describe the validity of the developed assessment instrument.
5. To determine and describe the reliability of the developed assessment instrument.

Measurement instruments are paper-and-pencil tools designed to gather data from study participants or persons known by the study participants about knowledge, attitudes, beliefs and feelings (Grove *et al*., 2013:425; LoBiondo-Wood & Haber, 2010:275). Researchers refer to instruments as tools, scales or rubrics that include evidence criteria to judge the quality or phenomena of subjects (Grove *et al*., 2013:429; LoBiondo-Wood & Haber, 2010:275; National Quality Council, 2009:online).

3.3 CONSTRUCTION OF ASSESSMENT INSTRUMENT

A researcher may use existing instruments or choose to design and construct a new instrument (LoBiondo-Wood & Haber, 2010:207). For the purpose of this study the researcher developed a new instrument to assess the competence of undergraduate nursing students based on existing instruments. The assessment instrument was developed based on thematic analysis of several existing instruments measuring competence of clinicians/practitioners within the field of health sciences.

Instrument development entails a process and comprises meticulous research (Grove *et al.*, 2013:440). The researcher had to do careful planning in order to construct the draft instrument. According to LoBiondo-Wood and Haber (2010:208) a methodological study with instrument development includes the following steps:

1. Defining the construct or behaviour to be measured;
2. Formulating items;
3. Developing instructions for users and respondents;
4. Testing the instrument's reliability and validity.

A brief discussion of each step of the instrument development process follows.

3.3.1 Defining the construct to be measured

In accordance with and following recommendations made by LoBiondo-Wood and Haber (2010:208) the researcher conducted a specific and exhaustive literature review to identify the theories underlying the construct to be investigated. The construct of competence was the main focus of the researcher during the literature review, which provided the basis of item formulation for the developed assessment instrument.

The researcher found that researchers ascribe to different definitions of competence and therefore had to exclude all the competence assessment instruments that did not agree with the definition of competence applicable to this research study.

As mentioned in Chapter 1, the researcher refers to competence as the *"ability to integrate knowledge from all disciplines in order to identify the problem, understand the related theory to the problem, the response, treatment and care of the patient as well as then applying all of this integrated knowledge in a practical event or situation in a real life setting or simulation"* (NES group, 2012:50). As illustrated in the literature review by Botma's (2016:online) diagram depicting the knowledge domains with corresponding thinking processes, competence equates functional knowledge that comprises making sound clinical judgments; for this reason, competence and clinical judgment are synonyms in this research study.

3.3.2 Identification and thematic analysis of existing instruments

The researcher conducted a thorough literature review in order to identify existing assessment instruments. The selection of existing instruments was a rigorous process where each existing instrument had to be identified and critically analysed for appropriateness. The researcher analysed appropriateness by defining the construct of each existing instrument. The construct of existing instruments had to

match the construct that was going to be measured with the developed instrument, namely competence.

The researcher reviewed existing instruments assessing competence of clinicians/practitioners within the field of health sciences. Sixteen assessment instruments were identified throughout the literature review. In order for an instrument to be selected for item extraction it had to meet the following inclusion criteria:

1. The measurable construct of the existing assessment instrument had to equate to the measurable construct of the assessment instrument that would be developed. Measuring competence by showing good clinical judgment was the gold standard for selecting any existing instrument.

2. The existing instrument had to measure the competence of clinicians/ practitioners, whether under- or postgraduate, as long as the sample was from within the field of health sciences.

3. The existing instrument had to be available for the researcher to extract the data and items.

After the researcher had conducted a thematic analysis of the sixteen identified assessment instruments, only nine assessment instruments were eligible for item extraction. Exclusion of the remaining seven instruments was based on the fact that these instruments did not measure the competence of subjects, but rather their ability to complete specific theme outcomes. This contradicted the requirement that the measurable constructs had to equate one another.

Another reason for not including all sixteen identified assessment instruments for item extraction was that some of the assessment instruments were incomplete and therefore it was not possible for the researcher to extract items from such an instrument. Incomplete assessment instruments were mostly found in articles. Authors of these articles only mentioned the categories that the assessment instrument consisted of, but did not list the items of the categories.

Although the researcher earnestly attempted to contact the authors in order to access complete assessment instruments, not all the authors replied to the request of the researcher.

Table 3.1 is a summary of the selected existing instruments used for item extraction. The selected existing instruments are listed in alphabetical order.

3.3.3 Item extraction

Each item out of the nine selected assessment instruments was classified in a category. The categories included six thinking processes as identified by the researcher during the review of applicable literature and correlated with the concepts of Tanner's (2006:204) *model for clinical judgment*, as well as Lasater's (2007: 500) *Clinical Judgment Rubric*. The researcher classified each item in a thinking process in a table format on Microsoft Word. The six thinking processes, with the number of items per process/domain after item extraction, included:

i. Critical thinking (notice) with 29 items
ii. Clinical reasoning (interpret) with 30 items
iii. Clinical judgement (respond) with 59 items
iv. Attitude with 23 items
v. Communication with 15 items
vi. Metacognition (thinking about thinking) with 21 items.

TABLE 3.1: Summary of the selected existing instruments for item extraction of the assessment instrument (to be continued)

NO.	AUTHOR(S)	YEAR	NAME OF ARTICLE	SCALE USED IN ARTICLE	VALIDITY DONE	RELIABILITY (INTERNAL CONSISTENCY) OF INSTRUMENT PROVEN	INTER-RATER RELIABILITY DONE
1	Al-Kandari, Vidal and Thomas (Al-Kandari, Vidal & Thomas, 2009:262)	2009	Assessing clinical learning outcomes: A descriptive study of nursing students in Kuwait	Five point Likert scale	Content validity done by two senior nurse educators	Cronbach Alpha reliability coefficient measured .77.	Not reported
2	Bourbonnais, Langford and Giannantonio (Bourbonnais, Langford & Giannantonio, 2008:66)	2008	Development of a clinical evaluation tool for baccalaureate nursing students	Two point Likert scale	Content validity done by clinical instructors who used the instrument	Not reported	Not reported
3	Hsu and Hsieh (Hsu & Hsieh, 2013:495)	2013	Development and psychometric evaluation of the competency inventory for nursing students: A learning outcome perspective	Seven point Likert scale	Content validity by a panel of seven experts in competence assessment	Cronbach Alpha reliability coefficient measured .98.	Not reported
4	Kuiper, Heinrich, Matthias, Graham and Bell-Kotwall (Kuiper, Heinrich, Matthias, Graham & Bell-Kotwall, 2008:8)	2008	Debriefing with the OPT Model of Clinical Reasoning during High Fidelity Patient Simulation	Checklist	Not reported	Not reported	Kendal's coefficient of concordance revealed a mean inter-rater reliability of .87 for all items between two raters.
5	Lasater (Lasater, 2007:500)	2007	Clinical judgment: development: Using simulation to create an assessment rubric	Rubric	Content validity by a group of expert instrument developers. Construct validity ranging from good to very good for each construct.	Cronbach Alpha coefficient of concordance revealed an internal consistency of .97.	Intraclass correlation coefficient value of .89.
6	Löfmark and Thorell-Ekstrand (Löfmark & Thorell-Ekstrand, 2000:8)	2000	Evaluation by Nurses and Students of a New Assessment Form for Clinical Nursing Education	Numeric rating scale	Face validity by clinical teachers in nursing.	Not reported.	Not reported.
7	Meretoja, Isoaho and Leino-Kilpi (Meretoja, Isoaho & Leino-Kilpi, 2004:127)	2004	Nurse Competence Scale: development and psychometric testing	Four point Likert scale	Face and content validity by six expert groups of nurses, managers and directors. Construct validity poor.	Cronbach Alpha reliability coefficient measured between .79-.91 per domain category. Mean Cronbach Alpha value = .85.	Not reported.

TABLE 3.1: Summary of the selected existing instruments for item extraction of the assessment instrument

NO.	AUTHOR(S)	YEAR	NAME OF ARTICLE	SCALE USED IN ARTICLE	VALIDITY DONE	RELIABILITY (INTERNAL CONSISTENCY) OF INSTRUMENT PROVEN	INTER-RATER RELIABILITY DONE
8	Todd, Manz, Hawkins, Parsons and Hercinger (Todd, Manz, Hawkins, Parsons & Hercinger, 2008:6)	2008	The Development of a Quantitative Evaluation Tool for Simulations in Nursing Education	Two point Likert scale	Content validity by six experts in the field of simulation.	Not reported.	Inter-rater reliability ranged between 84.4%-89.1% for each component of the instrument based on the percentage agreement of two evaluators. The specific type of inter-rater reliability test used to determine the inter-rater reliability is not specified.
9	Watson, Calman, Norman, Redfern and Murrels (Watson, Calman, Norman, Redfern & Murrels, 2002:555)	2002	Assessing clinical competence in student nurses	Four point Likert scale	Not reported	Cronbach's alpha reliability was measured twice. It was reported as .87 the first time and .89 the second time.	Not reported.

After the classification of the items, the researcher, assisted by her supervisor, further refined the instrument by eliminating ambiguous and duplicated items in each category and changed the sequence of the items to enhance the logical flow of the instrument. The next step was to compile a comprehensive instrument in the form of an assessment instrument. Each item was studied thoroughly in order to meet the requirements of constructing a sound instrument, which will be discussed further on. The first instrument, after eliminating ambiguous and duplicated items, included:

i. Critical thinking (notice) with 6 items
ii. Clinical reasoning (interpret) with 4 items
iii. Clinical judgement (respond) with 6 items
iv. Attitude with 7 items
v. Communication with 8 items
vi. Metacognition (thinking about thinking) with 2 items.

The researcher adhered to the guidelines of instrument development as described by Botma *et al.* (2010:134), Delport and Roestenburg (2012a:192), LoBiondo-Wood and Haber (2010:280) and Polit and Beck (2012:306) when the nursing competence assessment instrument was constructed:

- ✓ The researcher conducted a thorough literature review on the content of nursing competence instruments before starting the construction of the student nurse competence assessment instrument, in order to develop a table of specifications.

- ✓ An expert panel was approached in order to assist with the representativeness of the items of the instrument, as well as the face validity of the measurement instrument.

- ✓ A pilot study of the student nurse competence assessment instrument was performed.

- ✓ The instrument was developed in the two languages of preference of the users of the instrument, namely English and Afrikaans.

- ✓ Clear instructions were developed for the users of the instrument and the ability of the users to give information was investigated beforehand.

- ✓ Items that were selected were not ambiguous or vague, but short, to the point and clear. Terminology was clearly understood.

- ✓ Constructs were not fictitious, but covered the essential content.

- ✓ Questions that combine two or more questions in one (double-barrelled questions) were avoided. Every question only contained one thought.

- ✓ Questions that were stated in the negative were avoided.

- ✓ Biased items that encouraged participants to answer in a specific way were avoided.

- ✓ Loaded phrases that suggest a certain response were avoided.

- ✓ A complex, confusing and too long instrument was avoided. The developed instrument was simple, to the point and short.

- ✓ Reliability and validity were estimated by comparing the developed instrument with the reliability and validity of existing instruments.

3.3.4 Scale

Scales properly validate instruments in order to assess specific phenomena in subjects (Delport & Roestenburg., 2012b:213; Grove *et al*., 2013:429). The researcher now had to decide on the type of scale to assess the competence of undergraduate students on each item of the instrument.

The researcher decided to use a Likert scale for this purpose. For recording of structured observations a Likert scale, that requires respondents to rate a phenomenon on a scale, may be used (Polit & Beck, 2012:722). Since data were gathered through direct structured observation, the researcher found the Likert scale appropriate to use. The advantage of a Likert scale is that it consists of several declarative items, which are indications of viewpoints on a topic (Polit & Beck, 2012:301). Botma *et al.* (2010:138) confirm this advantage by mentioning that a Likert scale contains a number of declarative statements with a response category after each statement. Six of the nine existing assessment instruments used the Likert scale. The scales varied from two to seven points.

At least two response categories are required, but it is deemed optimal if the number of response categories varies between four and seven (Botma *et al.,* 2010:138; Delport & Roestenburg, 2012b:212). A five point Likert scale was used to assess the competence of undergraduate nursing students.

The scale consisted of:

- n.a = **Not applicable** (**No opportunity** to demonstrate expected behaviour during simulated patient scenario)
- 0 = **Not done** (Student **does not demonstrate any** aspect of expected behaviour)
- 1 = **Incompetent** (Student demonstrates **some** aspects of expected behaviour **haphazardly**)
- 2 = **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)
- 3 = **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly and consistently)**

Due the fact that one option of the scale equated ‘not applicable’, respondents could only choose between four options if an item was applicable. The researcher did this in order to oblige the respondent to side with a response to either agree or disagree, thus eliminating a neutral response from the respondent (Grove *et al*., 2013:430).

Likert scales are also referred to as summative rating scales as respondents' scores on the instrument are computed by summing the number of responses the observer gives (Delport & Roestenburg, 2012b:212). This is accomplished by assigning a value to each response of the Likert scale.

3.3.5 Demographic variables

Demographic variables are the attributes of the study participants and it is used to describe the samples (Grove *et al.,* 2013:154). Demographic variables included age, number of years postgraduate nursing experience, gender, ethnic group, highest qualification obtained, obtainment of a diploma in Nursing Education, previous preceptorship training, name of preceptorship training programme and the name of the institution where the preceptorship training had been obtained.

The researcher asked the respondents to complete a demographic sheet with these details. See Addendum B for the demographic sheet.

A number was allocated to each respondent in order to compare the responses of each respondent with one another through statistical analysis. The subjects to be assessed with the developed instrument were also allocated a number for the purpose of comparing the responses of the respondents. The researcher had a master list with the names and allocated numbers of the respondents.

3.3.6 Instructions for respondents

Clear instructions must be developed for the users of the instrument (Botma *et al.,* 2010:134; Delport & Roestenburg*,* 2012a:192; LoBiondo-Wood & Haber, 2010:280; Polit & Beck, 2012:307). Instructions for respondents with regard to the assessment of students with the developed assessment instrument were included on the first page of the assessment instrument, as well as on the demographic sheet that was provided to the respondents.

Respondents were instructed to write their given respondent number, as well as the number of the student who was being assessed on each assessment instrument. With regard to the items of the developed assessment instrument, each item represented a statement of the expected behaviour that the student had to demonstrate. The students' expected behaviour was assessed with the five point Likert scale mentioned earlier. The respondents were instructed to read each item (statement) and indicate with a ✓ the chosen option according to the five point Likert scale.

Instructions pertaining to the demographic data of the respondents varied according to the type of information that was needed. These instructions were provided in a clear and concise manner on the demographic sheet (Addendum B_1 and B_2) that was provided to respondents.

No problems were experienced during the pilot test, neither during the formal data collection with regard to instructions for respondents.

3.3.7 Validity of the assessment instrument

A valid instrument measures the attributes of a construct accurately and will truly reflect the construct it is supposed to measure (Delport & Roestenburg, 2012a:173; Grove *et al.*, 2013:173; LoBiondo-Wood & Haber, 2010:288). The purpose of validating an instrument according to Delport and Roestenburg (2012a:173) is twofold, namely that it confirms the measurement of the construct in the research question and that the instrument measures this construct accurately. Good validity reflects that the instrument is truly displaying the real meaning of the concept that is being measured. Validation of the instrument was done in order to determine if the newly developed instrument indeed accurately measures the competence of undergraduate student nurses.

