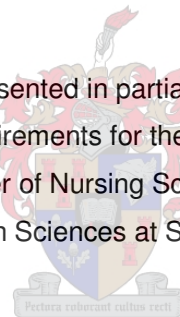# Experiences and perceptions of primary health care students utilizing simulation laboratories

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Thesis presented in partial fulfilment
of the requirements for the degree of
Master of Nursing Science
in the Faculty of Health Sciences at Stellenbosch University

Supervisor: Dr E.L. Stellenberg   December 2011

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

Simulation refers to a teaching method that is used to teach students clinical skills. The use of mannequins is the most common type of simulation. Given the pivotal role that simulation plays in teaching students clinical skills, it is important to understand the experience and perceptions students have utilizing simulation laboratories. The aim of the study was to explore the experience and perceptions of primary health care students utilizing simulation laboratories.

The researcher posed the following research question as a guide for this study: "What are the experiences and perceptions of primary health care students utilizing simulation laboratories?" A qualitative approach with a phenomenological research design was applied. A purposive sample of n=10 and a focus group of 7 participants was drawn from a total population of 232 primary health care students. An interview guide was designed based on the objectives of the study and validated by experts in Nursing, Education and the Ethics Committee at the Faculty of Health Sciences, Stellenbosch University. Experts in the field of teaching and learning, nursing and research methodology were consulted to determine the feasibility and content of the study, to evaluate the research process and outcome. Two (2) trained fieldworkers were responsible for collecting the data. Data was collected by means of individual interviews and by interviewing a focus group. The transcription of the interviews was done by the researcher.

The data that emerged from the data analysis was coded and categorised into themes and subthemes. The five themes that emerged were simulation as a teaching method; a mannequin offering effective learning; confidence in clinical practice; structure of the course; and a support system. The researcher compiled a written account of the interpretations that emerged from the data analysis and verified this with the fieldworkers. In addition, member checking was done on two (2) of the participants from the focus group as well as two (2) of the participants from the individual interviews, to validate the transcribed data.

The Conceptual Theoretical Framework of Bloom supports the findings of this study. The findings suggest that the mannequins should be upgraded regularly and should be able to register a response. It is recommended that a mannequin should be designed which is computer programmed according to different conditions which will include the signs and symptoms of those diseases for example tuberculosis. The participants need to be placed in the clinical environment at a much earlier stage in their programme. Peer group teaching and assessment should be introduced in the programme. Further research is recommended since institutions and disciplinaries working with simulation were not included in the study.

OPSOMMING

Simulasie verwys na 'n onderrigmetode wat gebruik word om studente kliniese vaardighede aan te leer. Die gebruik van mannekyne is die mees algemene vorm van simulasie. Gegee die deurslaggewende rol wat simulasie speel in die onderrig van kliniese vaardighede aan studente, is dit belangrik om die ervaring en persepsies van studente wat gebruik maak van simulasie-laboratoriums, te wete te kom. Die doel van hierdie studie was om die ervaring en persepsies van primêre gesondheidssorgstudente wat van simulasie-laboratoriums gebruik maak, te ondersoek.

Die navorser het die volgende navorsingsvraag as 'n riglyn vir hierdie studie gestel: "Wat is die ervaringe en persepsies van primêre gesondheidssorgstudente wat simulasie-laboratoriums gebruik?" 'n Kwalitatiewe benadering met 'n fenomenologiese navorsingsontwerp is toegepas. 'n Doelbewuste steekproef van n=10 en 'n fokusgroep van 7 deelnemers is geneem vanuit 'n totale bevolking van 232 primêre gesondheidsorgstudente. 'n Onderhoudgids is ontwerp, gebaseer op die doelwitte van die studie en gevalideer deur kundiges in Verpleging, Opvoedkunde en die Etiese Komitee van die Fakulteit van Gesondheidswetenskappe aan die Universiteit van Stellenbosch. Kundiges op die gebied van onderrig en leer, verpleging en navorsingsmetodologie is geraadpleeg om die haalbaarheid en inhoud van die studie te bepaal vir die evaluering van die navorsingsprosedure en uitkomste. Twee (2) opgeleide veldwerkers was verantwoordelik om die data te versamel. Die data was versamel deur middel van individuele onderhoude en 'n onderhoud met 'n fokus groep. Die onderhoude was getranskribeer deur die navorser.

Die data wat uit die analise gekom het, is geënkodeer en gekategoriseer in temas en subtemas. Die vyf temas wat hieruit voortgespruit het, is simulasie as 'n onderrigmetode; 'n mannekyn wat effektiewe leer bied; vertroue in die kliniese praktyk; die struktuur van die kursus; en 'n ondersteuningssisteem. Die navorser het 'n geskrewe verslag saamgestel van die weergawe van die data-analise wat saamgestel en deur die veldwerker geverifieer is. Bykomend is die kontrole van lede van twee (2) van die deelnemers van die fokusgroep, asook twee (2) van die deelnemers vanuit die individuele onderhoude gedoen, om die getranskribeerde data se geldigheid te verklaar.

Die Konseptuele Teoretiese Raamwerk van Bloom rugsteun die bevindinge van hierdie studie. Die bevindinge beveel aan dat die mannekyne gereeld opgegradeer behoort te word en dat hulle 'n respons moet kan registreer. Dit word aanbeveel dat 'n mannekyn ontwerp behoort te word wat rekenaar geprogrammeerd is volgens die verskillende toestande wat die

tekens en simptome van siektes soos tuberkulose insluit. Die deelnemers behoort in 'n baie vroeë stadium van die program in die kliniese omgewing geplaas te word. Verdere navorsing word aanbeveel, aangesien inrigtings en dissiplines wat met simulasie gemoeid is, nie in hierdie studie ingesluit is nie.

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DEDICATION

To my mother, Bernice Jacqueline van der Merwe for being my inspiration and role model in the profession of nursing.

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LIST OF ACRONYMS USED IN THE ASSIGNMENT

CNP   Clinical Nurse Practitioner

DVD   Digital Video Disc

HPS   Human Patient Simulator

ICU   Intensive Care Unit

KSA   Knowledge, Skills and Attitude

NCSBN   The National Council of State Boards of Nursing

NLN   National League for Nursing

OSCE   Objective Structured Clinical Examination

PHC   Primary Health Care

CHAPTER 1:
SCIENTIFIC FOUNDATION OF THE STUDY

1.1   Introduction

Clinical nurse practitioners' (CNP) confidence and competence levels are essential skills required when assessing the patient holistically. They need to have excellent clinical skills and requires basic knowledge to think critically and analytically of their practice. This will enable them to think beyond the normal practice, being creative and innovative in finding better ways in assessing and managing their patients, ensuring a safe practice and simultaneously being cost effective. For CNPs to have adequate confidence, and to be competent in assessing the patient, it is suggested that they are taught in a student-centered environment (Haider, 2009:22). Furthermore, to ensure that primary health care students are eventually safe and competent practitioners, it is essential to develop their skills by practicing as much as they can and be declared competent before going out into the field.

By practising their clinical skills as a learning strategy, the students simultaneously improve their levels of competence and confidence. It was observed in the clinical field that if the confidence and competence levels of the clinical nurse practitioners are inadequate when assessing patients, they are unable to assess the patient holistically. This has become a cause of concern in the clinical field as the safe management of patients may be seriously compromised.

1.2   Rationale

A clinical nurse practitioner working in a clinical field is required to apply the necessary skills and knowledge when assessing a patient holistically. Haigh (2007:95) argues that simulated practice in university settings is not just a second best to learning in the critical area, but one which offers the potential for reflection and deep learning. A deep approach to learning is student-centred and involves a search for understanding. Students must therefore think actively about what they are doing. One of the elements that foster a deep approach is active learning, where the student is actively involved (Meyer & van Niekerk, 2008:121). According to Murray, Grant, Howarth and Leigh (2008:5), simulation is an approach to teaching and learning that is gaining a greater weight within nursing education.

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Clinical simulation is a method of active learning, which offers the students a wide range of learning opportunities and ways of putting theory into performing, and can bring principles, learned in the classroom, to life (Haider, 2009:22). According to Stefanski and Rossler (2009:445), simulation has come to the forefront, as an effective teaching modality in teaching the science of nursing. The use of a human patient simulator (HPS), provides a method by which students can participate in clinical decision making, practise skills, and observe outcomes from clinical decisions (Brannan, White and Bezanson, 2008:495). According to Brannan *et al.* (2008:495), it was anticipated that the use of the HPS may develop students' cognitive skills and confidence levels.

Several studies have shown that by using simulation as a teaching method or style, it prepares the students to be more confident, when facing a real life situation. It is important that students are fully prepared when assessing and examining patients. Bloom's taxonomy is the focus of cognitive, affective and psychomotor domains which are essential approaches to learning (Meyer & van Niekerk, 2008:101). Furthermore, Bloom also devised mastery learning which indicates that all students may master tasks if they have been allocated enough time. According to Quinn and Hughes (2007:96), the amount of time it takes to master a task is dependent on the following variables:

- students' skills and experience;
- students' ability to understand;
- students' quality of training;
- students' determination; and
- the difficulty of the task.

However, it was observed that student clinical nurse practitioners, from a particular university failed to acquire adequate confidence and competence to assess the 'real' patient. At this particular university these students predominantly practised and acquired their clinical skills with artificial simulations. Students verbalized that they do not feel competent or confident enough, after practising on artificial mannequins to assess the patient holistically. This has raised serious concerns for academic lecturers who apply this teaching and learning strategy, as ultimately patient safety may seriously be compromised.

1.3   Significance of the study

The first level of care, according to the Primary Health Care (PHC) policy applicable in South Africa, prescribes that this level is managed by CNPs without the support of medical practitioners (Department of Health, 2000). Access to decent public services is the rightful expectation of all citizens in South Africa (Department of Health, 2000). Most of these

citizens are employed in a no-work, no-pay service and therefore expect an effective and efficient service. By completing this study the appropriate learning strategy or strategies will be identified and applied to produce confident and competent CNPs to ensure ultimately an effective and efficient service in primary health care.

1.4   Problem statement

With reference to the above discussion, the low confidence and inadequate competent levels gained by primary health care student nurse practitioners through laboratory simulation may compromise the patient's safety. It has therefore become imperative that a scientific investigation be undertaken to explore the experiences and perceptions of primary health care students utilizing simulation laboratories as a learning strategy.

1.5   Research question

The researcher posed the following research question as a guide for this study: "What are the experiences and perceptions of primary health care students utilizing simulation laboratories?"

1.6   Research purpose

The purpose of this study was to determine the experiences and perceptions of primary health care students with relation to the utilization of simulation laboratories.

1.7   Objectives

The following objectives set for this study were to determine through the experiences and perceptions of the primary health care students utilizing simulation laboratories whether they 'believe' they have gained:

- competence to assess the patient holistically in the clinical environment;
- confidence to assess the patient holistically in the clinical environment and
- the ability to correlate theory and practice.

1.8   Research methodology

In this chapter a brief discussion is given about the research methodology applied in this study, whereas a more in depth discussion is described in chapter 3.

1.8.1 Research approach and design

In this study, the researcher applied a qualitative approach with a phenomenological descriptive design, to evaluate the experiences and perceptions of primary health care

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students relating to a learning strategy applied to teach students practical clinical skills, namely laboratory simulation.

1.8.2 Population and sampling

The target population for this study was students who obtained the Diploma in Primary Health Care in 2010 at Stellenbosch University. The total population who completed and obtained their qualification was 232. According to De Vos, Strydom, Fouché and Delport *et al.* (2009:294), in qualitative research a maximum of ten (10) participants are required or until data saturation is reached. Therefore, for the purpose of this study, a purposive sample of ten (n=10) students was drawn to explore their experiences relating to the utilization of simulation. In addition a focus group of seven (7) voluntary students was interviewed. These students were purposively selected in order to cover a complete spectrum of students including high, average and low achievers. According to Burns and Grove (2007:337), in non-probability sampling, not every element of the population has an opportunity for selection in the sample. Purposive sampling is sometimes referred to as 'selective sampling'; the researcher consciously selects certain subjects, elements, events, or incidents to be included in the study (Burns & Grove, 2007:344). Therefore, a non-probability purposive sampling was applied.

1.8.3 Specific sampling criteria

All the students, male and female, who obtained the post graduate diploma in Nursing: Primary Health Care, at the University understudy during 2010 were included.

1.8.4 Validity and trustworthiness

The following principles, as described by Guba and Lincoln (1985:290), were applied to ensure trustworthiness of this study.

1.8.4.1 Credibility

Experts in the field of teaching and learning, nursing and research methodology were consulted to determine the feasibility and content of the study, and to evaluate the research process and outcome. Internal validity, truth-value or credibility was ensured by being satisfied that the participants accurately understood the questions and agreed to the accuracy of the transcribed data.

1.8.4.2 Transferability

According to De Vos *et al.* (2009:346), generalising findings in qualitative research may be problematic but is possible if researchers could show that the study was guided by concepts, models and the use of multiple data collection methods. For the purpose of this

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study a conceptual theoretical framework based on Bloom's Taxonomy (paragraph 2.4.6) was used, and the use of more than one method of data collection strengthened transferability.

1.8.4.3   Dependability

Dependability was assured through the use of a tape recorder to ensure that all the information given by the participant was recorded. In addition, a fieldworker took notes during and after the interviews with the participants. All interviews were conducted in the same manner using an interview guide. The data was transcribed and analysed after each interview and verified by a fellow researcher and expert in qualitative research.

1.8.4.4   Conformability

A fieldworker was trained to ensure that conformability was maintained due to the researcher's involvement in the programme, in this way bias was excluded. In addition after transcribing every participant's data it was verified with the particular individual to ensure that the data was transcribed accurately and that bias was excluded.

1.8.5 Instrumentation

For the purpose of this study, an interview guide (Appendix A) was designed based on the objectives of the study, the literature review and the researcher's own professional experiences. The interview guide was further validated by the supervisor of the study.

1.8.6 Pilot study (pretesting)

According to Burns and Grove (2007:549), a pilot study is a smaller version of a proposed study conducted to develop and refine the methodology to be used in the larger study. For this purpose the pilot study or sometimes referred to as pretesting in qualitative research was conducted on one (1) of the participants of the population who was not included in the study to test the feasibility of the methodology. According to De Vos *et al.* (2009:206) the pretesting of a measuring instrument consists of "trying it out on a small number of persons having characteristics similar to those of the target group of respondents". The pilot study revealed no pitfalls.

1.8.7 Data collection

Two trained fieldworkers were responsible for collecting the data. Data was collected by means of individual interviews and by interviewing a focus group. With the permission from the participants the interviews were recorded with the use of a tape recorder. One fieldworker (fieldworker A) had a guideline with open ended questions which guided the interviews and the other fieldworker (fieldworker B) took notes, in addition to the recording

of the interviews. After the interview fieldworker A summarized the notes which fieldworker B did, as confirmation that the students understood the fieldworkers perfectly.

