Using simulation for achieving competency in the practical procedures of a Critical Care nursing programme.

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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 owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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SUMMARY

Background to the study: The Critical Care nursing programme at the Faculty of Health Sciences (Stellenbosch University) is a one-year programme. The practical component consists of practical procedures and case presentations. Students have limited time available in the clinical areas to reach competency in the practical skills. Students tend to use the majority of the clinical teaching time available to reach competency in these practical procedures, rather than discussing the patient and learning the skills to integrate and understand the patient's condition and treatment, which they can acquire by doing case presentations. The end result of this misuse of clinical contact time is that some of the students, by the end of their programme, still have difficulty to integrate a patient's diagnosis and treatment regime, although they have managed to complete the expected practical procedures.

Summary of the work: A case study design was used. I wanted to investigate whether one could make use of simulation and the Clinical Skills Centre (CSC) to complete the majority of the practical procedures so that more time would be available in the clinical areas for the students to do case presentations. The study focuses on describing how the tutors and students involved experienced the use of simulation, as well as how it impacted on the available teaching time in the clinical areas.

Conclusions and recommendations: Some of the most important issues that were highlighted in the study and needs to be mentioned are the following:

- The students highly valued supervision by a Critical Care tutor when practising their skills in the CSC.
- Students indicated that they valued the opportunity to practise some of the more risky procedures in simulation, because it presents no risk to patients.
- Case presentations seem important to be added to the CSC's practical sessions in order to attempt making the practical simulated scenarios even more realistic.
- The teaching at the bedside in the clinical areas used to be done somewhat ad hoc. With the teaching in the CSC now being much more structured, this necessitates the teaching at the bedside to be revisited and to be structured to a certain extent.

Summary of the results: The information obtained from the Critical Care tutors and the students indicated that these two groups were largely in agreement that simulation seems to be valuable and can effectively be used in a Critical Care nursing programme.

OPSOMMING

Agtergrond tot die studie: Die Kritieke Sorg-verpleegkundeprogram by die Fakulteit Gesondheidswetenskappe (Universiteit Stellenbosch) is ‘n eenjarige program. Die praktiese komponent bestaan uit praktiese prosedures en gevallevoordragte. Studente het in die kliniese areas `n beperkte tyd tot hul beskikking om hul in hierdie praktiese vaardighede te bekwaam Studente neig egter om die grootste gedeelte van die beskikbare kliniese onderrigtyd te gebruik om vaardighede te ontwikkel in die praktiese prosedures, eerder as om gevallevoordragte te doen. Dit is deur gevallevoordragte, waartydens pasiënte bespreek word, dat studente die vaardighede van integrasie en insig in die pasiënte se toestand en behandeling aanleer. Die gevolg van hierdie wanbesteding van kliniese kontaktyd is dat sommige van die studente aan die einde van die program steeds sukkel om ‘n pasiënt se diagnose en behandelingsregime te integreer, terwyl hul wel daarin geslaag het om die praktiese prosedures waaraan hul moet voldoen, te voltooi.

Opsomming van die werk: Daar is gebruik gemaak van ‘n gevallestudie-ontwerp. Ek wou vasstel of die aanwending van simulasie in die Kliniese Vaardigheidsentrum (KVS) om die meeste van die praktiese prosedures te bemeester, vir die studente meer tyd beskikbaar sou stel om gevallevoordragte in die kliniese areas te oefen. Hierdie studie fokus op die beskrywing van hoe die betrokke tutors en studente die gebruik van simulasie ervaar het, sowel as hoe dit geïmpakteer het op die beskikbare onderrigtyd in die kliniese areas.

Gevolgtrekking en aanbevelings: Die belangrikste aspekte wat in die studie na vore gekom het en wat ek graag wil bespreek, is die volgende:

- Die studente het baie waarde geheg aan die begeleiding van ‘n Kritiekesorg-tutor terwyl hul die vaardighede in die KVS oefen.
- Studente het aangedui dat hul die geleentheid om van die meer gevaarlike prosedures in simulasie te oefen baie waardeer het, omrede dit geen risiko vir die pasiënte inhou nie.
- In ‘n poging om die gesimuleerde praktiese sessies nog meer realisties te maak, blyk dit belangrik te wees om al die praktiese sessies in die KVS in die vorm van ‘n gevallevoordrag aan te bied.
- Die onderrig by die bed in die kliniese areas gebeur gewoonlik redelik ad hoc. Met die onderrig in die KVS, wat nou meer gestruktureerd is, is dit ook nodig dat die

onderrigmetodes by die bed ondersoek moet word sodat dit vir die toekoms ook meer gestruktureer kan wees.

Opsomming van die gevolgtrekkings: Die inligting wat van beide die kritiekesorg-tutors en -studente ontvang is, het aangedui dat die groepe saamstem dat simulasie waardevol is en effektief kan gebruik word in ‘n kritiekesorg-verpleegkundeprogram.

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- The Critical Care nursing students of 2007
- The Centre for Health Sciences Education, Stellenbosch University
- My Maker for His grace

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LIST OF ABBREVIATIONS

CSC	Clinical Skills Centre
HPS	Human patient simulator
OSCE	Objective Simulated Clinical Examination
HEQC	Higher Education Qualifications Framework
CHE	Council on Higher Education
SANC	South African Nursing Council

CHAPTER ONE
ORIENTATION TO THE STUDY

Chapter 1 provides an overview of the study and explains the process of conducting the study. The aim of this chapter is to describe the background to the study and to explain the context within which it was undertaken. The research question and aims of the study are explained, as well as an outline of the research design and methodology that was used. The chapter concludes with an outline of the rest of the thesis.

1.1 INTRODUCTION

Working in a Critical Care Unit is challenging, yet satisfying for a nursing practitioner. Nurses trained in Critical Care are expected to have the expertise to perform a variety of practical procedures on a patient, but even more importantly, they should be able to integrate all information about each individual patient in order to provide holistic and effective care. During the Critical Care nursing programme that formed the basis for this study, the students needed to master both the practical and theoretical components. The practical component consists of practical procedures (technical skills) as well as case presentations (integration skills). In the course of the programme students often focus on the individual practical procedures and they hardly reach the higher level of being able to integrate and think critically about the patient and his/her environment. This presents a problem, because once the students are qualified and they enter the working environment with its responsibilities, they are expected to take charge of the Unit and the patients. This implies that they need to be able to integrate the details applying to the respective patients in the Unit and manage the individual patients accordingly. Very often the nurses do not possess these skills, which means that they become stressed, creating the potential for mistakes that may harm the patients. My broad aim with this study was to ensure that students in the Critical Care nursing programme would spend more time discussing patients extensively and learn the skills of integration and critical thinking. By taking the focus off the practical procedures and moving most of them to a simulated setting, the students could spend more time with the Critical Care tutor at the

bedside to discuss the patients, integrate their knowledge and skills and make use of the opportunity to think critically. [1]

1.2 BACKGROUND TO THE STUDY

1.1 Background

The Critical Care ,nursing programme offered by the Stellenbosch University's Faculty of Health Sciences is a one-year course that can be taken either as a postgraduate diploma or as an honours degree. The programme consists of a theoretical as well as a practical component. The practical module comprises the following:

- 12 practical procedures which allow the student access to the final practical examination once the student has been found competent in all aspects.
- 40 practical activities (skills) to be attended by the student, who either performs the activity him-/herself or assist a doctor when he/she performs it. This component of the practical module requiring students to be exposed to certain activities without requiring competence, was not included in the present study.
- 3 case presentations which are done at the bedside where a patient is presented by the student to a Critical Care tutor. The aim with these case presentations is to assess the student's ability to integrate the patient's diagnosis, medical and other treatment regimes in order to identify the relevant nursing needs and care.

To perform a case presentation of a critically ill patient is a complex skill that a student has to learn throughout the course of the programme, and it requires advanced knowledge and competency. The care and monitoring of this type of patient requires nurses to collect, analyse and react to data and information (Rauen 2004). The aim by the end of the Critical Care nursing programme is that the students will be able to integrate a patient's diagnosis and treatment regime, and also to handle troubleshooting with regard to the patient's condition. For critical care nursing students to grasp the nursing care priorities for a critically ill patient requires an integrative type of thinking about physiology, pathophysiology and treatment, because the priorities are interrelated (Rauen 2004).

[1] I have deliberately chosen to write this thesis in the first person, since it is largely an interpretivistic and qualitative study.

For teaching and assessing practical procedures, Fletcher and colleagues (2002, in Talbot 2004) suggest a cognitive model with four levels: (1) processing sensory data from the environment, (2) following procedural rules, (3) solving problems through reasoning and (4) co-ordinating attention and interactions. Doing a case presentation and discussing a patient's diagnosis and treatment regime at the bedside is a level three process, and thus at a higher level than performing competencies.

Despite the complexity of presenting a patient at the bedside, students often do not utilize the learning opportunities available to master this skill. They rather spend the teaching opportunities with a Critical Care tutor to complete the practical procedures expected of them. About once a week the students have the opportunity for a teaching session at the bedside in the clinical area, where a Critical Care tutor provides individual clinical guidance. Most of these clinical contact sessions should ideally be utilized to discuss critically ill patients in order to practise the students' integration, reasoning and case presentation skills; which are on level three and four of the cognitive model described by Fletcher et al. (2002, in Talbot 2004). Currently many of the clinical contact sessions are used by students to complete their practical procedures, which are in fact on level two of the described cognitive model. Some of the students may also require multiple attempts to reach competency in the procedures, thereby increasing the amount of time spent on practical procedures. The result of this is that valuable bedside teaching opportunities such as assessment and the discussions of patients are often forfeited. Clinical teaching time should ideally be used to discuss the patient and to teach students the skills to integrate and understand the patient's condition and treatment, rather than focusing on individual practical procedures. The end result of this misuse of clinical contact time is that some of the students, by the end of their programme, still have difficulty to integrate a patient's diagnosis and treatment regime, although they have managed to complete the expected competencies and practical activities. It can therefore be argued that more time spent on practising integrated thinking would result in a Critical Care nursing student who is more competent to grasp the nursing care priorities of a critically ill patient.

1.3 MOTIVATION FOR THE STUDY

I am a Critical Care nurse educator currently working as a clinical lecturer at the Clinical Skills Centre (CSC) at the Faculty of Health Sciences, Stellenbosch University. The

Critical Care nursing programme has been using the CSC to a very limited extent. Both the lecturer for the Critical Care nursing programme and I had the vision that simulation should be playing a much bigger role in the CSC when the practical component of the curriculum is taught. We realized that a vast number of the 12 practical procedures required of the students could be demonstrated, practised and assessed in simulation in the CSC. By using simulation to teach and learn most of the practical procedures, the Critical Care nursing students could possibly benefit in the following three ways:

- They will have the opportunity to master most of the practical procedures expected of them in a controlled environment where they can learn on models instead of on a real patient.
- They will all be taught and assessed under the same circumstances and conditions by the same Critical Care tutor.
- The students will have the opportunity to use their clinical contact sessions with a Critical Care tutor in the clinical areas to perform patient discussions, seeing that the majority of their practical procedures have then been taught and learned in the CSC.

Simulation in the CSC can potentially be utilized for different scenarios. Examples include practical procedures that require extensive cognitive knowledge; the assessment of a 12-lead electrocardiogram, as well as other potentially dangerous procedures, for instance the administering of an intravenous injection.

By using simulation and the CSC to teach and learn most of the practical procedures required, more time might become available for the Critical Care tutors. The focus of the clinical contact sessions would be to teach and mentor the students so that they develop the reasoning, integrating and monitoring skills expected of a Critical Care nurse caring for a critically ill patient.

1.4. RESEARCH PROBLEM

The problem that gave rise to this research is the fact that even after some of the Critical Care nursing students have completed their postgraduate diploma or honours programme in Critical Care nursing, they still lack the vital skills of reasoning, integrating and monitoring, which is expected of a Critical Care nurse caring for a critically ill patient. The students have several clinical teaching opportunities at the bedside during the course of their programme, which in my opinion could be planned and structured

differently in order to provide students with more opportunities to develop some of these skills which are often lacking. If the practical procedures could be taught, learned and assessed in simulation in a Clinical Skills Centre, the time available for clinical teaching at the bedside could be focused on case presentations and discussions, rather than on the individual practical procedures.

1.5. RESEARCH QUESTION AND AIMS

1.5.1 Research question

The main research question I formulated for this study was as follows:
Could simulation in the CSC be used to effectively teach, learn and assess the practical procedures required in a Critical Care nursing programme in the Nursing Department at the Faculty of Health Sciences, Stellenbosch University?

1.5.2 Primary aim

The primary aim of my study was therefore to describe and explore whether the CSC could be used to effectively teach and learn the practical procedures required in a Critical Care programme.

1.5.3 Secondary aims/research questions

I also set three secondary aims in order to answer the main research question:

- Which practical procedures could be taught effectively in simulation in the CSC?
- How do students and Critical Care tutors perceive the use of simulation and the CSC?
- How do students spend the allocated teaching time at the bedside with the Critical Care tutors?

By answering the three secondary research questions I thought it possible to determine ways in which simulation and the CSC might be used to teach and learn the practical procedures required in the Critical Care nursing programme. By performing the practical procedures in the CSC, more time should supposedly be available for the Critical Care tutor to do case presentations/discussions with the students at the patients' bedside. These discussions might have the potential to better assist and equip students to develop insight into their patients' management. The research methodology used to answer the research question is set out below.

1.6 RESEARCH METHODOLOGY

1.6.1 Research design

I used a descriptive case study design to investigate this relatively new field. A case study approach was followed, looking at an individual department (the Nursing Department at Stellenbosch University) and one module of the Critical Care nursing programme (Clinical Foundations). Creswell (1994) defines a case study as when the researcher explores a single entity or phenomenon, bounded by time and activity, and collects detailed information by using a variety of data-collecting procedures over a sustained period of time. A case study approach allows one to do the study in depth, while at the same time it offers the opportunity to provide explanations (Denscombe 2004). Hodkinson and Hodkinson (2001) state that because of its depth, it is possible for case studies to also engage with complexity. This is possible, because restricting the scope of the research facilitates the construction of detailed, in-depth understanding of what is studied.

1.6.2 Research approach

The research approach that I adopted was partly interpretivistic and partly positivistic. I therefore generated both qualitative and quantitative data (Henning 2004). Firstly, the perceptions of using simulation and the CSC to achieve competency in the practical procedures of a Critical Care nursing programme were studied. Secondly, the ways in which students spent their time with the Critical Care tutor in the clinical areas were analysed.

I investigated the Critical Care Nursing programme at the Stellenbosch University. Amongst the reasons why I decided to focus on this programme, is the fact that I am an employee of the Stellenbosch University. I am a Clinical Skills lecturer and have about ten years' experience as a Critical Care nursing tutor. Furthermore I have personal contact with the Critical Care students due to my involvement in the Nursing department. This study could be seen as a pilot study for further research within the broad topic of clinical competence of the Critical Care nurse.

1.6.3 Study population

The study population included all Critical Care nursing students registered at Stellenbosch University during 2007, as well as all the Critical Care tutors involved in the

clinical education of this group of students. All students and tutors were included in the study; therefore no samples were drawn.

1.6.4 Instrumentation

I used three methods to generate data in this study. Qualitative data was generated through focus-group interviews, while quantitative data was obtained through questionnaires and by analysing students' clinical logbooks.

1.6.4.1 Group interviews

Two group interviews were held with the Critical Care tutors involved in the programme. During the first consensus discussion group consensus was reached amongst the participants on which of the practical procedures required in the Clinical Foundations module were suitable to be taught and assessed in simulation in the CSC. After that a focus-group interview was held to describe and explore how the Critical Care tutors of 2007 had experienced the use of the CSC to determine student competency in the identified practical procedures. The Critical Care tutors also shared their experience of the time spent with the students during clinical contact sessions at the bedside.

1.6.4.2 Questionnaires

By the end of the programme the 2007 group of students had completed a questionnaire to establish how they had perceived the use of simulation in the CSC to achieve competency in some of their practical procedures.

1.6.4.3 Clinical logbooks

The clinical registers of student groups from 2006 and 2007 indicating the activities that had been performed during clinical contact sessions at the bedside, were used to gather information about activities and the time spent on them. The data gathered from 2006 was compared to the data of 2007.

1.6.5 The research procedure

The research procedure followed in the study included the following stages:

I obtained permission from the Committee for Human Research at Stellenbosh University to do the study at the beginning of 2007.

Consent was obtained from the 2007 Critical Care nursing students and tutors at Stellenbosch University. Students were then exposed to the teaching and learning of the practical procedures in simulation in the CSC.

In order to determine the perceptions of how students had experienced the use of simulation to learn most of the practical procedures, the students were asked to complete questionnaires by the end of the academic year.

At the beginning of the academic year the Critical Care tutors involved were asked to participate in a focus group to reach consensus on which of the practical procedures would be suitable for teaching and learning in simulation. By the end of the academic year a follow-up focus-group interview was held to determine how the tutors had experienced the use of simulation for these procedures.

Lastly the students' clinical logbooks indicating how time was spent at the bedside during clinical contact sessions between the Critical Care tutor and the students were analysed and compared to the group of 2006.

1.6.6 Data management and analysis

Quantitative data was analysed using basic descriptive statistics in Microsoft Excel with some assistance of a statistician. Qualitative data was analysed thematically, reflecting on central themes and sub-themes. Where indicated, the data is presented in the form of tables.

1.6.7 Ethical considerations

No research participant was coerced into participating in this study and participants remained anonymous throughout. I obtained informed consent from all the participants before they participated in the study. All generated data was held in safekeeping by myself and will be destroyed on publication of the study.

1.7 OUTLINE OF THE THESIS

Chapter one is an orientation to the study. The background and motivation for the study appear in this chapter. It also includes the research problem, the research question, its aims and the research procedure followed.

Chapter two constitutes an overview of the relevant literature. This chapter includes the history of simulation in health sciences education, as well as the advantages and disadvantages of its application. Attention is also paid to how clinical skills could be taught effectively by means of simulation.

Chapter three contextualizes the matter. The Critical Care nursing programme is put into perspective by looking at the bigger picture of Critical Care nursing and education.

Chapter four refers to the research methodology. It includes a discussion of the case study research design and its application in this study.

Chapter five records the results of the study. This chapter consists of a detailed description of the results from the focus-group interviews, the questionnaires completed by the students and the students' clinical logbooks.

Chapter six comprises the conclusions drawn, as well as a number of recommendations based on the findings of the study.