The researcher decided to look at the face and content validity of the developed instrument in order to determine if the developed instrument accurately measures the competence of undergraduate student nurses.

3.3.7.1 Face validity

Face validity, according to Delport and Roestenburg (2012a:173), is concerned with: *"the superficial appearance or face value of a measurement procedure".* Researchers use face validity to determine if the instrument appears to be measuring what it is expected to measure. The focus of face validity is to determine the readability of the instrument and items to measure the proposed variable (Botma *et al.,* 2010:137). Face validity is the general impression one has after looking at the instrument. Polit and Beck (2012:336) state that face validity alone does not give strong enough evidence to validate an instrument. Face validity must be done together with content validity.

After the researcher compiled the draft assessment instrument a panel of experts in the field of transfer of learning and nursing competence, who are knowledgeable regarding instrument construction, evaluated the instrument for face validity.

3.3.7.2 Content validity

Content validity *"is concerned with the representativeness or sampling adequacy of the content (e.g. topics or items) of an instrument"* according to Delport and Roestenburg (2012a:173). This is supported by other authors who state that content validity is the determination of the accuracy of the content of an instrument. The content of an instrument equals the items of the instrument. All the items of an instrument must reflect the concept that is being measured (LoBiondo-Wood & Haber, 2010:288). The content of an instrument therefore is validated with content validity in order to determine if it represents the concept being measured.

According to Polit and Beck (2012:337), at least three experts are needed to evaluate and confirm content validity of an instrument, while more are preferable. The experts must answer two questions as explained by Grove *et al.* (2013:173): *"Is the instrument really measuring the construct one assumes it is?"* and *"Does the instrument provide an adequate sample of items that represents the concept being*

measured?" The experts should also check for biased items or items that may be misinterpreted.

The researcher, with the help of her supervisor, contacted ten experts in the field of transfer of learning and nursing competence via email. Some of these experts represented universities from all over South Africa and some from international institutions. However, only seven of these experts gave feedback with regard to the instrument. Refer to Table 3.2 for a summary of the expert panel credentials and responses with regard to assisting with the face and content validity of the assessment instrument.

Face and content validity were further enhanced by the fact that the instrument was compiled from existing competence assessment instruments and an extensive literature review.

TABLE 3.2: Summary of expert panel crededentials responses on face and content validity

NUMBER	POSITION	EXPERTISE	RESPONDED
1	Professor (PhD) at university level	Academic	Yes
2	Professor (PhD) at university level	Clinical judgment- conducted research on topic	Yes
3	Lecturer (Masters) at university level	Clinical judgment- conducted research on topic	Yes
4	Lecturer (Masters) at university level	Preceptorship that focuses on development of clinical judgment and developed an instrument as part of research	Yes
5	Lecturer (Masters) at university level	Clinical judgment in simulation- conducted research on topic	Yes
6	Doctor (PhD) at university level	Critical care and trauma nurse clinician- apply clinical judgment in practice on a daily basis	Yes
7	Doctor (PhD) at university level	Teaches critical care nursing with a strong focus on clinical judgment	Yes
8	Lecturer (Masters) at university level	Teaches paediatric critical care nursing with a strong focus on clinical judgment	No
9	Professor (PhD) at university level	Renowned academic and researcher	No
10	Professor (PhD) at university level	Teaches critical care nursing with a strong focus on clinical judgment	No

The researcher asked the experts to comment on the six chosen domains as well as on each item of the assessment instrument. The draft instrument for experts is provided in Addendum C.

The experts had to give their agreement or disagreement with regard to the following statements about each domain of the assessment instrument, as well as give additional comments if needed:

a) This domain should be tested.
b) This domain has a specific significance in measuring student nurses' competence.
c) The order in which this domain has been placed is correct.
d) Please give any additional comment with regard to the domain if needed.

Refer to Table 3.3 for the feedback of the expert panel with regard to the six chosen domains.

TABLE 3.3: Percentage agreement of expert panel for six chosen domains

DOMAIN	SHOULD DOMAIN BE TESTED	SIGNIFICANCE OF DOMAIN IN MEASURING COMPETENCE	ORDER DOMAIN HAS BEEN PLACED IS CORRECT
Attitude	100%	85%	86%
Communication	100%	100%	86%
Noticing/critical thinking	100%	100%	100%
Interpretation/clinical reasoning	100%	100%	100%
Responding/clinical judgment	100%	100%	100%
Metacognition	86%	86%	100%

Experts suggested that attitude and communication should move from the beginning of the assessment instruments to before metacognition, in order for respondents to have time to look at these skills throughout the student's contact with the standardised patient. The researcher agreed with this suggestion and the assessment instrument was altered accordingly.

One expert suggested including a description after metacognition as with the other domains. The researcher added thinking about thinking as a description of metacognition. Some experts were concerned about the objective measuring of metacognition, as they felt that metacognition is a subjective process. The researcher solved this problem by asking the students to look into the video camera after the simulation activity and reflect about his/her experience of the simulation activity. In this way the observer was able to score the student for metacognition.

With regard to the items of the assessment instrument each expert was asked to agree or disagree with the following statements about each item, as well as give suggestions for improvement if needed:

a) It is representative of the domain;
b) It is measureable;
c) It is clearly phrased;
d) It is understandable; and
e) Suggestions to improve.

The evaluation of the assessment instrument by the panel of experts went well and minor changes to the instrument were made in order to clarify a few uncertainties. Changes that were made included:

- The sequence of items 6, 17, 27 and 28 was changed on request of the expert panel to further enhance the logical flow of the instrument.

- Despite the researcher's efforts to avoid double-barrelled items, the expert panel identified items 1, 7, 8, 9, 10, 13, 15, 18, 25, 28 and 32 to appear double-barrelled. The researcher subsequently split these items into two separate items.

- The expert panel was concerned that items 3, 5, 6 and 14 were not measurable. The researcher therefore rephrased these items in order to make the item a measurable component.

- The expert panel pointed out that items 5, 11, 16, 23, 24, 27, 29, 30 and 33 were ambiguous and vague. The researcher rephrased these items in order to enhance the clarity of the assessment instrument.

The overall feedback from the expert panel with regard to the assessment instrument was very positive with many of them stating that an assessment instrument like this would be a useful contribution to assessing competence in the field of nursing education.

The biostatistician was also included in reviewing the instrument to evaluate the content before the pilot study was undertaken. All recommendations made were taken into consideration by the researcher and the instrument was adapted accordingly. See Addendum D1 and D2 for the final instrument. The final instrument was submitted to the Health Sciences Research Ethics Committee (HSREC) of University of the Free State for approval. See Addendum A2 for a copy of the approval of the final developed instrument by the HSREC.

3.4 DATA GATHERING TECHNIQUE

Data must be gathered precisely and accurately in order to address the research purpose (Botma *et al*., 2010:131). The development of the assessment instrument was discussed above. The next step in the research process was to decide on a method to gather the data with the developed assessment instrument. This decision was influenced by ethical issues, cost implications, the availability of respondents to assess students with the developed assessment instrument, and the availability of students to be assessed.

The developed assessment instrument guided the direct observation of video footage that captured the students' performance during a simulation activity with a standardised patient.

3.4.1 Direct observation

According to LoBiondo-Wood and Haber (2010:271) observation is an important method for collecting data on how people behave under certain conditions. Delport and Roestenburg (2012a:182) emphasise the importance of direct observation by stating that observation has a definite value in quantitative research studies as it gives an indication of people's behaviour in their current environment. This technique allowed students to do what they normally would have done without disturbing them.

According to Polit and Beck (2012:313) there are several versatile observational methods, including the observation of skill attainment and performance. They add that nurses' performance and decision-making behaviours in a clinical setting are of interest to many researchers (Polit & Beck, 2012:313). Therefore the researcher resolved to observe how competent undergraduate nursing students are by observing the process of demonstrating clinical judgment and reflecting in a simulated clinical setting.

Observation applied in a quantitative study as a data gathering technique has to be structured and that which is observed must be quantified, as data in a quantitative study are numerical (Botma *et al.*, 2010:142). Quantification of data was accomplished by assigning a value to each response of the Likert scale. Refer to the discussion of the chosen scale earlier in this chapter.

The researcher has to describe the conceptual definition of what is observed clearly, as well as how the concept will be operationalised (Botma *et al*., 2010:142). Nurse researchers have to know what to observe; they cannot record an infinite number of details and therefore they need guidelines about how to focus their observation (Polit & Beck, 2012:320). LoBiondo-Wood and Haber (2010:271) emphasise that with observational research the researcher is not merely looking at what is happening, but rather watching with a trained eye for specific events. The respondents knew what the domains of the assessment instrument as well as the components of each domain are and could therefore look for specific expected behaviour.

Researchers using structured observational methods determine beforehand the behaviours to be observed and use record-keeping forms that yield numeric information. However, researchers are still required to make some inferences and exercise judgment (Polit & Beck, 2012:321). For research purposes structured scientific observation is the benchmark, as scientific observation focuses on the objective and systematic nature of the observation (LoBiondo-Wood & Haber, 2010:271). According to LoBiondo-Wood and Haber (2010:271) the following four conditions must be met for observation to be scientific:

1. The observations meet the aim and objectives of the study.
2. The observation and recording of data are done according to a standardised and systematic plan.
3. The observations have to be checked and controlled.
4. There is a correlation between the observations and scientific concepts and theories.

This research met the stipulated criteria because:

1. The assessment instrument was specifically developed to measure the competence of student nurses who demonstrate good clinical judgment.

2. By using the developed assessment instrument the observations and recordings of data were standardised. Data were gathered systematically and in a controlled environment according to a rigorously planned process that will be discussed later in this chapter.

3. The researcher personally checked the coding of the instruments and therefore could check the observations made by the respondents simultaneously.

4. The direct observations made by respondents correlated well with the scientific concept being measured, namely competence, as the assessment instrument was validated by means of face and content validity before the developed assessment instrument was used.

3.4.2 Standardised patient simulation activity

The clinical setting was mimicked by a simulation activity, using standardised patients. Simulation offers learners exposure to real-life scenarios and is a routine learning experience for undergraduate nursing students at the School of Nursing at the University of the Free State; students are exposed to it after each theme of their syllabus in order to assist students to apply theory in practice (Moule, 2011:645). Standard elements of simulation activities according to Botma (2014a:2) are:

- Briefing of students,
- Communication and interaction between student and patient,
- Professional behaviour of student,
- Safety of student and patient, Clinical judgment,
- Record keeping, and
- Debriefing of students.

Video footage of all simulation activities at the School of Nursing is available for a short period of time. It is a standard procedure for all undergraduate nursing students of the School of Nursing to give permission that video footage may be used for research and educational purposes. It is accepted that all information will be handled in a confidential manner. The researcher and all respondents who made use of the video footage for the purpose of the research study signed an agreement form inclusive of a confidentiality disclaimer (Addendum E_1 and $E_{2)}$.

The specific standardised patient simulation activity that was identified as providing the opportunity to gather formal data, included a scenario of an aged patient visiting the clinic with earache and no appetite. The patient described the pain as follows:

- Duration of pain: lasting 2 days
- Type of pain: sharp pain
- What relieves the pain: Panado
- When is the pain worse: at night

The patient had a penicillin allergy and was diagnosed with asthma, as well as chickenpox as a child. The patient did not report any recent asthma attacks.

Other important history of the patient included:

- Female obstetric history: Last normal period was 2 weeks ago and periods are regular. Patient not sexually active.
- Male obstetric history: Patient not sexually active.
- Operations: Tonsillectomy at eight years of age.
- Family history: Mother passed away three years ago of a heart attack and father passed away a few years ago after he had suffered a stroke.
- Social: Smokes 15 cigarettes per day, drinks alcohol occasionally and lives in a small flat near the clinic.

The patient's vital signs were recorded as follows:

- Pulse rate: 78 beats/min
- Blood pressure: $^{120}/_{80}$mmHg
- Breathing rate: 20 breaths/min
- Temperature: 37.7 °C
- BMI: 26.4 kg/m^2

During the examination of the patient's ear, the patient provided the student with a picture of an ear with a clear otitis media image.

The expected outcome of the student was to use GOSH to assess and diagnose a patient, while presenting a professional image. GOSH is an acronym used for:

G= General history taking
O= Observation of patient by doing a physical examination
S= Summary, which includes differential diagnoses and recording of final diagnosis

H= Handling, which includes treatment according to the PalsaPlus manual and recording forms.

The following instructions regarding the activity were given to the students:

1. You are a healthcare worker at a local primary health care clinic, seeing a patient with a minor ailment.
2. Use GOSH to assess and diagnose the patient.
3. PalsaPlus may be used to guide treatment options.
4. BMI and vital signs were already taken and recorded by the assistant nurse.
5. Record findings on record keeping forms.
6. Complete the activity within 15 minutes.
7. Turn to the camera and reflect on your experience of the activity once the patient has left the room.

With hindsight the researcher identified inconsistencies with regard to the standardised patient simulation activity. The researcher could not have foreseen these inconsistencies as the standardised patient simulation activity was developed as a routine simulation experience by the second-year programme coordinator. These inconsistencies/limitations included:

- An incomplete symptom analysis as described by the patient.
- Except for the patient's vital signs and picture of the ear there were no other physical assessment findings specified.
- The patient is referred to as aged, but the female obstetric history states that the patient had her last normal menstruation two weeks ago.

As standard practice with all simulated learning experiences in the School of Nursing, the interaction between each student and the standardised patient were video recorded and saved for the purpose of this research. The video footage and record keeping forms from the activity, as well as the student's personal reflections, were available for the respondent to validate their observations.

3.4.3 Role of observer

Observational methods can be distinguished by the role of the observer (LoBiondo-Wood & Haber, 2010:272). The observers in this research study are referred to as the respondents who assessed the students with the developed assessment instrument. Respondents were trained on how to use the assessment instrument and received a package consisting of assessment instruments, simulation footage and record keeping forms of students.

The students were unaware of the intention of the respondents, but the instructions to the students indicated that they should demonstrate sound clinical judgment by assessing, diagnosing and treating the patient. The fact that respondents could not provoke the students to action had both positive and negative effects. On the one hand all students were treated in the same manner. Students on the other hand may have been penalised because the respondent could not ask them to explain their reasoning.

3.4.4 Advantages of direct observation

If one looks at the advantages of the observational method many researchers agree on the main one being that observation may be the only way for the researcher to study the variable of interest and behaviour (Botma *et al.*, 2010:142; Delport & Roestenburg, 2012a:182; LoBiondo-Wood & Haber, 2010:273.). Many people do not always do as they say and therefore observation may be the only way to ensure valid substantive findings about human behaviour (LoBiondo-Wood & Haber, 2010:273). In addition, the depth and variety of information collected with observation is incomparable with other data gathering techniques (LoBiondo-Wood & Haber, 2010:273).

Another advantage which can also be a disadvantage that was mentioned under the role of the observer, is the presence of an observer. The presence of an observer can alter the behaviour of a subject (Polit & Beck, 2012:313). Respondents were not present during the simulation activity, making the data gathering technique non-

intrusive and allowing students to do what they normally would do without being disturbed or influenced by the respondent. However students could also be penalised because the respondents could not validate the reasoning of the students during the simulation activity. Although facilitators strive for high fidelity it is a simulated experience and is stressful for the students (Botma, 2014a:2).