1.8.8 Data analysis and interpretation

The researcher analysed the data by listening to the tapes and transcribing the participant's recorded interviews. The data was read several times to get a sense of the interview (paragraph 3.5.7). After categorising the data in detail, themes and categories of meaning were identified (paragraph 4.2 - 4.4). Data was analysed according to Tesch's eight (8) step model (1985) (table 3.2).

1.9   Ethical considerations

At the beginning of each interview each participant was given a 'Participant Information Leaflet' concerning the study and each one also gave written consent to participate in the study. Consent was also obtained for the audio and written recording of the interview. Participants were assured of anonymity. Permission to conduct this study was obtained from the Health Research Ethics Committee in the Faculty of Health Sciences at University Stellenbosch.

Interviews were conducted by a trained fieldworker as participants could have been reluctant to disclose information to the researcher, who is a lecturer of the primary health care program, involved in the study. All ethical principles were adhered to. Data is being kept locked and stored in a safe place at the residence of the researcher for at least five (5) years. Only the researcher has access to the safe.

1.10 Definitions

For the purpose of the study, the following terms are used as described bellow:

Clinical Nurse Practitioner (CNP)
Wiysonge and Chopra (2008:6), stated that "nurse practitioners are nurses who have undergone further training, often at graduate level, to work autonomously; making independent diagnoses and treatment decisions."

Primary Health Care (PHC)
The Alma Ata Declaration (WHO, 1978:428), defines primary health care as "essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to

maintain at every stage of their development in the spirit of self-reliance and self-determination.''

Simulation

Gaba (2007:2) defines simulation as "a device that presents a simulated patient or part of a patient and interacts appropriately with the actions taken by the simulation practitioner."

Student clinical nurse practitioner

The researcher observed that once the students go out into the clinical field and start assessing patients, they are known as student clinical nurse practitioners. Therefore, the primary health care students are referred to as student clinical nurse practitioners.

1.11 Outline of the study

Chapter 1: Scientific foundations of the study

Chapter 1 portrays the background and motivation for the study, problem statement, research question, goal and objectives. In addition, a brief overview of the research methodology, operational definitions and study layout are described.

Chapter 2: Literature review

An in-depth literature review related to the study is discussed including the conceptual theoretical framework which guided the study.

Chapter 3: Research methodology

In chapter 3 an in-depth description of the research methodology applied is discussed.

Chapter 4: Data analysis, interpretation and discussion

In chapter 4 the findings of the study which include the analysis and interpretation of the data are discussed.

Chapter 5: Conclusion and recommendations

In chapter 5 the findings according to the study objectives are concluded and recommendations are made based on scientific evidence obtained in the study.

1.12 Summary

Several studies show that by using simulation as a teaching method or style, it prepares the students to be more confident, when facing a real life situation. It is however, essential that students are fully prepared for the clinical environment when they are faced with assessments and examinations of real life patients. When students are fully prepared they

gain adequate confidence to engage with patients in the clinical environment. Jeffries and Rogers (2007:25-26), state that "During simulation activities, learning is most effective because the teaching environment is interactive and the adult student engages as a participant."

1.13 Conclusion

This study proposed to evaluate the experiences and perceptions relating to a learning strategy, namely laboratory simulation, as applied to teach PHC nurses practical skills with specific reference to the confidence and competence levels required by CNPs. Chapter 1 summarizes the rationale for the study and also gives a brief indication of the methodology used in the study.

In Chapter 2 an in depth literature review is done to determine the experience and perceptions of student utilizing, not only simulation as a learning method, but also the students' perceptions on different teaching and learning methods in a clinical module. With reference to learning methods the researcher explored Bloom's taxonomy as a framework for the study.

CHAPTER 2:
LITERATURE REVIEW

2.1   Introduction

In this chapter a literature review on simulation and different learning methods in clinical settings are described. Lamb (2007:33-42) states that students' clinical confidence can increase with simulator experiences, as simulation enables the student to practise skills before actually working with patients. There is a move away from teacher-centered education, towards a more student-centered education, which encouraged new forms of teaching to be developed. Educators have suggested that active learning and student participation produce better educational outcomes (Haider, 2009:22). "Just as every clinician has a unique style of interacting with patients, every clinical teacher has a unique teaching style" (Langlois & Thach, 2001:344). According to Langlois and Thach (2001:344), there is no one way of teaching in a clinical setting. Clinical teachers may adapt their styles to reflect the situations that arise.

2.2   Selecting and reviewing of the literature

The process of reviewing the literature was undertaken to search for and identify pertinent literature that would add value to the topic and improve understanding of the field to be researched. Material was selected from multiple electronic data bases (including Pubmed); periodicals; journals; and different monographs (pamphlets and books), as well as searching through different reference lists. To a greater extent, the material was selected not to be older than 10 years, yet still including seminal studies from an earlier time frame. The literature review substantiates what was observed using simulation and how it could influence the students' confidence and competency levels.

2.3   Approaches to learning

Various educationalists describe approaches to learning in the cognitive, affective and psychomotor domains emphasizing Bloom's Taxonomy (Meyer & van Niekerk, 2008:101). According to Larkin and Burton (2008:394) a taxonomy is a type of classification system, just like genus and species is a taxonomy for living species. Bloom's Taxonomy has long been the average framework among clinical nurse educators and staff development coordinators for designing learning experiences or, at least, has provided general guidance in development of objectives (Harton, 2007:261). Ming Su, Osisek and Starnes

(2004:116), state that the revised Bloom's Taxonomy provides a framework to help educators clarify their proposed objectives and design suitable education and assessment methods. Table 2.1 below comprises the following aspects of the cognitive, affective and psychomotor domains of Bloom's Taxonomy and each domain will be discussed further in paragraph 2.3.1 - 2.3.3.

Table 2.1: Three (3) domains of Bloom's Taxonomy

	Cognitive Domain	Affective Domain	Psychomotor Domain
1	Knowledge/Memorizing	Receiving knowledge	Re-demonstration
2	Insight/Comprehension	Willingness to learn	Manipulation of task
3	Application	Insight into value of knowledge	Precision and control
4	Analyzing	Building a value system	Articulation according to the situation
5	Synthesis	Internalizing	Automation
6	Assessment		

(Meyer & van Niekerk, 2008:104)

Harton (2007:261), states that learning within each domain builds on previously acquired knowledge from simple to complex. According to Meyer and van Niekerk (2008:101), achieving the ultimate level in each domain depends effectively on mastering previous levels. Students may not be able to solve problems, if they do not know what the problem involves or how to go about solving it. Therefore, educators must systematize the actions that students should be able to carry out. The planned systemization guides educators in selecting teaching and assessment strategies (Meyer & van Niekerk, 2008:101). Larkin and Burton (2008:390), further argues that using the framework of Bloom's Taxonomy of Educational Objectives assists staff members in being able to critically evaluate the patients' scenario with the objective of preventing future patient complications. Using Bloom's Taxonomy to frame education may have long-lasting effects on improving nursing practice (Larkin & Burton, 2008:402).

According to Haigh (2007:95) simulated practice in university settings is not just a second best to learning in the critical area, but one which offers the potential for reflection and deep learning. A deep approach to learning is student-centred and involves a search for understanding – students must think about what they are doing. One of the elements that foster a deep approach is active learning, where the student is actively involved (Meyer &

van Niekerk, 2008:121). Clinical simulation is a method of active learning; it offers the students a wide range of learning opportunities and ways of putting theory into practice. Clinical simulation can bring principles learned in the classroom to life (Haider, 2009:22).

According to Stefanski and Rossler (2009:445) simulation has come to the forefront, as an effective teaching modality in teaching the science of nursing. The use of a (HPS), provide a method by which students can participate in clinical decision making, practise skills and observe outcomes from clinical decision making (Brannan, White & Bezanson, 2008:495). According to Brannan *et al.* (2008:495), it was anticipated that the use of the HPS may develop students' cognitive skills and confidence levels.

2.3.1 Cognitive domain

The cognitive domain involves knowledge and the development of intellectual skills which include the recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills (Clark, 2010:2). According to Clark (2010:2), there are six (6) categories starting from the simplest behaviour to the most complex. Activities on the lower levels must first be mastered before moving to the next more complex level. The revised Bloom's Taxonomy is designed to provide a framework for classifying learning objectives on a cognitive level, not only through the six (6) levels of cognitive processes by the original taxonomy, but also through four (4) types of knowledge: factual, conceptual, procedural, and metacognitive (Anderson, Krathwohl Airasian, Cruikshank, Mayer & Pintrich, 2001:261).

Meyer and van Niekerk (2008:83) state that the knowledge (content) and the cognitive abilities (thinking skills) enhance independent problem-solving and the rendering of quality nursing. Anderson *et al.* (2001:261-262) states that factual knowledge is 'knowledge of isolated content elements', including terminology, knowledge of details and information pertinent to the field or practice. Conceptual knowledge is 'more complex, organized knowledge' resembling how knowledge is structured or organized, such as when using theories and mental models. Procedural knowledge is 'knowledge of how to do something' including simple, routine tasks or more complex algorithms but includes established or learned processes and methods. The final type of knowledge is metacognitive, knowledge which means that the individual knows that he or she possesses knowledge and understanding and has a conception that he or she does not know everything, including fast facts that may be necessary for total comprehension (Anderson *et al.,* 2001:261-262). During metacognitive knowledge the individual uses strategic thinking and planning to solve problems, applies learning according to context and conditions, and recognizes self-

knowledge as restraining or enhancing learning (Harton, 2007:261). Table 2.2 lists Bloom's six categories, in order of the cognitive domain:

Table 2.2: Six (6) categories of cognitive domain

	Category	Example and key words
1	**Knowledge**: Recall data/information. To recognize that particular knowledge is useful, relevant and significant to the given situation.	• Example: Recite a policy • Key words: Identifies, names
2	**Comprehension**: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. To state a problem in one's own words.	• Example: Explain in one's own words the steps for performing a complex task. • Key words: explains, gives an example
3	**Application**: Use a concept in a new situation. Applies what was learned in the classroom into novel situations in the work place.	• Example: Apply laws of a statistic to evaluate the reliability of a written test. • Key words: changes, modifies
4	**Analysis**: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences. Higher level of thinking is evident as the student analyzes.	• Example: Gathers information from a department and selects the required tasks for training. • Key words: compares, breaks down
5	**Synthesis**: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning.	• Examples: Design a machine to perform a specific task. • Key words: creates, categorize
6	**Evaluation**: Make judgments about the value of ideas or materials. Critique to determine whether conclusions are appropriate and if necessary to select from among two or more options.	• Examples: Select the most effective solution. • Key words: concludes, explains

(Clark, 2010:2-3)

According to Meyer and van Niekerk (2008:81) subject content is not the focus, but the vehicle that carries the skills of critical and creative thinking. The content provides the students with something to think about, while cognitive instruction provides ways of engaging students in dealing with the content in a thoughtful manner (Meyer & van Niekerk, 2008:81). Harton (2007:262) states that younger adult students may be more

interested in continuous cognitive development than older adult students. The adult students may believe that they have already made many contributions to life and learning and are less interested in continuous learning.

2.3.2 Affective domain

According to Clark (2010:4), the affective domain includes the manner in which people deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivation and attitudes. Table 2.3 lists the five (5) major categories, from the simplest behaviour to the most complex behaviour:

Table 2.3: Five (5) categories of affective domain

	Category	Example and Key words
1	**Receiving phenomena**: Awareness, willingness to hear, selected attention.	• Example: Listen to others with respect. • Key words: asks, describes
2	**Responding to phenomena**: Active participation on the part of the students. Attends and reacts to particular phenomena.	• Example: Participates in class discussions • Key words: answers, complies
3	**Valuing**: The value a person attaches to a particular object, phenomena or behaviour. This ranges from simple acceptance to the more complex state of commitment.	• Example: Shows the ability to solve problems. • Key words: completes, demonstrates
4	**Organization**: Organize values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system.	• Example: Recognizes the need for balance between freedom and responsible behaviour. • Key words: arranges, compares
5	**Internalizing values**: Have a value system that controls their behaviour. The behaviour is consistent, predictable, and most importantly characteristic of the student.	• Example: Shows self-reliance when working independently. • Key words: acts, listens

(Clark, 2010:4-5)

2.3.3 Psychomotor domain

The psychomotor domain includes physical movement, coordination and use of the motor-skill areas. To develop these skills a student needs to practise and is measured in terms of speed, precision, distance, procedures, or techniques in execution (Clark, 2010:5). Table 2.4 lists the seven (7) major categories of psychomotor domain:

Table 2.4: Seven (7) categories of psychomotor domain

	Category	Example and key words
1	**Perception**: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection to translation.	• Example: Estimates where a ball will land after it is thrown and then moving to the correct location to catch the ball. • Key words: chooses, describes
2	**Set**: Readiness to act. It includes mental, physical and emotional sets. These three sets are dispositions that predetermine a person's response to different situations.	• Example: Knows and acts upon a sequence of steps in a manufacturing process. • Key words: begins, displays
3	**Guided response**: The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	• Example: Follows instructions to build a model. • Key words: copies, follows
4	**Mechanism**: This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.	• Example: Drive a car • Key words: displays, fastens
5	**Complex overt response**: The skilful performance of motor acts that involve complex movement patterns. Proficiency is indicted by a quick, accurate, and highly coordinated performance, requiring a minimum of energy.	• Example: Parking a car in a tight parallel parking spot • Key words: builds, displays
6	**Adaptation**: Skills are well developed and the individual can modify movement patterns to fit special requirements.	• Example: Responds effectively to unexpected experiences. • Key words: adapts, changes
7	**Origination**: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativety based upon highly developed skills.	• Example: Constructs a new theory. • Key words: arranges, builds

(Clark, 2010:6-7)

2.4   Teaching and learning methods in clinical setting

2.4.1 Andragogic and pedagogic teaching styles

Harton (2007:262) believes that the ideal teaching strategy is one that will best meet the student's need. Langlois and Thach (2001:344) state that to consider the difference

between learning and teaching in adults (andragogy) and children (pedagogy) is one way of look at teaching and learning styles. In their argument they further state that not all the adults whom we teach are adult students, nor is an adult teaching style appropriate in all situations.