CHAPTER TWO
LITERATURE REVIEW

A literature review is aimed at contributing towards a clearer understanding of the nature and meaning of any study (De Vos 2002). Mouton (2005) prefers the term "scholarship review". He argues that when doing a literature review, the researcher's interest is not limited to the literature in question, but vested in an entire body of accumulated scholarship. The researcher wants to learn from other scholars, how they have theorized and what they have found; what instrumentation they have used, and to what effect.
This literature review aims to explore the most recent, credible and relevant scholarship in the area of clinical skills and the implementation of simulation in health sciences education, and nursing education in particular.

2.1 INTRODUCTION

Caring for a critically ill patient is a complex skill that has to be acquired by students prior to their completion of the Critical Care nursing programme. It calls for expertise in all three domains of Bloom's taxonomy, namely knowledge, skills and attitudes (http://www.nlink.com/donclark/hrd/bloom.html). How do these relate to the current Critical Care learning programme for nurses?

Knowledge is gained by students obtaining information in the classroom, from text books and at the bedside from Critical Care tutors, as well as from colleagues. *Skills* are the development of psychomotor competencies (practical procedures), a process based on regular practice. *Attitudes* relate to how the knowledge and skills are combined to care for the patients. This area includes the values of professional conduct and the vital, intangible qualities that contribute to the making of a competent nursing practitioner (Kneebone 2003). Although skills acquisition constitutes a major part of the requirements to function as a competent Critical Care nurse, one should take care not to neglect the other two domains. It is essential for Critical Care nurses to be taught how to integrate their skills, knowledge and attitude domains at the bedside. Too often Critical Care nurses' training programmes focus on the skills component, losing sight of the fact that it is vital for Critical Care nursing students to have the ability to integrate the patient's diagnosis and treatment regime and handle troubleshooting with regard to the patient's

condition. What complicates this even further, is that the teaching and learning of these three domains are often presented in isolation within the curriculum. Traditionally knowledge is conveyed in a classroom situation, whereas skills and attitudes are taught at the bedside in the clinical areas on actual patients. The integration of the three components at the bedside is often neglected and this is due to a variety of factors. This includes the fact that the larger part of the available time for bedside teaching is spent on attaining competence in the practical procedures. The situation is worsened by a current shortage of qualified and competent nurses to serve as role models for the novice nurses; while due to time constraints, students are allocated to specific clinical areas for short periods, etc.

Therefore the Faculty of Health Sciences at the Stellenbosch University has implemented an approach of demonstrating and teaching competency in most of the practical procedures by means of simulation in the CSC. With most of the required skills being taught and learned in simulation, the students and Critical Care tutors have the opportunity to spend more time at the bedside, discussing case studies of critically ill patients and practising the skills of integration, reasoning and problem-solving. This should result in a new generation of Critical Care nursing practitioners, equipped with all the skills expected of them in workplaces where they will become the leaders of tomorrow.

The aim of this study has been stated as a description and exploration of whether the Critical Care nursing students and tutors thought using simulation in the CSC to achieve competency in the required practical procedures in a Critical Care nursing programme was effective. By identifying and presenting the practical procedures that can effectively be taught and learnt in the CSC, the clinical component of the Critical Care nursing programme can be restructured to ensure optimal learning opportunities in the clinical area.

In this overview of the literature the following aspects will be addressed: Critical Care nursing education, Health Sciences education, learning and teaching of clinical skills, simulation and Clinical Skills Centres.

2.2 CHALLENGES IN CRITICAL CARE NURSING EDUCATION

One of the challenges of Critical Care nursing education is to prepare nurses to assume a variety of roles as they competently contribute to the care of critically ill patients. The

most prevalent role for professional registered nurses is that of direct care provider (Urden, Stacy & Lough 2006). According to Morton (1997) rapid technological advances, higher acuity levels of patients, pressures of cost containment, and the accelerating knowledge base have made it increasingly difficult to educate competent graduates for the Critical Care setting. To prepare students for the demands of the work setting lecturers must use creative and innovative teaching strategies. Clinical simulation combined with clinical experience and other teaching methods is a powerful tool to prepare competent nurses for the Critical Care environment (Morton 1997).

The minute-to–minute care and monitoring of a critically ill patient requires nurses to continuously collect, analyse and react to data and information (Rauen 2004). For Critical Care nursing students to grasp the nursing care priorities of a critically ill patient requires an integrative type of thinking about physiology, pathophysiology and treatment, because these priorities are interrelated (Rauen 2004). One could argue convincingly that more time spent on practising integrated thinking would result in Critical Care nursing students who are able to grasp the nursing care priorities of a critically ill patient better. Therefore the programme must be structured in such a way to allow more time for the students and Critical Care tutors to integrate the knowledge, skills and attitude domains at the bedside.

Another problem often encountered with regard to the practical procedures being signed off in the clinical areas by the senior nursing staff or allocated mentors, is the lack of standardization. This is because students are placed in different institutions to achieve their practical outcomes and the standard and learning opportunities among institutions vary. Furthermore, the Critical Care unit is a high pace, stressful environment and students often find it difficult to learn in such a threatening atmosphere.

Simulation can be a solution to many of these challenges faced in hospitals and Critical Care units, because simulation will allow for more efficient teaching. By presenting students with a variety of practical procedures in the CSC, the exposure of students is more consistent and uniform. Learning can occur more rapidly without the necessity of waiting for a specific procedure to be available, as is the case in a hospital setting. Simulation and the CSC can benefit the development of dexterity, so that when students receive tuition at the bedside, they can concentrate on skills that are better learned in a real care setting, for example the nursing care of a mechanically ventilated patient (Nicol & Glen 1999). As the use of simulation in Health Sciences education has evolved over many years and is used all over the world, it will be discussed next.

2.3 THE USE OF SIMULATION IN TUITION

Simulators in general have been used successfully in many forms of industry, most notably in aviation (Birch, Jones, Doyle, Green, McLaughlin, Champney, Williams, Gibbon & Taylor 2007). While simulations have been used for millennia to plan, reduce risk, and increase control in mock battles, wedding rehearsals, etc., the term has taken on new connotations in the past 50 years (Ziv, Small & Wolpe 2000). The costs of training and failures, changing attitudes about tolerable risks and injury reduction, and enabling technology have fuelled simulation in risky work, including power generation and the military (Ressler 1999 in Ziv, Small & Wolpe 2000). High stakes legal proceedings, professional sports training, business executives training (Keys & Wolfe in Ziv, Small & Wolpe 2000), homicide investigation training and costly construction projects are all areas increasingly turning to simulation. Morton (1997:66) states that simulation is "an attempt to replicate some or nearly all the essential aspects of a clinical situation so that the situation may be more readily understood and managed when it occurs for real in the clinical practice setting."

Aviation offers some of the most familiar examples of simulation; the basic 'Link' simulators filled a critical need in the Second World War for inexpensive and efficient training of large numbers of prospective young pilots during basic skills acquisition. Airline pilots spend time working in flight simulators, which are identical to the flight deck of an aircraft and in which the pilot can simulate experiences of handling emergencies that cannot (for safety and/or expense reasons) be gained in any other way (Quinn 1996). Denton (1994) conducted a very successful study which focused on a type of simulation in which small teams of school children had to simulate companies designing and making products for the market place. The need for the study was due to the high cost of visits and placements to industry. Interest in simulation-based medical training has increased for reasons similar to those that led to the advance of simulation in other fields. These include the drive for risk and cost reduction, improved possibilities for demonstration and assessment of a wider range of skills, and the availability of new technologies that enable more sophisticated simulation (Ziv, Small & Wolpe 2000).

The parallels between aviation and anesthesia led to the development of the first course on Anesthesia Crisis Resource Management at Stanford University in 1990. Using a high fidelity patient simulator and a full mock operating room, an anesthetic and surgery scenario was recreated. Critical incidents were then introduced for participants to

handle, followed by a video debriefing to discuss the important technical and non-technical skills related to the incident (Harrison & Gaba 2005). Although a relatively new technology, the uses and applications of simulation are limited only by the imagination of the individuals interested in medical education and safety. The growth and expansion of simulation over the last number of years is evident from the establishment of the Society for Medical Simulation in the United States and the Society in Europe for Simulation Applied to Medicine (Harrison & Gaba 2005).

Parr & Sweeney (2006) integrated a human patient simulator (HPS) into their undergraduate nursing curriculum with very positive effects. Computerized human patient simulators accompanied by sophisticated scenarios create the opportunity for high-level clinical simulation. These manikins have made their way into nursing schools in America during the last 10 years. Final semester students with their clinical placement in the adult Critical Care unit get a simulation experience with the following scenarios: acute coronary syndrome and acute myocardial infarction. With feedback from the students it was clear that the majority of them found these learning experiences very challenging. The authors concluded that although simulation can never replace the real patient and the fast-paced hospital setting, it can offer students rich, realistic opportunities to prepare for live patient care. It is expected that next time when the students work with an acute coronary syndrome patient, they will know what to expect.

Simulation is a learner-centric training modality that presents no risk to patients and facilitates repetition of particular aspects of tuition, until all students achieve a standard level of proficiency. This may limit time spent by students in clinical areas to gain necessary skills and therefore is thus perceived as a better management of limited resources (Lamb 2006). The Critical Care Unit clinical areas have been criticized for providing a threatening learning environment for the student. There is also an inability to standardize patient presentations in the clinical setting, thereby rendering it impossible to fairly assess learner performance.

Simulation takes place in the safety of a controlled setting, usually with a simulated patient and a representation of the patient's environment and this usually happens in the CSC or a Skills Laboratory.

2.4 THE USE OF CLINICAL SKILLS CENTRES (CSC)

The CSC according to Stark & Fortune (2003) is a space containing resources for teaching practical clinical skills. While Childs (2002) defines it as the environment that provides for students to observe, practise and learn clinical techniques before entering the actual clinical environment.

Wong (1987 in Du Boulay & Medway 1999) says that the shift in nursing education towards a more academic focus underpins the practice of nursing with theory and research. Nurses, like medical students, nowadays have less opportunity to develop and refine their skills. Studies of clinical learning suggest that students have anxieties in practice, often relating to a lack of practical skills, fear of failure, and making mistakes. This has led to the emergence of skills laboratories in many medical and nursing schools (Cowan & Wiens 1986 in Du Boulay & Medway 1999). The increased awareness of patient safety is another motivational factor to have the practical procedures rather completed in the CSC. Many Health Sciences education institutions in South Africa and worldwide have set up a CSC. These are staffed and equipped areas designed for putting groups of students through an intensive training in clinical skills, often using a wide range of simulations (Bradley 2006: Childs 2002 and Stark & Fortune 2003). The aim of these centres is to train various clinical skills in a structured and supervised way to ensure that all students achieve a basic level of competence (Newble & Cannon 2001).

Other reasons, according to Dent (2001), that have led to the development of CSCs, are changing perspectives. These include the public's focus on questions concerning the standards of clinical practice, the fact that in-patients stay in hospital for shorter periods; and an increase in student numbers making it increasingly difficult for students to have access to patients suitable for their stage of learning. Du Boulay & Medway (1999) state that with the increasing pressures and workload of health care personnel, staff find it difficult to give priority to clinical teaching, and so students' experiences often vary in quantity and quality.

Simulation can be created with a variety of models. When discussing simulation, the term "fidelity" is often used, referring to the degree to which a simulation represents real life (Rediffusion, 1986 in Denton 1994). Health Sciences simulation comprises a wide spectrum of tools and methods, some of which have been in use from the early days of medicine. All types of Health Sciences simulation share the feature of separating training

and education from the provision of actual patient care (Ziv, Small & Wolpe 2000). A brief description of the main delivery methods and range of simulators that seem to be used frequently follows below.

2.4.1 Simulated/standardized patients

This method implies a group of volunteers, real patients or professional actors who are used as simulated or standardized patients. They are commonly used for teaching of communication skills in undergraduate curricula. The simulated patient presents a history of sometimes mimic physical signs in a standardized, reliable manner. In the early stages of the undergraduate medical curriculum simulated patients serve as a very important bridge between structured clinical skills instruction and actual clinical experience in the clinical areas. Occasionally the students themselves may also act as simulated patients through role-play (Bradley 2006 and Dent & Harden, 2005).

2.4.2 Part-task trainers

These training models only simulate isolated parts of the body in order to teach a simple single skill/procedure and tutors utilizing these training models in simulation should be aware that complete isolation of reality is possible. Procedures commonly taught in this way include venepuncture, urinary catheterization and wound closure. There are also more sophisticated part-task simulators available, such as cardiovascular systems to help students recognize common auscultatory cardiac and lung findings (Bradley 2006). The majority of these models are unable to provide feedback, therefore learning of this nature requires extensive support from expert tutors. The criticism that human patient simulators (HPS) lack realism has been addressed and one should be aware of the fact that some of the modern simulators today can even verbally interact with the students through the tutors (Lamb 2006). In this case communication is achieved by placing a speaker in the mouth of the HPS, while the tutor speaks through a microphone connected to the speaker.

2.4.3 Integrated clinical simulators

These simulators use part or whole body manikins to facilitate the simultaneous integration of knowledge, attitude and skills. They are available as high fidelity computer-driven patient simulators, or intermediate and low-fidelity simulators (Perkins 2007). The high-fidelity simulators can simulate reality-based scenarios in a clinical setting such as

an intensive care unit, e.g. a life-size manikin programmed by a computer (Fletcher 1995 in Medley & Horne 2005). An advanced human patient simulator, which is a whole body manikin that can replicate many humanistic functions, including those of the cardiovascular and respiratory systems through the utilization of robotic technology, is a relatively new phenomenon in health care education (Birch et al. 2007). It is interesting to note that there is no indication that learning from simulation is related to high levels of fidelity (Evans & Sculli, 1984 in Denton 1994). However, increased fidelity may improve the learners' confidence in that particular context. When using intermediate or low-fidelity simulators, responses to interventions are generated by the instructors or tutors, e.g. the simulation is reliant on the instructor/tutor giving verbal feedback to the participant about the physiological variables of the manikin (Perkins 2007).

2.4.4 Computer programme-based simulators

This method has emerged as being quite powerful. Computer-based simulators allow people to interact efficiently with three-dimensional computerized databases in real time, using their natural senses and skills. They provide an artificial environment through computer-generated stimuli, which are transmitted to the user through visual, audio and tactile modalities, thereby creating the illusion of carrying out a practical procedure such as cannulation or catheterization (Dent 2001). These simulations can either be CD-ROMs or part of a web-based on-line system and it uses real-life simulation of clinical scenarios, allowing learners to progress at their own pace.

Apparently there are two areas of caution for the future. Firstly, the CSC is much more than just an area where a set of isolated tasks should be taught, and secondly, it will never be an alternative to the experience gained from an educative clinical placement with appropriate role models as mentors. The CSC seems to be inevitably complementary to that experience (Knight & Mowforth 1998).

At the Faculty of Health Sciences at Stellenbosch University, the CSC is available to all departments and students, but until recently it was mostly the medical curriculum that has made use of this facility. Over the last two years, however, the Critical Care nursing programme has started to include simulation in the CSC quite extensively in their curriculum. This appears to be a positive and rewarding experience to both the students and the tutors.

2.5 BENEFITS OF SIMULATED TEACHING

The recent Best Evidence Medical Education (BEME) Collaboration systematic review of high-fidelity simulation has explored the features and uses of medical simulations that led to most effective learning. Through this process the key features of medical use of simulation were identified (Perkins 2007). In the next section I will discuss the benefits of simulated teaching under relevant headings:

2.5.1 Providing feedback

Feedback on performance is a crucial component of the learning processes associated with simulation. Feedback informs students about how they are performing in relation to the learning situation. Interlinked with feedback is the process of reflection following an experience, which is an integral part of experiential learning. The model of experiential learning as suggested by Kolb (in Smith 1996 http://infed.org/biblio/b-expl.htm) describes an experience followed by reflection. The reflection is then assimilated into a theory and finally these new hypotheses are tested in new situations (Gibbs 1988 in Perkins 2007 & Smith 1996). Through simulation, multiple experiences can be created to allow for reflection. Nicol & Glen (1999) explain that as long as there is an adequate level of supervision, mistakes can be used to provide valuable feedback opportunities for the whole group. The use of video feedback further enhances learning by enabling students to gain insight into their abilities and to identify their own strengths and weaknesses. An important thing for clinical educators to remember about feedback in Health Sciences education is that it is extremely necessary and valuable. Tutors need to bear in mind, however, that for students to receive feedback is not always a simple passive act. It requires a certain degree of maturity, honesty, and selfless commitment towards the goal of improving their clinical skills (Ende 1983).

2.5.2 Repetitive practice

Deliberate and repetitive practice allows the learner to correct errors and improve performance which facilitates progression from novice to expert (Perkins 2007; Rose & Best 2005). To become comfortable and competent usually requires repeated exposure to the technology, which is easily accomplished in simulated environments (Dahl 1994). The benefit of this exposure for the Critical Care nursing students is that they have the

opportunity to practise their procedural skills on models in simulation until they feel competent to perform these on a real critically ill patient.

2.5.3 Curriculum integration

The integration of psychomotor skills training with problem-based learning during simulation leads to improved performance when compared to classroom delivered, problem-based learning alone. Simulation helps to bridge the gap between theory and practice by offering opportunities for learning in a risk-free, low-anxiety environment (Morton 1997; Neary 1997). Neary (1997) argues that if the students have to rely solely on clinical placements for making links between theory and practice, the principles of asepsis and the practical skill of performing a wound dressing, for example will be lost. Relying only on the clinical placement can mean that the development of clinical skills is ad hoc and dependent on what a particular unit has to offer. In a simulated environment students can be encouraged to discuss the situation and establish links between theory and practice in a way that may not be possible with a real patient. Discussing the complications of some procedures in front of the patient might, for example, cause anxiety or distress. Suggestions made by Henneman & Cunningham (2005) on how simulation can be successfully integrated into an existing nursing course are that before introducing simulation, it is important to have a vision, guiding principles and a framework to organize the simulation experience.

2.5.4 Range of difficulty

Another very exciting possibility created by the use of simulation, is that simulated clinical experiences can be controlled according to the level of skills and the learning needs of the students (Neary 1997). Helping students to acquire competence can be accomplished in many ways. A common application involves the concept of instructional scaffolding, which refers to Bandura's participation modelling technique in which a teacher initially models a skill, provides support and then gradually reduces aid as learners develop the skill (Schunk 2004 http://honolulu.hawaii.edu/intranet).

The advantage of being able to control the difficulty of the case presented/discussed in simulation is that the patient will not suddenly collapse, have an epileptic fit or refuse treatment as may happen in the real care setting. This results in more predictable learning.

2.5.5 Multiple learning strategies

Kneebone (2003) states that simulation can provide some objective evidence of performance and offers the potential for formative and summative assessment. The simulated setting can provide a realistic environment for the assessment of clinical skills, but one in which the complexity and other variables can be controlled (Nicol & Glen 1999).