With structured observational methods close attention must be given to the validity and reliability of the data gathered (Delport & Roestenburg, 2012a:182). Respondents' emotions, prejudices, attitudes, lack of knowledge and lack of insight may present a vague picture of what was observed (Botma *et al.*, 2010:142; Delport & Roestenburg, 2012a:182; LoBiondo-Wood & Haber, 2010:273). It is of the utmost importance to train and evaluate respondents very accurately regarding the phenomenon being researched (Botma *et al.*, 2010:142; Delport & Roestenburg, 2012a:182; LoBiondo-Wood & Haber, 2010:273; Polit & Beck, 2012:318).

The researcher tried to address the issues as mentioned above that may influence the validity and reliability of the data by briefing each respondent, who assessed the students with the developed instrument, on the standardised patient scenario given to the students. Each respondent was trained how to use the competence assessment instrument.

An additional factor that may have influenced the validity and reliability of data is that the respondents had to view video footage and not live interaction between the student and the patient. Assessing students on video footage is a complex, but attainable task. Respondents in this research study were exposed to assessing students via video footage during the pilot study (Strydom, 2012b:244).

3.5 PILOT STUDY

The pilot study is a trial run done in preparation for the major study (Polit & Beck, 2012:737). The pilot study improves the success and effectiveness of the investigation by refining the methodology of the investigation (Grove *et al.*, 2013:703; Strydom, 2012b:241). Problems regarding the assessment instrument, data

gathering process and effectiveness of the technology involved are identified during the pilot study and solved before the formal data gathering process (Strydom, 2012b:244).

A pilot study was done in order to identify challenges relating to the assessment instrument, as well as to practical issues. The pilot study ensured that the completion of the assessment instruments for the formal data gathering process would run smoothly. Furthermore the researcher determined that it would take each respondent approximately fifteen minutes to complete one assessment instrument during the formal data gathering process.

The respondents who were going to use the instrument for the research process participated in the pilot study, as well as two additional staff members from the School of Nursing. The respondents were invited to the house of the researcher's supervisor for a pizza evening to do the pilot test. This environment ensured a relaxed and conducive atmosphere for asking questions and raising uncertainties.

Archived video footage from the School of Nursing simulation laboratory was used for the pilot study. This footage included a standardised patient simulation scenario where second-year undergraduate Nursing students treated a patient with tuberculosis in a primary health care setting. Firstly all the respondents who participated in the pilot study discussed the instrument with regard to the clarity of the instructions, the clarity of the questions, completeness of the response sets and the time required to complete the competence assessment instrument. The respondents were also allowed to write down comments or raise any uncertainty if needed.

No problems or uncertainties were raised during the discussion of the assessment instrument. However, when the first video was played it came to the researcher's attention that the audio quality of the video material was very poor. The respondents could hardly hear anything and therefore could not assess the competence of the nursing student. The purpose of the pilot study was therefore extremely helpful as new plans could be made for the formal data collection.

The researcher arranged for better video filming with good sound during the formal data collection. Mobile video cameras on tripods, instead of the built-in video cameras in the top corners of the simulation laboratory rooms, were placed close to the student and the standardised patient. This ensured a better view of the student and the standardised patient, as well as clear sound of the conversation between the student and the standardised patient. An expert in video filming placed the video camera at the correct angle for optimal filming of the student and standardised patient. The researcher placed dictaphone machines as a back-up in every room in the simulation laboratory.

Adjustments were tested during a simulation activity of another group of students. The sound quality and images were much improved. In the meantime the researcher had to organise that the video footage of the pilot test, with the poor sound, was transcribed and again be looked at, but in a venue with good isolation and sound, in order to complete at least one instrument as part of the pilot test. This was eventually done and the respondents were able to practise how to use the assessment instrument before the formal data collection.

3.6 POPULATION AND SAMPLE

The population of a research study is a well-defined set that has certain specified characteristics (LoBiondo-Wood & Haber, 2010:221). Grove *et al.* (2013:703) supports this statement by defining a population as: *"All elements (individuals, objects, events or substances) that meet the sample criteria for inclusion in a study".*

The sample differs from the population in that it is a subset of the population that was selected for a study (Grove *et al.,* 2013:708). The population is refined to a subset by means of different sampling methods. The selected sample, after sampling was done, represents the entire population (LoBiondo-Wood & Haber, 2010:224).

The research study compromises two populations, namely students and observers who will be the respondents. Sampling of these populations were done separately and will therefore be discussed separately.

3.6.1 Student population

The student population consisted of 60 second-year undergraduate Nursing students at the School of Nursing who participated in the prescribed standardised patient simulation activities, as described in the curriculum for second-year Nursing students.

The second-year Nursing programme comprises many more one-to-one standardised patient simulation scenarios in comparison to the other undergraduate year groups at the School of Nursing. This results in more opportunities to collect data via video footage of such activities. Standardised patient simulation scenarios in the second year are on primary healthcare topics, giving the student the chance to relate science from different disciplines, reason clinically and decide on treatment. Therefore the clinical judgment and competence of a student can be assessed properly. One-to-one standardised patient scenarios enabled the respondents to assess the competence of individual Nursing students. It is not possible to assess an individual Nursing student's competence during a group high fidelity simulation scenario.

Inclusion criteria for the student sample were:

- Participants must be a registered second-year undergraduate Nursing student at the School of Nursing.
- Participants must participate in a specified simulated learning activity using standardised patients.
- Good quality video footage of each participant must be available.

Exclusion criteria for the student sample were:

- Poor video footage of the student during the simulation activity using standardised patients
- Poor voice quality on the video footage of the student during the simulation activity using standardised patients.

3.6.2 Student sample

The biostatistician, by means of simple random sampling, selected 15 of the 60 students to be assessed with the developed assessment instrument. Random sampling involves a selection process in which each participant in the population has an equal, independent chance of being selected (Polit & Beck, 2012:275). Simple random sampling is the most basic random sampling design and entails the process of establishing a sampling frame from where one can blindly place a finger at some point on the frame and select that subject for the sample (Polit & Beck, 2012:275).

The biostatistician gave each student a number and captured all these numbers on computer. The computer randomly selected 15 from the total numbers that were captured. These 15 numbers were linked back to the appropriate students, which made up the student sample of the research study. The reason why the whole population of second year nursing students have not been chosen to take part in the research is twofold. Firstly, it will take a respondent a long time to assess all 60 recordings. The respondents participated voluntarily and did not receive any remuneration. Secondly, on request of the biostatistician the researcher increased the number of respondents to assess the small number of students. The biostatistician recommended that many respondents should assess a small number of students, rather than a small number of respondents assessing many students.

3.6.3 Respondent population

The respondent population includes respondents from all over South Africa known to the researcher and who are interested in the field of preceptorship, transfer of learning, clinical judgment and primary health care.

3.6.4 Respondent sample

The researcher selected the respondent sample by means of purposive sampling. Botma *et al.* (2010:126) refer to purposive or judgmental sampling as: *"The researcher has determined the most typical characteristics of participants that should be included."* With purposive- or judgemental sampling the researcher might decide purposely to select participants who are knowledgeable about the issue under study (Polit & Beck, 2012:279).

Inclusion criteria for the respondents were that the person must:

- Be an expert and/or have experience in the field of preceptorship, transfer of learning and/or primary health care. Refer to Table 3.4 for a summary of the 20 respondents' credentials.
- Be trained on how to use the assessment instrument.
- Commit to complete the assessment independently.
- Commit to complete the assessment within two months after having received an assessment package consisting of assessment instruments, simulation footage of students, recording forms of students and a demographic sheet.

The researcher contacted 24 persons telephonically in order to recruit respondents and gave an explanation of the proposed research study. The respondents' participation would include assessment of student nurses' competence on video footage with a developed competence assessment instrument. The researcher told respondents that participation was voluntary with no retribution if the respondents did not want to participate. The respondents did not receive any remuneration for participating in the study. However, the researcher informed the respondents about the value of the study and the specific contribution such an assessment instrument will make to preceptorship, as the current tool used by preceptors was time-consuming and complex. Respondents were given one week to decide if they were willing to participate or not.

A total of 19 respondents expressed their willingness to take part in the study and 5 respondents declined the request to participate. The researcher also took part in the research study in order to form a sample of a total of 20 respondents. The second sample thus included 20 respondents who are interested in the field of preceptorship, transfer of learning, clinical judgment and primary health care.

TABLE 3.4: Summary of respondent credentials

NUMBER	POSITION	EXPERTISE
1	Professor (PhD) at university level	Academic and author on related topics
2	Lecturer (Master's) at university level	Teaches primary healthcare and dissertation addressed preceptorship
3	Lecturer (Master's) at university level	Clinical judgment in simulation- conducted research on topic
4	Clinical facilitator in private hospital	Preceptorship and critical care nursing
5	Clinical facilitator in private hospital	Preceptorship and operating room nursing
6	Clinical facilitator in private hospital	Preceptorship and operating room nursing
7	Lecturer at university level	Preceptorship, community health nursing and teaches paediatric nursing
8	Professional nurse	Preceptorship and mental health nursing
9	Clinical facilitator (Master's) in private hospital group	Clinical judgment- conducted research on topic
10	Nurse educator at private hospital group	Preceptorship and teaches general nursing care
11	Nurse educator (Master's) at private hospital	Preceptorship and teaches operating room nursing
12	Lecturer at university level	Preceptorship and teaches primary health care nursing
13	Professional nurse	Primary healthcare
14	Professional nurse	Primary healthcare
15	Deputy nursing manager (Professional nurse)	Preceptorship and critical care nursing
16	Clinical facilitator (Master's) in private hospital	Mentorship in critical care nursing- conducted research on topic
17	Professional nurse	Preceptorship, clinical judgment, thinking processes and operating room nursing
18	Lecturer (Master's) at university level	Clinical judgment- conducted research on topic
19	Lecturer at university level	Preceptorship, critical care nursing and teaches community health nursing
20	Unit manager (Professional nurse)	Preceptorship and operating room nursing

After the respondents had agreed to participate in the study, the researcher arranged a meeting with each respondent at the most convenient time and place for the respondent to sign a consent form. At the same time the respondent agreed to a confidentiality disclaimer, which stated that the respondents would keep all information confidential and not expose any student on the video footage received from the researcher.

The 20 respondents were asked to each assess the student's competence on the 15 randomly selected video footages with the use of the instrument compiled by the researcher. The researcher used this opportunity to brief each respondent on the standardised patient scenario given to the students and to train each respondent on how to use the competence assessment instrument. Each respondent was given a chance to raise any uncertainties for the researcher to clarify during this meeting.

The respondents were each allowed two months to assess the students on the 15 randomly selected video footages. No respondent who took part in the research study chose to withdraw and all 20 respondents, except one respondent who only completed 14 assessments due to poor voice quality on one video, completed 15 assessments.

3.7 DATA GATHERING PROCESS

The data gathering process is a precise process and it must be done accurately in order to resolve the research question (Botma *et al*., 2010:131). Obtaining numerical data to meet the research aim and answer the research question is part of the data gathering process (Grove *et al.*, 2013:46). Data gathering must follow a systematic process that includes obtaining consent from the relevant subjects before the physical data can be collected. The data gathering process will now be explained step by step.

Permission was obtained from all relevant authorities at the University of the Free State to conduct the research. These authorities include the Vice-Rector of Academic Affairs, Dean of Student Affairs, Dean of the Faculty of Health Sciences and the Head of the School of Nursing. The researcher firstly presented a proposal of the research study to the Head of the School of Nursing, University of the Free State and asked permission to conduct the research study at the school, making use of second-year undergraduate nursing students and respondents as the population of the study. Permission from the Head of the School to conduct the research study at the School of Nursing included permission to the researcher to make use of video footage of simulation activities for research purposes.

Before commencing with the research process, approval from the Health Sciences Research Ethics Committee (HSREC) was obtained (Addendum A1) after the evaluation committee of the School of Nursing had approved the research proposal.

The researcher, with the cooperation of the second-year undergraduate programme coordinator, arranged the standardised patient simulation activity and the video filming of the activity. The researcher was present during the simulated learning experience in order to assist with the coordination of the process. All 60 students were given a number, in order to match the video footage with the correct record keeping form.

The video footage, stored on a hard drive, together with each student's record keeping form was locked in a fireproof cabinet. The 15 randomly selected students' video footage was stored on 20 CDs, one for each preceptor. Copies of the record keeping forms of the 15 randomly selected students were made for corroboration of observed data.

Each respondent was given an assessment package to use during the data gathering process:

1) CD with the video footage of the 15 selected students
2) The record keeping forms completed by the 15 selected students
3) 15 assessment instruments
4) Information on the standardised patient scenario
5) Demographic sheet to be completed by the respondent.

The data gathering period stretched over three months. Although respondents were only allowed two months to complete the 15 assessments, some of them did not manage to do so in the allowed time and the preceptor granted them another month to complete the assessments. The researcher was responsible for handing out and taking in assessment instruments, as well as to give guidance to the respondents during the data gathering period if needed. The researcher obtained 299 completed assessment instruments.

3.8 DATA ANALYSIS

After the data have been collected the researcher is faced with volumes of data requiring sorting, coding and synthesising (LoBiondo-Wood & Haber, 2010:93). The collected data need to be organised in appropriate units for data analyses. The process of data capturing has to do with coding of data and entering the data into a computer. Coding of data is the process where the data are modified into numbers in order for data analyses to be done (Polit & Beck, 2012:722).

First the researcher herself numbered each instrument and then made use of a student assistant to code the data. The student assistant did this under the direct supervision of the researcher. Coding spaces were available on the right-hand side of the assessment instrument, but were clearly marked ‘for office use only’, in order to not confuse the respondents while they assessed the students. The coding spaces can be seen on the final assessment instrument in Addendum D1 and D2. A coding number was allocated by the researcher, with the help of the biostatistician

involved in the study, to each response of the 5 point Likert scale that was present on the assessment instrument. The coding of responses to items can be seen in Table 3.5.

TABLE 3.5: Coding of responses to items

LICKERT SCALE NUMBER	RESPONSE	DESCRIPTION OF RESPONSE	CODING NUMBER
n.a	Not applicable	No opportunity to demonstrate expected behaviour during simulated patient scenario	9
0	Not done	Student does not demonstrate any aspect of expected behaviour	0
1	Incompetent	Student demonstrates some aspects of excepted behaviour haphazardly	1
2	Competent	Student demonstrates most of the aspects of expected behaviour orderly	2
3	Exceptionally competent	Student demonstrates all of the aspects of expected behaviour orderly and consistently	3

The researcher herself captured the data of the 299 assessment instruments on a Microsoft Excel spread sheet, whilst checking that the coding had been done correctly. The student assistant then checked that the researcher had captured the data correctly by comparing the captured data with the hard copies again. No discrepancies were noticed during the verification process. The data were then emailed to the biostatistician involved in this study.

Polit and Beck (2012:719) refer to the analysing of data as: *"The systematic organisation and synthesis of research data and testing of the research question using those data"*. The data that have been gathered needs to be organised and given meaning during the data analysis process (Grove *et al.,* 2013:46).

A biostatistician in the Department of Biostatistics at the University of the Free State analysed the data with the use of SAS®/STAT® software, version 12.3 of the SAS® System for Windows®.

3.8.1 Reliability

Proving reliability of an instrument is of the utmost importance during a research study as it portrays the accuracy of an instrument. An instrument cannot be proven valid if it is unreliable, although an instrument can be reliable and yet not valid (Polit & Beck, 2012:336). Therefore testing the reliability of the instrument was a priority.