Knowles, Holton and Swanson (2005:60) defined andragogy as "any intentional and professionally guided activity that aims at a change in adult persons." In the andragogic style the students take responsibility for their own education and have a more active role in directing what they need. The teacher is more a facilitator of learning and a resource for learning (Langlois & Thach, 2001:344). Based on Donnan's reading, it appears that andragogy is not a theory but more a set of guidelines that can be used by adult learning practitioners (Donnan, 2008:1-3). According to Merriam, Caffarella and Baumgartner (2007:87), Knowles acknowledged that he "prefers to think of andragogy as a model of assumptions about learning or a conceptual framework that serves as a basis for an emergent theory" (see paragraph 2.4.2). According to Langlois and Thach (2001:344) in the pedagogical style the teacher decides what is taught and how it is taught, and the student depends on the teacher for direction as well as the content itself. Donnan (2008:1-3), states that some of the principles of andragogy may be valid for children as well.

Donnan (2008:1-3), states that practitioners should:
- be aware of cultural, social, and gender-related differences of adults;
- design learning that appeals to adults' diverse cognitive and learning styles;
- consider multiple approaches and apply the principles that are the best fit for the known adult learning situation;
- continue efforts to establish empirical evidence that validates a variety of learning theories; and
- retain a critical mindset.

Both styles of teaching are effective in certain situations as stated by Langlois and Thach (2001:344).

2.4.2 Knowles' theory

Knowles' theory of adult students is generally referenced by educators as focusing on the need to engage adult students in the learning process and promote their development based on multidimensional holistic needs (Bastable, 2003:471). Donnan (2008:1) states that whether termed as a theory, philosophy, or set of guiding principles, Knowles' work is still significant in today's world, combining with other theories providing added guidance to the practice of adult learning and education. The main assumptions of Knowles' andragogical model are that adults:
- " need to know why they need to learn something before they learn it."

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- "need to be seen and treated by others as being capable of self-direction."
- "bring a great deal of experience to their learning and the richest resources for learning reside in the adult students themselves."
- "readiness to learn is triggered by their moving from one developmental stage to another."
- "are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations."
- "learn most affectively when new learning is presented in the context of application to real-life situations."
- "are responsive to some external motivations but the most potent motivators are internal pressures."

(Knowles, *et al.*, 2005:64)

Harton (2007:262) states that students possess different learning styles, which must be considered by the educator in planning and implementing learning activities. Teaching for desired outcomes in the staff development setting demands that educators focus efforts on individual learning needs and that educators plan and provide activities that move the student along the learning continuum that begins with factual and conceptual knowledge, moves to acquisition of procedural knowledge, and culminates in meta-cognitive knowledge (Harton, 2007:268).

2.4.3 Social learning theory

According to Ming Su *et al.* (2004:116) the ultimate goal of the nursing curriculum is to promote the transfer of learning to clinical practice. Cherry (2005:1) explained that Bandura believed that direct support could not account for all types of learning. Bastable (2003:471) explained that Bandura's social learning theory explores the concept that individuals also learn by observation, especially watching role models who are admired and emulated. According to Cherry (2005:1) it is known as observational learning and this form of learning can clarify a wide range of behaviours. Harton (2007:260) argued that nursing staff working in a clinical setting must design appropriate learning objectives with applicable content to help students achieve desired outcomes.

Cherry (2005:1-2), states that there are three (3) concepts of social learning theory as described in table 2.5:

Table 2.5: Basic social learning concepts

Concept	
People learn through	Observational learning

observation.	Bandura identified three (3) basic models of observational learning: • A live model, involving an actual individual demonstrating or acting out behaviour. • Verbal instruction model, which involve images and explanations of a behaviour. • A figurative model, involving actual or fictional characters displaying behaviours in books, films, television programs, or online media.
Mental states are important to learning.	<u>Basic support</u> Bandura noted that external, environmental support was not the only aspect to manipulate learning and behaviour. He explained basic support as a form of internal reward, such as pride, approval and a sense of achievement. This emphasis on internal opinion and cognitions helps connect learning theories to cognitive developmental theories.
Learning does not essentially lead to change in behaviour.	<u>Modeling process</u> Observational learning demonstrates that people can be taught new information without indicating new behaviours. The following steps involve observational learning and modeling process: • Attention – to learn, a person needs to pay attention. Anything that detracts attention is going to have a negative influence on observational learning. • Retention – ability to store information, draw information and proceed on it! • Reproduction – Performing the behaviour that a person observed which leads to development and skill progression. • Motivation – A person needs to be motivated to imitate the behaviour that has been modeled.

(Cherry, 2005:1-2)

2.4.4 Critical thinking

MSN Encarta (2007:1) describes critical thinking as "disciplined intellectual criticism that combines research, knowledge of historical context, and balanced judgement." Horan (2009:28) states that listening to lectures about nurses in action will not help the nursing

student to think critically. Critical thinking is a process that develops over time, and only if students interact with the environment in which they will be expected to function after graduation (Horan, 2009:28). Planned learning opportunities should provide diversity in the use of thinking skills, and the challenge and discussion of ideas to enhance critical thinking and creativity (Meyer & van Niekerk, 2008:59).

Larkin and Burton (2008:392-393), argued that in the past decade, educators have focused on increasing students' ability to think critically, but critical thinking has not been universally evident in the performance of new graduates. They further state that some researchers argue that critical thinking cannot be taught. Meyer and van Niekerk (2008:81) however state that critical thinking is an educational imperative that enhances the professional autonomy of students in clinical practice.

2.4.5 Learning process

Harton (2007:262) argued that the learning process is when the novice or advanced beginner interprets and clarifies the collected data. It enables them to make connections and link the knowledge to practice. The nurse further learns processes and procedures through practice and experiences and begins to know where and when to use a defined process or protocol. Once the nurse establishes and internalizes the concepts, the core knowledge and practice helps them to solve problems. They may identify needs for additional learning and recognize deficits in knowledge. Thus beginning to internalise and apply principles of critical thinking (Harton, 2007:262). Critical thinking as an educational imperative enhances the professional autonomy of students in clinical practice. Clinical experiences are an essential part of nursing education as students learn technical skills, build on critical thinking skills, and sharpen skills on patient teaching (Wagner, Bear & Stander, 2009:465).

2.4.6 Bloom's three (3) domains of educational activities: KSA (Knowledge, Skills and Attitude)

2.4.6.1 Knowledge, Skills and Attitude

Bloom's three (3) domains of educational activities can be thought of as categories known as KSA (Knowledge, Skills and Attitude). This can be thought of as "the goals of the learning process" (Clark, 2010:1). Harton (2007:263) believes that the educator plans and develops educational programmes based on the principles of the Revised Bloom's Taxonomy to make certain that each of the four types of knowledge are addressed: factual, conceptual, procedural and meta-cognitive. Longlois and Thach (2001:344) states that at times the teacher needs to take control of the learning situation and work in a way

to ensure that the student has a solid base of knowledge. In addition, the students must be encouraged to assess their own needs and direct their own learning. This ensures that after a learning episode, the student should have acquired new skills, knowledge and attitudes (Clark, 2010:1-2).

2.4.6.2   *Phases of learning*

Bastable (2003:471) states that individuals generally experience four phases of learning: attentional, retention, reproduction and motivational. The individual first becomes aware of the need to know or learn, or is exposed to new knowledge and its function in the work or social environment. Then the student participates in a learning method that will promote retention of that knowledge or information. Reproduction involves purposely duplicating the learned behaviour in a controlled or simulated setting, or in the actual workplace. The student's motivation to continue to perform the behaviour is dependent on efficiency of outcomes, both intrinsic and extrinsic (Harton, 2007:260).

2.4.6.3   *Learning environment*

The National League for Nursing (NLN) (2003:1) states that nurse educators must provide 'learning environments that facilitate students' critical thinking, self-reflection and prepare graduates for practice in complex, dynamic health care environments.' Ward-Smith (2008:472) believes that infusing technology in nursing education seems appropriate since students of the 21st century are comfortable with technology, which appears to provide realism. According to O'Conner and Walker (2003:290) in a learning environment, everyone has talent and expertise in some capacity and has 'something to share, something to teach, and something to learn'. Harton (2007:263) states that learning participation is required to ensure that opportunities are obtainable for questions, practice, simulation, and integration of knowledge. Each teaching or learning opportunity is evaluated from the student's perspective to ensure that the student is able to achieve the defined goals (Harton, 2007:263). Bastable (2003:471) believed that employing a variety of materials and methods adds interest and depth to programme presentation and supplements the teaching efforts of the educator.

2.4.7 Simulation

2.4.7.1   *Different definitions of simulation*

The definition of simulation differs amongst authors. According to Murray, Grant and Howarth (2008:5), simulation is an approach to teaching and learning that is gaining greater weight within nursing education.

Gaba (2007:2), further define that simulation is "a device that presents a simulated patient or part of a patient and interacts appropriately with the actions taken by the simulation practitioner." Furthermore, Schiavenato (2008:389) defines simulation as techniques used to represent nursing processes and events in an educational framework and lists the various simulation methods that may be used in nursing education. Some of the simulation methods listed by Schiavenato (2008:390):

- Screen-based simulations
- High-fidelity and virtual reality task trainers
- Animal models
- Moulage or makeup
- Live actors/simulated patients

Hovancsek (2007:3) states that "Simulation serves as a medium to provide a wide range of experiences that are either too rare or too risky for novices to engage in using actual patients." In nursing education, the human patient simulator, high tech or high-fidelity simulation mannequin, currently appears to be the prime focus of simulation in the field (Schiavenato, 2008:389). Human patient simulators are extremely interactive and computer-driven. Full-body mannequins may replicate a variety of patient functions such as respiratory, peripheral pulses, blinking, and heartbeat. Furthermore, it may also be programmed to reflect changes in clinical situations (Brannan *et al.*, 2008:495). Simulation offers a method of practising skills and exposing students to situations that may not occur during their educational program (Ward-Smith, 2008:472).

2.4.7.2   Simulation and educational benefits

Several studies show that by using simulation as a teaching method or style, prepares the students to be more confident when facing a real-life situation. It is important that students are fully prepared when assessing and examining patients. When students are fully prepared they gain adequate confidence in assessing patients, they know what to do and how to go about it. Jeffries and Rogers (2007:25) state that "during simulation activities, learning is most effective because the teaching environment is interactive and the adult student engages as a participant." According to Stefanski and Rossler (2009:445) simulation is used as a means of enhancing a student's competence and confidence, as shown in their studies in intensive care unit (ICU) where they integrate simulation to improve learning and maintain competencies based on skills and events. Safety of patients depends on the accuracy of those providing care, and simulation as a learning method provides opportunity to attain a level of experience with no human risk (Ward-Smith, 2008:471). Ward-Smith (2008:472) states that it seems appropriate to predict that

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simulation, as a learning tool, will enhance clinical skills if used initially. Lynagh, Burton and Sanson-Fisher (2007:879-887) as well as Wilson, Shepherd, Kelly and Pitzner (2005:56) substantiate that using simulation and mannequins to assist in student learning has been shown to improve clinical performances.

Haider (2009:22) completed a study on clinical simulation in which real world experiences are simulated in learning environments. Richardson (2008:23) states that the link is best attained through active learning, in which nurses are encouraged to focus on self-directed learning, to ensure that they can emerge from their education as reflective clinical practitioners.

Jeffries (2007:392) states that students who had taken part in clinical simulations found that their self-confidence had increased. A study done by Wagner *et al.* (2009:467) concerning self-confidence and satisfaction levels with this method of teaching proved valuable in implementing postpartum and newborn teaching.   Most of the students agreed that this experience enhanced their learning about the postpartum period, increased confidence in their nursing abilities and provided an overall feeling of delight in their clinical experience (Wagner *et al.,* 2009:467).   This survey not only indicates that the use of simulation increases the confidence levels of the students but it shows that the students also enjoyed it. An environment conducive for learning in classrooms will keep the students motivated. Issenberg, McGaghie, Hart, Mayer, Felner and Petrusa (1999:472) demonstrate in their research that simulation technology improves student acquisition and retention of knowledge better than traditional lectures.

Haigh (2007:95) describes in her study a method to enhance and improve simulated clinical experience in midwifery education. In this study it focuses attention on the factors which create a learning context, or activity method, and in doing so demonstrates why, what and how students learn. Haigh (2007:97) used a focus group method because of its potential to stimulate debate on the issues among participants. The participants are student midwives who completed a three year problem-based learning curriculum. The focus group was tape-recorded and transcribed. The transcribed and verbatim anonymous quotes were used in reports. An issue that emerged from the analysis on how and why students learn was the students' perceived need for more simulated practice sessions (Haigh, 2007:99). Being proficient in the skills necessary to function in a clinical setting may actually make the clinical experience enjoyable, discouraging students from dropping out of the programme (Ward-Smith, 2008:472). Nehring and Lashley (2004:28) state that the HPS provides opportunities for interaction in a critical clinical environment that are realistic and which encourages the development of good clinical judgment and critical

thinking skills. The HPS helps decrease students' anxiety and promotes clinical judgment in a safe environment (Rhodes & Curran, 2005:29). Ward-Smith (2008:472) argues that simulation does provide a method for students to 'practise' a skill prior to performing on humans.

2.4.8 Case study method

The case study method is an ideal method to promote problem-solving skills. The students compile a holistic picture of a patient's healthcare needs, and may then complete an in-depth analysis of the problems. The case study can be fictional or refer to real-life situations (Meyer & van Niekerk, 2008:179).

2.4.8.1   *Case study methods and educational benefits*

In the 1880's the dean of Harvard Law School, Christopher Langdell, revived the case method that the early Chinese philosophers used. His revived method won acceptance in the schools of business, law and medicine. Langdell felt that the students could learn more about the law by studying actual court opinions than by reading legal text (Clark, 2010:2).

There are two (2) methods of case studies. The first is problem specific and it tends to use very short and specific kinds of cases in which the problem is transparent. It has been stated that with this method of case study, the student can demonstrate her problem solving ability using theories that have been previously taught (Clark, 2010:2). The second method uses complex and lengthy information which must be deeply analysed and this allows the students to apply their knowledge and skills. The purpose of this method is about helping students to identify problems, issues, and opportunities, as well as about fitting solutions and developing the logic that supports both problem identification and proposed solution or actions. It has been stated that although the case method does not provide real experiences, it is personal as it puts the burden of thinking on the students and arouses their interest by making them active participants (Clark, 2010:2).

Meyer and van Niekerk (2008:179) state that case studies are useful for the following reasons:

- Students have to examine the interrelationship of various concepts in the clinical situation.
- Students must use biomedical data in analysing the patient's health problems, and therefore correlation of theory with practice is enhanced.
- The development of cognitive skills is enhanced, as students use inductive and deductive reasoning in the analysis of patient problems, and explain the rationale of their decisions.

- Case studies teach ethics and moral judgment in the clinical setting.
- A case study teaches students managerial skills.

2.5   Competence in nursing

Ward-Smith (2008:471) states that simulation learning is used to promote clinical competency and reflective-thinking skills. According to Khomeiran, Yekta, Kiger and Ahmadi (2006:1) competence, a controversial matter in health care surroundings, affects many aspects of nursing including education, practice and management.