According to Neary (1997) another strategy of learning in simulated settings which offer an additional advantage to students is that nursing students can act as patients for their colleagues when learning to perform the various skills. This means that they do not only learn how to perform the skill, but also experience how it feels to be fed by someone else, or have a blood pressure cuff inflated to 250 mmHg! Such learning experiences provide valuable insights into the patient's world that cannot be provided in the real care setting. The use of simulation also enables larger groups of students to observe a realistic demonstration, while students can ask questions at any time and the demonstration can be repeated as many times as necessary.

Artificial models and simulated patients can be combined in the teaching and learning of practical skills. One can create simulation that is as real as possible, for example a simulated tissue skin pad strapped to a simulated patient's arm. The arm can be covered by a drape to mimic a patient with a real wound on her/his arm and students are then expected to suture the wound as part of a simulated teaching and learning session. This allows for students to be assessed on more than one domain, namely the procedural skill as well as the affective skill components. Reportedly, feedback from the students and tutors who took part in this study was positive and they all thought it to be a valuable learning method (Kneebone, Kidd, Nestel, Asvall, Paraskevas & Darzi 2002). Although one knows that simulation will never replace a real clinical experience, it still provides students with an unparalleled opportunity to practise numerous skills in a safe, controlled environment (Morton 1997).

2.5.6 Controlled and safe environment

Because the environment is safe, learners have the opportunity to fail and can then learn from their failures (Kneebone 2003). Dahl (1994) states that the advantage of a simulated care setting is the provision of a safe environment in which clinical skills can be learned and refined, safe in the knowledge that mistakes do not matter and no harm will come to the patient. According to Morton (1997) the CSC is ideal for Critical Care

nurses to develop psychomotor skills without the risk of inflicting harm to patients. In the CSC students can practise until competency is acquired in the practical procedures without embarrassment or negative criticism, and without interfering with patient management or well-being.

2.5.7 Individualised learning

In a “real” health care setting, learning is in a sense a by-product of care. The clinical needs of the patients must always take priority over the educational needs of the learner. Simulation, however, deliberately places the learners’ needs at the centre of attention and provides the opportunity to create conditions of best practice for teaching (Kneebone 2005). Kneebone (2003) states that simulated learning has the capacity for students to learn individually as well as collaboratively. Students working together have been shown to learn more effectively, because they observe each other and discuss decisions and priorities (Neary 1997).The training agenda can also be determined by the learner, not by the patient. Learners can therefore practise repeatedly and at their own pace. Fletcher (1995 in Medley & Horne 2005) also highlights the fact that active learning can occur and that communication, teamwork, and delegation can all be simulated. Another learning strategy that can be implemented in the CSC is self-directed learning. Students are increasingly being encouraged to take responsibility for their own learning and to develop skills for becoming lifelong learners. The CSC provides them with the opportunity to maintain their skills in periods between clinical placements and ‘revise’ them prior to clinical assessments (Nicol & Glen 1999).

2.5.8 Defined outcomes

Ziv, Small & Wolpe (2000) argue that simulation-based education requires educators to take a proactive approach to clinical exposure by designing an optimal learning environment and curriculum to serve the educational objectives. Simulation-based education provides the opportunity to have full control over the clinical curriculum in terms of content, degree of difficulty, sequence, clinical setting and the variety of clinical scenarios. The use of simulation enables clinical skills to be clearly defined as learning outcomes for each part of the programme (Neary 1997). A study by Buchanan (2001) on the use of simulation technology in dental education indicated that advanced technology simulators offer an exciting opportunity for dental educators to review and reconfigure

their curricula to meet the needs of their schools and dramatically improved student learning.

The clinical setting can be realistically simulated, with consistent and comparable experience occurring for all students. Specific and unique patient situations can be presented (Fletcher 1995 in Medley & Horne 2005). According to Nicol & Glen (1999) skills teaching must be structured and designed to prepare students for their placement experience so that they can optimize their learning within the context of increasingly scarce and finite resources.

Nicol & Glen (1999) argue that if simulation is used creatively by clinically competent nurse lecturers, it can provide an important foundation and enable students to develop a sufficient level of skills to make the most of the valuable learning experiences that only real patients and clients in real care settings can provide.

One of the most important and compelling uses of simulation – which are well known from aviation simulators – is the ability to simulate complications. With the development of simulators, we might well enter an era when patients do not come to the hospital to be learnt on, they will come to be cared for. Teaching and learning will occur on the simulator (Dawson & Kaufman, 1998).

2.5.9 Moral imperative

Patients have to be protected whenever possible and are not training commodities. It is therefore an ethical obligation to make all efforts to expose health care professionals to clinical challenges that can be reasonably well simulated, prior to allowing them to encounter and be responsible for similar real-life challenges (Ziv, Small & Wolpe 2000).

According to Fletcher (1995 in Medley & Horne 2005) simulation technology offers many advantages for nursing education. She argues that there is no threat to patient safety and errors made can be corrected and discussed immediately. In a study that was done to determine the most effective method of delivering training to staff on the management of an obstetric emergency, simulation-based training was found to be an appropriated proactive approach to reducing errors and risk in obstetrics, improving teamwork and communication, whilst giving the students a multiplicity of transferable skills to improve their performance (Birch et al. 2007).

It was these advantages of simulated teaching and learning that prompted me to embark on a study to empirically test the use of the CSC and simulation for achieving

competency in the context of the practical procedures of a Critical Care nursing programme. Having looked at the potentially positive aspects, I shall now discuss the potential disadvantages of simulated teaching.

2.6 DISADVANTAGES OF SIMULATED TEACHING

Many of the advantages of simulation have been well described, but there are several limitations as well. In the next section I will discuss a number of these.

2.6.1 Resistance and competence of lecturers

Rapid, major changes always create resistance and complex new technology takes time to assimilate. For these reasons some lecturers still have a barrier to the adoption of medical simulation (Ziv, Small & Wolpe 2000). In order to teach clinical skills, lecturers need to be clinically competent themselves (Neary 1994). In some institutions a special programme has been developed for educators to provide them with the tools required to teach in active clinical areas and to meet the challenges that they face in preparing new staff for work in specialized, high acuity care areas (Reid 2007).

2.6.2 Student anxiety

Lessons learned by Henneman & Cunningham (2005) when using clinical simulation to teach patient safety in a Critical Care nursing course were the importance of overcoming student anxiety about interacting with a plastic manikin, and being videotaped. The authors recommend that simulation should preferably be introduced early in the nursing program using simple simulations such as patient safety. As students become more comfortable with simulation technology, it becomes possible to engage them in more complex simulation exercises.

2.6.3 Cost

Simulation can be a costly teaching method because of the expense of obtaining and maintaining the necessary equipment (Morton 1997; Perkins 2007). Areas where one can attempt to save money is to try and get hold of out-of-date disposables that have been returned from clinical areas – for example, intra-venous cannulas, suture material, intravenous fluids and dressing trays (Morton 1997). Smith (2006) advises that one should not buy manikins or equipment only because they look good; one should first be

clear about what is to be taught in the CSC. Fletcher (1995 in Medley & Horne 2005) raises a concern that although simulated models are available in many nursing learning centres, a failure to maximize the use of this equipment wastes resources and is a valuable, but lost opportunity for innovative teaching. The provision of such a modern skills-teaching facility requires the commitment of a considerable amount of resources; both financial and human. Teaching within such a facility is labour intensive, as groups of no more than 20 can usually be accommodated. In addition to teaching, human resources are also needed to manage the facility; organize room bookings, order stocks, etc. (Neary 1994).

2.6.4 Neglecting the affective domain

Lecturers must be cautious not to overemphasize the psychomotor domain and skills performance. To become a caring Critical Care nurse requires a measure of comfort and competence with technology so that the latter is no longer the focus of the care, but instead the patient becomes the focus (Morton 1997). Kneebone, et al. (2002) argue that performing clinical procedures involves two sets of skills, those related to the procedure itself and those related to communicating with the patient, and these skills are usually taught separately. The concern is that skill analysis (the breaking down of complete motor skills into its component parts) to teach skills should not be reduced to a presentation of isolated tasks (Quinn 1996). It is the responsibility of the tutors to help students to link knowledge to skills (Knight, Moule & Desbottes 2000).

2.6.5 Transfer of skills

Kneebone et al. (2004) argue strongly for simulation to be used alongside clinical practice and linked closely with it. Otherwise, if operated in isolation from the clinical context, it can ignore students' learning needs in a real health care environment. According to the said authors the acquisition of specific skills and competencies can be learned in a CSC on bench top models in isolation from its clinical context. Clinical practice, however, amounts to more than technique. It demands a sensitive and highly complex matrix of knowledge, skills and professional judgment. The same advantage of simulation, namely that real life scenarios can be created without all the distractions and inconveniences of real life, can also be perceived as a disadvantage. This can create a false situation that fails to teach students about real-life clinical situations. Nor is there any proof that it helps students to transfer skills learnt using simulation into their clinical

placements (Neary 1994; Perkins 2007). The notion of “transfer of learning” underpins all aspects of simulation, the aim being to use the simulated experience to help the student to learn how to cope with the real thing.

Much work related to procedural interventions, however, is directed towards task-based training, where clinical practice is artificially broken down into component skills. These are practised and assessed in skills laboratories, isolated from the clinical reality that they are intended to reflect. The assumption that such learning is directly transferable to a clinical context often goes untested. There is a danger that the task-based simulation may become divorced from the wider context of actual clinical practice (Kneebone 2005).

In the context of using the CSC for Critical Care nursing students in this study, the following aspects were perceived as the major disadvantages:

Students entering this programme are adult learners and have probably not been exposed to teaching and learning in a CSC. This led to a situation where most of the students were uncomfortable and anxious in the simulated setting. However, the students got used to performing the procedures in simulation as they progressed through the programme during the course of the year. Resources are also a limitation, due to the fact that most of the models and equipment used in the CSC need to be imported. It is extremely expensive and unfortunately not all the equipment that one would like to have available in order to set up realistic simulation exercises can be afforded.

To further understand the nature of learning, particularly in a SCS context, a brief review of several taxonomies which are in use will be discussed next.

2.7 LEARNING DOMAINS

Educators find it useful to understand some of the complexities of the acquisition and the development of student knowledge. Theoretical frameworks are often referred to when it comes to stages of development of knowledge, skills and values. These frameworks include the work of Bloom (1956), Anderson & Kratwohl (2000), Dave (1976/70), Simpson (1966/72) and Harrow (1972) (http://www.nlink.com/donclark/hrd/bloom.html.) which will be explained briefly in the next session.

2.7.1 Bloom's taxonomy

Bloom's taxonomy of educational objectives was initially published in 1956 (Bloom 1972). Although this taxonomy was originally created in and for academic contexts, it has since been expanded over many years by Bloom and other contributors. Bloom and his colleagues initially focused on the cognitive domain (knowledge and the development of intellectual skills) and after that on the affective domain (the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivation and attitudes). Various people suggested detail for the third, psychomotor domain (manual and physical skills), which explains why this domain detail varies in different representations of the complete Bloom Taxonomy. The three most popular referenced versions of the psychomotor domain seem to be those of Dave, Simpson and Harrow (http://www.businessballs.com.bloomstaxonomyoflearningdomains.html). Bloom and his colleagues felt that the academic environment held insufficient expertise to analyse and create a suitable structure for the psychomotor domain and they left this area as a gap for other experts to complete. The psychomotor domain will be discussed in more detail later in this literature review.

In each of the domains Bloom's taxonomy is based on the premise that the categories are ordered in degree of difficulty; each level must be mastered before progressing to the next. The levels described in the cognitive domain start with simply "recalling data" and progress to "evaluating data" when getting to the 6th level. Subsequently levels 5 and 6 of the cognitive domain have been inverted by Anderson and Kratwohl in 2001. The affective domain progresses from a level of "receiving (awareness)" to the 5th level of "internalizing a value system (adopt behaviour)" (http://www.businessballs.com. bloomstaxonomyoflearningdomains.html and Rose & Best 2005).

2.7.2 Bloom-Kratwohl taxonomy

A group of theorists, working from 1995 to 2000, redefined Bloom's original concepts. This work was referred to as Anderson and Kratwohl's taxonomy. The major differences between this updated taxonomy and Bloom's original one, are the more useful and comprehensive additions of how the taxonomy intersects and acts upon different types and levels of knowledge, namely factual, conceptual, procedural and metacognitive knowledge. A comparison of Bloom's and Anderson & Kratwohl's cognitive taxonomies provides the following list in Wilson (2006 www.usdp.edu/education/lwilson/curric/ newtaxonomy.htm).

Bloom et al. 1956	*Anderson & Krathwohl et al. 2000*
Evaluation	Create
Synthesis	Evaluate
Analysis	Analyse
Application	Apply
Comprehension	Understand
Knowledge	Remember

This updated version has added “metacognitive” dimension to the original knowledge types. Using a simple cross impact grid like the one below, one can easily match activities and objectives to the types of knowledge and to the cognitive processes.

Table 2.1: The different levels of knowledge and cognitive processes

	Cognitive processes					
The knowledge dimensions	1. Remember	2. Understand	3. Apply	4. Analyse	5. Evaluate	6. Create
Factual						
Conceptual						
Procedural						
Metacognitive						

(Wilson 2006. www.usdp.edu/education/lwilson/curric/ newtaxonomy.htm).

Factual knowledge refers to essential facts, terminology and details of elements students must know or be familiar with in order to understand a discipline or solve a problem in it.
Conceptual knowledge is knowledge of classifications, principles, generalizations, theories, models or structures pertaining to a particular disciplinary area.
Procedural knowledge refers to knowledge that helps students to do something specific within a discipline, subject or area of study. It also refers to methods of inquiry, very specific skills and procedures, as well as particular methodologies.
Metacognitive knowledge represents an awareness of one’s own cognition and cognitive processes. It is strategic knowledge about how to go about solving problems, cognitive tasks to include contextual and conditional knowledge, and knowledge of self (Wilson 2006. www.usdp.edu/education/lwilson/curric/ newtaxonomy.htm).

The psychomotor domain was originally included in Bloom's taxonomy to explain skills development relating to manual tasks and physical movement. In the Anderson-Krahtwohl taxonomy it has developed to include modern day business and social skills such as communication skills. Therefore whatever the training situation, it seems likely that the psychomotor domain is significant.

2.7.3 Dave's psychomotor domain taxonomy

The Dave version of the psychomotor domain is the most relevant for work- and life-related development and it is the model most adequate and appropriate for adult training in the workplace.

Table 2.2: The following table is Dave's version of the psychomotor domain.

Level	Category	Behaviour descriptions	Examples of activity to be measured	Key words
1	**Imitation**	Copy action of another	Watch trainer and repeat action	Copy, follow, replicate, repeat
2	**Manipulation**	Reproduce activity from instruction or memory	Carry out task from written or verbal instruction	Re-create, build, perform, execute, implement
3	**Precision**	Execute skill reliably and independent of help	Perform an activity with expertise and to high quality without assistance or instruction	Demonstrate, complete, show, perfect, calibrate, control
4	**Articulation**	Adapt and integrate expertise to satisfy a non standard objective	Relate and combine associated activities to develop methods to meet varying novel requirements	Construct, solve, combine, coordinate, integrate, adapt, develop, formulate, modify
5	**Naturalization**	Automated unconscious mastery of activity and related skills at strategic level	Define aim, approach and strategy for use of activities to meet strategic need	Design, specify, manage, invent, project manage

Table after Dave's version of the Psychomotor domain, "Developing and writing behavioural objectives", 1970 (http://www.businessballs.com.bloomstaxonomyoflearning domains.htm) & Huit (2003 http://chiron.valdosta.edu/whuitt/col/ behsys/phymtr.html).

2.7.4 Simpson's taxonomy of the psychomotor domain

Another dimension in the acquisition of a psychomotor skill was described by Simpson (http://www.businessballs.com.bloomstaxonomyof learningdomains.htm) who built this taxonomy on the work of Bloom and others. This version is particularly helpful when adults are taken out of their comfort zones, because it addresses sensory, perception and preparation issues. It is therefore ideal for emergency routines, conflict situations and tough physical tasks. Simpson highlighted the following mental aspects of skill acquisition:

Table 2.3: Simpson's taxonomy

Level	Category	Description	Examples of activity to be measured	Key words
1	**Perception**	Awareness	Use selection of senses to absorb data for guiding movement	Recognize, distinguish, notice, touch, hear, feel
2	**Set**	Readiness	Mental, physical, or emotional preparation	Arrange, prepare, get set
3	**Guided response**	Attempt	Imitate instruction, trial and error	Imitate, copy, follow, try
4	**Mechanism**	Basic proficiency	Competently respond to stimulus for action	Make, perform, shape, complete
5	**Complex overt response**	Expert proficiency	Execute a complex process with expertise	Coordinate, fix, demonstrate
6	**Adaptation**	Adaptable proficiency	Alter response to reliably meet varying challenges	Adjust, integrate, solve
7	**Origination**	Creative proficiency	Develop and execute new integrated responses and activities	Design, formulate, modify, re-design, trouble-shoot

Table after Simpson's psychomotor domain, "The classification of educational objectives in the psychomotor domain" 1972 (http://www.businessballs.com.bloomstaxonomyof learningdomains.htm) & Huit (2003 http://chiron.valdosta.edu/whuitt/col/behsys/ phymtr.html.)

2.7.5 Harrow's taxonomy of the psychomotor domain

Harrow (1972) developed his taxonomy which is organized according to a degree of coordination including involuntary responses and learned capabilities. His taxonomy is strongly biased towards the development of physical fitness, dexterity and control of the physical body. This model is the only one of the three psychomotor domain versions which specifically implies emotional influence with others within the most expert level of body control. When educators have to decide which framework to use for their situation they need to consider the needs and aims of the students as well as the type of skill that needs to be learned Huit (2003 http://chiron.valdosta.edu/huitt/ col/behsys/phymtr.html.).

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Table 2.4: Harrow's taxonomy

Level	Category	Description	Examples of activity to be measured	Key words
1	**Reflex movement**	Involuntary reaction	Respond physically instinctively	React, respond
2	**Basic fundamental movement**	Basic simple movement	Alter position, move, perform simple action	Grasp, walk, stand, throw
3	**Perceptual abilities**	Basic response	Use one ability in response to different sensory perceptions	Catch, write, explore, distinguish using senses
4	**Physical activities**	Fitness	Develop strength, endurance, agility, control	Endure, maintain, repeat, increase, improve exceed
5	**Skilled movements**	Complex operations	Execute and adapt advanced integrated movements	Drive, build, juggle, play a musical instrument
6	**Non discursive communication**	Meaningfully expressive activity	Activity expresses meaningful interpretation	Express and convey feeling and meaning through movement and actions

Table after Harrow's psychomotor domain (1972) (http://www.businessballs. com.bloomstaxonomyoflearningdomains.htm) & Huit (2003 http://chiron.valdosta.edu/ huitt/ col/behsys/phymtr.html.).