Reliability assesses how consistently the method of measurement measures a concept and indicates that a measurement instrument applied to the same individuals, at two different occasions, should produce the same results (Botma *et al.*, 2010:177; Grove *et al.,* 2013:45; Polit & Beck, 2012:331).

Polit and Beck (2012:307) suggest that researchers who develop or adapt existing instruments for their own use must evaluate the reliability of the developed instruments. Polit and Beck (2012:307) further emphasise that an instrument previously proven reliable is no guarantee of its reliability in a new study. The reliability of an instrument is not a hallmark of the instrument itself. It represents the instrument when administered to a certain sample under certain conditions.

Polit and Beck (2012:318) warn that precautions must be taken in order to enhance the reliability of observational instruments. The researcher therefore defined the items of the instrument with great precision and explained the features of the instrument with great clarity to the respondents (Polit & Beck, 2012:318). Training of the respondents on how to use the instrument was the most effective way to enhance reliability of the instrument (Polit & Beck, 2012:318). Another suggestion to enhance reliability that was taken into consideration was to add more items that would measure the concept of the instrument, namely competence (Polit & Beck, 2012:318). Grove *et al.* (2013:391) support this suggestion by stating that instruments with 20 or more items have a better reliability compared to instruments with 10 to 15 items. All measurement methods contain some random error due to the measurement method used, the participating respondents or the researcher gathering the data (Grove *et al.,* 2013:389). Reliability testing assesses the amount of measurement error in the instrument used in a study (Grove *et al.*, 2013:389).

Three tests were conducted to determine and prove the reliability of the developed assessment instrument. Firstly the Cronbach alpha coefficient test that is aimed at the internal consistency of the developed instrument will be discussed. In addition an Intraclass correlation coefficient test and a Kendall's coefficient of concordance test that measured the inter-rater reliability value of the respondents who used the developed assessment instrument will be discussed (Grove *et al.,* 2013:391; LoBiondo-Wood & Haber, 2010:298).

3.8.1.1 Internal consistency

The internal consistency of an instrument addresses the correlation of the various items within the instrument (Grove *et al.,* 2013:391; LoBiondo-Wood & Haber, 2010:298). An instrument may be said to be internally consistent to the extent that its items measure the same trait (Polit & Beck, 2012:334). Instruments designed to measure one concept, such as competence, exclusively include items that measure that specific concept and nothing else. This element of an instrument may be proved with good internal consistency.

A Cronbach Alpha coefficient test was used to determine the internal consistency of the developed assessment instrument. The Cronbach Alpha coefficient test simultaneously compares each item in the instrument with the others to produce a total score during the analysis of data (LoBiondo-Wood & Haber, 2010:299). The Cronbach Alpha coefficient test is calculated as the mean of the inter-item correlations (Grove *et al.,* 2013:391).

The value of a Cronbach Alpha coefficient test may range from .00 to 1.00 (Grove *et al.,* 2013:391). The closer to 1.00 the coefficient value is the more reliable is the instrument (LoBiondo-Wood & Haber, 2010:295). Unfortunately Cronbach Alpha coefficients of 1.00 cannot be obtained, because all instruments have some measurement error (Grove *et al.,* 2013:391). A Cronbach Alpha coefficient value of .80 (80%) indicates the instrument is 80% reliable with a 20% error. For an

instrument to be proven reliable a Cronbach Alpha coefficient value of ≥ .70 must be obtained (LoBiondo-Wood & Haber, 2010:295).

3.8.1.2 Inter-rater reliability

Inter-rater or inter-observer reliability is described as computing data of the agreement between two or more trained respondents watching an event simultaneously and independently recording data according to the instrument's instruction (LoBiondo-Wood & Haber, 2010:301; Polit & Beck, 2012:334). The comparison of two or more respondents will deliver results on the inter-rater reliability of an instrument (Botma *et al.*, 2010:177; Grove *et al.*, 2013:390).

Inter-rater reliability is usually computed with the direct observation method (LoBiondo-Wood & Haber, 2010:580; Polit & Beck, 2012:334). Inter-rater reliability is important to determine in studies where many respondents are gathering data. Two different tests were used to determine the inter-rater reliability of respondents who used the developed assessment instrument, namely the Intraclass correlation coefficient test and Kendall's coefficient of concordance test.

The Intraclass correlations coefficient (ICC) represents inter-rater reliability as a continuum of the developed assessment instrument, including the total score of all the items given by the respondents. Intraclass correlation coefficients represent the proportion of total variance within the data that is explained by the variance between all the respondents (Byrne, Deane, Murugusan & Connaughton, 2014:501). The ICC [2,1] method was used to calculate the inter-rater reliability of the developed assessment instrument's total score. The biostatistician recommended this method because the same sample of respondents, who represents a larger population, was used to assess all of the students and all the data at the end was analysed to calculate the ICC value (Shrout & Fleiss, 1979:425).

ICC values range between .00-1.00, with values closer to 1.00 indicating good inter-rater reliability (Byrne *et al*., 2014:501). For interpretive purposes ICC values >.80 denote excellent reliability, values between .60-.79 moderate reliability and values <.60 questionable reliability (Lizarondo, Grimmer & Kumar, 2013:137). Thus an acceptable Intraclass correlation coefficient value must be >.60 (Lizarondo *et al*., 2013:137).

The Kendall's coefficient of concordance (W) test indicates the degree of similarity of ordinal responses per item made by multiple respondents when assessing the same subject, namely students (Minitab Incorporated, 2016:online). The biostatistician selected the Kendall's coefficient of concordance test to determine inter-rater reliability per item because the response set consisted of ordinal responses. The attribute of an ordinal response can be ranked with the quantity that the attribute possesses (Grove *et al*., 2013:386). In the case of this research study, the higher the level of competence demonstrated by the student, the higher the respondent would rank the student according to the five point Lickert scale for that item.

Kendall's coefficient of concordance values can range from .00 to 1.00. The higher the Kendall's coefficient of concordance value, the greater the similarity per items that exists between the respondents (Duckworth, Radhakrishnan, Nolan & Fraser, 1993:268; Leung, Chui, Arthur, French, Lai, Lee & Wong, 2005:123; Minitab Incorporated, 2016:online). A high Kendall's coefficient of concordance value indicates that the respondents applied the same standard for each item when they assessed the students.

Kendall's coefficient of concordance values between .50-.69 equates to moderate agreement, values between .70-.99 to good agreement and a value of 1.00 signifies complete agreement (Leung, *et al.*, 2005 123).

3.9 ETHICAL CONSIDERATIONS

Ethics is a set of moral principles which is suggested by an individual or group, is subsequently widely accepted and offers rules as well as behavioural expectations about the most correct conduct towards all stakeholders of an experimental research study (Strydom, 2012a:114). Strydom (2012a:114) further emphasises that ethical guidelines serve as standards and a basis on which each researcher should evaluate his/her own conduct.

The principles of respect for persons (autonomy and dignity), beneficence and non-maleficence, as well as distributive justice (equality) are set down by the Department of Health Republic of South Africa (2015:online) as the guiding principles to consider when conducting any research study involving human participants. The researcher adhered to these principles during the research study.

3.9.1 Respect for persons (autonomy and dignity)

Respect for persons requires that the researcher respects respondents' autonomy and right to self-determination (Botma *et al.*, 2010:3; Brink, Van der Walt & Van Rensburg, 2012:35; Department of Health Republic of South Africa, 2015:online). The respondent may decide if he/she objects to or is willing to take part in the study after the researcher had presented all the facts regarding the study to the respondent.

In order to avoid deception, the researcher shared full information regarding the study verbally and in written format. Deception involves deliberate withholding of information regarding the study or providing false information to respondents (Polit & Beck, 2012:154). The researcher acted strictly within ethical boundaries and regarded telling the truth as a principle of high priority to prevent deception. The Health Sciences Research Ethics Committee (HSREC) approved the written information pamphlet (Addendum E1 and E2). Willingness to participate was explained as voluntary with no retribution on refusal. Respondents were not remunerated for their participation. The information pamphlet contained information

on the right of the respondent to withdraw from the study at any time and that the results of the study will be disseminated in various forms. Respondents had to sign the consent form as well as a confidentiality disclaimer if they agreed to participate in the research study.

With regard to the second-year undergraduate nursing students, participation in simulation is compulsory for all students as it is part of the teaching and learning strategy in the School of Nursing. Students do not have a choice with regard to participating in learning events, although they need to give permission that video footage of learning events may be used for research purposes. Although it is a standard procedure for all students of the School of Nursing, University of the Free State to give permission that video footage may be used in a confidential manner for research purposes, students may refuse to grant permission. Video footage is destroyed after debriefing when a student refuses permission that it may be used for research and educational purposes.

Respect for persons also includes treating all subjects and respondents with dignity by ensuring the confidentiality of disclosed information (Department of Health Republic of South Africa, 2015:online). Brink *et al*. (2012:35) refers to the process of ensuring confidentiality as the researcher's responsibility to prevent all data gathered during the study from being divulged or made available to any other person. Confidentiality includes secure storage of data during the research study as well as for five years after completion of the research study. Limiting access to data is another way of enhancing confidentiality, therefore only the researcher, researcher assistant, supervisor and biostatistician had access to the collected data. Destroying data gathered five years after completion of the research study will prevent disclosure of confidential information (Botma *et al*., 2010:2).

Confidentiality was further maintained by not identifying subjects or respondents by name during any phase of the data gathering process or during the dissemination of results, but rather allocating a number to each subject and respondent and linking these numbers to an assessment instrument. *What* was assessed was important, not *who* was assessed.

The researcher reassured students that the video footage will only be used for research purposes by respondents and that the mark given on the assessment instrument will not be applied as any semester or examination marks whatsoever. It will only be used by the researcher to test the developed competence assessment instrument.

3.9.2 Beneficence and non-maleficence

The principle of beneficence and non-maleficence is manifested in the benefit/risk ratio that imposes a duty on the researcher to minimise harm and to maximise benefit (Botma *et al.*, 2010:20; Department of Health Republic of South Africa, 2015:online; Polit & Beck, 2012:152). The benefits of a research study must always outweigh the risks involved in a research study (Department of Health Republic of South Africa, 2015:online).

No harm was foreseen with the study. However, respondents could have experienced a mild degree of stress to complete the assessments correctly and on time. The researcher minimised the feelings of stress and fear by training respondents how to use the developed assessment instrument. She also reassured respondents that she was available for any queries during the data gathering process.

Students may have experienced stress during the video recording but it would not have been different to what they are exposed to on a regular basis as part of their training programme. High fidelity simulated experiences are stressful for students and could have contributed to an emotional burden on the students (Botma, 2014:2). These learning experiences are, however, compulsory for students and good debriefing sessions may minimise the stress students experience during a simulated learning experience.

Travelling costs were eliminated, as it was the responsibility of the researcher to deliver and collect the assessment instruments to and from the respondents.

Subjects and respondents were not remunerated for participating in the study. Although the students who participated in this study will not directly benefit from the study, future students will benefit from the adjustments that may be made with regard to teaching and assessment strategies. Respondents of this study may gain more insight into what a competent student nurse is, and what is required to promote transfer of learning.

3.9.3 Distributive justice (equality)

Justice entails that all subjects and respondents have equal opportunity to participate in the study and that benefits would be distributed equally between subjects and respondents (Botma *et al.*, 2010:19; Polit & Beck, 2012:155). The populations from which the subjects and respondents are drawn must benefit from the research results, if not immediately, then in the future (Department of Health Republic of South Africa, 2015:online).

The right to fair selection and treatment was maintained by randomly selecting the 15 video footages from all second-year undergraduate nursing students registered at the School of Nursing in 2016. Random selection means that everyone has an equal chance to be selected (Polit & Beck, 2012:275). All the students may indirectly benefit when the assessment instrument is proven to be reliable and valid.

Respondents were purposefully selected, based on specific inclusion criteria discussed earlier in this chapter. Respondents may have gained more insight into what a competent student nurse is and future students will benefit from the adjustments to teaching strategies that may be made, based on the assessment of competence.

3.10 CONCLUSION

The comprehensive strategy of the research study has now been explained. The researcher continuously referred to the research question, as well as the aim and objectives of the research study throughout the chapter. Now that the steps and procedures of the research process have been discussed in such detail that another person will be able to replicate this research study, the researcher finds it appropriate to share the results of the research study with the reader in the next chapter.

CHAPTER 4

Results

4.1 INTRODUCTION

It is the goal of nursing research to develop nursing knowledge and evidence-based practice in order to support the scientific basis of nursing. The discussion and interpretation of the results of a research study is therefore an essential element of the research study. In this chapter the researcher will explain what the data of the methodological study revealed by presenting the results generated by the data analysis (Grove *et al.* 2013:608, LoBiondo-Wood & Haber, 2010:335).

As mentioned in the methodology chapter the data were analysed by a biostatistician at the Department of Biostatistics at the University of the Free State. The biostatistician used SAS®/STAT® software, version 12.3 of the SAS® System for Windows® to analyse the data.

The researcher will provide the results and immediately follow with an applicable discussion. The results comprise demographical data, internal consistency of the assessment instrument and the inter-rater reliability of the respondents who used the assessment instrument.

4.2 DEMOGRAPHICAL INFORMATION

The researcher selected demographic variables according to the focus of the study (Grove *et al*., 2013:154).

Twenty respondents completed the assessment instruments. Demographical information of the respondents was requested on a separate sheet. Age, gender and ethnicity are essential demographic variables to examine in all research studies, as these demographics describe the sample and determine the population for generalisation of the research findings (Grove *et al*., 2013:154). The demographical data of the respondents will be presented and discussed first. Please note that no missing responses are included in the calculations.

TABLE 4.1: Age distribution of respondents (n=20)

AGE	Frequency	Percentage (%)
29	1	5.00
30	1	5.00
31	1	5.00
32	1	5.00
34	2	10.00
35	1	5.00
37	2	10.00
38	1	5.00
41	3	15.00
42	1	5.00
45	2	10.00
51	1	5.00
56	1	5.00
58	1	5.00
59	1	5.00

The respondents' ages ranged from 29 to 59 as seen in Table 4.1. The median age of the respondents is 38 years, with an average age of 39 years. The majority of respondents (80%) were younger than 49 years of age. This finding does not correlate with the current age distribution of registered nurses and midwives in South Africa (SA Nursing Council, 2016:online). According to the South African Nursing Council (2016a:online) registered nurses and midwives aged 49 years and younger represent 51% of all South African registered nurses and midwives, while 49% of registered nurses and midwives are 50 years of age and older. According to the age distribution of registered nurses and midwives as indicated by the South African Nursing Council (2016a:online) there is only a 2% difference between registered nurses and midwives under 49 years of age and registered nurses and midwives above 49 years of age. In this study the difference in the age of respondents is 60%.

The majority of respondents (90%) were female. This finding corresponds with statistics provided by the South African Nursing Council (2016b:online). The finding that most respondents are female may be due to the fact that nursing is traditionally regarded as a female profession.

The majority of respondents (75%) reported to be white, followed by black respondents (20%) and only one coloured respondent (5%) in the minority. The researcher could not compare these results with the ethnic representation of a higher education or health care institution as the respondents were not all from the same institution. Therefore such statistics were not accessible to the researcher.