According to Clark and Holmes (2007:1) it is expected of newly qualified nurses to be competent and able to practise independently without direct supervision. In addition Clark and Holmes (2007:1) state that in reality their training has not equipped them with the necessary skills, knowledge and confidence to practise independently. Tabari-Khomeiran, Kiger, Parsa-Yekta and Ahmadis' (2007:1) data revealed in their study that nurses developed competence through an interactive process called 'the process of constant interaction'.

Long (2004:84) believes that simulation learning in nursing education aims to promote clinical competency and reflective-thinking skills. In Clark and Holmes' (2007:1) qualitative exploratory study, they found that the ward managers appear to have low expectations of the newly qualified, while 'new' nurses themselves believe that they are expected to be able to fulfill tasks that they feel ill-equipped to undertake. They state that this emphasises the need for appropriate support to enable them to develop their knowledge, skills and confidence and enable them to practise independently (Clark & Holmes, 2007:1). Tabari-Khomeiran *et al.* (2007:1) state that although the nurses are the key players in the process of their own competence development, employers have a responsibility in facilitating the nurse's progress toward ongoing professional competence, which is the key element of quality of care. Wagner *et al.* (2009:467) state that the use of multiple teaching methods provides repetition and support to help students build competence in newly acquired nursing skills and prepares them for clinical rotation.

2.6   Confidence in nursing

It is crucial that students are involved in practice-oriented teaching laboratory environments that enable them to develop confidence in delivering fundamental nursing care (Hilton & Pollard, 2005:289). Lamb (2007:33), argues that students' clinical confidence may increase with simulator experiences as they practise skills before actually working with patients. If students focus on the situation at hand, without the fear of

harming the patient, students gain confidence in dealing with real-life critical patient situations (Rhodes & Curran, 2005:256).

Ward-Smith (2008:471) states that simulation as a remediation allows students to practise skills, increase confidence, and minimize the likelihood of error prior to working in a clinical setting. Haskvitz and Koop (2004:181-184) also state that the use of simulation as remediableness allows the student who has performed unsatisfactorily to practise skills, increase confidence, and minimize the likelihood of error prior to returning to a clinical setting. Providing a simulation skills laboratory prior to actual clinical placement allows the students to practise new skills, build confidence, and competently provide quality nursing care (Haskvitz & Koop, 2004:181).

2.7   Correlating theory into practice

Theory and practice correlation imply the development of abstract reasoning skills. Nurse education should be geared towards developing students' critical-analytical reasoning, and towards stimulating their independent evaluation of scientific content (Meyer & van Niekerk, 2008:81). According to Moeti, van Niekerk and van Velden (2004:1), the clinical competence of newly registered nurses depends, on their ability to correlate theoretical knowledge learned in the classroom with practise and the development of clinical skills. Wagner *et al.* (2009:467) believes that clinical experiences represent the first step in assisting students to integrate simulation experiences and skills into actual clinical practice. According to Meyer and van Niekerk (2008:81) the nurse educators should also consider the methods of theory and practice correlation in order to enhance the personal and professional development of students.

The thinking skills according to Meyer and van Niekerk (2008:82) necessary for theory and practice correlation are:
- skill acquisition;
- critical and creative thinking processes; and
- thoughtful application.

The educators enhance this process through:
- explicit micro-level education and active accompaniment;
- active involvement in the identification of clinical problems, problem-solving and decision-making; and
- critical analysis, application and transfer of related content into real nursing situations.

Application of theoretical concepts must be demonstrated to students in the clinical setting. The students need to understand the relevance of the principles in context. Therefore opportunities should be created for them to apply the principles in various clinical situations. If the students are not being exposed to this they will not be able to function effectively in the clinical setting. Consequently, students will become frustrated with their own inabilities, and turn to memorizing procedures as a means of problem-solving. Ultimately they will be unable to think on their feet and apply flexible treatment methods and to act independently in the clinical setting (Meyer & van Niekerk, 2008:82). The National Council of State Boards of Nursing (NCSBN) (2005) requested that research be performed in evaluating the use of simulation in developing clinical competencies. It was identified that simulated learning experiences have demonstrated the ability to facilitate the link between theory and practice, increase the students' ability to synthesize knowledge, and promote insight.

2.8   Limitations related to the use of simulation

2.8.1 Time constraints

Haigh (2007:99) shows in her study that despite the yearly workshops on key clinical skills, the students still think that more time should be dedicated to simulated practice. Wagner *et al.* (2009:467) also indicate in their study that many students desire more opportunities to teach.

2.8.2 Costs

Lynach *et al.* (2007:879) cited that the use of mannequins and simulation exercises to assist in student learning has been shown to improve clinical performance but Henneman, Cunningham, Roche and Curnin (2007:216) show that if simulations are not sufficiently developed and structured, it is difficult for instructors to provide an optimal learning experience for students. From a financial point of view the findings suggest that although there is a small advantage in nursing the more complex, higher fidelity new age group mannequin, the increased cost, which is approximately four times that of the standard mannequins, does not justify their use (Schiavenato, 2008:392).

2.8.3 Correlating theory and practice

Lee (2006:783) argues that the use of computers to learn complex procedures is appropriate, other than learning patients' values, preferences, and needs which can only be obtained by direct human interaction for the simple reason that people are not machines. Moeti *et al.* (2004:1) reveal in their study that the shortage of staff, equipment

and supplies negatively affect the competency of newly registered nurses. This leads to a discrepancy between what the newly registered nurses learnt in the classroom and what they observe in the clinical area.

According to Meyer and van Niekerk (2008:81) the inability to apply theoretical concepts in the planning and execution of patient care is a general phenomenon in nursing. Moeti *et al.* (2004:1) found that the newly registered nurses have sufficient theoretical knowledge but lack competency in basic nursing skills due to an inability to correlate theory into practice. Moeti *et al.* (2004:1) state that nursing skills alone cannot ensure quality care of clients without the application of theory. According to Meyer and van Niekerk (2008:81) this problem affects the academic and personal development of students regarding:

- the inability to solve problems;
- rigidity and dependency in the execution of patient care;
- fragmentation of patient care and
- an apathetic attitude in clinical practice.

2.9   Conceptual theoretical framework

According to Brink, van der Walt and van Rensburg (2006:199), conceptual framework is "a background or information for a study; a less well-developed structure than a theoretical framework. Concepts are related in a logical manner by the researcher." The framework is an abstract, a reasonable structure of significance, such as a portion of a theory, that guides the progress of the study, is tested in the study, and enables the researcher to connect the findings to nursing's body of knowledge (Burns & Grove, 2007:540).

The conceptual theoretical framework for this study is based on Bloom's Taxonomy of Learning Domains. A discussion on the various elements contained in the framework as illustrated in figure 2.1, follow thereafter.
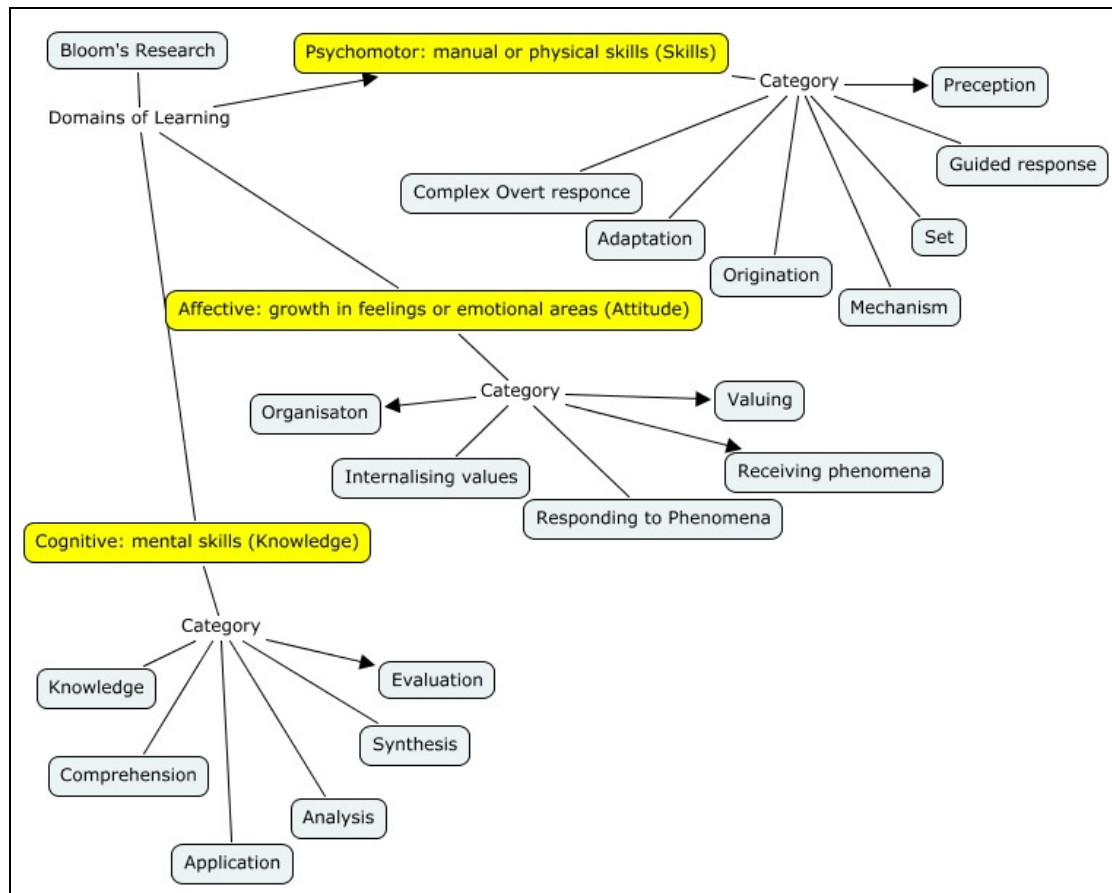
Figure 2.1: Diagram illustrating the conceptual theoretical framework based on Bloom's Taxonomy of learning domains.

(Churches, 2011:3)

Bloom's Taxonomy in its various forms represents the process of learning. He proposed that learning fits into one of three psychological domains (figure 2.1):

- the **Cognitive** domain – processing information, knowledge and mental skills
- the **Affective** domain – attitudes and feelings
- the **Psychomotor** domain – manipulative, manual or physical skills

(Churches, 2011:3)

2.9.1   Cognitive domain according to Bloom's taxonomy

The cognitive domain is the domain where a person learns knowledge and needs to apply the knowledge going through different categories (paragraph 2.3.1). Illustrated by table 2.2 and figure 2.1 it shows that during the cognitive domain a person is introduced to knowledge, tries to understand the knowledge and then tries to apply the new knowledge to a situation. After applying the knowledge, a person organizes it into concepts and puts

the different parts together to form a whole. The last category one goes through, is judging what you have done.

2.9.2 Affective domain according to Bloom's taxonomy

The second domain of learning according to Bloom (paragraph 2.3.2) is the affective domain. During this domain the student receives phenomena, making them aware of the situation. After receiving the phenomena they decide whether they want to respond to the situation and place a value to the object. The second last category the student goes through in the affective domain is organizing the objects and prioritizing. After all the categories the student learns to work independently (figure 2.1).

2.9.3 Psychomotor domain according to Bloom's taxonomy

The last learning domain according to Bloom is the psychomotor domain (figure 2.1) where the students estimate something and they need to react or begin with it. Firstly, there is the need to be guided and during this category they follow steps where they learn the skills. After learning the skills they become skilful. The second last category the students go through is when their skills are well developed and they start to create new ideas and movements (paragraph 2.3.3).

2.10 Summary

The literature review conducted shown that using simulation, as a teaching method, is to the advantage of the students. It is of utmost importance to understand that students do not learn in the same manner. The conceptual framework guides the researcher in structuring and understanding the learning process.

2.11 Conclusion

Chapter 2 summarized a wide variety of literature on different teaching and learning methods. This chapter also included Bloom's Taxonomy as a conceptual framework for the study.

Chapter 3 discusses the research methodology that was used to explore the perceptions of primary health care students utilizing simulation laboratories at a particular university.

CHAPTER 3:
RESEARCH METHODOLOGY

3.1   Introduction

The previous chapters provided a description of the background to the study including a comprehensive literature review regarding the use of simulation and the effect that it has on teaching and learning. The purpose of this chapter is to describe the research methodology that was applied to determine the experiences and perceptions of primary health care students utilizing simulation laboratories.

Research methodology refers to the research plan, in other words, what the researcher did to solve the research problem or to answer the research question (Brink *et al*. 2006:191). According to De Vos *et al.* (2009:71), the term research methodology is 'a term that simply means the way in which to solve problems'. Thus, this chapter describes the purpose and objectives set for the study, including the research design, population, sample, setting and the gathering of data and data analysis.

3.2   Purpose of the study

The purpose of this study was to determine the experiences and perceptions of primary health care students with relation to the utilization of simulation laboratories.

3.3   Objectives

The following objectives set for this study were to determine through the experiences and perceptions of the primary health care students utilizing simulation laboratories whether they 'believe' they have gained:
- Competence to assess the patient holistically in the clinical environment
- Confidence to assess the patient holistically in the clinical environment
- The ability to correlate theory and practice.

3.4   Research question

A research question refers to a concise interrogative statement developed to direct a study (Burns & Grove, 2007:553). The researcher posed the following research question as a guide for this study: "What are the experiences and perceptions of primary health care students utilizing simulation laboratories?"

3.5   Research methodology

3.5.1 Research approach and design

According to Burns and Grove (2007:553) the research design is a 'blueprint' for conducting a study and guides the planning and implementation of a study in a way that is most likely to achieve the intended goal. This study entailed a qualitative approach with a phenomenological design.

Qualitative research is the systematic, subjective methodological approach used to describe life experiences and give them meaning (Burns & Grove, 2007:551). According to Brink *et al.* (2006:113) qualitative methods focus on qualitative aspects of meaning, experience and understanding, and they study human experience from the viewpoint of the research participants in the context in which the action takes place.

De Vos et al. (2009:264), explained phenomenological study as a study that attempts to understand people's perceptions, perspectives and understanding of a particular situation.

Phenomenological studies examine human experience through the descriptions that are provided by the people involved. The purpose of phenomenological research is to describe what people experience in regard to certain phenomena (Brink *et al.,* 2006:113). According to Burns and Grove (2007:549) a phenomena is an occurrence or a circumstance that is observed, something that impresses the observer as extraordinary.

According to De Vos *et al.* (2009:270), this approach enables the researcher to interpret the meanings that the participants attach to their everyday experiences. The purpose of this approach with regard to this study allowed the researcher to listen to the in-depth interviews of the participants that lasted around 15 to 30 minutes. In this study participants were quoted word for word in the transcriptions as these assisted to confirm the data collected. Thereafter, the researcher read and reread the transcriptions. The researcher was therefore able to grasp the experience and perceptions of the participants utilizing simulation laboratories.