Quinn (1996) stresses that when planning to teach a motor skill, the teacher has to consider the level at which the students must learn the skill. There will be some motor skills that students have to learn to the highest level and others where an intermediate level is acceptable. Therefore a useful point of reference for levels of skills is the notion of the taxonomies of motor skills.

In the context of the use of the CSC and the teaching and learning of clinical skills for Critical Care nursing students the psychomotor domain is undoubtedly the focus, but one needs to take care not to neglect the affective and cognitive domains. While teaching the students the psychomotor skills (for example the suctioning of a patient) clinical tutors need to link the cognitive knowledge related to the skill (for example the complications of the procedure) and the affective skills (for example communicating with the patient while doing the procedure) appropriate for the skill that is being taught. Looking at Dave's version of the psychomotor domain as explained above, it is clear that when students have to learn a new skill they should also have the opportunity to move through the different levels, although this might be a relatively time-consuming factor in the programme curriculum. Next a few approaches for the teaching and learning of psychomotor skills will be discussed.

2.8 TEACHING AND LEARNING OF TECHNICAL/PSYCHOMOTOR SKILLS

2.8.1 The acquisition of motor/technical skills

A number of theorists have described the teaching and learning of psychomotor/technical skills, and according to Fitts and Posner (1967 in Quinn 1996) three processes occur in the acquisition of a motor/technical skill:

The cognitive phase, which is concerned with the learning of the procedure. The more complex the skill, the longer this period will take.

The associative phase, in which the part-skills are taking on the characteristics of skilled performance and interfering responses are eliminated.

The autonomous phase, during which the skill becomes automatic and can be performed without the student thinking about it.

Gomez and Gomez (1987) described the more traditional means of the *apprentice-type approach model* as one of the means of acquiring knowledge and skills. This model describes students who learn quickly and become more confident from observing role models practising skills in clinical areas, rather than in a classroom. Studdy et al. (1994

in Nicol and Glen 1999) emphasize that the time spent in the clinical area should be a structured supervision of experiences, leaving time for reflection and not merely consisting of exposure to a clinical area. A model of an apprentice-type approach relies heavily on the assumption that all clinical areas are staffed by highly competent and motivated staff who feel confident enough and have enough time to pass their skills on the student nurses. Knight & Mowforth (1998) add to this by stating that learning skills are not achieved simply through observation and apprenticeship, but through a structured and systematic approach, which allows for repeated practice in a safe environment. Due to the shortage of nursing staff the reality is that very few clinical areas are staffed sufficiently and therefore the approach of apprenticeship is seldom used nowadays.

The traditional teaching of *"See one, do one and teach one*" training programmes in health sciences education is no longer an acceptable and safe practice. It seems critical that health care providers who perform procedures on patients need to be trained, supervised and assessed, ensuring that they are competent before they are allowed to perform these procedures independently on patients. Simulation training allows students to reflect on their practice, while the assessment of their performance makes it ideal for the training of certain practical skills (Tan, Tan & Tee 2007).

Psychomotor skills, and therefore technical skills, involve the senses, the brain as well as the muscles. Good performance requires co-ordination and smooth execution (Cox & Ewan 1988).

2.8.2 Tips for the planning of teaching technical skills

Research on learning (Fitts & Posner 1967 & Gagne 1970 in Quinn 1996) permits some generalizations for course designers and teachers when planning the teaching of technical skills. It seems important that they need to

- provide students with a satisfying rationale for learning the technical skills
- help the students to understand the logic or overview of the skills routine and to understand links with related perceptual skills and knowledge
- provide opportunities for practice and feedback to improve accuracy and speed, and
- take into account the fact that once mastered, technical skills are well remembered and retained and they continue to improve with practice.

As far back as 1979, Tornyay & Thompson (in Quinn 1996) proposed that to apply the theories of psychomotor learning to nursing education, the teacher must start by

describing why and how each specific psychomotor skill fits into the total art of nursing. The demonstration phase of teaching therefore deserves careful attention and the initial demonstration should be smooth, skilled and successful. All learners should be able to see and hear clearly. The skill is performed in its entirety by a skilled practitioner in order that students may view a smooth and proficient demonstration. The skill is then divided into short, progressive steps, with each step shown separately. Students practise each step independently until the entire performance is complete and the skill can be demonstrated at the level of expected competence. Interestingly enough; the expert practitioner is not always the best person to demonstrate complex psychomotor skills. Learners may feel overwhelmed and hesitant to try a new procedure if teachers are tempted to "show off" their expert skills in the demonstration phase. Another cautionary note about the use of experts to demonstrate skills is offered in Quinn (1996). They describe experts as persons who have incorporated each of the steps of the skill into the performance to the extent that they can no longer identify the individual steps. In the demonstration phase it is vital that the individual steps be identified clearly for the learner. The next phase in learning psychomotor skills is guided practice. Some hints for teachers to consider during the guided practice phase are:

- Learners need to explore and manipulate equipment as soon as possible after the demonstration. The learning environment should be made warm and accepting, inviting learners to take risks, try things and experiment.
- Keep in mind that student differences related to manual dexterity, attitude, confidence, age, intelligence, etc. are important variables in learning psychomotor skills.
- The complexity of the psychomotor skill determines the amount and type of practice required to learn the skill.
- Feedback on performance during the practice phase is vital to reinforce correct behaviours and eliminate errors.
- When a learner is stuck at one step of performance and consistently makes the same mistakes, it may be helpful to have the learner repeat the error over and over to make it very visual and bring awareness of the error to the conscious level. It is wise to remember that an adult learner is fragile when frustrated.
- Teachers should be aware of left-handed learners and make provision for them.

- It may be helpful if teachers share personal examples of their own ineptitude as they initially learned skills. It may comfort struggling learners to know that others had problems in the beginning.

George, Frank & Doto (2001) have created a useful five-step method by using the principles of the taxonomy of the psychomotor domain. To me his principles of conceptualization, visualization, verbalization, practice and correction and reinforcement are a practical and manageable way of teaching psychomotor/practical skills. This simple five-step method for teaching clinical skills can be applied as follows:

Step 1: The learner must understand why the skill is needed and be motivated to learn.

Step 2: The tutor should demonstrate the skill exactly as it should be done without talking through the procedure.

Step 3: The tutor then repeats the procedure, but takes time to describe in detail each step of the process.

Step 4: Students talk through the skill. Students describe step by step how to do the skill.

Step 5: The students perform the skill with the tutor watching and giving feedback as needed. Students can continue practicing until they feel comfortable with the procedure.

While going through these steps it may seem lengthy, the result though is that the tutor will spend less time observing and correcting performance problems and will ensure a better learning environment (George, Frank & Doto 2001).

In this section I have outlined different models of learning manual skills. In the next section I will look at the different teaching strategies which can be utilized in a CSC.

2.9 TEACHING AND LEARNING STRATEGIES USED IN A CLINICAL SKILLS CENTRE.

This section is about the teaching strategies educators might consider to assist in facilitating the learning of clinical skills in a simulated environment. Clearly one wants to choose the method of teaching likely to achieve the learning objectives in the most efficient way, and therefore, several options need to be considered.

2.9.1 Demonstration

The purpose of demonstration as a teaching technique is to transmit the big picture to a relatively small group of students in a short period of time (Ewan & White 1996).

Videotapes, field trips, on-the-job training and simulated experiences are all adaptations of demonstrations. Demonstrations usually require a lot of preparation time and must be supported with various audio-visuals. Demonstrations are particularly useful in teaching skills and are more teacher-centered than student-centered (Schunk 2004 http://honolulu. hawaii.edu /intranet). Ewan & White (1996) warn inexperienced teachers not to fall into the trap of assuming that demonstrations are sufficient for students to know how to proceed with practising skills. They suggest three steps in a successful demonstration: the demonstration, followed by supervised practice of the components of the task, followed by a return demonstration in which the student demonstrates the ability to integrate the components into performance of the task.

Valuable guidelines for lecturers when presenting demonstrations as pointed out by Watts (1990) are the following:

- Begin by giving students a clear, visual picture of the overall procedure they are about to learn.
- With more detailed demonstrations, don't present too much at one time. Break complex procedures into subroutines so that students can work one at a time.
- Let students observe from a point of view that makes it easy for them to visualize their own performance.
- Let students imitate what they have seen with a minimum of delay.
- Emphasize selected, key points in performance and give students short verbal cues to help them remember these steps.
- Don't clutter up your performance instructions with unnecessary explanations.
- Do explain enough about why the procedure is done in the recommended way to help students figure out what to do if they forget a step.
- Provide backup instructions in writing, using terms the students can understand and use as verbal cues.
- Provide plenty of feedback, especially in early stages of practice by the student – and add to what you provide by helping students learn to assess their own performance.
- As learning progresses, place greater emphasis on how the performance should feel if it is correct, and less on verbal cues.

There are a few guidelines available for the most effective instructor:student ratio for technical skills training. Numbers, however, have important implications for staffing laboratory based teaching sessions. In a study by Dubrowski & MacRae (2006) to assess the optimal ratio of teachers to learners during the teaching of a simulated wound closure, it was found that the optimum ratio is 1 instructor for 4 students. These findings are in keeping with current motor learning theories in which there is evidence that the optimal amount of augmented feedback for the learning of a motor skill interacts with the current knowledge base of the learner. Typically, more feedback is necessary in the initial stages of learning and less as the learner's knowledge base expands. Further research is needed to study how this instructor:student ratio changes as a skill differs in difficulty and training level.

2.9.2 Role-playing and case studies

Nikendei et al. (2005) describe the use of role-playing and case studies to create a more realistic training situation and to enhance students' involvement in the CSC. They believe that role-playing represents a useful medium for combining technical skills procedures and communication skills early on in a student's medical education.

Skills training with standardized patients (Kneebone 2002 in Nikendei, Zeuch, Diekmann, Roth, Schafer, Volkl, Schellberg, Herzog & Jungerer 2005) and more complex scenarios can be introduced later after a certain degree of security and experience has been attained through skills training with student role-playing. Especially useful and faculty–sparing are realistic one-on-one encounters between the learner and a simulated patient, with the additional use of self-assessment instruments and constructive patient, peer and faculty feedback, based on shared simulated experience and remote observation by a tutor (Dent & Harden 2005). According to Dent & Harden (2005) simulated and standardized patients can be trained to reproduce a clinical history and to respond to physical examination in a consistent manner. They can also be trained to subjectively report on the history-taking, physical examination and communication behaviours of the care provider, and to subjectively assess interpersonal skills and satisfaction with care.

2.9.3 Videos

Dent & Harden (2005) state that prerecorded videos provide a valuable resource for demonstrating aspects of clinical skills. The reality of practice-settings can be brought

into the classroom to provide authentic material for discussion and analysis. They also ensure that an agreed approach to clinical examination is uniformly available. Other benefits of using videos are the possibility of seeing a range of patient conditions at one time, of focusing attention on one specific feature and of showing a lengthy procedure in a short time. Videos can also be used for self-videoing of students' interviews with patients, followed by independent reflective review or by peer or tutor feedback. The opportunity to assess an individual student performance with a video recording is also highly rated by students and tutors. The repetitive critiquing of each other's performance and the opportunity for tutor supervision that this provides have been positively received by students as a formative experience (Dent 2001).

Treadwell & Grobler (2001) who did a study asking medical students about their perceptions of learning in simulation, recommend the following with regard to the use of videos in the CSC:

- Videos should not take the place of live practical demonstrations.
- Videos are only appropriate if students watch it before an actual live demonstration so that they are able to formulate questions to ask during the demonstration.
- One should aim to show videos that are relevant to the South African context.

2.9.4 Self-directed learning

The increased understanding of how adults learn has emphasized the importance of presenting a more active and independent style of learning (Vaughn et al, 2001 in Dent 2001). Dent & Harden (2003) define independent learning as students who work on their own to meet their own learning needs. Although independent learning means different things to different people, it incorporates six key principles:

- Students can learn on their own.
- Students have a measure of control over their own learning.
- Students may be encouraged to develop their personal learning plans.
- The different needs of students are recognized.
- Student learning is supported by learning resources and study guides prepared for this purpose.
- The role of the lecturer changes to a manager of the learning process.

(Dent & Harden 2003).

Judged against the above principles, the use of the CSC as a learning resource provides the students with ample opportunities to develop their self-directed learning skills.

2.9.5 The objective, structured clinical examination (OSCE)

In the OSCE, students rotate through a series of stations at which they are asked to carry out a task. In most stations they are observed by examiners and scored as they carry out the tasks. In others they may interpret clinical material, write notes or answer questions. All the students are given the same challenge and assessed by the same instructors using the same preset standards (Dent & Harden 2003). In our programme the OSCE was not only used for summative examination; it was also used as part of the teaching and learning process. The students attended sessions where they had the opportunity to move through the practical stations before the summative assessment. During these practice sessions the students obtained feedback on their performance in two ways, namely feedback from a Critical Care tutor, as well as from their peers. Students also had access to the checklists that were used by the Critical Care tutors for the summative assessment of the procedures.

In this section I have discussed a number of ways in which the development of clinical skills might be facilitated in a simulated environment. In the institution where my study was done we made use of demonstrations as well as formative and summative assessments to facilitate the practical procedures required by the programme. In the next section I will address the perceptions of students and tutors of teaching and learning in a CSC.

2.10 PERCEPTIONS OF TEACHING AND LEARNING IN A CLINICAL SKILLS CENTRE (CSC)

From a study on the perceptions of nursing students and tutors by Freeth & Fry (2005) it appeared that students and tutors enjoy learning and teaching in a CSC, although senior students are slightly more muted in their appreciation. What they particularly value are the opportunities for supported practice of clinical and communication skills. According to the questionnaire results the students saw the CSC as a learning environment that supported the linking of theory and practice. Students and tutors also valued teaching in which tutors provide expert demonstrations and then allow for organized structured practice, offering help as necessary.

Another study by Treadwell & Grobler (2001) where demonstrations of skills using interactive multimedia were followed by immediate supervised practical sessions in the CSC indicated that medical students' perceptions on skills training in simulation were very positive. During the practical sessions in the CSC students received formative evaluation from the supervising lecturers. Students viewed the skills they acquired in the laboratory setting as a stepping stone to the practice, which is evidenced by what one student said *"It is difficult to say what is going to happen in the wards… it at least gives you and idea*" (Treadwell & Grobler 2001:p.478).

Another study done by McFetrich & Price (2006) looked at the use of simulators and scenarios for training nurses in emergency care. When asked to evaluate these sessions, 97% of respondents said that the practical application was either "good' or "very good". The staff involved revealed that after the simulated experience they felt more confident when assessing acutely ill patients and they were able to think more laterally and in greater depth when assessing patients in the workplace. Another positive comment in this study was that the small-group teaching allowed focused discussion in a non-threatening environment.

When simulation was used as a teaching strategy, Denton (1994) found that many teachers had difficulties in standing back and allowing learners sufficient autonomy. This underlines the importance of institutions providing in-service support for teachers as they adopt new teaching/learning techniques with which they are not familiar. Using simulation as part of the curriculum might be a good example.

2.11 CONCLUSION

From the literature review in general, as well as from particular evidence, it seems that simulation has a significant part to play in addressing educational challenges surrounding access to clinical problems, feasibility and control (Stillman & Swanson 1987 in O'Neil 2002) and that it might be of considerable benefit in the preparation and assessment of students and professionals.

The literature review also indicates that the following issues are important and should be taken into consideration when using simulation in the teaching and learning of clinical skills:

- Simulation is a learner-centered modality that presents no risk to patients and facilitates repetition of particular aspects of tuition. This may limit time spent by

students in clinical areas to gain necessary skills and therefore, perceived as a better utilization of resources – particularly in environments where resources are limited.

- There are indications that those students who work together in simulated learning environments learn more effectively, as they observe one another and are more prone to discussing decisions and priorities.
- In simulated environments students have the opportunity to first be shown a complete procedure after which the procedure is broken down into separate components to be practised and mastered. This could be beneficial to clinical learning, since students can master preliminary steps before moving on to subsequent steps.
- Students seem to value teaching in which tutors provide expert demonstrations and then allow for organized, structured practice with the necessary help. The feedback during these practice sessions can inform students about their performance in relation to the learning situation. It also appears that as long as there is adequate supervision by the critical care tutor; mistakes made by students can be used to provide valuable feedback opportunities for an entire learning group.
- From the consulted literature it appears that the criticism of simulators that lack realism has been adequately addressed, and that some modern simulators can even interact with the students. From a learning perspective this is beneficial, since the feedback from the simulator can assist students to gain insight into their abilities and to identify their own strengths and weaknesses.
- Clinical Skills Centres and simulation facilities allow for an objective simulated clinical examination (OSCE) to be used with relatively ease. OSCEs have the benefit of all students being given the same challenge and the same judges utilizing the same preset standards.

Keeping in mind that Critical Care nursing takes place in a dynamic environment, requiring nurses in this field to acquire and possess adequate knowledge, values, attitudes and psychomotor skills, it makes sense that when combined with other teaching methods, the use of simulation could provide learners with an effective means to achieve the cognitive, affective, and psychomotor competencies necessary for the complexities of clinical practice.

In the next chapter I shall explain the context of the case that I studied, namely the Critical Care nursing programme at Stellenbosch University.

CHAPTER 3
CONTEXTUALIZING INNOVATION IN THE CRITICAL CARE NURSING PROGRAMME

In Chapter 3 the context of my case study, the Critical Care nursing programme at Stellenbosch University, will be discussed in detail. The aim of this chapter is to contextualize the innovation implemented in the practical module of the programme and establish how it fits into the bigger picture of the Critical Care nursing environment and the training of Critical Care nursing students. The broader role of the statutory bodies guarding training and education in the Critical Care nursing field will be discussed, followed by an enquiry into specific issues playing a role in the environment of Critical Care nursing education.