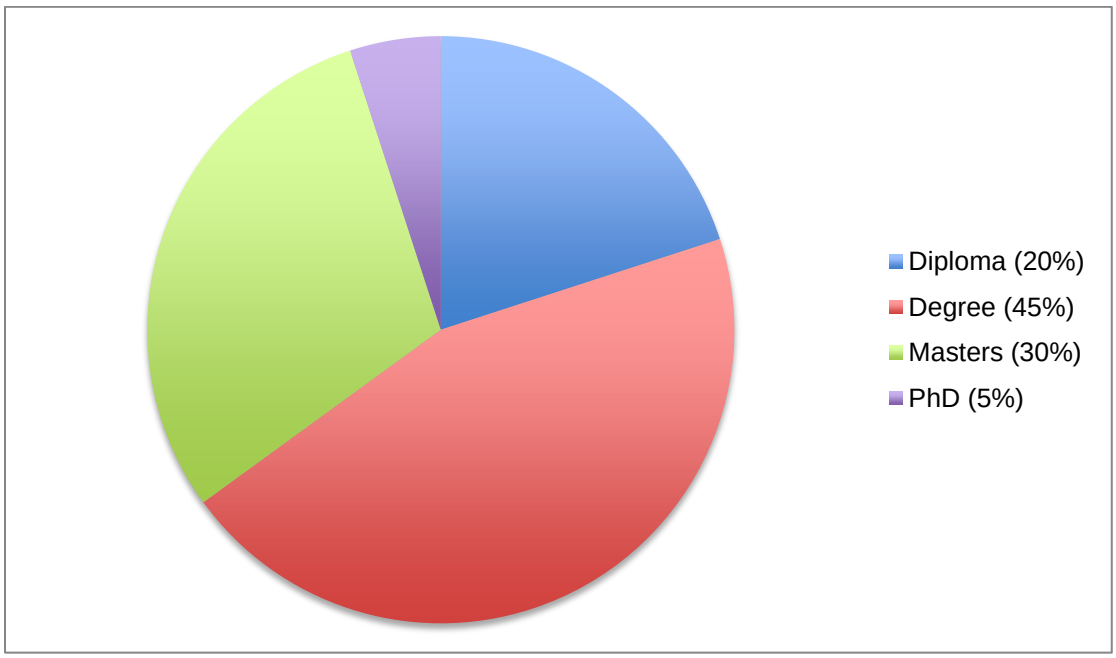

FIGURE 4.1: Highest qualification obtained by respondents (n=20)

Figure 4.1 shows that 80% of respondents obtained a degree in nursing from a university. Of those 80%, 30% have a master's degree and 5% have a doctoral degree. Twenty percent of respondents obtained a diploma in nursing from a nursing college. According to the registrations and listed qualifications statistics of the South African Nursing Council (2016b:online), more registered nurses and midwifes are trained at nursing colleges than universities. Thus, the sample did not portray the national trends.

TABLE 4.2: Nursing experience of respondents in years (n=20)

NURSING EXPERIENCE IN YEARS	FREQUENCY (N)	CUMULATIVE PERCENTAGE (%)
6	1	5.00
7	1	10.00
8	1	15.00
9	2	25.00
10	1	30.00
11	1	35.00
12	1	40.00
13	1	45.00
16	1	50.00
18	2	60.00
19	2	70.00
20	1	75.00
21	1	80.00
28	1	85.00
30	1	90.00
34	1	95.00
36	1	100.00

All respondents have good foundational knowledge of nursing as science as everybody had more than five years' experience as a registered nurse. Table 4.2 indicates that only five respondents (20%) had less than ten years' nursing experience.

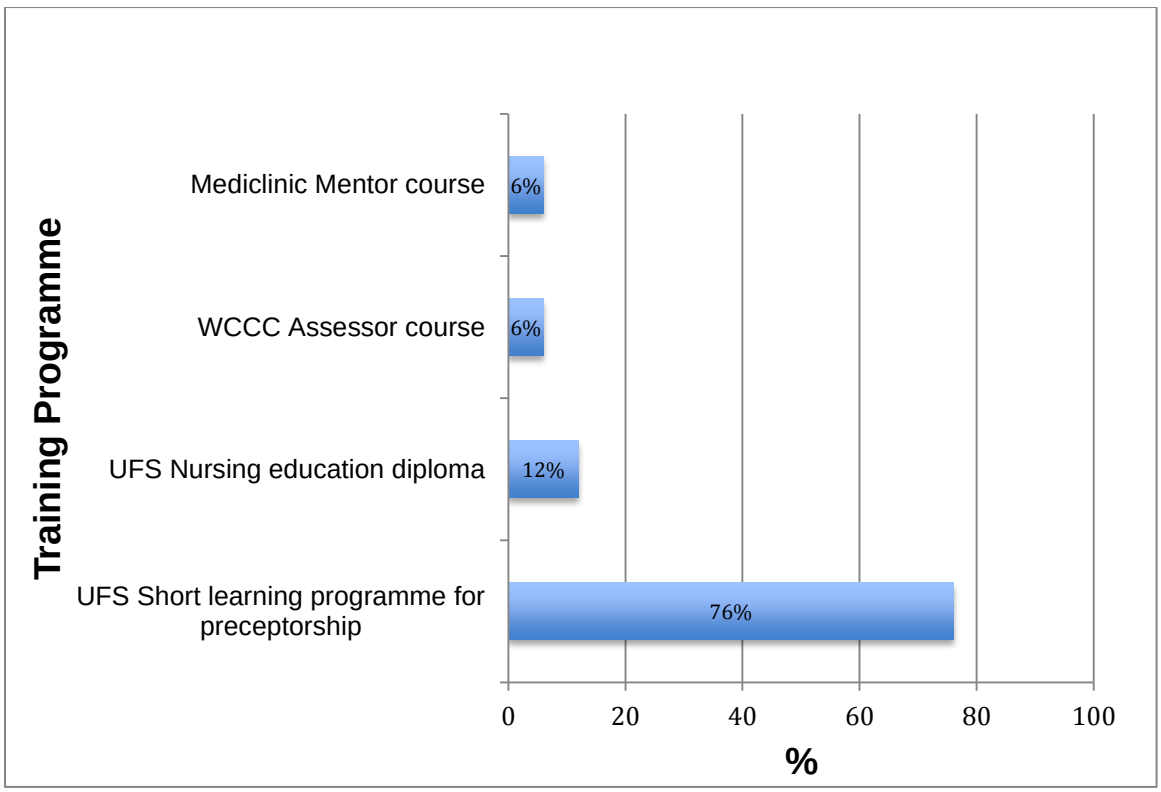

FIGURE 4.2: Preceptorship training programme (n=20)

Eighty percent of the respondents had obtained the Diploma in Nursing Education. Assessment of students is one of the themes addressed by the Diploma in Nursing Education. Therefore the majority of respondents were aware of assessment criteria of an assessment instrument such as validity and reliability (LoBiondo-Wood & Haber, 2010:207; Mouton 2001:173; Polit & Beck, 2012:331).

Although the Department of Health Republic of South Africa (2012:online) states that there are currently few preceptors trained and that training of preceptors is a priority that must be addressed, most of the respondents (85%) were trained as preceptors. The majority of respondents (76.47%) attended the Short Learning Programme for Preceptorship offered by the Academy for Continuous Education, hosted by the School of Nursing, University of the Free State. As displayed in Figure 4.2, 11.76% of respondents received preceptor training during the Diploma in Nursing Education. One respondent (5.88%) completed the assessor course at the Western Cape College of Nursing and another respondent (5.88%) completed the Mediclinic Mentor course.

The researcher will discuss the reliability of the assessment instrument in the next section.

4.3 RELIABILITY

Reliability of an assessment instrument indicates the consistency of the instrument and signifies the accuracy of the instrument (Botma *et al.*, 2010:177; Grove *et al.,* 2013:45; Polit & Beck, 2012:331). The Cronbach alpha coefficient test was used to determine the internal consistency of this assessment instrument, whereas the Kendall's coefficient concordance test, as well as the Intraclass correlation test, were used to test the inter-rater reliability of respondents who used this assessment instrument.

The internal consistency of the assessment instrument, determined by the Cronbach alpha coefficient test as an indicator of the reliability of the assessment will be discussed first.

4.3.1 Cronbach alpha coefficient

A Cronbach alpha value may range from .00 to 1.00 (Grove *et al.,* 2013:391, LoBiondo-Wood & Haber, 2010:295). The closer to 1.00 the coefficient is the more reliable is the instrument (LoBiondo-Wood & Haber, 2010:295). For an instrument to be proven reliable a Cronbach alpha coefficient value of ≥ .70 must be indicated (LoBiondo-Wood & Haber, 2010:295).

The Cronbach Alpha coefficient for this newly developed assessment instrument with 38 items tested .90 and is indicative of very good internal consistency, as the value is close to 1.00. Instruments designed to measure one concept, such as competence, must include items that measure that concept and nothing else in order to be proven internally consistent. This element of the developed assessment instrument has thus been proven with good internal consistency and little measurement error.

Data were analysed a second time because the researcher noticed that some respondents were inconsistent in the manner they assessed the students. The researcher drew up a table (Table 4.3) with the items of the developed assessment instrument against the number of each respondent. The researcher then checked the responses of each respondent. If a response from a respondent appeared to be contradictory, the researcher marked the response of that item against the number of the respondent with an x. Examples of contradictory responses are *"not done"* responses for some students and "not applicable" responses for other students for the same item. In other words, it transpired that the respondent was not consistent in assessing the students. The researcher added up the crosses (x) of each respondent. The respondents with two or less contradictory responses were set apart as reliable respondents. Eight respondents, namely numbers 3, 4, 9, 11, 12, 16, 17 and 20, were set apart as reliable respondents and a second data analysis was done on the response set of these eight respondents.

An analysis of the more consistent respondents had an even better Cronbach alpha coefficient value of .92. Furthermore, Table 4.3 shows that only one respondent (number 4) was consistent throughout the 15 assessments.

The developed assessment instrument was proven reliable as the Cronbach alpha coefficient value of .92, measuring the internal consistency of the instrument and thus portraying reliability of the instrument, is much higher than the required value of ≥ .70. The internal consistency of the developed assessment instrument (.92) compared well with four existing assessment instruments measuring competence mentioned in Table 3.1 of Chapter 3. Only two instruments, namely *The competency inventory for nursing students* (Hsu & Hsieh, 2013:495) and *Lasater clinical judgment rubric* (Victor-Chmil & Larew, 2013:4), had higher Cronbach alpha coefficient values of respectively .98 and .97 than the Cronbach alpha value of the developed assessment instrument. Furthermore the developed assessment instrument had a higher Cronbach alpha value than the *Nurse Competence scale* (Meretoja *et al*., 2004:127) and the assessment instrument measuring the clinical learning outcomes of students in Kuwait (Al-Kandari *et al*., 2009:262) that have Cronbach alpha coefficient values of respectively .85 and .77.

TABLE 4.3: Table indicating unreliable responses (x = unreliable response)

Item	RESPONDENT																				Total x per item
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1																					0
2			x																x		2
3					x			x		x									x		4
4																					0
5											x				x	x					3
6							x						x								2
7					x		x	x		x				x							5
8	x	x			x	x		x		x			x	x				x		x	**10**
9																					0
10														x							1
11														x							1
12																				x	1
13														x							1
14	x																				1
15								x							x						2
16							x						x	x							3
17			x			x	x	x	x					x				x			**7**
18	x	x					x	x					x					x			6
19	x	x					x	x		x					x						6
20	x	x				x	x	x							x						6
21																					0
22																					0
23						x				x											2
24							x	x													2
25							x	x			x			x			x				5
26																					0
27													x								1
28																					0
29														x							1
30													x	x							2
31														x							1
32													x	x							2
33						x	x	x		x		x	x	x							7
34						x		x					x	x							4
35	x						x	x	x			x	x	x	x				x		**9**
36																					0
37																		x			1
38																		x			1
Total x per respondent	6	4	**2**	**0**	3	6	11	13	**2**	6	**2**	**2**	10	15	5	**1**	**1**	5	3	**2**	

The next point of importance is the inter-rater reliability of the developed instrument. Comparing the responses of two or more respondents will deliver results on the inter-rater reliability of an instrument (Botma *et al.*, 2010:177; Grove *et al.*, 2013:390). This was achieved with two methods, namely with the Intraclass correlation coefficient and the Kendall's coefficient of concordance test. The Intraclass correlation coefficient will be discussed first.

4.3.2 Intraclass correlation coefficient

The Intraclass correlation coefficient (ICC) is the proportion of total variance within the data that is explained by the variance between all the respondents (Byrne *et al.,* 2014:501). The ICC represents inter-rater reliability as a continuum, including the total score of all the items given by the respondents. Intraclass correlation coefficients range between .00-1.00, with values closer to 1.00 indicating good inter-rater reliability (Byrne *et al*., 2014:501). An acceptable ICC value must be >.70 for an instrument to be proved reliable (Lizarondo *et al.,* 2013:137). The ICC [2,1] method was used to calculate the inter-rater reliability of the developed assessment instrument's total score, as the same sample of respondents, who represents a larger population, was used to assess all the students. All the data were analysed at the end to calculate the ICC value (Shrout & Fleiss, 1979:425).

The ICC value for the newly developed assessment instrument tested .85. According to the acceptable ICC value (>.70) the ICC value of the developed instrument proved the instrument to be reliable. Furthermore the ICC value of the developed assessment instrument compared well with the ICC value of the *Lasater clinical judgment rubric* (Victor-Chmil & Larew, 2013:4), which has an ICC value of .89. Considering that most inter-rater studies report on two to three respondents and this study reports on 20 respondents, the ICC value of .85 is remarkable.

The inter-rater reliability of the concluding instrument judging incompetent, competent and exceptionally competent was .85, which portrays good inter-rater reliability as a continuum of all the respondents' responses.

The data were also analysed to determine the Kendall's coefficient of concordance value, indicating the inter-rater reliability per item.

4.3.3 Kendall's coefficient of concordance

Kendall's coefficient of concordance (*W*) indicates the degree of similarity of ordinal responses per item made by multiple respondents when assessing the same subject, namely students (Minitab Incorporated, 2016:online). Kendall's coefficient of concordance values can range from 0 to 1. Kendall's coefficient of concordance values between .50-.69 equates to moderate agreement, values between .70-.99 to good agreement and a value of 1.00 to complete agreement (Duckworth *et al.,* 1993:268; Leung *et al.,* 2005:123; Minitab Incorporated, 2016:online). A high Kendall's coefficient of concordance value indicates that the respondents applied the same standard for each item when they assessed the students.

The Kendall's coefficient of concordance values of the newly developed assessment instrument ranged between .04 and .40 per item as displayed in Table 4.4.

In view of the low level of similarity between the respondents the researcher investigated the consistency of the respondents during the 15 assessments to discover if any of the respondents were responsible for the low inter-rater reliability per item. This process may be seen in Table 4.3, earlier in the chapter. At the same time the researcher used the mentioned table to also investigate which items delivered inconsistent responses from respondents.