3.5.2 Population and sampling

A population according to Burns and Grove (2007:549) are all elements that meet the sample criteria for inclusion in a study and can also be referred to as a target population. De Vos *et al.* (2009:193) stated "Population as a term that sets boundaries on the study units." The target population for this study was students who obtained the Diploma in Primary Health Care in 2010 at Stellenbosch University. The selected university was

chosen since the researcher is employed at the University, as a lecturer in Primary Health Care, consequently the information required for population and sampling was easily accessible.

The total population who completed and obtained their qualification was 232. However, because a qualitative research approach was utilized large numbers of participants were not required. According to De Vos *et al.* (2009:294) in qualitative research a maximum of ten participants are required or until data saturation is reached.

Brink *et al.* (2006:124) defined a sample as a part or fraction of a whole, selected by the researcher to participate in a research study. Sampling according to Burns and Grove (2007:554) is a "process of selecting a group of people, events, behaviors, or other elements that are representative of the population being studied."

Therefore, for the purpose of this study, a purposive sample of ten (10) students was drawn to explore their experiences and perceptions about utilizing simulation. In addition a focus group of seven (7) voluntary students was interviewed. Burns and Grove (2009:701), stated that a focus group is a group that is designed to obtain participants' perceptions in a specific area in a setting that is permissive and non-threatening. These students were purposively selected in order to cover a complete spectrum of students including high, average and low achievers. According to Burns and Grove (2007:337) in non-probability sampling, not every element of the population has an opportunity for selection in the sample. Purposive sampling is sometimes referred to as 'selective sampling'; the researcher consciously selects certain subjects, elements, events, or incidents to include in the study (Burns & Grove, 2007:344). Therefore, a non-probability purposive sampling was applied.

In qualitative research, according to De Vos *et al.* (2009:294), there are two criteria to determine if the sample size is 'enough'. The first is 'sufficiency', meaning there are sufficient numbers to reflect the range of participants so that others outside the sample may be able to connect with those in the study. The second criterion is related to the saturation of information obtained, in other words, the researcher begins to hear the same information repeatedly and no longer learns anything new. Therefore, for the purpose of this study, more participants would have been drawn should data saturation not have been met after the 10th interview.

3.5.3 Interview guide

For the purpose of this study, an interview guide (Appendix A) was designed based on the objectives of the study, the literature review and the researchers own professional experiences. The interview guide was further validated by the supervisor of the study, presented at the master's tutorial scholarly committee for constructive critique and the ethics committee.

An interview stated by Burns and Grove (2007:544) is a structured or unstructured oral communication between the researcher and the subject, during which information is obtained for a study. Since the researcher is a lecturer for Primary Health Care at the particular university, one trained fieldworker did the interview with the participants, while a second fieldworker took notes during the interviews, to prevent possible bias. Bias according to Burns and Grove (2007:531) is the influence or action in a study that distorts the findings.

The questions in the guide were designed to express the perceptions and experiences of the students utilizing simulation laboratories. Furthermore, the questions were to determine if the students were confident and competent enough in assessing a patient holistically after utilizing simulation laboratories.

Probing questions asked during the interview were to expand more on simulation, and what type of simulation, as a learning method or style would make them more confident and competent. As discussed in chapter 2 paragraph 2.5.7.2, several studies showed that some sort of simulation as a teaching method or style made the students feel more confident.

3.5.4 Pilot study (pretesting)

A pilot study is a smaller version conducted prior to the main study on a limited number of subjects from the population at hand to develop and refine the methodology, such as the treatment, instruments, or data collection process to be used in the larger study (Brink *et al.,* 2006:166; Burns & Grove, 2007:549).

For this purpose the pilot study, or sometimes referred to as pretesting in qualitative research, was conducted on one (1) of the participants of the population who was not included in the study to test the feasibility of the methodology. According to De Vos *et al.* (2009:206) the pretesting of a measuring instrument consists of "trying it out on a small number of persons having characteristics similar to those of the target group of

respondents". The pilot study revealed no problems as stated in chapter 1 paragraph 1.8.6.

3.5.5 Validity testing of the research

Brink *et al.* (2006:163) stated that the central question that determines the concept of validity and reliability addresses the issue of whether the measures used by the researcher yield data that reflect the truth. Validity is an extent to which an instrument accurately reflects the abstract construct being examined along with evaluating the use of an instrument for a specific group or purpose, rather than the instrument itself (Burns & Grove, 2007:365,559).

According to Brink *et al.* (2006:118) to establish validity requires, firstly, to determine the degree to which conclusions effectively signify empirical reality. In addition, assessing whether constructs devised by researchers measure the categories of human experience that occur, to establish validity. While the terms *reliability* and *validity* are essential criterion for quality in quantitative paradigms, in qualitative paradigms the terms credibility, conformability, dependability and transferability are to be the essential criteria for quality (Guba & Lincoln, 1985:290).

According to Trochim (2006:1) Guba and Lincoln proposed four criteria for judging the soundness of qualitative research and explicitly offered these as an alternative to more traditional quantitatively-oriented criteria. Trochim (2006:1) stated further that they felt that their four criteria better reflected the underlying assumptions involved in such qualitative research. Guba and Lincoln's proposed criteria and the "comparable" quantitative criteria according to Trochim (2006:1) are listed in table 3.1.

Table 3.1: Guba and Lincoln's comparable quantitative and qualitative criteria

Traditional criteria for judging quantitative research	Alternative criteria for judging qualitative research
internal validity	credibility
external validity	transferability
Reliability	dependability
Objectivity	conformability

The following principles, as described by Guba and Lincoln (1985:290) were applied to ensure trustworthiness of this study.

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3.5.5.1 Credibility

According to Brink *et al.* (2006:118), creditability (internal validity) in qualitative research is referred to as internal validity. To reach the ultimate goal of credibility is to demonstrate that the investigation was conducted in such a manner as to ensure that the subject was correctly identified and described (De Vos *et al.,* 2009:346). According to Trochim (2006:1), the credibility criteria involves establishing that the results of qualitative research are credible or believable from the perspective of the participant in the research. In addition, Brink *et al.* (2006:118), developed the following techniques to achieve credibility:

- to remain in the field over a long period;
- to use a selection of sources in data gathering;
- searching and accounting for disconfirming data;
- to member checking with the participants to ensure that the facts have not been misconstrued and
- peer debriefing, where the researcher exposes him-/herself to a disinterested peer who probes the researcher's biases.

Experts in the field of teaching and learning, nursing and research methodology were consulted to determine the feasibility and content of the study, to evaluate the research process and outcome. Trochim (2006:1), stated "since from this perspective, the purpose of qualitative research is to describe or understand the phenomena of interest from the participant's eyes, the participants are the only ones who can legitimately judge the credibility of the results." Internal validity/truth-value or credibility was ensured by being satisfied that the participants accurately understood the questions and agreed to the accuracy of the transcribed data. In addition member checking was done on two (2) of the participants from the focus group as well as two (2) of the participants from the individual interviews, to validate the transcribed data.

3.5.5.2   Transferability

Transferability (external validity) is defined by quantitative researchers as the degree to which the results of a study can be generalised to other settings or samples (Brink *et al*., 2006:119). From a qualitative perspective according to Trochim (2006:1), transferability is primarily the responsibility of the one doing the generalizing. The qualitative researcher can enhance transferability by doing a thorough description of the research context and the assumptions that were central to the research (Trochim, 2006:1). According to De Vos *et al.* (2009:346) generalising findings in qualitative research may be problematic but is possible if researchers could show that the study was guided by concepts, models and the use of multiple data collection methods. For the purpose of this study a conceptual

theoretical framework based on Bloom's Taxonomy was used, and the use of more than one method of data collection strengthened transferability.

The data was collected by means of one trained fieldworker guiding the one-on-one interviews with an interview guide and a second fieldworker took notes during the interview. The interviews were tape-recorded.

3.5.5.3   *Dependability*

To be more specific with the term of reliability in qualitative research, Guba and Lincoln (1985:300), use "dependability", in qualitative research which corresponds to the notion of "reliability" in quantitative research (table 3.1). Dependability is a further criterion listed by Guba and Lincoln (1985), to establish the trustworthiness of the study (Brink *et al.* 2006:119). Brink *et al.* (2006:119) stated that this requires an audit. The enquiry audit, usually a peer, follows the researchers' process and actions, used in the study, and determine whether they are dependable (Brink *et al.*, 2006:119).

Dependability was assured through the use of a tape-recorder to ensure that all the information given by the participant was recorded. In addition, a second fieldworker took notes during and after the interviews with the participants. All interviews were conducted in the same manner using an interview guide. The data was transcribed and analysed after each interview and verified by a fellow researcher, the two (2) fieldworkers who collected the data and an expert in qualitative research. The researcher and the fieldworkers discussed the transcribed data and clarified differences of opinions to ensure that the interpretation of the transcripts was congruent with the recorded interview.

The analysis of the data and the themes and subthemes was further verified by the supervisor of the researcher.

3.5.5.4   *Conformability*

Conformability captures the traditional idea of objectivity (De Vos *et al.,* 2009:347) also stated by Guba and Lincoln (table 3.1) and it guarantees that the data supports the findings, conclusions and recommendations (Brink *et al.,* 2006:119). Conformability according to Brink *et al.* (2006:119) is when there is an internal agreement between the investigator's understanding and the actual facts. Two (2) fieldworkers were trained to ensure that conformability was maintained due to the researcher's involvement in the programme, in this way bias was excluded. Trochim (2006:1) states: "Confirmability refers to the degree to which the results could be confirmed or corroborated by others." In

addition, after transcribing every participant's data, it was verified with the particular individual to ensure that the data was transcribed accurately and that bias was excluded.

Member checking was done as stated in paragraph 3.5.5.1. Hence, the participants in this study were given an opportunity to be informed of the findings of the study and make further recommendations. The participants, however, did not make any further recommendations.

3.5.6 Data collection

Data collection according to Burns and Grove (2007:536) is the identification of subjects and the systematic gathering of information applicable to the research purpose or the exact objectives, questions or hypotheses of the study. In addition, the procedure of collecting data is extremely important to determine the success of the study. Lacking high quality data-collection techniques, the accuracy of the research conclusions is without difficulty challenged (Brink *et al.,* 2006:141).

Two (2) trained fieldworkers were responsible for collecting the data. Data was collected by means of individual interviews and by interviewing a focus group. One fieldworker (fieldworker A), a lecturer at an university, is in possession of a master's degree in nursing and therefore has practical experience in research, had a guideline with open ended questions which guided the interviews in collecting the data. The trained fieldworker conducted the interviews, in an agreement with the participants, either in the university's seminar room or the fieldworker's office. With permission of the participants the interviews were recorded with the use of a tape- recorder. The tape-recorder ensured that all data was captured accurately.

The second fieldworker (fieldworker B), a clinical nurse practitioner, was just a scribe who took notes in addition to recording the interviews. After the interview fieldworker A summarized the notes which fieldworker B did, as confirmation to the students that the fieldworkers understood them perfectly well.

Simple English language was used to ensure that all participants understood the questions. Some participants answered in Afrikaans as they were more comfortable in expressing themselves in their home language.

The duration of each individual interview was between 15-30 minutes. The duration of the focus group interview was an average of 95 minutes. Ten (10) individual participants and a focus group of seven (7) participants were interviewed over a period of four weeks. The four week data collection period was due to the availability of the participants and the

fieldworkers. Their work commitments and personal obligations prevented their immediate availability.

De Vos *et al.,* (2009:297) recommend that at the beginning of each interview the participant should be made feel comfortable and that the questions should be open-ended in nature. According to De Vos *et al.* (2009:297) the researcher could hand the interview schedule to the participant so that they could read it together. Furthermore, the participant could choose which particular question he wished to answer at specific stages. Therefore, each interview followed a relatively similar pattern. Participants were made feel welcome and at ease by posing the question, "How are you today?" In addition, the fieldworker handed the interview schedule to the participants to go through before starting the interview. Once the participants were at ease, the fieldworker started the interview.

Probing questions followed surrounding simulation and being confident enough in assessing patients holistically for example:

> "Would you say that the holistic assessment came easier on a patient?"

3.5.7 Analysis and interpretation

Burns and Grove (2007:536) describe data analysis as a technique used to reduce, organize, and give meaning to data. Brink *et al.* (2006:55) state that data analysis of qualitative studies involve the integration and synthesis of narrative non-numeric (word, videotape, audiotapes) data that are reduced to themes and categories with the aid of a coding procedure. A huge amount of data in the form of words are gathered, which makes analysis in qualitative studies extremely time consuming (Brink *et al.,* 2006:184). De Vos *et al.* (2009:335) state that a traditional study separates data analysis from data collection; in a qualitative study it involves an inseparable relationship between data analysis and data collection.

The transcription of the interviews was done by the researcher. Most of the transcriptions of the interviews were done on the same day as the particular interview took place. In cases where this was not possible it was done within 72 hours of recording. In this manner the researcher became familiar with the data as it was gathered.

Data was analysed according to Tesch's eight (8) step model (1985:18) because of the clarity and the purpose (table 3.2).

Table 3.2: Tesch's eight (8) step model for data analysis

1.	Read through all of the data carefully, jotting down ideas as they come to mind;
2.	Pick one document and ask, What is this about? What is its underlying meaning? Writing thoughts in the margin;
3.	After doing this for several documents, make a list of all topics, cluster similar topics, and form them into columns that might be grouped as major topics, unique topics, and leftovers;
4.	Take this list and go back to the data, abbreviating the topics as codes, writing the codes next to the corresponding segments in the data, trying out the preliminary organizing scheme to check for emerging categories/domains and codes;
5.	The researcher finds the most descriptive wording for the topics and turns them into categories. He/she endeavors to reduce the total list of categories by grouping together topics that relate to each other. Lines are drawn between the categories to show interesting relationships.
6.	Make a final decision on the abbreviations and alphabetize these codes;
7.	Assemble the data material belonging to each category, or domain, together and perform a preliminary analysis; and,
8.	Domain, together and perform a preliminary analysis; and, (g) recode the existing data if necessary.

3.5.7.1   *Familiarisation and immersion*

Complete familiarisation with the data was therefore facilitated through reading and re-reading transcribed notes as indicated by step one of Tesch's model (table 3.2). Notes were made in the margin of the transcribed data to get more familiar with the data according to step 2 of Tesch's model (table 3.2).

3.5.7.2   *Inducing themes*

De Vos *et al.* (2009:338) state that as a popular form of analysis, classification involves identifying five or six general themes. The data was divided into themes and sub themes.