3.1 THE COUNCIL ON HIGHER EDUCATION (CHE) AND THE HIGHER EDUCATION QUALIFICATIONS FRAMEWORK (HEQF)

The South African Council on Higher Education (CHE) was established as an independent statutory body in May 1998, in terms of the Higher Education Act, no 101 of 1997. The Higher Education Act and the Education White Paper 3 of 1997, a Programme for the Transformation of Higher Education, established the responsibilities of the CHE as advising the Minister of Education on all matters related to higher education policy issues and quality assurance within higher education and training. All providers of higher education are subjected to an audit at least once in six years (the present cycle started in 2004). The purpose of this audit is to encourage and support institutions to identify their own academic strengths and shortcomings, and to take proactive steps to address areas in need of attention. Eventually this should impact on all the programmes and qualifications offered by institutions. All new programmes which institutions intend to offer, will have to be evaluated by the HEQC to determine whether such programmes meet the minimum standards of quality (Council on Higher Education http://che.ac.za).

Following the publication of the CHE: “A new academic policy for programmes and qualifications in higher education (2002)”, the Higher Education Qualifications Framework (HEQF) was founded. The need for the HEQF emerged from the fact that in

the past separate and parallel qualifications structures for universities and technikons have hindered the articulation of programmes and the transfer of students between higher education institutions. In October 2005, the HEQF was proposed by the Department of Education and accepted by the South African Parliament as a single qualifications framework which was applicable to all higher education institutions and providing the basis for integrating all higher education qualifications (Government Gazette 2007).

The current Postgraduate Diploma in Nursing (Critical Care) and the Bachelor of Nursing with Honours (Critical Care) degree are pitched at level 8 on the National Qualifications Framework. The HEQF published new qualification levels and guidelines for qualifications in October 2007, and currently all nursing programmes are being revised. The new programmes will be ready for implementation in 2009. The current proposal by the HEQF is that the two existing programmes offered by the Faculty of Health Sciences, Stellenbosch University, will be replaced by a Master's Certificate in Nursing at level 9 on the HEQF.

3.2 THE ROLE OF THE SOUTH AFRICAN NURSING COUNCIL (SANC)

The Nursing Profession falls under the Regulatory body, the South African Nursing Council (SANC). SANC was established by the Nursing Act no. 45 of 1944 as an autonomous statutory body and currently this is still the case. Over the years many amendments of the Nursing Act followed and the latest version (1978) is being replaced by Act no. 33 of 2005 (South African Nursing Council http://www.SANC.co.za).

Until recently SANC has been solely responsible for the accreditation and inspection of nursing training institutions and clinical facilities under the Nursing Act. These standards were, however, not aligned with the standards set out in terms of Higher Education. According to the Higher Education Act no.101 of 1997, SANC will remain responsible for the approval and monitoring of nursing schools, for conducting examinations and for issuing diplomas and certificates, provided that their standards are aligned with the standards set by the Higher Education Act.

SANC provides institutions with regulations on the content and duration of nursing courses presented as proposed by the SA Nursing Council in terms of section 45 (1) of the Nursing Act, 1978 (Act no. 50 of 1978) (South African Nursing Council

http://www.SANC.co.za). The Regulation relating to the Course in Clinical Nursing Science leading to the registration of an additional qualification (Regulation 212) guides the already mentioned Critical Care nursing programmes discussed in this case study. (South African Nursing Council http://www.SANC.co.za). SANC manages to implement quality control by sending their executives to do regular site visits as well as ensuring that the regulations have very specific criteria providing prescriptions for minimum requirements, such as guidelines on admission to the course and the issuing of a qualification, duration of the courses, the curriculum and the course content.
SANC last inspected the Critical Care nursing programme at the University in 2002 and at that time they made no major recommendations for improvement.

3.3 CRITICAL CARE NURSING AS A SPECIALIZATION FIELD

A critical care unit is a designated area in a hospital admitting patients who need specialized monitoring, interventions or organ support. These patients require intensive care and attention from the nursing staff. The nursing personnel working in these units require a level of knowledge that is specialized and at a higher level than the basic nursing qualification. A registered nurse working in a critical care unit should be able to care holistically for the patient and his or her family, which includes the provision of emotional, psychological and physical support. In order to equip registered nurses working in these areas with the necessary knowledge and skills to perform their duties, the registered nurses are encouraged to enrol for a programme in critical care nursing. The students currently have the options to enrol for a certificate or diploma, or for a master's or doctoral study in the field of Critical Care nursing science. On completion of such programme, registered nurses receive recognition from the South African Nursing Council for their post basic qualification.

3.4 THE DEMAND FOR CRITICAL CARE NURSES

According to Scribante & Bhagwanjee (2007) nurses are the backbone of any health care system and the department of National Health as well as the South African Nursing Council has acknowledged that there is an acute shortage of nurses trained in critical care. The general scarcity of suitably trained nursing and medical staff impacts negatively on critical care unit outcomes (Bhagwanjee & Scribante 2007). Despite the

major focus on the delivery of Primary Health Care in South Africa over the last number of years, there remains a need for the delivery of critical care nursing in a tertiary hospital setting. South Africa carries a huge burden of disease amongst its residents which leads to a high incidence of diseases such as coronary artery disease, cancer, etc. Furthermore, the high levels of trauma related to car accidents and violence that we face in our country often lead to major injuries, resulting in patients needing advanced and specialized nursing care. The spectrum of patients that need Critical Care nursing is wide, and varies from the very old to the very young; from patients needing special care after major surgery or trauma to patients experiencing medical emergencies related to coronary artery diseases, diabetes, etc. It is particularly stressful for nursing staff to work in a Critical Care unit, and caring for these very ill patients requires staff who can think on their feet. Taking into account that we in South Africa, like the rest of the world, are facing a nursing shortage, it comes as no surprise that Critical Care units experience a major shortage of nurses. Hospitals in the private and government sectors therefore encourage their nursing staff to enroll for the highly sought after post-basic qualification: Critical Care nursing. A logistical factor that restricts the number of students who can enroll for the programme at any given time, is the fact that all the students must be working in a Critical Care unit during the course of the programme. This is necessary in order that they may achieve the practical outcomes required by the programme.

3.5 THE CRITICAL CARE NURSING PROGRAMMES OFFERED AT THE STELLENBOSCH UNIVERSITY

The above-mentioned programmes (552 117 and 367 102) have been part of the professional-academic offering of the Faculty of Health Sciences, Stellenbosch University since 1993. Students have the option of doing either a Postgraduate Diploma in Nursing (Critical Care) or a Bachelor of Nursing with Honours (Critical Care) degree. Both of these programmes are presented over one academic year and requires a student to be working in a critical care unit during the period of study.

According to the Academic Calendar or Yearbook of the Faculty of Health Sciences, the purpose of both of these programmes is to expose students to a specialist area in nursing. They also aim at equipping students with advanced, in-depth theoretical knowledge and clinical skills, empowering nurses to practise effectively in the chosen specialist area, while also promoting critical, analytical thinking. The main objective of

the two programmes; the Postgraduate Diploma in Nursing (Critical Care) and the Bachelor of Nursing with Honours (Critical Care) degree, is to assist the student in developing the attitudes, knowledge and skills to function as a competent critical care nursing practitioner with the ability to manage critically ill patients and the critical care environment with insight, confidence and compassion.

The only difference between the honours and diploma programme, according to the yearbook, is that the honours students should complete a mini-research assignment successfully, while the diploma students will only be exposed to basic and simple principles of research methodology.

The programme content is based on the medical and surgical nursing knowledge that students have gained through their basic nursing qualification. Both programmes consist of the following modules:

- Principles and processes of Critical Care nursing.
- System disorders: Critical Care nursing.
- Principles of advanced nursing practice.
- Research methodology.
- Clinical foundations: Critical Care nursing.

Each module must be passed with a final mark of 50% for the successful completion of the programme. Assessment of the theoretical component of the programme may take the form of semester tests, assignments, class presentations and group work.

For the purposes of my study I have focused on the practical module of the programme, namely Clinical Foundations: Critical Care Nursing. In the next paragraph this module will be discussed in detail.

3.6 THE CLINICAL FOUNDATIONS MODULE

In my opinion the Clinical Foundations module, generally referred to by students as the “practical module”, forms the core of the programme. The qualified Critical Care nurse is expected to perform a variety of practical skills in her daily activities, and this module offers students the opportunity to develop these particular skills.

In order for the students to complete the programme successfully and to obtain the additional qualification for registration with the South African Nursing Council, the listed clinical requirements that have to be met for this module (11022774) are the following:

- The practical procedures, competencies and case presentations need to be completed successfully.
- A certain number of hours in different disciplines (e.g. 180 hours in surgery, 180 hours in cardiology, etc) need to be completed.
- The fully completed practical register indicating the amount and type of patients that the student has cared for, needs to be handed in.

Assessment for this module consists of peer assessments, individual case presentations and skill competency tests.

As mentioned above, this module consists of two major elements: the practical procedures and the case presentations. Next I will discuss the relevance and importance of both these elements. Bearing in mind that the practical teaching and assessment are largely effected with the help of Critical Care tutors, the clinical supervision provided by the Critical Care tutors will also be discussed in the next section.

3.6.1 The relevance of the practical procedures

My working definition for a practical or clinical procedure (in accordance with Quinn 1996) is *an intellectual skill consisting of rules for sequencing actions*. These procedures are activities that are performed by registered nurses working in a Critical Care unit, caring for critically ill patients on a daily basis. Examples of practical procedures are administering intravenous medication, interpretation of a Chest X-ray, nursing care of the mechanical ventilated patient, etc. The Clinical Foundations module include 12 key practical procedures in which the student has to demonstrate competency, which in turn will allow the student access to the final practical examination. These practical procedures are formative assessments and students have the opportunity to repeat them until they are found competent. Students are required to be found competent in all 12 procedures by the beginning of October of the academic year. The assessment of the procedures is done by a Critical Care tutor against a prescribed checklist which is available to the students.

Although the practical procedures consist of a cognitive, psychomotor and affective component, it amounts to a set of rules for a list of actions, and therefore has the risk of fragmenting the patient's care instead of providing holistic care. Performing the practical procedures correctly will obviously contribute towards better and safer nursing care of the critically ill patient, but it also does much to assist in developing the insight and critical thinking skills required of students by the end of the programme.

The case presentations which are also required of the students in this module, and which will be discussed next, assist the students in developing the skills to view and care for their patients holistically and to make use of their critical thinking skills.

3.6.2 The relevance of the case studies/presentations

The aim of a patient case presentation is to assess the student's ability to integrate the patient's diagnosis with the medical and other treatment regimes in order to identify the relevant nursing needs and care. The discussion of critically ill patients (case presentations) is one of the most effective ways to assist students in gaining insight into the patient's condition and problems, and to develop their critical thinking skills. To do a case presentation of a critically ill patient is a complex skill that students have to learn through the course of the programme and it requires advanced knowledge and competency.

During a case presentation the students are required to discuss the following aspects of the critically ill patient:

Data collection: To obtain the history and execute the physical examination of the patient.

Data interpretation and integration: To interpret and integrate the vital signs; patient assessment and other available data.

Care planning and implementation: To prioritize problems and implement actions and skills.

General: Infection control, technological safety, psychosocial considerations and multidisciplinary team involvement.

The outcome of the comprehensive clinical assessment is that the students will present a patient case study by integrating the theoretical and clinical aspects of critical care nursing, while applying the scientific principles of nursing to the care of a critically ill patient.

To facilitate this thinking process, students are required to do at least 3 patient case presentations before they are allowed to do their final case presentation for examination purposes by the end of the programme. Assessment of the case presentations is done against a Comprehensive Clinical Assessment form. A student can achieve a maximum mark of 4. The key to rating is as follows:

Table 3.1 Key to the rating of case presentation assessments

0	Fails to act
1	Has minimal knowledge and skills, requires direct supervision
2	Has knowledge but is unable to integrate theory and practice, requires direct supervision
3	Can integrate the necessary knowledge and skills to practice safe nursing care, can perform without supervision
4	Can integrate the necessary knowledge and skills to practise excellent nursing care. Demonstrates initiative, creativity and understanding of the different elements

The expectation is that students will progress from needing supervision in the beginning of the programme to being a practitioner that can function on level 3 or 4, without supervision, by the time they complete the programme.

The student and the Critical Care tutor should ideally spend most of the teaching and learning time in the clinical area (at the bedside) discussing the critically ill patient and his/her environment. In this way the students can learn to develop their critical thinking skills. They can also learn how to handle potential problems that could arise.

3.6.3 Clinical supervision provided by the Critical Care tutors

Structured clinical supervision by dedicated critical care tutors is of marked importance, and for several reasons. Seeing that students who enrol for this programme are required to provide proof of a prescribed number of hours spent in the clinical areas, as well as of completing certain practical procedures on actual patients, students need supervision when working in the clinical areas.

A big challenge is the maintenance of the standard of teaching and learning taking place in the clinical areas. Students come from various clinical institutions and their prior knowledge differs widely, e.g. some of the students have been working in the Critical Care unit for several years, where others have only started to work in this new environment. The university expects the particular clinical area to delegate and assign a senior registered nurse with the post-basic qualification in Critical Care nursing to act as a mentor and clinical supervisor for the students. The mentor should be available to show students how to care for a critically ill patient and handle difficult situations, and to demonstrate certain procedures. Unfortunately, due to the nursing shortage, some of the units do not have a mentor available and students working in these areas are left to themselves. The university attempts to maintain a certain level of quality and

consistency regarding the teaching and learning, by appointing Critical Care tutors to provide clinical support to students in the different hospitals. These tutors aim to spend at least one hour per week with each student. During this time the students can either practise the practical procedures or ask questions and discuss challenging patients with the Critical Care tutor.

The Critical Care students are required to complete a clinical register during their year of training. The students are expected to enter all the time spent with the Critical Care tutor and the activities that had been performed. This register enables the Critical Care lecturer to determine the proportion of time the students and Critical Care tutors had spent on different activities during clinical contact sessions.

3.7 DISCUSSION OF THE INNOVATION IMPLEMENTED IN THE CLINICAL FOUNDATIONS MODULE

The critically ill patient provides students with a wide range of learning and teaching opportunities. When the Critical Care tutor spends time with the students in the clinical area, the “on the spot” teaching at the bedside on how to manage the critically ill patient is extremely valuable. Bedside teaching is the only site where history taking, physical examination, empathy and a caring attitude can be taught and learnt by example (Nair, Coughlan & Hensley 1997).

3.7.1 Problem areas identified

Despite the complexity of doing a case presentation and, at the same time, developing the insight into the disease process and management of a critically ill patient, students often spend most of the available time with the critical care tutor attempting to complete the required practical procedures. Most of these procedures, though, can be practised and assessed by simulating a scenario without a real patient, whereas learning opportunities with the critically ill patient can never be repeated.

It requires a lot of time and effort to ensure that students acquire competency in the practical procedures. Firstly the procedure needs to be demonstrated to them; then they need time to practise it, and by the time they feel competent enough, they have to approach one of the critical care tutors to assess them on performing the procedure. Some of the students may even require multiple attempts to reach the required level of competency.

The Critical Care tutor has time to visit each student only about once a week. As a result students spend all their available time under supervision to complete the required list of practical procedures. They seldom utilize these learning opportunities with the clinical tutor to discuss and understand their patients holistically.

The dilemma with students spending most of their time in the clinical areas on the practical procedures, is that by the time they have completed this module, some of them will not have reached set outcomes. They might be able to perform the practical procedures individually, but still lack the ability to gain insight into their patients' conditions for making informed decisions regarding their nursing management and their environment.

3.7.2 Implementation of a new strategy and the desired outcomes

The question for me was how the current situation could be changed to allow students to maximize the value of the time spent during clinical supervision sessions. Would simulation have a role to play in this regard? Could the Clinical Skills Centre and simulation be utilized for teaching and assessing most of the practical procedures?

Therefore this study has proposed that the immediate focus be turned away from the individual practical procedures, allowing the tutor and the students more time at the bedside to focus on patient discussions, and thereby assisting students to develop their reasoning and critical thinking skills.

To underpin the proposal made in this study, I have implemented a strategy for demonstrating and assessing the required practical procedures by using simulation in the Clinical Skills Centre. By performing the practical procedures away from the patient and the clinical environment, students would have more time available to focus on holistic care. Moreover, it would afford them with more opportunities for learning to do case presentations in the clinical areas and at the bedside.

The other major advantage of using simulation for learning and teaching the practical procedures in the Clinical Skills Centre, is that of establishing a standard method of how these procedures are to be performed.

3.8 DEMOGRAPHICS OF THE STUDENTS

Students from the diploma and honours programme jointly attend this practical module. For the purpose of this study I will therefore not distinguish between the two groups. Furthermore, students registering for this programme are all post-basic students. They are registered nurses who have completed at least 4 years of basic nursing training. The average age of the students registered for the programme in 2007 was 32 years.

Amongst the students enrolling for the programme in 2007, there was no one who had just completed their basic training, and who had no experience at all of either working in a ward or a Critical Care environment. This implies that all the students have had some prior working experience before starting the programme.

Another demographic fact was that 20 % of the class was male, with the majority being female. This distribution is in line with the reality, as there are many more females than males in the nursing profession. One has to mention that 70% of the students in the class have children of their own and therefore have to care for a family and children together with their academic and work responsibilities. This has a marked impact on the students' learning environments and should be kept in mind when the learning programme is designed.

3.9 THE USE OF SIMULATION AND THE CLINICAL SKILLS CENTRE (CSC)

The Clinical Skills Centre (CSC) at Stellenbosch University's Faculty of Health Sciences is an area containing resources for teaching of practical clinical skills. This Centre was established in 2001, but it is only since 2006 that it has been included formally as part of the practical curriculum of the Critical Care nursing programme.

This area has numerous physical models and other equipment that can be used to teach students the practical skills expected of them. Students are scheduled to attend sessions in the CSC in small groups of 10 students at a time, where a demonstration is given to them by a Critical Care tutor. After the demonstration the students have time to ask questions and practise the skills themselves. Following that, they are scheduled to return to the CSC for a formal practice session where they have the opportunity to practise the practical procedures in the presence of a Critical Care tutor and their peers. Only then are the students put through an OSCE (objective structured clinical examination) where they are assessed individually to see whether they are competent in performing the required practical procedures.

One has to bear in mind that not all the practical procedures can be taught and assessed effectively in simulation. For this reason some of the procedures are still taught at the bedside in the clinical area. The idea of simulation has never been to replace real patients; it merely serves to prepare the students perform these procedures on live patients to the best of their ability. Another significant advantage of using the CSC, is that it makes it possible to maintain a certain standard of care. All students are given the same demonstration by a clinical expert, and all of them are assessed under the same circumstances. This also enables the lecturer to set a particular clinical standard.

3.10 CONCLUSION

This chapter has tried to highlight at least two issues as being important in contextualizing a new strategy for the teaching and learning of clinical skills.