TABLE 4.4: Kendall's coefficient of concordance (*W*) values

ITEM	DESCRIPTION OF ITEM	*W*
1	The student: collects applicable subjective data (history taking) holistically	0.35
2	collects applicable objective data (observation) correctly, with the use of various techniques (observation, inspection, palpation, percussion and auscultation, side room investigations)	0.27
3	notices trends and/or deviations from baseline data/previous report	0.15
4	associates all assessment data with relevant sciences	0.19
5	the student's explanations of the findings to the patient/family/significant others/preceptor are scientifically correct	0.40
6	offers relevant differential diagnoses	0.17
7	substantiates each differential diagnosis with evidence from the assessment data	0.15
8	requests more information/diagnostic tests to either confirm or nullify possible diagnoses	0.09
9	makes a correct final/working diagnosis based on the available data in the current clinical context	0.36
10	ensures that the treatment plan addresses all healthcare needs (signs and symptoms)	0.23
11	ensures that the treatment plan is comprehensive in nature with regard to all healthcare needs	0.23
12	ensures that nursing actions/care address the root cause(s) whenever possible and does not only offer symptomatic relief (except in palliative care)	0.28
13	plans nursing actions/care with regard to all healthcare needs based on best available evidence	0.24
14	prioritises the correct sequence in which all nursing actions/care should be implemented	0.13
15	executes all nursing activities that demonstrates foundational knowledge and psychomotor skill	0.25
16	The student's time-on-task is appropriate throughout	0.23
17	seeks assistance when care is beyond his/her competence level	0.04
18	appropriately monitors the patient's condition throughout	0.17
19	notices all reactions relevant to current nursing actions/care	0.11
20	adapts current nursing actions/care appropriately to the patient's needs	0.13
21	was well prepared for the clinical exposure by demonstrating in-depth foundational knowledge, psychomotor competence and an acceptable attitude throughout	0.33
22	demonstrates interest in the patient/family/significant others throughout	0.33
23	demonstrates sensitivity towards the patient/family/significant others throughout	0.33
24	assumes primary responsibility for the care of the patient throughout	0.25
25	involves the patient/family/significant others in decision-making throughout	0.15
26	is confident throughout	0.44
27	is professional throughout	0.23
28	expresses him/herself clearly throughout	0.36
29	communicates the applicability of all the aspects of the nursing care process throughout	0.32
30	explains relevant findings (normal and/or abnormal) with discretion to the patient/family/ significant others	0.29
31	confirms all trends/patterns of the condition with the patient/family/significant others	0.20
32	communicates the root cause of the patient's condition to the patient/family/significant others (makes sense of all data gathered as described under clinical reasoning)	0.15
33	discusses all the patient's/family's/significant others' expectations and/or concerns with them throughout	0.21
34	assesses the patient's/family's/significant others' understanding of the information provided throughout (asks checking questions or uses other relevant methods)	0.22
35	uses SBAR to communicate with colleagues and/or inter-professional team	0.05
36	keeps legitimate records related to all patient care	0.18
37	is realistic with the evaluation of own performance (limitations and/or excellences	0.13
38	demonstrates realistic self-directed learning readiness by identifying limitations and/or excellences and plans on how to address learning needs	0.18

Items 8, 17 and 35 have *W* values of less than .10. With regard to the low *W* values of items 8, 17 and 35 the respondents may have found it difficult to assess the student on demonstrating the specific action mentioned in the item description, as there was no opportunity for a student to demonstrate the action and the action could be better demonstrated in a real-life clinical setting. Item 8 for instance states: *"The student requests more information/diagnostic tests to either confirm or nullify possible diagnoses."* Some respondents may have felt that this item is not applicable, as there was no opportunity to get more information from family members neither were there any diagnostics tests available, whereas other respondents just felt the student did not demonstrate this action. The same is possible with item 17, stating: *"The student seeks assistance when care is beyond his/her competence level."* The student was alone in the room with the standardised patient and this action could better be assessed in a real-life clinical setting where members of the interprofessional team are available. Item 35 states: *"The student uses SBAR to communicate with colleagues and/or interprofessional team."* This was also a difficult action to assess via video footage as the student was alone with the standardised patient.

Table 4.4 indicated that for these items, with extremely low *W* values, respectively 10, 7 and 9 respondents were inconstant with their responses. The high inconsistency of respondents with these specific items may explain the extremely low *W* values.

Furthermore, the fact that respondents could not ask students to explain their reasoning in order for the respondent to validate the reasoning of the student and allocate an appropriate mark for a specific behaviour had an influence on low inter-rater reliability (*W*) per item.

Although the inter-rater reliability per item (*W*) has little similarity, the Intraclass correlation coefficient (ICC) value indicates a good inter-rater reliability value of the developed instrument's total score.

4.4 CONCLUSION

In conclusion the data analysis indicated that the newly developed assessment instrument is reliable with good internal consistency and inter-rater reliability as a continuum of all the items, including the total scores of all the respondents. With further refinement of the items that delivered low *W* values, implementing the developed assessment instrument in real-life clinical settings and meticulous selection of reliable respondents, the newly developed assessment instrument may be used effectively to assess the competence of undergraduate student nurses.

In the next chapter the researcher will give an overview of the study with regard to the identified limitations and recommendations on addressing these limitations.

CHAPTER 5

Recommendations

5.1 INTRODUCTION

In Chapter 1 it was emphasised that nurse educators are responsible for the preparation of competent nursing students to enter complex and constantly evolving clinical settings. The WHO (2015:online) emphasises that the clinical competence of newly registered nurses is a crucial issue related to professional standards and public safety, currently hindering the attainment of health goals In this regard the WHO (2015:online) stresses the need to adopt more effective education and teaching strategies to address the competence of nursing students in the Global Strategy on Human Resources for Health: Workforce 2030.

According to the Nursing Education and Training Strategic Plan 2012/2013-2016/2017, compiled by a ministerial task team of the Department of Health Republic of South Africa, the South African NES group (2012:50) recommended that a competency-based approach must be developed and implemented as a new model for clinical teaching and training in South Africa.

Competence in nursing is based on the ability to integrate knowledge from all disciplines in order to identify the problem, understand the theory related to the problem and respond appropriately with treatment and care of the patient, as well as then applying all this integrated knowledge in a practical event or situation in a real-life setting or simulation (NES group, 2012:50). A competent nurse has mastered clinical reasoning skills, can practice sound clinical judgment, possessed metacognitive knowledge and is able to apply in practice or skills laboratories what he or she has learned in class. A competent nurse will identify and solve problems effectively in clinical practice.

In order to pursue the progress of training competent s, the competence of nursing students has to be assessed. In other words, the assessment of the student nurse is a key issue for educators and clinical facilitators in order to track the progress that has been made with regard to training competent nurses. A valid and reliable assessment instrument is therefore needed to allow an objective evaluation of nursing students' competence (performance) in clinical settings; in return, it can serve as a reference for nursing education to adjust teaching strategies to prepare competent professional nurses.

The assessment of competence however is a complex task and there is much controversy in the literature about the type of instrument to assess competence (Meretoja *et al.,* 2004:125). The complexity of competence assessment may be due to the variation of nursing training programmes globally. South African registered nurses, for instance, have a broad scope of practice and autonomy, especially where they function independently in remote and primary healthcare settings. The researcher was therefore hesitant to use an instrument that had not been tested in a South African context, and identified the need to develop a new competence assessment instrument for nursing students in South Africa.

5.2 OVERVIEW OF THE STUDY

The aim of this study was to develop a valid and reliable instrument to assess undergraduate nursing students' performance by showing competence with good clinical judgment and critical reflection in clinical settings. In order to assess the competence of nursing students the researcher had to achieve the objectives of the research study as outlined in Chapter 1.

The first objective was to conduct a thematic analysis of existing instruments on nursing competence and clinical judgment. The researcher identified sixteen existing instruments through the literature review and conducted a thematic analysis of the nine selected assessment instruments. Based on the thematic analysis the researcher developed an assessment instrument consisting of six categories, namely six knowledge domains and 38 items.

Objective four, namely to determine and describe the validity of the developed assessment instrument, was achieved when the developed assessment instrument was reviewed for face and content validity by a panel of experts in the field of transfer of learning and nursing competence. The researcher adapted the developed assessment instrument according to the recommendations by the expert panel. The review by the panel of experts enhanced the face and content validity of the assessment instrument.

The Cronbach Alpha coefficient value of .90 indicated a high reliability of the developed assessment instrument and therefore addressed the fifth and last objective. The Intraclass correlation coefficient value of .85, indicating inter-rater reliability as a continuum of all the respondents' responses, further contributed to the high reliability of the developed assessment instrument.

However, the Kendall's coefficient of concordance (*W*) value, indicating inter-rater reliability per item, ranged between .04 and .40 per item and therefore displayed low inter-rater reliability per item. This was attributed to the fact that some respondents were inconsistent in assessing students and because respondents could not validate the reasoning of students. Another contributing factor could be the large number of assessors (20) in comparison to other inter-rater studies that utilise three assessors at the most.

Every research study comprises some form of limitation. The researcher identified a number of limitations with regard to this research study.

5.3 LIMITATIONS OF THE STUDY

Although the number of responses was adequate for data analysis of this study, a bigger student sample would have improved the power of the study, as the construct validity may then have been determined as well. The random selection of only 15 second-year undergraduate nursing students contributed to the smaller than expected student sample. The reason for only selecting 15 students to assess was

the enormous time burden which the assessment of all the second-year undergraduate nursing students would have placed on the respondents.

The involvement of the researcher as a respondent could be argued as a possible limitation for this research study as objectivity is essential in quantitative research and could have effected the rigour of this research study.

A further point with regard to the sample is the fact that only nursing students and respondents within the field of nursing were included in the sample, as it was convenient for the researcher. Inclusion of other health science professions would have broadened the application of the developed assessment instrument.

With regard to the undergraduate training of the respondent sample, the researcher found that the sample did not represent the national trend of registered nurses and midwives, as 80% of respondents were trained at a university, while more registered nurses and midwives are trained at nursing colleges than universities according to national trends (South African Nursing Council, 2016b:online). This was due to the fact that the researcher had been trained at a university and approached fellow learners and educators at the known workplace as it was convenient to the researcher. However, this may limit the use of the developed assessment instrument to registered nurses and midwives who had been were trained at a university.

The subjectivity of the respondent sample as a result of non purposive sampling furthermore could have contributed to the misrepresentativeness of the respondent sample against the national trend of undergraduate training of registered nurses and midwifes. Last mentioned limitation could have been prevented by using quota sampling in addition to purposive sampling.

The researcher identified inconsistencies with regard to the standardised patient simulation activity. The researcher unfortunately could not have foreseen these inconsistencies as the standardised patient simulation activity had been developed as a routine simulation experience by the programme coordinator for the second-year students.

Although the validity of the developed assessment instrument's face and content had been enhanced by a panel of experts in the field of transfer of learning, nursing competence and instrument development, items 8, 17 and 35 were not measurable and respondents' responses appeared to be inconsistent with low *W* values. Inconsistent responses may be attributed to the fact that the respondents could not validate the reasoning of the students during the simulation activity via the footage they received. The expert panel did not review the developed assessment instrument by observing the students' performance via footage and therefore the review of the instrument's face and content validity was not optimal.

Furthermore, this study reported on the inter-rater reliability of 20 respondents as requested by the biostatistician, although one of the selected existing instruments that had been used for the development of the assessment instrument reported inter-rater reliability on only two respondents (Kuiper *et al*., 2008:5). The more respondents included in a research study, the bigger chance for disagreement between the respondents.

Only eight respondents were set apart as reliable respondents, meaning more than half of the respondents were inconsistent in assessing the nursing students' competence. Despite the researcher's attempt to select appropriate respondents by means of purposive sampling and training all the selected respondents with regard to the use of the assessment instrument, the inconstancy of respondents is regarded as a big limitation of this research study.

Heterogeneity implies that respondents' experience in nursing education and the assessment of students may have influenced the assessment of the students via video footage as a respondent's expectation of students adapt throughout their career as they gain more knowledge and experience in this regard.

Despite the limitations mentioned above, the potential benefits of this research study outweigh the limitations This will be discussed next.

5.4 VALUE OF THE STUDY

The value of this study and the benefits posed to relevant stakeholders in clinical nursing education are multi-faceted; therefore the roles that these stakeholders play in clinical nursing education will be considered in a discussion of the value of this research study.

Assessing the competence of nursing students could provide an indication of the clinical judgment levels of nursing students, and encourage nurse educators to import and expand teaching strategies that will develop thinking processes into their pedagogies. Future students will benefit from the adjustments that can be made to teaching strategies with regard to bridging the theory-practice gap and aiding students in developing their own thinking processes.

In a global sense, preceptors should facilitate the development of the thinking processes of students. The developed assessment instrument could guide preceptors on the domains that need to be developed in students. By interpreting the student's assessment, the preceptor could identify the specific learning need of the student, for example lack of declarative knowledge as demonstrated in the inability to interpret the assessment findings of a patient.

By developing the thinking process of students and aiding them to transfer their learning, students become more motivated to learn and to apply their knowledge in practice. Students become more skilled in making sound clinical judgments and become competent in rendering safe and evidence-based patient care. Subsequently, the standard of care is raised and the patient and healthcare system benefits. The improved quality of care reflects positively on the service provider.

The School of Nursing at the University of the Free State has a standardised assessment instrument to measure the competence of nursing students and guide preceptors and educators in identifying students' learning needs; this in turn may influence the teaching and learning strategies of the school.

Other nursing education institutions may also use this instrument to prepare competent professional nurses for the clinical setting. The knowledge generated by this study therefore contributes to the existing body of knowledge on nursing and evidence-based practice.

Furthermore the developed assessment instrument may be translated to other health science professions that focus on competence and the development of the thinking processes of students.

The following section will discuss recommendations that emanate from this research.

5.5 RECOMMENDATIONS

Recommendations are clustered for Nursing Education Institutions (NEI) and future research.

5.5.1 Recommendations for NEI

The developed assessment instrument may be used as a formative and summative assessment instrument for the following purposes:

- Formative assessment with the developed assessment instrument will indicate the learning needs of students that focus on and may inform NEI how to change teaching and learning strategies and perhaps scaffold the learning content.

- Summative assessment with the developed assessment instrument will clearly indicate if a student is competent in clinical practice or not.

- Intensive training of preceptors in the use of the assessment instrument is necessary. Training should not only be on the instrument but should include the thinking processes as well as methods of developing the cognitive and nursing therapeutic skills.

5.5.2 Future research

It is recommended that an exploratory and confirmatory factor analysis be done in order to determine the construct validity of the developed assessment instrument. This will significantly enhance the validity of the developed assessment instrument.

Performing a stability test through a test-retest cycle may improve the reliability of the developed assessment instrument. It is recommended to conduct the stability test in a real-life clinical setting and not via video footage in order for all the items of the assessment instrument to be measurable.

The selection of respondents must be done more accurately and precisely to include more respondents who had been trained at nursing colleges as well as to eliminate unreliable respondents. The number of respondents should be carefully considered for the stability test.

Students from other health sciences may be assessed with the developed assessment instrument in order to determine if other health care professions can use the instrument and thus broaden the scope of application of the developed assessment instrument.

Future research is recommended on the following topics:

- Determine the construct validity of the developed assessment instrument in order to prove that the items of the assessment instrument relate to the constructs of the assessment instrument.
- Determine if the inter-rater reliability of the developed assessment instrument is enhanced if the assessment instrument is implemented in a real-life clinical setting.

- Determine whether the competence (performance) of nursing students had improved after teaching and learning strategies to assist with transfer of learning was implemented.

5.6 CONCLUSION

This concludes the findings of this research study. The development of competent nursing students is an important aspect of nursing education. Careful consideration must be given to the teaching strategies that guide our future nurses.