3.5.7.3   *Coding*

Coding is a way of indexing or identifying categories in qualitative data (Burns & Grove, 2007:533). De Vos *et al.* (2009:338) state that a researcher applies some coding scheme to categories and themes, and diligently and thoroughly marks passages in the data using the codes. Codes may take several forms: abbreviations of key words, coloured dots, and numbers according to De Vos *et al.* (2009:338), it is up to the researcher.

For the purpose of this study the participants were coded numerically and data was coded by coloured dots and keywords. The researcher assigned a numerical number to each participant. This number enabled the researcher to differentiate between the data obtained from the various participants, in other words, who said what? It also assisted with not revealing their true identity, in other words, it maintained their anonymity.

3.5.7.4   Elaboration

The data was carefully re-examined for more themes that might have previously been overlooked. Coding, elaboration, and recording continued until no new insights appeared.

3.5.7.5   Interpretation and checking

According to Burns and Grove (2009:552) interpretation involves explaining the meaning of information. They further stated that the process of interpretation includes examining evidence, determining findings, forming conclusions, exploring the significance of the findings, generalizing the findings, considering implications, and suggesting further studies (Burns & Grove, 2009:553). The researcher compiled a written account of the interpretations that emerged from the data analysis and verified this with the fieldworkers.

In this study participants were quoted verbatim as this added to the 'richness' of the study as noted in De Vos *et al.* (2009:352).

3.5.8 Ethical principles

Burns and Grove (2007:539) explained that ethical principles are principles of respect for people, beneficence, and fairness that are appropriate to the conduct of the study. Ethical principles are important elements that provide direction for thoughts and performing in order to conclude what should or should not be done in particular situations (Pera & van Tonder, 2005:32).   At the beginning of each interview each participant was given a 'Participant Information Leaflet' concerning the study and written consent to participate in the study was obtained (Appendix C). Consent was also obtained for the audio and written recording of the interview. Participants were assured of anonymity. Anonymity is a condition in which the subjects' identity cannot be linked (Burns & Grove, 2007:531).

Permission to conduct this study was obtained from the Health Research Ethics Committee in the Faculty of Health Sciences at the Stellenbosch University (Appendix B). Interviews were conducted by a trained fieldworker as participants could have been reluctant to disclose information to the researcher, who is a lecturer in the Primary Health Care program. All ethical principles were adhered to. Data is being kept locked and stored

in a safe place at the residence of the researcher for at least five (5) years. Only the researcher has access to the safe.

3.6   Summary

According to Burns and Grove (2009:8) the philosophical orientation of qualitative research is holistic, and the purpose of this research is to examine the whole rather than the parts. They stated further that qualitative researchers are more interested in understanding complex phenomena than in determining cause-and-effect relationships among specific variables (Burns & Grove, 2009:8). The experience and perceptions of primary health care students utilizing simulation laboratories, were explored by asking open ended questions. During the interviews the students had the opportunity to express their feelings regarding the use of simulation, as a teaching method.

3.7   Conclusion

This chapter contains a detailed description of the purpose and objectives of the study. The design of the study is explained as well as the population and sampling processes. Validity testing of the research was also explained in this chapter. Information regarding the ethical principles maintained and data collection and analysis were also included.

Chapter 4 will present an in-depth description of data analysis and interpretation of the research findings.

CHAPTER 4:

DATA ANALYSIS AND INTERPRETATION

4.1   Introduction

The findings, about the experience and perceptions of primary health care students utilizing simulation laboratories, are discussed in the current chapter. The collected data was transcribed word for word to confirm trustworthiness of the data. Inductive reasoning was applied to form themes. According to Burns and Grove (2007:542) inductive reasoning is an analysis from the specific to the general, in which particular instances are observed and then combined into a larger whole or general statement.

Ten (10) individual interviews and one focus group interview of seven (7) participants were done as mentioned in paragraph 3.5.2.

The data was collected from the 1st of May until the 31st of May this year (2011). The analysis was done using Tesch's eight (8) step model (1985:18) (paragraph 3.5.7.) The data was transcribed and keywords were identified representing the codes, as listed in table 4.1.

4.2   Codes that emerged from the interviews

There were a few concepts in the interviews that emerged in codes which will be described in table 4.1.

Table 4.1: Codes that emerged from the data

Code	Evidence: Example of quotation (source/number of interview in brackets)	Interpretation
The following related to simulation		
Benefitted	Well it benefitted me. (Participant 2, line 1)	Applicable for learning method
Not the same	In the first place simulation is not the same…..it did not really help. (Participant 8, line 1)	Not the same as practising on an actual person
Good start	Simulation is good; it gave me an idea on where to start..	Comments about simulation as a learning method and a

	(Participant 6, line 1)	good start for clinical
	It is good to practise on dolls as a starting basis,… (Participant 2, line 16-17)	simulation.
Preparation	The simulation that we had at the university, prepared me for what to expect. (Focus group, line 3-4)	Simulation helped the students. It is a good start for initial training.

The following related to confidence in clinical practice

People	It felt for me at the end of the day when I practised on people at home…it made my confidence much better. (Participant 2, line 47-48)	By practicing on real people it increases confidence levels.
Practice	As a person practises, so a person learns. (Participant 10, line 23-24)	Practicing their skills developed competence.
	With practicing we became better and the longer we were in the course the more confident we became. (Focus Ggroup, line 298-299)	
"Scared"	I was very scared because people accept more from you. (Participant 3, line 4)	Feelings around confidence in clinical practice show that students lacked confidence when entering clinical environment due to only practicing on mannequins.
Gradually	It came gradually when I practised. (Participant 4, line 33-34)	Gaining confidence and competence is a gradual process.
Peer support	Peer support really helped. (Focus group, line 307)	Working in groups improves confidence and competence.

All following related to the use of mannequins		
Lack of resources	It was often frustrating because there weren't enough resources. (Participant 1, line 90-91)	Amount of mannequins were inadequate
Realistic	It benefitted me because the dolls were realistic. (Participant 2, line 1)	Despite that many related poorly to the mannequins there were students who appreciated the mannequins as it was 'realistic'.
Practice	It was nice to practise on the doll to become more confident with the practising and then what I practised to apply to a person. (Participant 2, line 5-6)	Students appreciated the dolls to practise on but this should be complimented with a human being as well before going to the actual clinical environment.
Anatomically correct	The disadvantage is that working on a mannequin is a lot easier because everything is anatomically correct. (Participant 1, line 1-2)	Mannequins are anatomically correct but human beings are not as their figures differ from one another; this makes it difficult as the patients you are faced with are much more complicated.
Doll can't speak	With a mannequin you don't know are you working to hard or to soft, you don't know because the doll can't speak back to you. (Participant 2, line 63-63).	It is problematic to only function on dolls due to the inability to communicate.
React	The problem comes in with the reality, you practise on a doll that does not react. (Focus group, line 101-102)	Students feel that the dolls do not react as patients do; it appears that the students want to be introduced to human beings before going to patients.
Difficult	Difficult to go from a doll to an actual person. (Participant 3, line 14)	Students would prefer to be introduced to actual people after the mannequins before they go to the patient.

The following are related to structure of the course

Time	Simulation time must not exceed the time that there is for reality in the clinic. (Focus group, line 235)	The students felt that the times they are in the clinics are too little and would prefer going to the clinic earlier in their course.
Groups	The groups were too big for the skills lab. (Participant 1, line 84-85)	The students complained about the large groups and this hampers learning as having a large group is not the ideal when demonstrating any skills.
Actual persons	Mannequins are good, but I feel that once a week,…...before we go to the clinic, they should have introduced us to an actual person, so that you can get the correct feeling. (Participant 4, line 41-42)	The student did not feel that mannequins are a bad idea to start off with but they felt the need to be introduced to an actual person so that they can get the feeling of working on humans before assessing a patient.
Theory	Yes definitely, it helped me bring practical and theory together and I think it was a good idea to do simulation first. (Participant 7, line 44-45)	The students felt that simulation helped them put theory and practice together.
Clinics	Students need to attend clinics earlier to practise more on actual patients. (Focus group, line 444)	Some of the students felt that by attending the clinics earlier in their course they will be introduced to actual people to become more competent and confident.

4.3   Subthemes that emerged from the interviews

Table 4.2: Subthemes that emerged

Subthemes	Evidence: Example of quotation (source/number of interview in brackets)	Interpretation
Gaining confidence	It helped me when I first practised on the doll and got the confidence to go to the patient. (Participant 7, line 2) I will say it boosts more your confidence; you have an idea because you saw the doll. (Participant 6, line 71) Simulation helped because you come with a little confidence to the patient. (Participant 8, line 91-92)	Simulation assisted students to gain confidence before going to the patients; it gave them an idea before seeing the patient.
Foundation / Starting point	At the beginning it helped, you could apply what you've learned. (Participant 10, line 1) …it already began laying the foundation to work with the patients and stuff. It gives reassurance that you at least know something. (Focus group, line 8-9)	The students believed that simulation is a good foundation phase getting to know the knowledge before applying it on actual patients.
People increases confidence	Simulation I would say is good, but you must also practise on a person. (Focus group, line 50) …practised on my family that gave me confidence. (Participant 5, line 26) …students practised on each other. (Participant 6, line 25-26) A person is the ultimate thing. (Participant 8, line 93)	Most of the students were positive about simulation but they would also have wanted to be introduced to an actual person, because by practicing on human beings made them more confident.
Support helped	We worked as a team, we helped each other if one forgets something, the other remembers it. (Participant 5, line 15-16)	The students believed that by working as a team and supporting one another made them more at ease in the clinical practice.
Practise helped	The more I did in practical the better I got….(Participant 9, line 38-39)	By practicing over and over made the students more confident in knowing what to do next.

Mannequin to start off	Better to start working on the doll first before going to the patient.(Participant 6, line 88-89) …mannequins are good…they could have brought in a person, a patient so that you could get a feeling of reality. (Participant 4, line 43-44)	In combination with simulation the students stated that to start off working on a doll they get a feeling of what to expect but they would have liked to be introduced to an actual person before entering the clinics and start seeing patients.
Feelings before clinics	O hell, where do I start now? (Participant 6, line 33) In the first place, very scared… (Participant 3, line 4)	Most of the students felt scared or nervous before entering the clinics. They have been practicing on dolls and now they need to apply that on actual patients.
Communicating with mannequin	…mannequin can't express their emotions to you, they can't express that they are having problems at home… (Participant 1, line 42-43)	The students had a problem with the mannequins as they did not communicate back to them or express any form of emotion.
Mannequin differs	…as I said it differs from doll and a person. (Participant 4, line 47)	The majority of the students stated that a mannequin and an actual person differ from one another again wanting to be introduced to an actual person before going to the clinical field.
Time allocated	Yes we can maybe spend more time in the practical field. (Participant 9, line 36)	The students wanted more time in the practical field leading to the findings that they want to work more on actual people than on mannequins.

4.4   Themes that emerged from the interviews

Five (5) themes emerged from the interviews namely simulation as a teaching method, a mannequin offers effective learning**,** confidence in clinical practice, structure of course, and support system. Table 4.3 shows the five themes that emerged from the collected data.

Table 4.3: Five (5) themes

	Themes	Evidence: Example of quotation (source/number of interview in brackets)	Interpretation
1.	Simulation as a teaching method	Simulation, yes definitely, as I said it is a kick start, because how can I explain it, your first contact with a person, even though it is not an actual person. (Participant 8, line 87-88)	The students agreed that simulation is a very good starting point, it is a foundation phase before practising on human beings.
2.	A mannequin offers effective learning	……because it was a doll, I could more often practise with the arm or abdomen of the doll, than if it was a person who didn't have time for me to practise. (Participant 4, line 4-6)	The mannequin is not an actual person; in this way the student could practise their skill over and over on the same mannequin to become more confident.
3.	Confidence in clinical practice	…when I practised on people at home, because they were actual people, it made my confidence much better, to apply it on a patient at the end on of the day. (Participant 2, line 48-50).	After only starting to practise on real people the students realized that this made them even more confident and prepared them for the patient.
4.	Structure of course	The ratio between the students per mentor should be smaller. (Focus group, line 473).	The students felt the need for more individual attention by the mentor and would have liked smaller groups in practical situations.
5.	Support system	The peer support really helped. (Focus group, line 307)	Having friends and colleagues going through the same challenges helped the students support one another during the course.

4.4.1 Simulation as a teaching method

According to Murray *et al*. (2008:5), simulation is an approach to teaching and learning that is gaining greater weight within nursing education. Participants spoke willingly about their experience with simulation during their one year post graduate diploma in Primary Health Care. A number of participants stated that the use of simulation prepared them for

what to expect in the clinical setting and the use of simulation is good to have as a starting point. Clinical simulation is a method of active learning; it offers the students a wide range of learning opportunities and ways of putting theory into practice. Clinical simulation can bring principles learned in the classroom to life (Haider, 2009:22). The participants stated the following:

> " I shall say that it is a very good starting point, the simulation, it's a very good starting point,…" (Participant 2, line 106).

> "It helped me a lot, it gave me an idea how to start and where to start.." (Participant 6, line line 1).

Lamb (2007:33-42) stated that students' clinical confidence can increase with simulator experiences, as simulation enables the student to practise skills before actually working with patients. One of the participants stated the following:

> "I am for simulation, because it helped me. I don't know how the other students feel, but for me it definitely helped, because it is a new field and it gave me confidence." (Participant 5, line 42-43).

Jeffries (2007:2) states that students who had taken part in clinical simulations found that their self-confidence had increased. Generally the participants agreed that simulation, as a teaching method, benefitted their studies, but some of the participants believed that simulation is the foundation but not the ultimate to learn from. As stated below:

> "…for me I would say that simulation was the foundation of,… but not the ultimate. " (Focus group, line 52-53)

According to Stefanski and Rossler (2009:445) simulation has come to the forefront, as an effective teaching modality in teaching the science of nursing. The use of a HPS provides a method by which students can participate in clinical decision making, practise skills and observe outcomes from clinical decision making (Brannan *et al.*, 2008:495). According to Brannan *et al.* (2008:495) it was anticipated that the use of the HPS may develop students' cognitive skills and confidence levels. Simulation as a starting point or to build a foundation was one of the most frequent reasons why the 16 out of the 17 participants felt that simulation benefitted them in their studies. As illustrated by one of the participants who felt that simulation is best to help the students who lack interpersonal skills as stated below:

> "…also if your student isn't a very confident person or lack sort of interpersonal skills or confidence to actually approach a patient, it will be a good foundation phase for which you can work on,…" (Participant 1, line 69-71).

However, the focus group did not approve of simulation as a teaching method:

"Simulation, on dolls, has no place in teaching. It takes you away from the reality. It also takes time to adapt from a lifeless doll to the reality." (Focus group, line 416-417).

"There were times I felt simulation was cold to me. Its like the dead, it is not reality...." (Focus group, line 36-37).