Firstly, Critical Care-trained nurses are a scarce modality and this leads to major staff shortages in the workplace. Because of the practical learning that must take place, Critical Care students further increase the workload that the permanent staff has to carry. As a consequence educational institutions have to be innovative regarding the implementation of the practical component of the Critical Care programme.

Secondly, the practical procedures tend to take up a lot of teaching time involving the students and Critical Care tutors in the clinical area. It therefore it appears that the use of simulation to teach most of the practical procedures in the programme is a potentially useful strategy. This might provide students and Critical Care tutors with more time at the bedside to be spent on activities such as patient discussions. These discussions would contribute to the development of integrated thinking and problem solving skills which are vital for any Critical Care-trained nurse.

The aim of Chapter 3 was to contextualize the case study under investigation. Therefore the programme, Critical Care nursing, and the new teaching strategy implemented in the Clinical Foundations module were discussed in detail. In the next chapter I will discuss the research methodology that was utilized in the study.

CHAPTER 4
RESEARCH METHODOLOGY

The aim of this study was to determine the role of the Clinical Skills Centre (CSC) and the value that simulation in this Centre could add to the practical component of a Critical Care nursing programme. In this chapter the research objectives, the research design, research approach and methods for generating data are described.

4.1 OBJECTIVES OF THE STUDY

The primary aim of my study was to investigate whether the CSC could be used to effectively teach and learn the practical procedures required in a Critical Care programme.

Branching from this primary aim, the secondary aims were to establish:

- Which practical procedures could be taught effectively in simulation in the CSC?
- How do students and Critical Care tutors perceive the use of simulation and the CSC?
- How do students spend the allocated teaching times at the bedside with the Critical Care tutors?

4.2 STUDY DESIGN

4.2.1 A descriptive case study design

This study has aimed to describe a specific case and could therefore be typified as a descriptive case study (De Vos, 2002). A specific module, the Clinical Foundations module, as part of the programme Critical Care Nursing at an individual Faculty (Faculty of Health Sciences, Stellenbosch University) was investigated.

The starting point and one of the defining characteristics of the case study approach according to Denscombe (2004), is its focus on just one instance of the phenomenon that is to be investigated. A qualitative case study design is often referred to as a single-subject or idiographic research study by other authors (e.g. Bailey 1997). In this type of case study an individual or event is studied in depth over time, anywhere between a few weeks to several years. The case being studied is usually an individual person,

programme or institution. The case that forms the basis of the investigation is normally something that already exists. It is not a situation that is artificially generated specifically for the purpose of the research. It has existed prior to the research project, and it is hoped that it will continue to exist once the research has finished (Denscombe 2004). Verschuren (2003) argues that there is a tendency to define a case study as a study of a single (or few) object(s) rather than as a methodological approach or research strategy. He goes on to say that one has to apply the term “case research” for this type of research rather than a “case study”. Stake (1995 in De Vos 2002) is of the opinion that the sole criterion for selecting cases for a case study should be “the opportunity to learn”.

The type of case study that I have chosen is an intrinsic case study and it has the purpose of attempting to gain a better understanding of the individual case. Its aim is therefore not to understand a broad social issue or to generalize this particular phenonmenon to other contexts, but merely to understand the particular case in more depth.

The advantage and logic of using the case study approach is that there may be insights to be gained from looking at the individual case that may have wider implications and that would not have come to light through the use of other research strategies. When using a case study approach the researcher has the opportunity to delve into a particular situation in more detail and even discover things that might not have become apparent through more superficial research approaches (Stake, 1995 in De Vos 2002).

Denscombe (2004) also points out that one of the strengths of the case study approach is that it allows the researcher to use a variety of sources, a variety of data types and a variety of methods to generate data as part of the investigation. This quality appealed to me, since I wanted to investigate one module of the Critical Care Nursing programme at Stellenbosch University.

4.2.2 Limitations of a case study design

By choosing a case study design, I kept in mind that the case study approach is most vulnerable to criticism in relation to the credibility of generalizations made from its findings, as findings might be unique to the particular case (Denscombe 2004). According to Gillham (2000) research (particularly in the natural sciences) is aimed at generalizable findings, but in human behaviour generalization from one group of people to another, or from one institution to another, is often suspect – because simply too

many elements or variables are specific to that group or institution. Because of this unknown degree of specificity the naturalistic researcher needs to know what other researchers have done, but cannot be sure that they are relevant. Perhaps the major distinction is that the naturalistic researcher is interested in the qualitative element of what other researchers have done, namely in how people understand themselves or their settings, and not so much in the objectives or the results of their research. Hodkinson & Hodkinson (2001) argue that despite the limitation of case studies that are not generalizable in the conventional sense, good case studies can tell us about situations beyond the actual case that was studied. These authors use the following three points to defend their argument:

- If a case study can generate new thinking, that thinking has a validity that does not entirely depend upon the case from which it was drawn.
- Readers of case study research can judge whether or not the analysis presented sounds convincing, based upon what they know of similar situations and circumstances.
- Case studies can provide provisional truths until contradictory findings or better theorizing has been developed.

4.3 RESEARCH APPROACH

In this study I predominantly took an interpretivistic approach, as focus group interviews and qualitative data played a major role. However, elements of positivistic research were also present, considering the questionnaires and student logbooks used to generate supportive quantitative data.

According to Hesse-Biber & Leavey (2006) the interpretive perspective was developed as a direct challenge to positivist epistemology and its interpretation of objectivity. The interpretive epistemology is based on the interpretations of interactions and the social meaning that people assign to their interactions. Henning (2004) states that research cannot be conducted in a theoretical vacuum; any researcher sets out to investigate issues from a position of knowledge, and this knowledge can frame his/her inquiry. Such a theoretical framework assists one in positioning one's research in the discipline in which one is working, it provides an orientation to one's study and it anchors one's research in the literature.

The interpretivistic framework is about making descriptions of people's intentions, beliefs, values and reasons, trying to make meaning and come to self-understanding. Researchers using this paradigm or framework are therefore extremely sensitive to the role of the context of the research (Henning 2004). Interpretive researchers start out with the assumption that access to reality is only through social constructions such as language, consciousness and shared meanings (Meyers 1997).

Hesse-Biber & Leavey (2006) define positivism as a knowable reality that exists independently of the research process, and it can be discovered and tested through objective means and a neutral researcher. A positivistic research framework sees science as the way to arrive at truth, to understand the world well enough so that it can be controlled by a process of prediction. In this paradigm/framework it is argued that the world is operated by laws of cause and effect that researchers can detect by means of scientific methods (Henning 2004). Positivists generally assume that reality is objectively given and can be described by measurable properties which are independent of the researcher and his or her instruments (Meyers 1997 http://qual.auckland.ac.nz).

4.4 STUDY POPULATION

The study population included the Critical Care Nursing (CCN) students at the Stellenbosch University in 2007, as well as the Critical Care tutors involved in the clinical education of these students.

4.4.1 Sampling

As all students and tutors in the CCN programme were involved in the study, no samples were drawn. The reason why I made use of the students and tutors of 2007 to gather data through consensus discussion group interviews and questionnaires, was simply because these students and tutors were easily accessible. In gathering the data from the students' clinical logbooks, however, I did make use of the 2006 group of students as well, because I could get access to their practical books relatively easily via their lecturer. The participants in the first part of the study (a consensus discussion group) consisted of all the Critical Care tutors involved in the clinical education of the Critical Care nursing programme at the Stellenbosch University. Two group interviews were held with this group; one at the beginning of the academic year and a second towards the end of the year.

For the second part of the study (questionnaires) the participants consisted of all the Critical Care nursing students enrolled at Stellenbosch University during 2007.
The third part of the study (logbooks) involved both the Critical Care nursing students enrolled at Stellenbosch University during 2007, and the documentation (clinical logbooks) of the Critical Care nursing students enrolled for 2006.

4.4.2 Sample size

The first consensus discussion group consisted of 3 Critical Care tutors, and the second of 6 Critical Care tutors. The sample size for the questionnaires was made up from the 15 students that were enrolled the Critical Care nursing programme at the University of Stellenbosch in 2007. The two students who were used in the pilot testing of the questionnaire were excluded from the study. For the clinical logbooks the sample size was represented by the Critical Care nursing students enrolled for both 2006 (17 students) and 2007 (17 students).

4.5 INSTRUMENTATION

Three methods to generate data were used in the study. Firstly, a consensus discussion group interview and focus group interview were conducted. Secondly, students had to complete a questionnaire. Thirdly, clinical logbooks were analysed.

4.5.1 Consensus discussion group interview and focus group interview

Two group interviews were held with the Critical Care tutors involved in the education of the students. The researcher acted as the facilitator for the interviews. The reason why a consensus discussion group interview and a focus group interview were selected as a medium for qualitative data collection in this study, was because of the following reasons (cf. Denscombe 2004; Bruseberg & McDonagh-Philp 2002):

- The sessions revolved around a certain topic and the facilitator/researcher stimulated the group to focus the discussion.
- It was not possible for the facilitator/researcher to adopt a completely neutral role in the proceedings.
- The facilitator/researcher wanted the interaction within the group as a means to elicit information on the points discussed rather than just collecting each individual's point of view.

- The facilitator/researcher wanted the group members to encourage and stimulate one another in the discussion.

4.5.1.1 The consensus discussion group interview

In the consensus discussion group interview the researcher wanted the three Critical Care tutors to arrive at some consensus about which procedures were appropriate to be taught and assessed in a simulated setting. This group discussion was structured, as the participants had each received a letter of information stating what the intention and points of discussion of the interview were going to be (*Appendix A*). Permission to take part in the study was obtained from all the participants (see *Appendix B* for an example of the consent form). Participants were given the assurance that they would be free to withdraw at any point in time.

On the day of the consensus discussion group interview the researcher started with a brief welcome and a short summary of the purpose of the study, making use of the information already provided to the group participants in the handout. The participants all knew one another and the atmosphere in the group was relaxed and non-threatening (de Vos, 2002). The researcher facilitated the discussion and kept field notes while the structured questions from the information letter were discussed in order to reach consensus. One of the factors that helped the group to reach consensus was the fact that all the Critical Care tutors were experts in Critical Care nursing education and they knew the programme and the learning opportunities available to the students in the clinical setting very well.

The results of the consensus discussion group interview are discussed in Chapter 5.

4.5.1.2 The focus group interview

A follow-up focus group interview was held 10 months later. Seeing that by then more Critical Care tutors were involved in the programme, the group for the second interview was larger than the first. This group of 6 persons, was the ideal size for a focus group ionterview, for according to De Vos (2002) it allows everyone to participate and still elicits a range of responses. The researcher emailed all of the participants a month in advance to set the location, date and time for the session. A day before the focus group interview was scheduled, all the participants received a remindeder by SMS.

In the process of finalizing the questions for the focus-group interview, the researcher had put together a list of the issues that the group would need to focus on. This list was

given to another Critical Care educator for feedback with regard to its relevance. This Critical Care educator was also asked to act as co-facilitator and to assist in taking field notes during the interview.

The focus-group interview was planned and conducted in the same manner as the first interview, and the two participants who had not signed the forms of consent yet were given the opportunity to do so. As with the first group, the researcher thanked all the participants for attending the session and ensured them that their input was valuable and that they should feel free to share their ideas with the group. An advantage was that the researcher knew all the participants personally, and most of them knew one another. Therefore the response climate was already comfortable and non-threatening. The researcher then suggested that English would be the language used during the discussion, seeing that one of the participants did not understand Afrikaans very well. It was made clear to the Afrikaans-speaking participants that if they wanted to comment in Afrikaans, they were welcome to do so. The session was then started by the researcher who pointed out that the aims of the session were the following:

- To describe and explore how the Critical Care tutors of 2007 had experienced the use of the CSC as a means to determine student competency in the identified clinical competencies.
- To describe and explore whether the Critical Care tutors experienced better utilization of time spent in the clinical setting during clinical contact sessions.

The following questions were prepared by the researcher to focus the discussion:

- Discuss how you experienced the inclusion and use of the CSC and simulation in the practical programme in general.
- Do you still agree on the 10 practical procedures identified earlier in the year to be taught and assessed in simulation and in the CSC?
- How did you as Critical Care tutors experience the fact that 10 out of the 12 practical procedures were taught and signed off by tutors in the CSC? Would you say that this had an effect on the content and quality of the clinical contact sessions you had with the students in the clinical areas at the bedside?
- How did you perceive the transfer of knowledge from the simulated area to the real clinical setting? Do you think the students were competent to do the procedures on real patients after they had practised and been assessed in simulation?

- In your own opinion – comparing to previous years' groups of students that you have had for clinical sessions, do you think that you were able to spend your time at the bedside better / more productively with this group of students?
- Did you manage to do more case presentations and patient discussions than practical procedures with the students?
- Do you think this intervention assisted the students to better grasp nursing care priorities of the critically ill patient, as well as caring for the patient holistically?

The results of this focus-group interview are discussed in detail in Chapter 5.

4.5.2 Questionnaires

According to De Vos (2002) the basic objective of a questionnaire is to obtain facts and opinions about a phenomenon from people who are most informed about the particular issue. Questionnaires are probably the most generally used instruments of all for this purpose (Boynton & Greenhalgh 2004).

4.5.2.1 Questionnaire design

The questionnaire used by Freeth & Fry (2005) in a study on "Nursing students' and tutors' perceptions of learning and teaching in a Clinical Skills Centre" served as the basis for my questionnaire (See *Appendix C* for the questionnaire used in the study.) Most of the questions in the questionnaire were presented as closed-ended questions, making use of a 5-point Likert scale (24 questions) and the rest (5 questions) were open-ended.

The Likert scale is often used for nominal data and when one wants to know respondents' feelings or attitudes about something (http://coe.sdsu.edu/eet/ Articles/surveyquest/start.htm). A benefit of the Likert scale is that it is easy to understand and contributes to consistent answers. This scale is an ordered, one-dimensional scale from which respondents choose one option that best aligns with their view. There are typically between four and seven options, but five is the most common. There is much debate about how many choices should be offered; the argument being that an odd number allows respondents to sit on the fence, whereas an even number forces them to make a choice, whether this reflects their true position or not (Clason & Dormody 2006; http://changingminds.org/explanations/reserach/measurement/likert scale.htm).

In the questionnaire used in this study participants had to indicate on a five-point Likert-type scale their degree of agreement or disagreement with the statements made. The choice options were:

Strongly agree *Agree* *Uncertain/Neutral* *Disagree* *Disagree strongly*

The questions in the questionnaire were focused around the following themes that emerged as being important from the literature review. (Chapter 2):

- Whether students value the fact that they can repeat practical procedures in simulation without causing harm to their patients (Questions 1 & 5).
- Whether practical procedures are taught according to a specific method (Questions 2 & 13).
- Whether theory and practice can be integrated in the CSC (Question 6).
- Whether students valued the assistance and feedback from a Critical Care tutor in the CSC while practising the practical procedures (Question 3).
- Whether practice in the CSC is realistic enough to ensure the transfer of learning to the clinical area (Questions 4, 7, 20 & 21).
- Whether the learning opportunity in the CSC assists in making students more confident and competent to perform the procedures on real patients (Questions 8, 9, 10 & 11).
- Whether learning in groups and from peers was meaningful and enjoyable (Questions 12 & 14).
- Whether learning the practical procedures in the CSC has special added value and meaning (Questions 16, 17 & 23).
- Whether simulation and the CSC can replace real patients in the clinical environment (Questions 18 & 19).
- Whether the sessions in the CSC were enjoyable (Question 22).
- Whether the formative assessment sessions in the CSC assisted the students to perform better in their summative Objective Structured Clinical Examinations (Questions 15 & 24).

According to Boynton & Greenhalgh (2004) open-ended questions allow for creative expression, but may not suit less forthcoming respondents, and the responses must be formally analysed with qualitative methods. The researcher used only five open-ended questions towards the end of the questionnaire that allowed respondents enough time to complete the rest of the questionnaire (De Vos 2002). Although open-ended questions

can provide the researcher with the full richness of the views held by the respondents, they demand more effort on the part of the respondents and might well reduce their willingness to either take part in the study or to answer those types of questions (Denscombe 2004).

Of the open-ended questions used in the questionnaire, numbers 25-27 focused on the respondents' ages and number of years' experience in the working environment.

Question 28 and 29 were open-ended, giving respondents the opportunity to make recommendations and to comment on the teaching and learning of the practical procedures in simulation and in the CSC.

4.5.2.2 Letter of consent

The questionnaire was accompanied by a letter of consent stating the purpose and importance of the study, and intended to motivate respondents to cooperate in the survey. A more detailed discussion of the letter will be provided under point 4.6 (Ethical considerations*)* later in this chapter*.* The letter of consent that the researcher used in the study is included as *Appendix B*.

4.5.2.3 Pilot testing of the questionnaire

According to De Vos (2002) it is essential that all newly constructed questionnaires should be pilot-tested before being presented to the full sample. The researcher used two students (they were randomly selected from the participant group) to complete the questionnaire in order to identify any errors and ambiguous or vaguely phrased questions. The final questionnaires completed by these two students were later excluded from the participant group.

4.5.2.4 Completion of the questionnaire

At the beginning of 2007, during the students' first contact session in the CSC, I explained my study to them. In the course of 2007 students were exposed to the teaching and learning of some of their practical procedures in the CSC. During their last day of class in October 2007 the participant group was asked to complete the consent forms as well as the questionnaires. I was present while the students completed the questionnaires and I made sure to remain only in the background. At most I would encourage respondents with a few words to continue with his/her contribution or lead

him/her back to the topic (De Vos 2002). None of the participants needed to ask any questions, and on completion the questionnaires were returned to me.

4.5.3 Clinical logbooks

The students in this programme completed clinical logbooks in the course of the academic year to reflect how their contact times had been spent with the Critical Care tutor in the clinical areas (see *Appendix D* for an example of the clinical logbook). In these logbooks the students indicated whether the time was used to gain competency in the practical procedures, or whether it was used for patient discussions in an attempt to integrate theory and practice. The researcher summarized the data from the 2007-students' logbooks by grouping the activities on which the students have spent their time into the two categories mentioned above. The researcher also analysed the logbooks of the 2006-students in order to compare them to the group of students from 2007. This analysis of the numerical data is discussed in Chapter 5.

4.6 THE RESEARCH PROCEDURE

The researcher and the principal lecturer of the CCN programme worked together and planned innovations to the practical component of the programme. Towards the end of 2006 we discussed the logistics of the programme and how my study would fit into the practical component.

The next step was to convene a group interview between the researcher, the lecturer and the critical care tutors involved in the practical education of the programme. Consensus needed to be reached on the practical procedures that were most appropriate to be taught and assessed in simulation in the Clinical Skills Centre (CSC). This consensus discussion interview was held during January 2007.