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ADDENDUM A1

Letter of Ethics Committee:

Approval research project

UFS
UV

Research Division
Internal Post Box G40
☎(051) 4062812
Fax (051) 4444359

E-mail address: StraussHS@ufs.ac.za

Ms H Strauss/jdpls

2014-04-14

REC Reference nr 230408-011
IRB nr 00006240

MS N PIEK
PO BOX 12227
BRANDHOF
9324

Dear Ms Piek

ECUFS NR 49/2014
PROJECT TITLE: DEVELOPMENT AND TESTING OF A COMPETENCE ASSESSMENT INSTRUMENT FOR UNDERGRADUATE NURSING STUDENTS.

1. You are hereby kindly informed that the Ethics Committee approved the above research project at the meeting held on 8 April 2014.

   1.1. ***Kindly note that once the questionnaire has been developed, it has to be submitted to the Ethics Committee for approval.***

2. Committee guidance documents: Declaration of Helsinki; ICH GCP and MRC Guidelines on Bio Medical Research. Clinical Trial Guidelines 2000 Department of Health RSA: Ethics in Health Research: Principles Structure and Processes Department of Health RSA 2004: Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa, Second Edition (2006); the Constitution of the Ethics Committee of the Faculty of Health Sciences and the Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines.

3. Any amendment, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

4. The Committee must be informed of any serious adverse event and/or termination of the study.

5. All relevant documents e.g. signed permission letters from the authorities, institutions, changes to the protocol, questionnaires etc. have to be submitted to the Ethics Committee before the study may be conducted (if applicable).

6. A progress report should be submitted within one year of approval of long term studies and a final report at completion of both short term and long term studies.

7. Kindly refer to the ETOVS/ECUFS reference number in correspondence to the Ethics Committee secretariat.

Yours faithfully

PROF WH KRUGER
CHAIR: ETHICS COMMITTEE

Cc Prof Y Botma

ADDENDUM A2

Letter of Ethics Committee:

Approval developed instrument

IRB nr 00006240
REC Reference nr 230408-011
IORG0005187
FWA00012784

30 November 2016

MS N PIEK
SCHOOL OF NURSING
IDALIA LOOTS BUILDING
UFS

Dear Ms N Piek

ECUFS 49/2014
MS N PIEK
SCHOOL OF NURSING
PROJECT TITLE: DEVELOPMENT AND TESTING OF A COMPETENCE ASSESSMENT INSTRUMENT FOR UNDERGRADUATE NURSING STUDENTS

1. You are hereby kindly informed that the Health Sciences Research Ethics Committee (HSREC) approved the following at the meeting held on 29 November 2016:

   - *Developed questionnaire*

2. Kindly use the **ECUFS NR** as reference in correspondence to HSREC Administration.

3. The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the Ethics Committee of the Faculty of Health Sciences.

Yours faithfully

DR SM LE GRANGE
CHAIR: HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

ADDENDUM B1

Respondent demographic information

Respondent information:

Assessment instrument measuring competence of undergraduate nursing students:

With regard to the assessment of undergarduate nursing students' competence, please complete the following form by providing all of the information as instructed. By completing this form you are consenting to participate in the research. Your participation is voluntary and anonymous.

Write your given assessor number, age and years of post graduate nursing experience in numbers:	For administrative use	
1. Assessor number _____		1-2
2. Age _____ years		3-4
3. Post graduate nursing experience _____years		5-6
Tick the box to indicate your gender, ethnic group and highest qualification obtained:		
4. Gender [1] Male [2] Female		7
5. Ethnic group [1] White [2] Black [3] Coloured [4] Indian [5] Oriental		8
6. Highest qualification obtained [1] Diploma [2] Degree [3] Masters [4] PhD		9
7. Do you have a post-basic diploma in nursing education? Yes [1] No [2]		10
8. Have you received any preceptor training? Yes [1] No [2]		11
If answer is yes, please specify the name of the training programme and the name of the institution that presented the training programme:		
9. Name of training programme _____		12
10. Name of institution _____		13

ADDENDUM B2

Respondent demografiese inligting

Respondent inligting:

Assesseringsinstrument vir die bevoegdheid van voorgraadse verpleegkunde studente

Met betrekking tot die assessering van voorgraadse verpleegkunde studente se bevoegdheid, voltooi asseblief die onderstaande vorm deur die inligting te verskaf soos aangedui. Indien jy hierdie vorm voltooi bevestig jy jou bereidheid om deel te neem aan hierdie navorsingprojek. Jou deelname is vrywillig en anoniem.

Skryf jou gegewe assessornommer, ouderdom en jare nagraadse verpleegondervinding neer in syfers:	**Slegs kantoorgebruik**	
11. Assessornommer _____		**1-2**
12. Ouderdom _____ jare		**3-4**
13. Nagraadse verpleegondervinding _____jare		**5-6**
Merk die toepaslike ruimte om jou geslag, bevolkingsgroep en hoogste kwalifikasie geslaag aan te dui:		
14. Geslag [1] Manlik [2] Vroulik		**7**
15. Bevolkingsgroep [1] Blank [2] Swart [3] Kleurling [4] Indiër [5] Oosters		**8**
16. Hoogste kwalifikasie geslaag [1] Diploma [2] Graad [3] Magister [4] PhD		**9**
17. Het jy ‘n na-basiese diploma in verpleegonderrig Ja [1] Nee [2]		**10**
18. Het jy enige preseptor-opleiding ontvang? Ja [1] Nee [2]		**11**
Indien die antwoord ja is, noem die opleidingsprogram en die naam van die instansie wat dit aangebied het:		
19. Naam van opleidingsprogram _____		**12**
20. Naam van instansie _____		**13**

ADDENDUM C

Draft instrument for experts

Evaluation of assessment instrument, measuring the competence of student nurses

Dear Expert in Nursing Education

Please be so kind comment on each question, typed in red, regarding the domains and items of this instrument. A space is provided for comments on each domain and item. At the end of the instrument please comment on the questions with regard to the instrument as a whole.

Kindest Regards.

Nicola Piek
M.Soc.Sc Nursing Student UFS
0824981959
nicola@piekgroup.co.za

The scale is a four point Likert as explained below.

0 = Not done (Student does not demonstrate any aspect of expected behaviour)
1 = Incompetent (Student demonstrate some aspects of excepted behaviour haphazardly)
2 = Competent (Student demonstrate most of the aspects of expected behaviour orderly)
3 = Exceptional competent (Student demonstrates all of the aspects of expected behaviour orderly and consistetnly)

Please indicate your viewpoint with a Y or ✓ for yes OR N or X for no. Next to each statement is room for comments. Any suggestions are most welcome.
The domains for the assessment tool are listed in the left hand column. Indicate your agreement/disagreement regarding the domains

Domain	This domain should be tested	This domain has a specific significance in measuring student nurses' competence	The order that this domain has been placed is correct	Please give any additional comment with regard to the domain if needed
1. Attitude				
2. Communication				
3. Noticing/critical thinking				
4. Interpretation/clinical reasoning				
5. Responding/clinical judgment				
6. Metacognition				

Domain	It is representative of the domain	It is measureable	It is clearly phrased	It is understandable	Suggestions to improve
Attitude					
The student: 1. demonstrates interest and sensitivity during the assessment of the patient's situation.					
2. assumes responsibility for the care of the 3. patient					
4. involve the patient and family in decision-making regarding care/ treatment options and priority of care activities					
5. was well prepared for the clinical exposure					
6. adheres to the time schedule as arranged with the supervisor, patient, family and other people					
7. responds positive to feedback of the supervisor					
Communication					
The student: 8. communicates the purpose, significance and relevance of all the aspects of the assessment and care throughout the engagement with the patient					
9. expresses him/herself clearly and confidently throughout the process					
10. communicates normal and abnormal findings to the patient					
11. confirms trends and patterns of the disease with the patient					
12. discusses the expectations (benefits, risks and consequences) of choosing a particular course of action					
13. communicates the root cause of the patient's condition to the patient, after making sense of all data gathered					
14. keeps accurate records of all information gathered and actions implemented					
15. assesses the patient's understanding of the information provided					

Domain	It is representative of the domain	It is measureable	It is clearly phrased	It is understandable	Suggestions to improve
Noticing/critical thinking					
The student: 16. collects applicable subjective data holistically[1] and appropriately in a systematic manner					
17. uses various techniques of objective data collection (observation, inspection, palpation, percussion & auscultation, side room investigations).					
18. demonstrates correct techniques during a thorough systematic and relevant physical examination (head to toe)					
19. is able to notice trends and deviations					
20. is able to relate the findings to related sciences					
21. demonstrates correct critical thinking when explaining findings to the patient					
Interpretation/clinical reasoning					
The student: 22. offers differential diagnoses					
23. is able to substantiate each differential diagnoses with evidence from the assessment findings					
24. request more information/diagnostic tests to either confirm or nullify options					
25. make a final diagnosis based on the available evidence and the current clinical situation					
Responding/clinical judgment					
The student: 26. ensures that the treatment plan addresses all complaints and that it is comprehensive[2] in nature					
27. ensures that actions address root cause whenever possible and does not only offer symptomatic relief					
28. incorporates best practice guidelines, national guidelines, policies etc while planning care					
29. executes nursing activities skillfully and confidently (including use of equipment and technology)					

[1] Addresses all domains of living e.g. physical, emotional, psychosocial, social, cultural, spitirual, developmental etc.

[2] Promotes health, prevents disease, curative and rehabilitative

Domain	It is representative of the domain	It is measureable	It is clearly phrased	It is understandable	Suggestions to improve
30. consistently monitors the patients progress and notices deviations and unexpected reactions					
31. is flexible during the implementation of the management plan and does not hesitate to adapt to patients' needs					
32. prioritise the sequence of the treatment plan					
Metacognition					
The student: 33. verbalises knowledge limitations in the provision of care and seeks assistance when care is beyond knowledge level					
34. Plans on addressing shortcomings in knowledge and skill realistically					

With regard to the assessment instrument as a whole:

	Yes/No	Comment
Do you have any uncertainties or discrepancies with regard to the assessment instrument		
Please give any additional comment with regard to the instrument if needed		

Thank you

ADDENDUM D1

Assessment instrument measuring the competence of undergraduate nursing students

Assessment instrument measuring competence of undergraduate nursing students

Please assess the undergraduate nursing student's competence in a simulated patient scenario as seen on video footage with this assessment instrument.

Only administrative use			
			1-3
			4-5
			6-7

<u>Write your given assessor number and the number of the student who is being assessed:</u>

Assessor number _____

Student number _____

Refer to the scale below to assess the student on each statement of the assessment instrument

n.a = **Not applicable** (**No opportunity** to demonstrate expected behaviour during simulated patient scenario)
0 = **Not done** (Student **does not demonstrate any** aspect of expected behaviour)
1 = **Incompetent** (Student demonstrates **some** aspects of excepted behaviour **haphazardly**)
2 = **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)
3 = **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly & consistently)**

Please read each statement and indicate with a ✓ your chosen option

Domain	n.a. (**No opportunhity** to demonstrate expected behaviour during simulated patient scenario)	If applicable: 0 **Not done** (Student **does not show any** of expected behaviour)	If applicable: 1 **Incompetent** (Student demonstrates **some** aspects of excepted behaviour **haphazardly**)	If applicable: 2 **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)	If applicable: 3 **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly and consistently**)	For administrative use	
Noticing/critical thinking							
The student: 1. collects applicable subjective data (history taking) holistically[3]							**8**
2. collects applicable objective data (observation) correctly, with the use of various techniques (observation, inspection, palpation, percussion and auscultation, side room investigations)							**9**
3. notices trends and/or deviations from baseline data/previous report							**10**
4. associates all assessment data with relevant sciences							**11**
5. the student's explanations of the findings to the patient/family/significant others/preceptor are scientifically correct							**12**
Interpretation/clinical reasoning							
The student: 6. offers relevant differential diagnoses							**13**
7. substantiates each differential diagnosis with evidence from the assessment data							**14**
8. requests more information/diagnostic tests to either confirm or nullify possible diagnoses							**15**
9. makes a correct final/working diagnosis based on the available data in the current clinical context							**16**

[3] Addresses all domains of living e.g. physical, emotional, psychosocial, social, cultural, spitirual, developmental etc.

Domain	n.a. (**No opportunhity** to demonstrate expected behaviour during simulated patient scenario)	If applicable: 0 **Not done** (Student **does not show any** of expected behaviour)	If applicable: 1 **Incompetent** (Student demonstrates **some** aspects of excepted behaviour **haphazardly**)	If applicable: 2 **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)	If applicable: 3 **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly and consistently**)	For administrative use	
Responding/clinical judgment							
The student: 10. ensures that the treatment plan addresses all healthcare needs (signs and symptoms)							**17**
11. ensures that the treatment plan comprehensive[4] in nature with regard to all healthcare needs							**18**
12. ensures that nursing actions/care address the root cause(s) whenever possible and does not only offer symptomatic relief (expect in palliative care)							**19**
13. plans nursing actions/care with regard to all healthcare needs based on best available evidence							**20**
14. prioritises the correct sequence in which all nursing actions/care should be implemented							**21**
15. executes all nursing activities that demonstrates foundational knowledge and psychomotor skill							**22**
16. the student's time-on-task is appropriately throughout							**23**
17. seeks assistance when care is beyond his/her competence level							**24**
18. appropriately monitors the patient's condition throughout							**25**
19. notices all reactions relevant to current nursing actions/care							**26**
20. adapts current nursing actions/care appropriately to the patient's needs							**27**

[4] Promotes health, prevents disease, curative and rehabilitative

Domain	n.a. (**No opportunhity** to demonstrate expected behaviour during simulated patient scenario)	If applicable: 0 **Not done** (Student **does not show any** of expected behaviour)	If applicable: 1 **Incompetent** (Student demonstrates **some** aspects of excepted behaviour **haphazardly**)	If applicable: 2 **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)	If applicable: 3 **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly and consistently**)	For administrative use	
Attitude							
The student: 21. was well prepared for the clinical exposure by demonstrating in-depth foundational knowledge, psychomotor competence and an acceptable attitude throughout							**28**
22. demonstrates interest in the patient/family/ significant others throughout							**29**
23. demonstrates sensitivity towards the patient/ family/significant others throughout							**30**
24. assumes primary responsibility for the care of the patient throughout							**31**
25. involves the patient/family/significant others in decision-making throughout							**32**
26. is confident throughout							**33**
27. is professional throughout							**34**
Communication							
The student: 28. expresses him/herself clearly throughout							**35**
29. communicates the applicability of all the aspects of the nursing care process throughout							**36**
30. explains relevant findings (normal and/or abnormal) with discretion to the patient/family/ significant others							**37**
31. confirms all trends/patterns of the condition with the patient/family/significant others							**38**

Domain	n.a. (**No opportunhity** to demonstrate expected behaviour during simulated patient scenario)	If applicable: 0 **Not done** (Student **does not show any** of expected behaviour)	If applicable: 1 **Incompetent** (Student demonstrates **some** aspects of excepted behaviour **haphazardly**)	If applicable: 2 **Competent** (Student demonstrates **most** of the aspects of expected behaviour **orderly**)	If applicable: 3 **Exceptionally competent** (Student demonstrates **all** of the aspects of expected behaviour **orderly and consistently**)	For administrative use	
Communication							
The student: 32. communicates the root cause of the patient's condition to the patient/family/significant others (makes sense of all data gathered as described under clinical reasoning)							**39**
33. discusses all the patient's/family's significant others' expectations and/or concerns with them throughout							**40**
34. assesses the patient's/family's/significant others' understanding of the information provided throughout (asks checking questions or uses other relevant methods)							**41**
35. uses SBAR to communicate with colleagues and/or inter-professional team							**42**
36. keeps legitimate records related to all patient care							**43**
Metacognition/thinking about thinking							
The student: 37. is realistic with the evaluation of own performance (limitations and/or excellences)							**44**
38. demonstrates realistic self-directed learning readiness by identifying limitations and/or excellences and plans on how to address learning needs							**45**

ADDENDUM D2

Assesseringsinstrument vir die bevoegdheid van voorgraadse verpleegkunde studente

Assesseringsinstrument vir die bevoegdheid van voorgraadse verpleegkunde studente

Assesseer asseblief die voorgraadse verpleegkundestudent se bevoegdheid deur middel van hierdie assesseringsinstrument soos gesien in 'n gesimuleerde pasiëntsenario.