Furthermore, a number of participants felt that simulation did work for them in their studies as stated below:

"Simulation I believe worked, for me it definitely worked,....." (Participant 4, line 71-72).

"Yes, it did help me in the physical examinations,.." (Participant 9, line 58-59).

"As I mentioned simulation helped with the work, I won't write it of." (Participant 4, line 58).

From the focus group the participants stated that simulation prepared them for what they could expect:

"I come from a complete different setting as primary health care in the government, so I had no idea what's going to happen and how is it going to go about. The simulation that we got at the university prepared me what to expect." (Focus group, line 1-4).

"A preparation what the course is going to be about and what is going to be expected of you." (Focus group, line 11-12).

To conclude, participants showed a more positive attitude towards the use of simulation than a negative one. From the focus group there were both negative and positive comments but the focus group agreed that for some systems it is good to start with simulation.

"....for some systems it is good to first do it on mannequin simulation." (Focus group, line 419).

4.4.2 A mannequin offers effective learning

This theme consisted of different perceptions of the participants in terms of the use of mannequins to facilitate them with their education. The first subtheme that emerged was the fact that mannequins helped the students gain confidence:

"..I could first practise on the doll to get enough confidence before I went to the patient." (Participant 7, line 2).

"..because on the mannequin you were a lot more confident and you weren't afraid of making mistakes, because you couldn't harm the patient and there where no embarrassing moment or harm to the patient…(Participant 1, line 2-4).

"It is better to first start with the doll before you do it on the patient, because when you walk in there and you have never practised on a doll, you need to learn on the patient now, it is going to upset the patient and they will have no confidence because they can see that you are unsure." (Participant 6, line 88-91).

Jeffries and Rogers (2007:392) stated that "during simulation activities, learning is most effective because the teaching environment is interactive and the adult student engages as a participant." Long (2004:82-88) believes that simulation learning in nursing education aims to promote clinical competency and reflective-thinking skills.

From the focus group emerged a strong feeling about the use of mannequins:

"When I started with simulation or working on the doll, I just felt why can't I work with a human being, it will be better for me, but when I started working with a human being I realized that the doll was much better for me because I had a second chance on the doll to do it right or at least try and do it right and when I went to the clinic I could do it the correct way." (Focus group, line 26-30).

Communication was a very important aspect for the participants. The majority of the participants felt that the mannequin needs to communicate with them:

"With a doll, you don't know are you working too rough or too soft, because the doll can't tell you that, they can't communicate." (Participant 2, line 63-64).

Communication forms an enormous part in assessing the patient holistically and without practicing these skills the participants could only start applying these skills on patients:

"On the mannequins they can't express their emotions to you, they can't express that they are having problems at home or that the child is being naughty or this one is feeling ill or takes you to the problem." (Participant 1, line 42-44)

One participant felt totally negative towards the use of a mannequin as communication is seriously hampered with a doll:

"…The doll can't speak back to you, he can say absolute nothing   to you. The dolls do not work that good, because when you   enter the practice and you get the patient, you are totally dazed because now the doll speaks back to you. It   is task orientated you just finish the task, the doll didn't say she had pain." (Participant 8, line 1,2, 5-7).

Two participants felt that the mannequin needs some sort of a voice:

"…it will help to give it a voice." (Participant 10, line 49)

"Maybe the dolls should at one point give you a question like a tape-recorder which gives you a question that makes you think." (Participant 9, line 61-63).

Almost all the participants affirmed that the mannequins need to be more realistic. They are being taught on a perfect mannequin, anatomical correct, and then in the field they need to deal with obesity and so much more. The doll differs from the actual person:

"…the doll and the human being differ." (Participant 4, line 47)

This confused the participants and made their learning more challenging. The focus group agreed on the doll that is anatomically not the same as a person:

" The doll has a slim body, a flat stomach so you can do everything on it, now you get someone like me who is overweight and now you must try and find where everything is. Yes I would say that reality only happens once you are in the clinic and you see that your patient do not have the dolls body." (Focus group, line 62-65).

"…it depends on your patient; the doll is plastic and flat and not big, but now I get an obese patient, I need to examine the abdomen, where do I start now?" (Focus group, line 396-398).

"In reality the problem starts, because you practised on a doll which don't react." (Focus group, line 101-102).

"The mannequin or doll is fine, but I feel once a week…..could they bring in a person so that we can get the feeling of reality,…" (Participant 4, Line 41-42).

Two participants felt that the mannequins helped them in more than one way. They felt that the mannequins were realistic and they benefitted from it:

"The anatomy, I felt it was clear enough on the doll itself,….." (Participant 9, line 1).

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> "It benefitted me a lot; the dolls were realistic, very modern and I could really practise on them and it helped me at the beginning when I knew nothing." (Participant 2, line 1-3)

Some of the participants felt that they could not utilize the mannequins as much as they would have liked to. They stipulated that there were too many students for a small number of mannequins:

> "I think our groups were too large for the amount of equipment that was available…." (Participant 1, line 58).

4.4.3 Confidence in clinical practice

Participants indicated that they gained confidence when exposed to practising on human beings. Despite the fact that they practised over and over on mannequins, confidence developed slowly. Most of the participants felt that simulation is a good way to start off (paragraph 4.4.1), but they felt that the confidence only came when they started to practise on human beings:

> "Confidence, I practised at home on a human." (Participant 8, line 28-29).

> "…definitely, it started with a human because you interact with a person while you learn." (Participant 3, line 75-76).

> "….I practised on my family and that gave me confidence. (Participant 5, line 26).

> "….I needed to do it on a person for a few times to get the confidence,…(Focus group, line 277).

A few of the participants stated that their confidence developed with time. It took them a few months of practising to be confident enough to examine a patient:

> "I practised on dolls, practised practised practised and also on people at home I practised." (Participant 2, line 46-47).

> "Gradually, when I practise so I learned the stuff." (Participant 10, line 23-24).

> "Like I said, it came gradually when I practised here." (Participant 4, line 33-34).

> "There were systems where I felt confident from the start,……and there were others where I got stuck, but it came with time." (Participant 9, line 29-31).

They felt that they first needed to do the physical examination perfectly on a mannequin and then on an actual person before they could do it on a patient.

Safety of patients depends on the accuracy of those providing care, and simulation as a learning method provides opportunity to attain a level of experience with no human risk (Ward-Smith, 2008:471). A participant stated the following:

> "And I practised on the doll, if a person makes a mistake its not that big issue, like if you make a mistake on an actual person, it was nice for me to practise on a doll to become confident with the practicing and then that what I practised to do it on a person. " (Participant 2, line 3-6)

If students focus on the situation at hand, without the fear of harming the patient, students gain confidence in dealing with real-life critical patient situations (Rhodes & Curran, 2005:256).

4.4.4 Structure of the course

When the fieldworker asked the last question, whether it was feasible to use simulation in primary health care, all 18 participants agreed that simulation must be used. In addition, they expressed their feelings regarding the setting of the post graduate diploma in Primary Health Care. Participants felt positive towards primary health care:

> "Over all is primary health care the best course ever. I think if one has it, you are far ahead of the other people." (Participant 3, line 88-89).

> "…for me I'm just glad I could do this course, I can see I have grown a lot and learned in this course and I really enjoyed doing it." (Participant 5 , line 48-50).

Furthermore, they felt that the student groups were too big:

> "….I think our groups were too large for the amount of equipment that was available, in the skills lab. (Participant 1, line 56).

The majority of participants felt that they wanted to enter the clinics earlier in their course. They felt the need to interact with patients at an earlier stage:

> "If I had a choice then I would have wanted the practical to start in the clinics." (Participant 3, line 94).

> "…need to start in clinics immediately." (Focus group, line 435).

> "..will learn more when we are in the field." (Focus group, line 429).

> "..one should, I know we must practise on simulation, but It would help if the students can get into the clinics at a earlier stage." Focus group, line 318).

They stipulated that some of the students who work in a clinical setting do so to their advantage because they know what to expect:

> "There are students who are in the clinic every day, I work in a hospital, I'm not used to the physical examination where those people do it more often." (Participant 9, line 49-50).

4.4.5 Support system

The majority of the participants felt that the course was too full. They desired more support or structure to help them pass the diploma. A qualitative exploratory study found that the ward managers appear to have low expectations of the newly qualified, while 'new' nurses themselves believe that they are expected to be able to fulfil tasks that they feel ill-equipped to undertake. They stated that this emphasises the need for appropriate support to enable them to develop their knowledge, skills and confidence and enable them for independent practice (Clark & Holmes, 2007:1). According to the participants; simulation as mentioned is a good starting point, however they felt the need to be introduced to a human being before entering the clinics and start working on patients. Nearly everyone took their own initiative to practise on their family or friends at home, and build confidence (paragraph 4.4.3). Most of the participants stated that the support and practice sessions among each other as students were wonderful and it helped a lot:

> "…we practised on each other as students." (Participant 4, line 35-36).

> "Me and my friend,….we helped each other, if I forgot something she said it is this or that." (Participant 10, line 7-9)

> "..we were a team, and worked as a team. We helped each other that way, if we forgot something the other one remembered it." (Participant 5, line 15-17).

> "..there the friends came in handy." (Focus group, line 283).

> "Your buddy, your friend played a good role…." (Focus group, line 335).

Not only did the practice sessions on the peers help the students to become competent in their practical skills, but a number of participants also indicated after a day's class in the skills laboratory they had the opportunity to watch the practical digital video disc (DVD) and practise on family at home:

> "I practised on a family member and watched the DVD, It helped me a lot.' (Participant 6, line 83).

> "…the DVD was available, which I played a lot at home. (Participant 5, line 25).

"on my brothers son, ...I told him we must practise and he was very happy. (Participant 10, line 35-36).

"...practised at home...." (Participant 1, line 61).

"...practised on people at home..." (Participant 2, line 48).

4.5   Discussions

The purpose of the study was to determine the experience and perceptions of primary health care students utilizing simulation laboratories. The following objectives were set for the study:

- Competence to assess the patient holistically in the clinical environment
- Confidence to assess the patient holistically in the clinical environment
- The ability to correlate theory and practice

The experiences that the participants had with simulation over all were positive. The concept that stood out was the fact that simulation benefitted them as a starting point to gain confidence. However, the participants agreed that when they started practicing on each other and on their family, it was then only when they discovered that practising on human beings made them even more confident. It is clear that simulation does not give confidence as the participants need to work on human beings to gain confidence. The mannequins did not communicate with them; in addition the physic of the mannequin was anatomically perfect, with no excess fat or skin folds. The figures were not the reality to what the participants are used to.

Competence was gained through practice on the dolls and complemented with practice on human beings. It was more so with the human beings that assisted in this regard. The participants used what they were taught on the dolls, from the DVD and then on human beings and in this way they gained confidence. The majority of participants did not elaborate on correlating theory into practice, whereas they did agree that they could do it. Therefore, this objective was not reached adequately as participants were not able to say much more on this.

Simulation was an excellent teaching method to prepare the student in terms of what to expect, and is a starting point for confidence, although the finding showed that by practising on a human being prepared them for the clinical setting.

4.6   Summary

The findings showed that the majority of participants enjoyed simulation; they just felt that the use of human simulation could have benefitted them from the start. They especially required the reality and felt that the mannequins definitely differed from actual human beings. Simulation is good to have for a starting point they maintained, but before they should enter the clinical setting they wanted to practise on a human being first.

4.7   Conclusion

In this chapter the results were presented and discussed. The data was transcribed and coded according to Tesch's model. Thereafter, several subthemes developed which were emerged into 5 themes. The research question was adequately answered regarding the Primary Health Care students' experience and perceptions on utilizing simulation laboratories.

Chapter 5 will describe certain limitations of the study and draw together the final conclusions and suggest recommendations.

CHAPTER 5:

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

5.1   Introduction

Prior to this chapter, the researcher stipulated objectives for this study, presented an in-depth literature review and described the appropriate research methodology and data analysis for the purpose of this study.

This chapter includes the conclusions and recommendations based on the findings of the study, as well as the limitations identified from the study.

5.2   Discussions and recommendations

The aim of the study was to determine the experience and perceptions of primary health care students utilizing simulation laboratories. The discussion on the findings of the study in relation to each study objective follows:

5.2.1 Objective 1: Competence to assess the patient holistically in the clinical environment

Ward-Smith (2008:471) states that simulation learning is used to promote clinical competency and reflective-thinking skills. According to Khomeiran *et al.* (2006:1) competence, a controversial matter in health care surroundings, affects many aspects of nursing including education, practice and management. The revised Bloom's Taxonomy is designed to provide a framework for classifying learning objectives on a cognitive level, not only through the six (6) levels of cognitive processes by the original taxonomy, but also through four (4) types of knowledge: factual, conceptual, procedural, and metacognitive (Anderson *et al.,* 2001:261).

The participants stipulated that by practising over and over made them more competent and confident in assessing the patient (paragraph 4.2). This applied to the conceptual framework (paragraph 2.9.3). According to the fourth category of the psychomotor domain the students learn a complex skill that is how to assess a patient. Long (2004:82), believes that simulation learning in nursing education aims to promote clinical competency and reflective-thinking skills. Hence, the findings are related to the revised Bloom's Taxonomy related to the procedural knowledge (paragraph 2.4.1). One of the participants revealed that by practicing with a doll, she became more at ease because she could

practise over and over again. This could apply to the sixth category of the psychomotor domain where the students adapt to the skills.

According to Clark and Holmes (2007:1) it is expected of newly qualified nurses to be competent and able to practise independently without direct supervision. In addition, Clark and Holmes (2007:1) state that in reality their training does not equip them with the necessary skills, knowledge and confidence to practise independently.   Shown by the conceptual framework (paragraph 2.9) learning should first start with the knowledge that is gained, one should apply the knowledge and then start doing it. One should learn to become competent and comfortable with the new knowledge. Tabari-Khomeiran *et al.* (2007:1) reveal in their study that nurses developed competence through an interactive process called 'the process of constant interaction'.

The participants stated that the support of their peers (paragraph 4.4.5), helped them in assessing the patient. They worked in groups and supported one another, if the one failed to remember what to do, the other was there to assist.

Tabari-Khomeiran *et al.* (2007:1) state that although the nurses are the key players in the process of their own competence development, employers have a responsibility in facilitating the nurse's progress toward ongoing professional competence, which is the key element of quality of care. Wagner *et al.* (2009:467) state that the use of multiple teaching methods provides repetition and support to help participants build competence in newly acquired nursing skills and prepares them for clinical rotation.

There was much debate among the members of the focus group about the use of mannequins as a learning method. Some of the participants felt that the mannequin was not needed and that they did not benefit from it at all while they agreed that mannequins were a good starting point (paragraph 4.4.2). Most of the participants enjoyed working with the mannequins but emphasised that they should be introduced to a human being because the mannequins were anatomically perfect and differed from the actual person. Furthermore, the participants also had a problem with the mannequin which could not communicate, which created a barrier in developing affective skills (paragraph 4.4.2).