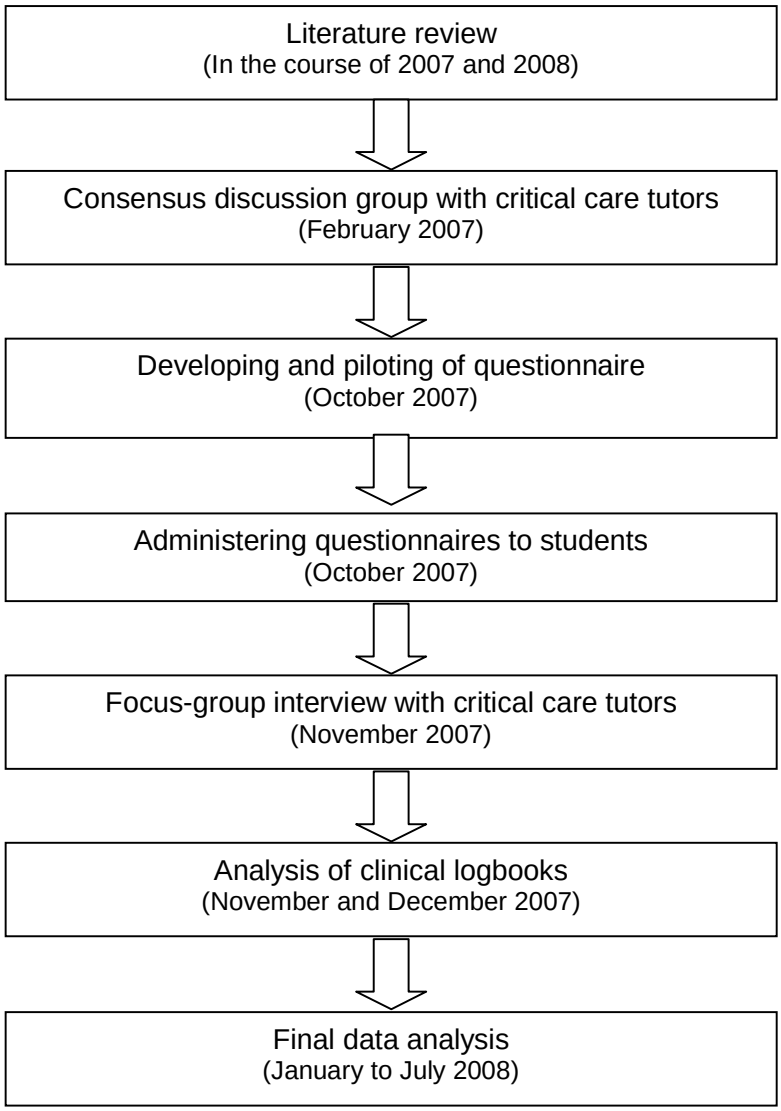
During the course of the academic year the identified practical procedures were taught and assessed in simulation in the CSC.

Towards the end of the programme the students involved were asked to complete a questionnaire to assess their experience and perceptions of using the CSC to achieve competency in the practical procedures.

A follow-up focus-group interview was held with the lecturer and Critical Care tutors by the end of the academic year to gather data on how they had experienced the use of simulation in the CSC as part of the programme.

Finally, the clinical logbooks of the students were analysed to gather numeric data on the activities that students had been spending time on during clinical contact sessions. Clinical logbooks of students from 2006 as well as 2007 were analysed in order to see whether any observable differences existed. Figure 4.1 provides a graphic summary of the sequence of the research procedure:

Figure 4.1 Research procedure



4.7 DATA ANALYSIS

An experienced statistician was consulted on how the data should be managed and analysed.

4.7.1 Analysis of qualitative data

The recorded tapes were transcribed for data analysis by myself. Seeing that the quality of the tape recording was not very good, the field notes that were taken during the focus-group interviews were also used to ensure that none of the discussion points during the interviews were missed. Reflecting back on this exercise of analysing the qualitative data, I have to acknowledge that the process of transcribing needs to be recognized as a substantial part of the method of interviewing and not be treated as some trivial chore (Denscombe 2004).

Content analysis is the preferred choice for novice researchers, because it is easy to access and it works on one level of meaning (Henning 2004). The text was then broken down into units for analysis. These units were coded and then categorized according to events and ideas. I then worked through the notes again in order to see whether the categories made sense and whether there was some coherence. The categories identified were then put together to see which different themes were emerging. At this stage I went back to my central research question to ensure that the themes could be related to it.

4.7.2 Analysis of quantitative data

The major attraction of quantitative data is that the use of numbers can present findings in the form of graphs and tables that convey a sense of solid, objective research. The data of the completed questionnaires, as well as the clinical logbooks, were captured by making use of the Microsoft Word computer program. For the analysis of the data simple descriptive measures such as averages and tables were used.

4.8 ETHICAL CONSIDERATIONS

I submitted the research protocol for this study to the Committee for Human Research at the Faculty of Health Sciences, Stellenbosch University. It was approved in March 2007. I also obtained written consent from all the students taking part in the study (see *Appendix B* for the letter of consent to the students and Critical Care tutors).

At the time when I invited the respondents to take part in the study, they were given details of the research project. The importance of the respondents understanding what the research entailed and the ways in which they were involved, were highlighted. Respondents were assured that their participation was entirely voluntary and that they were free to decline to participate. The respondents were also told that they were free to withdraw from the study at any point, even if they had initially agreed to take part. They were reassured that the information collected would be treated as confidential and protected, and that only the researcher would have access to the records. If it was to be used in a publication or thesis, participants would remain anonymous throughout (De Vos 2002).

4.9 VALIDITY AND RELIABILITY

To obtain valid and reliable data a researcher must ensure that the measuring procedures and the instruments used have acceptable levels of reliability and validity. These two concepts will now be discussed from a qualitative and quantitative perspective.

4.9.1 Validity and reliability of qualitative data

During the process of generating and analysing the data I was aware of the fact that certain critics doubted the reliability and credibility of qualitative research findings, and that I therefore had to find ways to address such criticism (Bailey 1997). The qualitative study is more likely to achieve validity than the quantitative study, because in quantitative studies the researcher gathers information in an “unreal” setting while, on the other hand, the qualitative researcher usually goes to the research subjects and observes or involves them over longer periods of time (Bailey 1997).

Validity in research, according to Henning (2004), has three criteria:

- Validity as competence and craftsmanship, which includes continually checking, questioning and theoretically interpreting the findings.
- Dialoguing the knowledge by asking other people; especially the research participants, whether they agree with the researcher’s data.
- Taking action – pragmatic consequences of knowledge claims regarding validity, which has relevance for the usability of the findings, and also the empowerment of the research participants.

Lincoln and Guba (1985 in De Vos 2002) and Gillham (2000) also propose alternative constructs that more accurately reflect the assumptions of the qualitative paradigm. Credibility or trustworthiness to them is the alternative to internal validity, and the goal with these criteria is to demonstrate that the inquiry was conducted in such a manner as to ensure that the subject was accurately identified and described. Therefore it was very important to me that the setting, population and boundaries of the study would be described adequately. Transferability, which seems to be an alternative to external validity or generalizability in qualitative research can, however, be problematic. A strategy to enhance a study's generalizability is to triangulate multiple sources of data. Designing a study in which multiple cases, multiple informants or more that one data generating method is used, can strengthen the study's usefulness for other settings (http:/www2.chass.ncsu.edu/garson/pa765/cases.htm). Seeing things from a different perspective and the opportunity to correlate findings can enhance the validity of the data. This measure is called triangulation (Denscombe 2004). De Vos (2002) points out that if researchers take multiple measures to study a particular phenomenon, they are more likely to arrive at the true picture. If data generated in multiple ways do not correspond, it means that caution should be exercised about basing one's understanding on any one set of data (Gillham 2000). In this study I have attempted triangulation measures by making use of questionnaires and clinical logbooks completed by the students, as well as arranging focus-group interviews with the tutors.

According to Bailey (1997) it is more difficult to achieve reliability than validity in qualitative studies. Reliability is concerned with replicability; it requires that a researcher using the same data collection and analysis techniques can obtain the same results as those of a previous study. Positivists' notions of reliability assume an unchanging universe where inquiry could quite logically be repeated. This is in direct contrast to the qualitative assumption that the social world is always being constructed and replication is problematic (Lincoln and Guba 1985 in De Vos 2002).

4.9.2 Validity and reliability of quantitative data

The validity of a questionnaire relies first and foremost on reliability. If the questionnaire cannot be shown to be reliable, there is little probability of validity. Validity refers to whether the questionnaire measures what it intends to measure (questionnaire validity). I enhanced content validity by asking two experts in clinical skills education and Critical

Care nursing to give critical feedback on the questionnaire before administering it to the students (Bostwick and Kyte 1981 in De Vos 2002).

Reliability according to Bostwick and Kyte (1981 in De Vos 2002) primarily concerns how well something is measured. Independent administration of the same instrument (or highly similar instruments) consistently yields the same results under comparable conditions. I made use of a questionnaire that had been used in a survey by Freeth & Fry (2005) as a basis for this study. This enquiry by Freeth & Fry, as well as my own study, revealed similar results by highlighting that students and tutors were positive about learning and teaching within the CSC, particularly valuing the opportunities for supported practice (see Chapter 5).

Reliability was further enhanced by the fact that the whole class of 2007 was used for the study, compared to possibly only a sample of the class.

4.10 SUMMARY OF THE CHAPTER

Bearing in mind that both qualitative and quantitative data were generated in my study, it is important for me as the researcher to point out the differences in generating and analysing these two sets of data. Denscombe (2004) states that the whole point of quantitative research is to produce numerical data that are “objective” in the sense that they exist independently of the researcher, while qualitative research by contrast tends to place extensive emphasis on the role of the researcher in the construction of the data.

Chapter 4 served to discuss the research design used in the study, the research instruments used to generate data, the ethical considerations, as well the issues of validity and reliability. The results of the empirical investigation are displayed and discussed in Chapter 5.

CHAPTER 5
RESULTS OF THE EMPIRICAL STUDY

I generated qualitative data through two group interviews with tutors/teaching staff and quantitative data from students through a questionnaire and clinical logbooks. These three sets of data are presented and discussed in this chapter.

5.1 INFORMATION ABOUT THE PARTICIPANTS

5.1.1 The Critical Care tutors

All of the 6 Critical Care tutors involved were female and between 38 and 50 years of age. The requirements set by the Nursing Department at the Faculty of Health Sciences, Stellenbosch University for acting as a Critical Care tutor are as follows:

- The person should be registered with the South African Nursing Council (SANC)
- The person should have Critical Care nursing as well as Nursing Education as additional post-basic qualifications.

All of the Critical Care tutors involved complied with these standards.

The tutors have worked in a Critical Care unit environment for a number of years before moving into the teaching positions they are holding at present. The hands-on experience they have gained in the Critical Care units over the years is of crucial importance, seeing that it would enable them to handle all the scenarios they might be faced with when teaching the students in the clinical areas. Another benefit of having extensive experience as a Critical Care nurse in the hospital is that it enables tutors to draw on examples from personal experience when teaching, which in turn gives them the necessary credibility in the eyes of the students.

All the Critical Care tutors involved in this programme have both informal and formal experience in clinical teaching. Informal clinical teaching is a role that SANC requires from all registered nurses working in the clinical area. Senior nurses are expected to teach junior students and act as their role models while fulfilling their daily tasks.

Formal teaching means that the individual has been appointed in a designated teaching post and her primary role in that post is to teach nurses in the specific institution. The Critical Care tutors used for my focus-group interviews each had from 5 to 11 years of formal teaching experience.

All of the Critical Care tutors enjoy teaching and they are passionate about their specialization field, Critical Care nursing. Bearing in mind how dynamic and fast-changing the medical world and this area of nursing are, it is vital that these tutors remain informed of new developments in order to able to teach the novice nurses entering this field of nursing. Ways to keep abreast of the latest best practices and research in the Critical Care environment include attending conferences, reading journals and attending the meetings of the Critical Care society offering access to a journal club and 3-monthly information sessions.

At the beginning of the academic year (2007) only 3 Critical Care educators were involved in the programme, but towards the middle and the end of the programme, when the focus-group interview was held, 6 Critical Care educators were involved. The response rate for both group interviews was 100%; all 3 Critical Care tutors involved at the beginning of 2007 attended the consensus discussion group, and all 6 that were involved by the end of 2007 attended the second focus-group interview.

5.1.2 The students

Table 5.1 contains a summary of the students registered for the 2007 programme, breaking the detail down into age, the number of years since they have completed their basic nursing training, and since when they have been working in the Critical Care unit.

Table 5.1: Biographical information of student participants

Student	*Age*	*Years since students had completed their basic registered nursing qualification*	*Years of working in a Critical Care unit*
1	26	2	2
2	31	3	3
3	24	2	2
4	24	2	2
5	41	17	14
6	31	9	9
7	30	4.5	4.5
8	42	2	2
9	31	4	3
10	47	27	2.5
11	27	3	3
12	30	4	7
Average	**32**	**6.6**	**4.5**

The response rate of the students was 12 out of 15 (80%). Questionnaires were used, so that a high response rate was expected. I also took into account that the 2 students who were used in the piloting of the questionnaire were excluded from the study, and that 3 of the questionnaires were not completed, which meant that they could not be used for generating data.

As can be seen from table 5.1, the students are all adult learners with an *average age* of 32 years. This might explain why the learner-orientated approach of teaching and learning that is followed in the curriculum (e.g. self-directed learning) is posing challenges to both the students and their lecturer. The lecturer for the Critical Care nursing programme has verbalized her concern and difficulties in motivating these students to learn independently without expecting her to provide them with all the answers and notes. The reason why the ages of the students are significant, is because most of these students come from a schooling system which was still very much teacher-centred, as opposed to systems currently favouring a learner-centred approach.

The relevance of the *number of years since the students had completed their basic registered nurse qualification*, is that none of these students are novice nurses. They have all worked in clinical areas, with 2 years being the least number of years' experience and the average being 6.6 years. This implies that it might be fair to expect them to have prior knowledge of the basic nursing care of a patient.

The relevance of the average *number of years the students had been working in a Critical Care unit* being 4.5 years, indicates that the students have a fair amount of experience in the field of critical care nursing. The least number of years of working in the Critical Care environment is 2 years, and the most is 14 years. The ideal for any student is to have more or less 2 years' experience before enrolling for a Critical Care nursing programme, since the two years would have provided them with sufficient background and experience to make sense of the programme. Students who have less than 2 years' experience often find the programme overwhelming and too difficult. The potential problem with anyone having for example 14 years of experience, is that they had been working in the specialization field without formal training for so long that they often have learned wrong habits. They may well have fallen into a habit of performing their job without the necessary understanding or without any insight into the patients' problems. It is often very difficult to assist these students to unlearn their bad habits before they can actually start learning the correct methods of performing the practices and procedures required of them.

Next I will discuss the group interviews that were conducted with the Critical Care tutors.

5.2 RESULTS OF THE GROUP INTERVIEWS

5.2.1 The consensus discussion group interview

The consensus discussion group interview was aimed at reaching consensus between the Critical Care tutors on the practical procedures that would be appropriate to be taught and assessed in simulation in the Clinical Skills Centre (CSC). The results of consensus reached during the group discussion are displayed in Table 5.2 below.

Table 5.2: Results of the consensus discussion group interview

Procedure	Conclusion on whether the procedure could be taught in simulation in the CSC or not
1. Assess an abnormal blood gas	Yes, this procedure is theoretical and could easily be done without a real patient, by giving a case scenario in simulation.
2. Assess a chest x-ray	Yes, this procedure is theoretical and could easily be done without a real patient, by giving a case scenario in simulation.
3. Assess a 12 lead ECG	Yes, this procedure is theoretical and could easily be done without a real patient, by giving a case scenario in simulation.
4. Administer IV medication	Yes, this procedure could be simulated effectively by using the models and equipment available in the CSC.
5. Perform open ET suctioning	Yes, this procedure could be simulated effectively by using the models and equipment available in the CSC.
6. Extubate a patient	Yes, this procedure could be simulated effectively by using the models and equipment available in the CSC.
7. Maintain epidural analgesia	Yes, seeing that this procedure has a huge theoretical component it can be done in simulation with the models and equipment available in the CSC.
8. Maintain haemodynamic monitoring	Yes, this procedure could be simulated by using the models and equipment in the CSC. The application of this procedure will have to be monitored by the critical care tutors in the clinical settings.
9. Care of patient post-TPM insertion	Yes, seeing that this procedure has a huge theoretical component it can be done in simulation with the models and equipment available in the CSC.
10. Care of patient with VDD in situ	Yes, seeing that this procedure is not often available in the clinical setting and because it has a big theoretical component one can use the models and equipment available in the CSC to simulate this.
*11. Care of a ventilated patient	No, in order to see the patient-ventilator interaction this procedure needs to be taught and assessed on a real patient with a ventilator in the clinical area.
*12. Assessment of neurological status	No, this procedure needs a real patient with an abnormal neurological status and therefore needs to be completed in the clinical area.

During the discussion the Critical Care tutors agreed from the start that the first 6 procedures could be done in simulation in the CSC. In fact, procedures 1 to 3 were

already being done very often through simulation in the clinical areas. These 3 procedures are mostly carried out away from the patient's bedside in any event, and therefore it was argued that teaching and assessing these can easily be done in the CSC.

Although procedures 4 to 6 are generally performed on patients in the clinical areas, the group had reached consensus that this could also be taught and assessed in the CSC. The reason for this decision is that the equipment available in the CSC is sufficient to simulate these 3 procedures effectively and realistically.

Procedures 7 to 12 provoked the most discussion between the participants, but consensus was reached as indicated below.

The participants felt that principles of procedures 7 to 10 could be taught and assessed in the CSC. However, when a real patient is involved and the procedure has to be applied in that context, the Critical Care tutors will have to monitor the application of these 4 procedures in the clinical areas very closely.

The 2 last procedures marked with an asterisk (*) were discussed in detail. The consensus reached was that they should be done in the clinical area on a real patient. The patient's role in the interpretation of these 2 procedures is vital and it would not be possible to simulate it effectively. Seeing that the students often have difficulty to reach competency in these 2 procedures, the Critical Care tutors felt that these 2 procedures should still be discussed and demonstrated in the CSC, but that the assessment should take place in the clinical area, and the procedure performed on a real patient.

5.2.2 The focus-group interview

The aims of the focus-group interview were as follows:

- To describe and explore how the Critical Care tutors of 2007 had experienced the use of the CSC for determining student competency in the identified clinical competencies
- To describe and explore whether the Critical Care tutors had experienced better utilization of time spent in the clinical setting during clinical contact sessions.