Slegs kantoorgebruik			
			1-3
			4-5
			6-7

<u>Skryf jou gegewe assessornommer en die nommer van die student wat geassesseer word neer:</u>

Assessornommer _____

Studentnommer _____

Verwys na die onderstaande skaal om die student te assesseer ten opsigte van elke stelling van die assesseringsinstrument

n.v.t = **Nie van toepassing** (**Geen geleentheid** tydens pasiëntsenario om verwagte gedrag te demonstreer nie)
0 = **Nie gedoen nie** (Student vertoon **geen** aspek van verwagte gedrag nie)
1 = **Onbevoeg** (Student demonstreer **sommige** aspekte van verwagte gedrag op **ongeordende** wyse)
2 = **Bevoeg** (Student demonstreer die **meeste** van die aspekte van verwagte gedrag **georden**)
3 = **Buitengewoon bevoeg** (Student demonstreer **al** die aspekte van verwagte gedrag **georden en konsekwent**)

Lees elke stelling en dui u gekose opsie aan met ✔

Domein	n.v.t.. (**Geen geleentheid** tydens pasiëntscenario om vewnwagte gedrag te demonstreer nie)	Indien van toepassing **0** **Nie gedoen nie** (Student vertoon **geen** aspek van verwagte gedrag hnie)	**1** **Onbevoeg** (Student demonstreedr **sommige** aspekte van verwagte gedrag op **ongeordende wyse**)	**2** **Bevoeg** (Student demonstreer die **meeste** van die aspekte van verwagte gedrag **geordeen**)	**3** **Buitengewoon bevoeg** (Student demonstreer al die aspekte van verwagte gedrag **geordeen en konsekwent**)	Vir kantoorgebruik	
Waarneming/kritiese denke							
Die student: 1. samel toepaslike subjektiewe data (geskiedenis neem)[5]							**8**
2. samel toepaslike objektiewe data (observasie) korrek in deur die gebruik van verskeie tegnieke (observasie, inspeksie, palpasie, perkussie en ouskultasie, sykamerondersoeke)							**9**
3. neem patrone en/of afwykings van basislyndata/ vorige verslag waar							**10**
4. vermin alle assesseringsdata met betrokke wetenskappe							**11**
5. die student se verduidelikings van die bevindinge aan die pasiënt/family/ander betrokkenes/ preceptor is wetenskaplik korrek							**12**
Interpretasie/kliniese redenasie							
Die student: 6. bied toepaslike differensiële diagnoses aan							**13**
7. ondersteun elke differensiële diagnose met bewyse uit die assesseringsdata							**14**
8. versoek verdure inligting/diagnostiese toetse om moontlike diagnoses of te bewys of uit te skakel							**15**
9. maak ‘n finale/werkende korrekte diagnose gebaseer op die beskikbare data in die huidige kliniese konteks							**16**

[5] Spreek alle domeine van die lewe aan, bv. Fisies, emosioneel, psigososiaal, sosiaal, kultureel, geestelik, selfverwesenliking ens.

Domein	n.v.t.. (**Geen geleentheid** tydens pasiëntscenario om vewnwagte gedrag te demonstreer nie)	Indien van toepassing: 0 **Nie getoen nie** (Student vertoon **geen** aspek van verwagte gedrag hnie)	Indien van toepassing: 1 **Onbevoeg** (Student demonstreedr **sommige** aspekte van verwagte gedrag op **ongeordende wyse**)	Indien van toepassing: 2 **Bevoeg** (Student demonstreer die **meeste** van die aspekte van verwagte gedrag **geordeen**)	Indien van toepassing: 3 **Buitengewoon bevoeg** (Student demonstreer al die aspekte van verwagte gedrag **geordeen en konsekwent**)	Vir kantoorgebruik	
Responsiewe/kliniese oordeel							
Die student: 10. maak seker dat die behandelingsplan alle gesondheidsorgbehoeftes aanspreek (tekens en simptome)							**17**
11. maak seker dat die behandelingsplan van omvattende[6] aard is met betrekking tot alle gesondheidsorgbehoeftes							**18**
12. maak seker dat verpleegaksies/-sorg waar moontlik die kern oorsaak aanspreek en nie slegs simptomatiese verligting bied nie (buiten palliatiewe sorg)							**19**
13. beplan verpleegaksies/-sorg met betrekking tot alle gesondheidsorgbehoeftes deur dit te baseer op die beste beskikbare data							**20**
14. prioritiseer die korrekte volgorde waarin alle verpleegaksies/-sorg uitgevoer moet word							**21**
15. voer alle verpleegaksies, wat fundamentele kennis en psigomotoriese vaardigheid demonstreer, uit							**22**
16. tyd gespandeer aan die taak (“time-on-taks”) is deurlopend toepaslik							**23**
17. versoek bystand wanneer sorg sy/haar bevoegdheidsvlak oorskry							**24**
18. moniteer deurlopend die pasiënt se toestand							**25**
19. neem alle relevante reaksies op huidige verpleeg-aksies/-sorg waar							**26**
20. pas huidige verpleegaksies/-sorg toepaslik aan by die behoeftes van die pasiënt							**27**

[6] Bevorder gesondheid, voorkom siekte, maak geson en rehabiliteer

Domein	n.v.t.. (**Geen geleentheid** tydens pasiëntscenario om vewnwagte gedrag te demonstreer nie)	Indien van toepassing: 0 **Nie gedoen nie** (Student vertoon **geen** aspek van verwagte gedrag hnie)	Indien van toepassing: 1 **Onbevoeg** (Student demonstreedr **sommige** aspekte van verwagte gedrag op **ongeordende wyse**)	Indien van toepassing: 2 **Bevoeg** (Student demonstreer die **meeste** van die aspekte van verwagte gedrag **geordeen**)	Indien van toepassing: 3 **Buitengewoon bevoeg** (Student demonstreer al die aspekte van verwagte gedrag **geordeen en konsekwent**)	Vir kantoorgebruik	
Houding							
Die student: 21. was goed voorberei vir die kliniese leerervaring deur deurlopend indiepte fundamentele kennis, psigomotoriese vaardigheid en ‘n aanvaarbare houding te demonstreer							**28**
22. toon deurlopend belangstelling							**29**
23. demonstreer deurlopend sensitiwiteit							**30**
24. aanvaar deurlopend primêre verantwoordelikheid vir die sorg van die pasiënt							**31**
25. betrek deurlopend die pasiënt/familie/ander betrokkenes tydens besluitneming							**32**
26. is deurlopend selfversekerd							**33**
27. tree deurlopend professioneel op							**34**
Kommunikasie							
Die student: 28. druk deurlopend hom-/haarself duidelik uit							**35**
29. kommunikeer deurlopend die toepaslikheid van al die aspekte van die verpleegsorgproses met die pasiënt/familie/ander betrokkenes							**36**
30. verduidelik relevante bevindinge (normal en/of abnormal) met diskresie aan die pasiënt/familie/ ander betrokkenes							**37**
31. bevestig alle tendense/patrone van die toestand met die pasiënt/familie/ander betrokkenes							**38**

Domein	n.v.t.. (**Geen geleentheid** tydens pasiëntscenario om vewnwagte gedrag te demonstreer nie)	Indien van toepassing 0 **Nie gedoen nie** (Student vertoon **geen** aspek van verwagte gedrag hnie)	1 **Onbevoeg** (Student demonstreedr **sommige** aspekte van verwagte gedrag op **ongeordende wyse**)	2 **Bevoeg** (Student demonstreer die **meeste** van die aspekte van verwagte gedrag **geordeh**)	3 **Buitengewoon bevoeg** (Student demonstreer al die aspekte van verwagte gedrag **geordeh en konsekwent**)	Vir kantoorgebruik	
Kommunikasie							
Die student: 32. kommunikeer die kernoorsaak van die pasiënt se toestand aan die pasiënt/familie/ander betrokkenes (maak sin uit al die data ingesamel soos beskryf word onder kliniese redenasie)							**39**
33. bespreek deurlopend al die pasiënt/familie/ander betrokkenes se verwagtinge en/of bekommernisse met hom/haar/hulle							**40**
34. assesseer deurlopend die pasiënt/familie/ander betrokkenes se begrip van die inligting verskaf (vra toepaslike kontrolerende vrae of gebruik ander relevante metodes)							**41**
35. gebruik SBAR om met kollegas en/of interprofessionele span te kommunikeer							**42**
36. hou wettige rekords in verband met alle pasiëntsorg							**43**
Metakognisie/denke oor denke							
Die student: 37. is realisties oor die evaluering van eie prestasie (beperkings en/of uitnemendheid)							**44**
38. demonstreer realistiese selfgerigte leergereedheid deur beperkings en/of uitnemendhede te identifiseer en te beplan hoe om leerbehoefte aan te spreek							**45**

ADDENDUM E1

Agreement by respondent

Development and testing of a competence assessment instrument for undergraduate nursing students

I, Nicola Piek, am doing research on the competence of undergraduate nursing students. Research is simply a process to learn the answer to a question. In this study I want to learn how to assess the competence of undergraduate nursing students by using an assessment instrument. I will complete this research study in order to obtain my M.Soc.Sc degree in Nursing. The results of this study may be published/presented and future authorship has been agreed upon.

I am asking you, as an expert in preceptorship, to participate in this research study by assessing second-year undergraduate nursing students' competence by means of video footage of simulated activities with the help of the assessment instrument that I, the researcher, will develop. With the help of other experts in the field of preceptorship you will evaluate 5 second-year undergraduate nursing students to test the developed assessment instrument for readiness and if needed refine it for the formal assessment and data collection later.

There is no risk for being involved in the study. To assist with the assessment will take two and a half hours of your time. The most convenient time for all participants will be arranged. Participants might gain more insight into competence and clinical reasoning of students. There will be no costs payable by the participants for participating in the study. Participants will be given one week to think about participating in the study.

No reimbursements will be given for participation in the study. Participation in the study is voluntarily and participants may discontinue their participation at any time without penalty or loss of benefits to which you as an expert in preceptorship is otherwise entitled. Refusal to participate will not result in penalty or loss of benefits to which you as an expert in preceptorship is otherwise entitled.

Data gathered during the study will not be made available to any person not involved in the research study. Last mentioned will be ensured by storing assessment instruments in locked fireproof cabinets and limiting access only to those involved in the study. On conclusion of the study all assessment instruments will be destroyed.

Lastly you are requested to agree to a confidentiality disclaimer pertaining to the video footage of nursing students involved in this research study. Vidoe footage may only be used for research and educational purposes and it is accepted that all information will be handled in a confidential manner.

You may contact me, Nicola Piek, at cellphone number 082 498 1959 if you have questions about the research.

You may contact the Secretariat of the Ethics Committee of the Faculty of Health Sciences, UFS at telephone number (051) 405 2812 if you have questions about your rights as a research subject.

Agreement by participant:

The research study, including the above information, has been verbally described to me. I understand what my involvement in the study entails and I voluntarily agree to participate.

_____ _____

Signature of Participant **Date**

_____ _____

Signature of Witness **Date**

ADDENDUM E2

Onderneming deur respondent

Ontwikkeling en toetsing van ‘n bevoegdheids assesseringsinstrument vir voorgraadse verpleegkunde studente

Ek, Nicola Piek, is besig met navorsing oor die bevoegdheid van voorgraadse verpleegkunde studente. Navorsing is bloot ’n proses om die antwoord op ’n vraag te wete te kom. Met hierdie studie wil ek bepaal hoe om die bevoegdheid van voorgraadse verpleegkunde studente met behulp van ’n assesseringsinstrument te assesseer. Ek wil hierdie navorsingstudie onderneem ten einde my MSocSc-graad in Verpleegkunde te behaal. Die resultate van hierdie studie mag gepubliseer of voorgedra word. Konsensus in verband met outeurskap van publikasie is bereik.

Daarom versoek ek u, as ’n kundige op die gebied van preseptorskap, om aan hierdie studie deel te neem deur tweedejaar- voorgraadse verpleegkunde studente se vaardigheid te assesseer met behulp van videomateriaal van gesimuleerde aktiwiteite en die assesseringsinstrument wat ek, die navorser, gaan ontwikkel. Met die hulp van ander kundiges op die gebied van preseptorskap gaan u 5 tweedejaar-voorgraadse studente evalueer om die ontwikkelde assesseringsinstrument te toets vir gereedheid en te verfyn soos nodig vir die formele assessering en data insameling later.

Daar is geen risiko verbonde aan deelname aan die studie nie. Die assessering sal twee en ‘n half uur van deelnemers se tyd vereis. Die gerieflikste tyd vir alle deelnemers sal gereël word. Deelnemers sal waarskynlik meer insig in bevoegdheid en kliniese redeneringsvermoë van studente bekom. Deelnemers het ‘n week om te gaan nadink oor deelname aan die studie.

Daar is geen vergoeding vir deelname aan die studie nie. Deelname aan die studie is vrywillig en deelnemers mag te eniger tyd hulle deelname beëindig sonder benadeling of verlies aan voordele waarop u as ’n kundige oor preseptorskap

andersins geregtig is. Weiering tot deelname sal nie lei tot benadeling of verlies aan voordele waarop u as ’n kundige oor preseptorskap andersins geregtig is nie.

Data wat tydens die studie ingesamel word, sal beperk word slegs tot diegene wat direk by die navorsing betrokke is. Laasgenoemde sal verseker word deur assesserings instrumente in brandbestande kabinette wat kan sluit te stoor en toegang te beperk slegs tot diegene wat direk by die navorsing betrokke is. Na afloop van die studie sal alle assesserings instrumente vernietig word.

Laastens word u versoek om ‘n toe te stem tot ‘n vertroulikheidsversuim rakende die video materiaal van verpleegkunde studente. Video materiaal mag slegs vir navorsing en opleidings doeleindes gebruik word en daar word verneem dat inligting vertroulik hanteer sal word.

U kan my, Nicola Piek, by 082 498 1959 kontak indien u enige vrae omtrent die navorsing het.

U kan ook die Sekretariaat van die Etiekkomitee van die Fakulteit Gesondheids-wetenskappevan die UV by (051) 405 2812 kontak indien u vrae het omtrent u regte as ’n navorsingsonderwerp.

<u>Onderneming deur deelnemer:</u>

Die navorsingstudie, insluitende bogenoemde inligting, is mondeling aan my verduidelik. Ek verstaan wat by betrokkenheid by die studie behels en stem vrywillig daartoe in om deel te neem.

_____ _____

Handtekening van Deelnemer **Datum**

_____ _____

Handtekening van Getuie **Datum**