In conclusion, the finding showed that gaining competence in assessing patients is a gradual process. To develop competence multiple practice sessions are required to enable a student to competently assess a patient. In addition, competence in assessing patients should include practising on human beings.

5.2.2 Objective 2: Confidence to assess the patient holistically in the clinical environment

According to Stefanski and Rossler (2009:445) simulation has come to the forefront, as an effective teaching modality in teaching the science of nursing. Gaba (2007:2), further define simulation as "a device that presents a simulated patient or part of a patient and interacts appropriately with the actions taken by the simulation practitioner." Larkin and Burton (2008:390) further argue that using the framework of Bloom's Taxonomy of Educational Objectives assist staff members in being able to critically evaluate the patients' scenario with the objective of preventing future patient complications. Using Bloom's Taxonomy to frame education may have long-lasting effects on improving nursing practice (Larkin & Burton, 2008:402).

Both positive and negative opinions were obtained from the participants related to their experience and perception of simulation laboratories. All the participants agreed at the end that simulation is a "good starting point" (paragraph 4.4.1), in the clinical program. Furthermore, they referred to simulation as a foundation phase which prepares them for what to expect on an actual patient (paragraph 4.4.1). However, the participants felt that the use of simulation is positive in a clinical program but preferably would have liked to be introduced to a human being before working with the actual patients, seeing that the human being made them feel more confident (paragraph 4.4.3).

The use of a HPS provides a method by which students can participate in clinical decision making, practice skills, and observe outcomes from clinical decision making (Brannan *et al.*, 2008:495). According to Brannan *et al.* (2008:495) it was anticipated that the use of the HPS may develop students' cognitive skills and confidence levels. The cognitive domain involves knowledge and the development of intellectual skills which include the recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills (Clark, 2010:2).

According to the participant by practicing on people made the participant more confident to assess a patient (paragraph 4.2). The study showed that the participants preferred the use of simulation as a starting point but it was not enough to prepare them to have adequate confidence when assessing the patient in the clinical field.

In conclusion, the findings showed that the participants start gaining confidence with simulation as a foundation phase but the ultimate is to gain confidence on a human being.

5.2.3 Objective 3: The ability to correlate theory and practice

According to Haigh (2006:95) simulated practice in university settings is not just a second best to learning in the critical area, but one which offers the potential for reflection and deep learning. A deep approach to learning is student-centered and involves a search for understanding – students must think about what they are doing. One of the elements that foster a deep approach is active learning, where the student is actively involved (Meyer & van Niekerk, 2008:121). Clinical simulation is a method of active learning; it offers the students a wide range of learning opportunities and ways of putting theory into practice. Clinical simulation can bring principles learned in the classroom to life (Haider, 2009:22).

All the participants indicated that simulation assisted them in applying theory to practice, however they did not expand further on theory and practice (paragraph 4.2). According to the conceptual framework (paragraph 2.9.1), it showed by learning knowledge (theory), the students, when they are comfortable with the knowledge start applying the knowledge (paragraph 2.9.2). The participants stipulated that the use of simulation and practising on mannequins made them aware of the theory and would put it into practice when they first attended the clinic to assess a patient.

5.3   Recommendations

The recommendations, grounded in the findings of the study, are presented under headings, according to the themes that emerged from the data. Each of the themes, namely simulation as a teaching method, a mannequin offers effective learning, confidence in clinical practice, structure of course, and support system will be described.

5.3.1 Simulation as a teaching method

Simulation, as a teaching method, is a good starting point for the participants (paragraph 4.2.1). The data showed that the participants preferred to start with simulation, because it gave them an idea of what to expect. Haigh (2006:99) shows in her study that despite the yearly workshops on key clinical skills, the students still think that more time should be dedicated to simulated practice.

Recommendation

It is recommended that different ways of simulation as a teaching method such as the human patient simulator as described in paragraph 5.5.2 should be used.

5.3.2 A mannequin offers effective learning

There were diverse feelings around the mannequin offering affective learning for the participants, but as described (paragraph 4.4.2), it showed that the participants enjoyed the fact that they could practise over and over on the mannequin. They stipulated that with a mannequin they were not so scared of making a mistake as they would have been with a real person.

Recommendation

To make teaching more effective by using a mannequin the updating of the mannequins should be done regularly. The design of mannequins should be more realistic to human beings. As recommended by the participants (paragraph 4.4.2), the mannequin should have a voice and have different shapes and sizes, not to be anatomical perfect all the time but aligned to actual human beings. The physique of the mannequin should be various sizes for example big stomach should mimic the reality.

 It is recommended that a mannequin should be designed which is computer programmed according to different conditions which will include the signs and symptoms of those diseases for example tuberculosis. So once the student wants to practise on the mannequin she types into the computer programmed mannequin 'TB'. The computer will programme all the necessary signs and symptoms according to TB and when the student starts doing the history taking, the mannequin should also have a voice answering the student's questions. This leads to a physical examination for example examining the chest. The mannequin should be designed that it is anatomically correct for example one should feel the 12 ribs and the intercostals spaces so that the student can practise percussion of the lungs and auscultation more effectively. The lungs should have an abnormal lung sound so that the students can identify the different lung sounds which lead to a condition, keeping in mind that the mannequin's heart is also working and making a lip dip sound. This is only one example and it is recommend that the mannequin should be like a human robot. It would also be perfect if the mannequin could have reflexes when the students want to practise the central nervous system for example in a condition such as meningitis.

Lastly, it is would recommend that the mannequins should be designed/programmed to fit disease profiles. When the students practise for instance how to palpate the liver, the mannequin should some how show them that they are touching the correct place or not. By practising on the mannequin the mannequin should also be able to talk to the student if the student is pressing too hard. In this way the student can get an idea of how hard to

palpate the different organs. This would also be perfect for objective structured clinical examination (OSCE) examinations, when the lecturer programmes a condition in the mannequin and the student needs to diagnose the patient in the end.

5.3.3 Confidence in clinical practice

The collected data showed that the participant felt more confident after practising on human beings than only on mannequins (paragraph 4.2.2). The data also showed that by starting off with simulation made the participants aware of what to expect (paragraph 4.2.1).

Recommendation

The use of mannequins for the foundation phase should be maintained. However, the introduction of human beings for students to practise on after practising on a mannequin should become part of the learning opportunities. In this way the students will develop a foundation phase which could provide for further practise on a human being before exposure to the clinical environment. This is a two step approach to prepare the students to become more confident in assessing patients.

Mannequin $\implies$ Human $\implies$ Patient
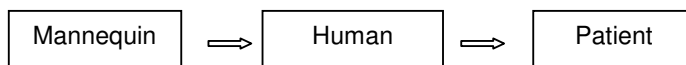
5.3.4 Structure of course

The structure of the Primary Health Care programme should be revised and be adapted to the needs of students.. The data showed that the participants would prefer to attend the clinics at an earlier stage in their course (paragraph 4.2.4). This is a postgraduate diploma and the participants need to be in the clinics at a much earlier stage.

Recommendation

It is recommended that the participants need to be placed in the clinical environment at a much earlier stage in their programme.

5.3.5 Support system

The collected data showed that the support of peers or other students (paragraph 4.2.5), made the learning more effective. Learning in groups made it easier for the students. They supported one another when the other forgot something and it also helped when the students practised on each other. Not only by practising on each other did they gain more

confidence but it was a learning opportunity for both the students, the one practising as well as for the student who acted as the model.

Recommendation

Peer group teaching and assessment should be introduced in the programme.

5.4   Limitations

Burns and Grove (2007:545) describe limitations as 'theoretical and methodological restrictions in a study that may decrease the generalizability of the findings.'

The study only focussed on the experience and perceptions of the primary health care students utilizing simulation laboratories at the Stellenbosch University. It excluded other institutions offering primary health care. The study excluded other disciplinaries such as medicine, physiotherapy and so forth that also have a clinical component in the program.

The study only had ten (10) participants within one university; it could have been more effective if the researcher had another institution to compare it with.

5.5   Conclusion

In this chapter the findings of the study were discussed in relation to the study objectives. The purpose of the study was to explore the experience and perceptions of primary health care participants utilizing simulation laboratories. It can however be concluded that the participants of Stellenbosch University doing the one year postgraduate diploma in primary health care experienced the use of simulation laboratories as positive, yet they felt that they should be introduced to reality at a much earlier stage in their course. Practising on real human beings as models made them more competent and confident to assess the patient holistically in the clinical field.

The findings of the study are supported by Bloom's Taxonomy. Firstly, the students learn new knowledge, which is the theory of the programme that forms part of the cognitive domain. They get used to the theory and need to apply the theory by practising on the mannequin, in order for them to become competent. They develop an attitude to apply and learn more, which is the affective domain. During practicing the students become more skilled and competent and start thinking of new ways to become more skilled and competent which supports the last domain, the psychomotor domain. This applies to the conceptual framework (paragraph 2.9).

Further research is recommended since, as explained in the section on limitations, other institutions and disciplinarys working with simulation were not included in the study.

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APPENDICES

APPENDIX A: DATA COLLECTION TOOL

Guidelines

Questions to ask individual participants

You have been taught how to do a physical examination on mannequins only. I would like to explore with you your experiences about the use of simulation.

- How did the use of simulation benefit you in your studies?
- Share with me your learning experience about gaining competence to assess the patient holistically when you entered the clinic for the first time.
- Relate to me your experiences about whether you had gained confidence to perform the first physical examination on a human being.
- Explain to me whether this approach enabled you to correlate theory and practice.
- What is your opinion of the use of simulation in teaching and learning for students on your level enabling them to gain enough confidence and competence to critically analyze a patient problem?

APPENDIX B: ETHICAL COMMITTEE APPROVAL LETTER

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot · your knowledge partner

14 April 2011   **MAILED**

Mrs N Nel
Department of Nursing
2nd Floor Teaching Block

Dear Mrs Nel

Experiences and perceptions of primary health care students utilizing stimulation laboratories.

<u>ETHICS REFERENCE NO: N11/02/042</u>

<u>RE : APPROVED WITH STIPULATIONS</u>

It is a pleasure to inform you that a review panel of the Health Research Ethics Committee has approved the above-mentioned project with STIPULATIONS on 04 April 2011, including the ethical aspects involved, for a period of one year from this date.

1. Please change the study objective on page 6 to read "The following objectives set for this study are to determine through the experiences and perceptions of the primary health care students utilizing simulation laboratories whether they 'believe they' have gained:..."

This project is therefore now registered and you can proceed with the work. Please quote the above-mentioned project number in ALL future correspondence. You may start with the project. Notwithstanding this approval, the Committee can request that work on this project be halted temporarily in anticipation of more information that they might deem necessary.

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly and subjected to an external audit.

Translations of the consent document in the languages applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Please note that for research at primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department

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Fakulteit Gesondheidswetenskappe · Faculty of Health Sciences

Verbind tot Optimale Gesondheid · Committed to Optimal Health
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Yours faithfully

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APPENDIX C: PARTICIPANT CONSENT FORM

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

Experiences and perceptions of primary health care students utilizing simulation laboratories

REFERENCE NUMBER:

N11/02/042

PRINCIPAL INVESTIGATOR:

Natalie Nel

ADDRESS:

CONTACT NUMBER:

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied and that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the Health Research Ethics Committee (HREC) at Stellenbosch University **and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.**

What is this research study all about?

- The study will be conducted at a venue arranged between the researcher and the participant. Ten (10) individual participants will be interviewed and one focus group of seven (7) voluntary students will be interviewed.
- The aim of the project is to determine through the experience and perceptions of the primary health care (PHC) students utilizing simulation laboratories whether they have gained:
    - competence to assess the patient holistically in the clinical environment;
    - confidence to assess the patient holistically in the clinical environment; and/or
    - the ability to correlate theory and practice.
- These students will be purposely selected, in order to cover a complete spectrum of students, to explore their experiences about utilizing simulation.

Why have you been invited to participate?

- You have been invited to participate because you fall under the specific criteria of the project.

What will your responsibilities be?

- Your responsibilities is to arrange a date and venue which suit you and the researcher best. The fieldworker will ask a few questions on behalf of your studies during 2010 which you have to answer honestly.

Will you benefit from taking part in this research?

- There are no personal benefits for the participant, but the outcomes of the study will definitely benefit the future students studying any program using simulation as a learning style.

Are there any risks involved in you taking part in this research?

- No there are no risks involved in the project.

If you do not agree to take part, what alternatives do you have?

- There are no alternatives involved in this project, either you want to take part or not.

Who will have access to your medical records?

- The use of any medical record is not necessary for this project. The information that will be collected by means of a tape recorder at the interview will be treated as confidential and protected. If it is used in a publication or thesis, the identity of the participant will remain anonymous. The researcher, fieldworker and the supervisor will have access to the information.

What will happen in the unlikely event of some form of injury occurring as a direct result of you taking part in this research study?

- You will only be involved in an interview with no potential risk for injury.

W*ill* you be paid to take part in this study and are there any costs involved?

No you will not be paid to take part in the study but your transport and meal costs will be covered for each study visit. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

- You can contact Dr EL Stellenberg at tel: 021 938 9036 if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.
- You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I ……………………………..………… agree to take part in a research study entitled *(insert title of study)*.

I declare that:

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

Signed at (*place*) ....….......……………….. on (*date*) …………....……….. 2011.

_____   _____

Signature of participant   **Signature of witness**

Declaration by investigator

I (*name*) …………………………………………..……… declare that:

- I explained the information in this document to …………………………………..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use a interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) ....…….......…………….. on (*date*) …………...………... 2011.

_____   _____

Signature of participant   **Signature of witness**

Declaration by interpreter

I (*name*) …………………………………………..……… declare that:

- I assisted the investigator (*name*) ……………………………………. to explain the information in this document to (*name of participant*) …………….…………………………….. using the language medium of Afrikaans/Xhosa.
- We encouraged him/her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her questions satisfactorily answered.

Signed at (*place*) ....…….......…………….. on (*date*) …………...………..

_____   _____

Signature of participant   **Signature of witness**

APPENDIX D: LANGUAGE EDITING

LONA'S LANGUAGE SERVICES

English/Afrikaans
* Translations
* Editing
* Proof-Reading
* Academic Manuscript Preparation
* Archival Research
* Transcriptions from Archived Documents

Member: South African Translators' Institute (SATI)

3 Beroma Crescent
Beroma
Bellville 7530

TO WHOM IT MAY CONCERN

This letter serves to confirm that the undersigned

ILLONA ALTHAEA MEYER

has proof-read and edited the document contained herein for language correctness.

(Ms IA Meyer)

SIGNED