To increase the trustworthiness of the interview I set up the issues I wanted to be discussed and then handed it to a Critical Care educator for feedback. I also requested this same person to act as co-facilitator and to take notes during the interview.

Following are the ideas/themes that emerged from the focus-group interview with the Critical Care tutors as interpreted by myself (see *Appendix E* for the transcript):

Theme 1: The use of the CSC to teach and assess the students.

- It worked pretty well.
- Students learned well in the CSC.
- The students with little practical experience doing the programme benefit considerably from the sessions in the CSC.
- The procedures were taught consistently.
- Assessment was fair and consistent, uniform.
- Due to the fact that students were assessed on the practical procedures at regular intervals in a structured manner, the students' practical procedures were all completed in time, not like previous years when they struggled to finish it.
- Critical Care tutors requested that all the practical procedures needed to be demonstrated and practised in the CSC, even the ones that need to be assessed at the bedside on a real patient. The reason for this request was that valuable time was wasted at the bedside to teach and assess the two practical procedures that had been identified to be assessed on real patients.

Theme 2: How time was spent.

- The CSC sessions were definitely to the benefit of the weaker students. Seeing that their practical procedures were done on time in the CSC, the students could proceed to case presentations with their Critical Care tutor, where in the past it took them the whole year just to become competent in the procedures.
- Because students were fairly competent in their practical procedures, the time that we as Critical Care tutors spent with them during clinical contact sessions was far more productive this year than in previous years.
- A problem that arose was that students started to cancel their practical appointments with the tutors because there was no pressure to obtain competency in the practical procedures (it was already obtained in the CSC).
- Students should be required to have a minimum number of clinical contact sessions with their Critical Care tutor, and not be allowed to cancel their appointments simply because their practical procedures have been completed. With this arrangement the Critical Care tutors will have the opportunity and time for more meaningful teaching at the bedside.

Theme 3: Better information regarding the teaching process in the CSC should be given to students and tutors.

- The importance of the practical sessions should be explained to the students in detail at the beginning of the year.
- The new Critical Care tutors felt that they wanted to be more involved with what was happening and taught to the students in the CSC. They did not quite know how to approach the bedside teaching, because they did not have access to what the teaching in the CSC entailed and how was done.
- Critical Care tutors felt that once the students had been found competent in simulation, they did not want to be evaluated again at the bedside on the same procedure. Therefore it should be explained to the students that they could be re-evaluated on the practical procedures at any time, because they are supposed to be able to perform the procedures correctly in all circumstances.
- If students do not perform the practical procedures correctly at the bedside, they should be sent back to the CSC to obtain more practice and be re-evaluated if necessary.

Theme 4: A new way of looking at the teaching that happens at the bedside

- One of the Critical Care tutors verbalized that she now realizes that the time spent at the bedside cannot be wasted on ABCD issues, etc. It must rather be used to focus on critical thinking and looking at the patient holistically.
- The practical procedures that were taught in the CSC in simulation must be applied under supervision of the Critical Care tutor at the bedside.
- The Critical Care tutors wanted to know exactly what was expected of them at the bedside.
- Before the CSC was added to the practical curriculum the teaching at the bedside happened somewhat ad hoc. The new structured way of teaching and assessing the practical procedures now necessitates teaching at the bedside to be revisited and to be structured to a certain extent.

Theme 5: The sessions in the CSC must be made even more realistic

- Case presentations should be added to the CSCs practical sessions.
- A designated simulated Critical Care unit area should be set up permanently in the CSC.

Theme 6: Obstacles identified in the teaching and assessment done in the CSC.

- If the simulations are not done in the format of a patient scenario, it could be somewhat unrealistic. Therefore one needs to link some of the practical procedures, e.g. the interpretation of an X-ray or an ECG, to a patient scenario.
- A lack of equipment to make the scenarios realistic was a logistic problem and an attempt should be made to procure more equipment. Hospitals could be approached to donate some of their old equipment that is being replaced to the CSC.

The results from the questionnaires completed by the students will be discussed next.

5.3 RESULTS OF THE QUESTIONNAIRES

5.3.1 The Likert scale results

The Likert scale questions asked in the questionnaire were grouped together in themes and the results are displayed accordingly in the table below:

Table 5.3: Questionnaire results (n=15)

Theme 1	***Students can repeat practical procedures in simulation without causing harm to their patients.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 1	42%	58%			
Question 5	50%	50%			
Theme 2	***Practical procedures are taught according to a specific method.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 2		67%	33%		
Question 13	50%	42%	8%		
Theme 3	***Theory and practice are integrated in the CSC.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 6	33%	67%			
Theme 4	***Students valued the assistance and feedback while practising the practical procedures with a clinical tutor in the CSC.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 3	42%	58%			
Question 24	42%	58%			

Theme 5	***Practice in the CSC is too artificial to be helpful.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 4			8%	75%	17%
Theme 6	***The learning opportunity in the CSC assists in making students more confident and competent to do these procedures on real patients.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 7	50%	50%			
Question 8	33%	67%			
Question 9	25%	67%	8%		
Question 10	25%	75%			
Question 11	33%	67%			
Theme 7	***Learning in groups and from peers was meaningful and enjoyable.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 12	25%	58%	17%		
Question14	17%	67%	8%	8%	
Theme 8	***The teaching of practical procedures in the CSC has no special added value and meaning.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 16		42%	8%	33%	17%
Question 17		25%	75%		
Theme 9	***Simulation and the CCS can never replace real patients in the clinical environment.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 18	8%	67%	25%		
Theme 10	***The manikins are realistic enough to help with the development of clinical skills.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 19	8%	67%	25%		
Theme 11	***The sessions in the CSC were enjoyable and students learned a lot.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 22	58%	42%			
Question 23	58%	42%			

Theme 12	***The assessment sessions in the CSC (formative and summative) were meaningful.***				
Related questions	*Strongly agree*	*Agree*	*Uncertain/Neutral*	*Disagree*	*Strongly disagree*
Question 15	25%	58%	17%		

From the questionnaire data the students' feelings and attitudes towards the teaching and learning in simulation in the CSC can be summarized as follows under the above-mentioned themes:

- Theme 1: All students agreed that they valued the fact that they could repeat practical procedures in the CSC without causing harm to their patients.
- Theme 2: Students were not really aware of a specific method used by tutors to teach them procedural skills, but felt that they learned best when the tutor first demonstrated the particular skill.
- Theme 3: Students all agreed that the sessions in the CSC assisted them in the process of integrating theory and practice.
- Theme 4: Students indicated that they valued the assistance and feedback while practising the practical procedures with a Critical Care tutor in the CSC.
- Theme 5: On the issue of whether the practice in the CSC was too artificial to be useful, students indicated that this was not the case.
- Theme 6: Students agreed that the learning opportunity in the CSC helped to make them more confident and competent to perform these same procedures on real patients.
- Theme 7: Most of the students indicated that learning in groups and from peers was meaningful and enjoyable, although some of them seemed to attach less value to it.
- Theme 8: Although the students felt that they had learned a lot in the CSC, they seemed to have mixed feelings about whether the simulated practical procedures could have been taught equally well in the clinical area or in any classroom.
- Theme 9: All students indicated that although they had been taught in the CSC, they still needed the practice on real patients. This confirms that simulation in the CSC can never replace real patients in the clinical environment.
- Theme 10: Most of the students agreed that the manikins in the CSC were sufficiently realistic to help with the development of their clinical skills, although some of them indicated that they were uncertain about this statement.

- Theme 11: All students indicated that they enjoyed the sessions in the CSC and learned a lot from it.
- Theme 12: The overall indication was that the formative and summative assessment sessions in the CSC were meaningful to the students.

5.3.2 The open-ended questions

The results of the open-ended questions in the questionnaire regarding the students' recommendations on the teaching and learning experience in the CSC can be grouped in the following themes:

Theme 1: Enjoyable and meaningful for students.

- The method is good and it is a very good learning environment.
- Wish we could spend more time in the CSC.
- Enjoyed the time allocated for each skill.
- Students should make more frequent use of the CSC.

Theme 2: Students have a need for supervised practice.

- Students indicated that they needed to have a dedicated Critical Care tutor to be available for a specific day who could assist them with practice sessions.

Theme 3: The simulation scenarios need to be made more realistic.

- Simulation must be used even more effectively and realistically, so that one can for example note the effect of a temporary pacemaker without putting the patient at risk.

Theme 4: Additional teaching and learning material should be available.

- The students indicated that there was a need for DVDs to demonstrate certain procedures. Students should be able to either buy or borrow these DVDs.

Summarily, the results of the student questionnaires proved that students were in favour of making use of simulation to learn the practical procedures. All the students indicated that they had enjoyed the sessions and felt that it was useful.

5.4 ANALYSIS OF CLINICAL LOGBOOKS

I compared the statistics of the 2006 students' logbooks to those of the 2007 group and consequently investigated how their time was spent during the clinical contact sessions with the Critical Care tutor. These two sets of data are displayed in Tables 5.4 and 5.5.

Table 5.4: Clinical contact summarized from the logbooks of 2006 students

Student	Number of times patient discussions / presentations were done	Number of times practical procedures were done
1	19	12
2	21	15
3	16	4
4	9	13
5	12	10
6	9	12
7	13	11
8	10	9
9	11	14
10	23	20
11	22	13
12	23	17
13	16	16
14	19	16
15	8	12
16	20	12
17	17	17
	Total number of times patient discussions/ presentations were done 268	Total number of times practical procedures were done 223
	Average p/student 15.8	*Average p/student 13.1*

Table 5.5: Clinical contact summarized from the logbooks of 2007 students

Student	Number of times patient discussions / presentations were done	Number of times practical procedures were done
1	23	8
2	22	15
3	32	12
4	38	4
5	20	9
6	17	6
7	29	15
8	29	7
9	22	13
10	29	16
11	33	15
12	28	13
13	27	9
14	23	12
15	26	9
	Total number of times patient discussions/ presentations were done 398	Total number of times practical procedures were done 163
	Average p/student 26.5	*Average p/student 10.9*

The aim of this part of the empirical study was to analyse the differences in how time was spent at the bedside by Critical Care tutors and students. The intention of using simulation in the CSC to complete most of the practical procedures was to reduce the amount of time students would spend with their Critical Care tutors on practical procedures in the clinical areas. Time at the bedside could then be used more effectively by spending it on patient discussions/presentations, which in turn would assist students to think holistically and critically about the patients they are caring for.

From the clinical logbook data as displayed in Tables 5.4 and 5.5, it becomes clear that more time was spent at the bedside doing discussions/presentations of patients in 2007 than in 2006. There is also a significant decrease in the number of practical procedures performed at the bedside during 2007, compared to 2006. This could be due to the fact that students had the opportunity to complete most of their practical procedures in simulation in the CSC and that they could therefore spend more time at the bedside to discuss their patients with their Critical Care tutors.

5.5 SUMMARY OF THE CHAPTER

The information obtained from the focus-group interview with the Critical Care tutors and the student questionnaires indicated that these two groups were largely in agreement that simulation seems to be valuable and can effectively be used in a Critical Care Nursing programme.

The feedback provided by both the students and Critical Care tutors highlighted some of the issues that were brought to the fore in my literature review (Chapter 2). These important issues are the following:

- Although literature makes it clear that simulators are becoming so sophisticated that one can address the issue of lack of realism, the equipment available in the CSC in the case of Stellenbosch University is limited and some of the simulated scenarios were not as realistic as one would have preferred it to be.
- Case presentations seem to be an important component of the CSC's practical sessions, and a designated simulated Critical Care Unit area appears to be valuable for a CSC.

- The students placed a high value on supervision by a Critical Care tutor when practising their skills in the CSC. They indicated that they would like a tutor to be available by appointment.
- Students also indicated that they had a need to practise some of the more risky procedures, e.g. the use of the temporary pacemake,r on a manikin in simulation. The CSC is ideal for this purpose, because it presents no risk to patients, while facilitating the repetition of particular aspects of tuition.

In Chapter 5 the information gathered by the data generating tools was presented and discussed. In the next chapter some conclusions, recommendations and opportunities for further research based on the findings of the study will be highlighted.

CHAPTER SIX

DISCUSSION OF FINDINGS AND RECOMMENDATIONS

In this final chapter the results of the empirical study are discussed in view of the research question as described in Chapter 1 and the literature reviewed in Chapter 2.
The primary aim of the study was to describe and explore whether simulation in the Clinical Skills Centre at Stellenbosch University could be used to effectively teach and learn the practical procedures required in a Critical Care nursing programme. The research question that guided the study was formulated as follows: 'Could simulation in the Clinical Skills Centre be used to effectively teach and learn the practical procedures required in a Critical Care nursing programme at the Nursing Department, Faculty of Health Sciences, Stellenbosch University?" (See 1.4.1).

In Chapter 6 I will point out how the findings of the study have addressed the research question and draw conclusions from its findings under the headings of the secondary aims set out in Chapter 1. In this chapter I also provide recommendations for practice, provide suggestions for further research and point out a number of possible limitations of the study.

6.1 DISCUSSION OF FINDINGS

6.1.1 Which practical procedures could be taught effectively in simulation in the Clinical Skills Centre (CSC)?

At the beginning of the study the Critical Care tutors reached consensus that 10 out of the 12 practical procedures required of the students were suitable to be taught and assessed in the CSC (Section 5.2.1). After the implementation of the study, and having taught and assessed these practical procedures in simulation to the students; Critical Care tutors in the second focus-group interview indicated that learning had taken place successfully in the CSC and that the method worked well (Section 5.2.2). Critical Care tutors even requested that in future all practical procedures would be demonstrated and practised in the CSC, including the two procedures that still needed to be assessed at the bedside on a real patient. The motivation for this request was that a considerable amount of time at the bedside was used to demonstrate, teach and assess these two practical procedures.

6.1.2 How students and Critical Care tutors perceived the use of simulation in the Clinical Skills Centre (CSC).

6.1.2.1 Special added value and enjoyment

The Critical Care tutors indicated that they thought this was a consistent manner in which to teach the practical procedures. They valued the fact that the practical procedures were offered and also completed by the students in a much more organized and shorter time span than with previous year groups (Section 5.2.2). All students seemed to have enjoyed the sessions, a finding which is well supported by McFetrich & Price's study (2006) referred to in Section 2.10. The students expressed mixed feelings about whether the simulated practical procedures could have been taught equally well in the clinical area or in any classroom (Section 5.3.1).

Simulation is a learner-centered modality that presents no risk to patients and facilitates the repetition of particular aspects of tuition. This aspect was greatly valued by the students and they indicated that they welcomed the fact that they could repeat practical procedures in the CSC without causing harm to their patients (Section 5.3). The findings in this case generally supported the important observations of Ziv, Small & Wolpe (2000) that patients should be protected whenever possible, and should not be regarded as training commodities.

6.1.2.2 How realistic was the situation?

Parr & Sweeney (2006) conducted a study with cardiac scenarios, concluding that it gave the students rich, realistic opportunities to prepare for live patient care (Section 2.3). The Critical Care tutors suggested that the teaching and assessment of all the practical procedures in the CSC should be made part of a scenario in an attempt to make the situation more realistic. The students indicated that the situation in the CSC was sufficiently realistic for them to learn, and that it definitely added to their confidence for dealing with real patients in the clinical area. Students did point out though that there were some of the procedures that they would like to practise on the models in the CSC, for example the use of the pacemaker. The lack of adequate funds to buy this equipment currently hinders this procedure from being simulated effectively.

6.1.2.3 The method used to teach and learn the practical procedures in the CSC

Literature indicates that in simulated environments students have the opportunity of first being shown a complete procedure, after which the procedure can be broken down into

separate components to be practised and mastered. It has been shown that this strategy is beneficial to clinical learning (Section 2.8.2). Unfortunately in this study the procedures were demonstrated and taught by different Critical Care tutors in the CSC. The teaching methods used by the different tutors might have varied, which may have influenced the experiences of the students when learning the practical procedures. Tutors should be advised to make use of the same method to teach these practical procedures, namely the five-step method for teaching practical skills proposed by George, Frank & Doto (2001), as explained in Section 2.8.2. According to the student responses in the questionnaires, they were not really aware of a specific method used by the tutors when procedural skills were taught, but they felt that they learnt best when the tutor first demonstrated the skill to them (Section 5.3).

All of the students indicated that they valued the assistance and feedback while practising the practical procedures with a Critical Care tutor in the CSC. This confirms that feedback on performance is a crucial component of the learning processes associated with simulation (Section 2.5.1). Students indicated that they needed to have a dedicated Critical Care tutor to be available on a specific day to assist them with practice sessions.

The students also indicated that they had a need for additional teaching and learning material to be available in the CSC, e.g. DVDs demonstrating certain procedures. They were interested in either buying or borrowing these DVDs. Prerecorded videos provide a valuable resource for demonstrating aspects of clinical skills and it ensures that an agreed approach to clinical examination is uniformly available (Section 2.9.3).

6.1.2.4 Effect of the teaching sessions on the students' performance in the clinical settings

Simulation does not aim to replace the learning that takes place when dealing with real patients. Both the students and the tutors indicated that although students had been taught in the CSC, they needed the practice on real patients. One has to bear in mind that the students that took part in the study have all had several years of experience in the Critical Care environment (Section 5.1.2). One can therefore assume that they had performed some of these procedures on real patients, despite the fact that they have only started the formal programme at this point in time. Interestingly enough, the students nevertheless indicated that the sessions in the CSC had in fact increased their confidence and competence to perform the procedures on real patients (Section 5.3).

Critical Care tutors were concerned about the attitude of some of the students, as once they had been found competent in a procedure in simulation, they did not want to be re-evaluated on that same procedure at the bedside. This was a concern to the tutors, seeing that they have to assess whether the transfer of learning has taken place from the simulated to the real environment. The issue of transferring the learning in the CSC to the clinical area is always a challenging issue that one has to be aware of, as pointed out by Kneebone, Scott, Darzi & Horrocks (2004) in Section 2.6.5.

6.1.2.5 Peer learning

Literature indicates that when students work together in simulated learning environments, they learn more effectively, since they observe one another and are more prone to discussing decisions and priorities (Section 2.5.7). However, the empirical data indicated that not all of the students thought that learning in groups and from peers was meaningful and enjoyable (Section 5.3). This could be due to the fact that the students enrolled for this particular programme are senior nursing students who probably had limited exposure to peer learning and self-directed learning. Most of them come from a background of teacher–centered instead of learner-centered education. This could perhaps explain why at least some of them indicated that they did not enjoy the peer learning experiences (Section 5.1.2).

6.1.2.6 Assessment

The Clinical Skills Centre and simulation facilities allow an objective simulated clinical examination (OSCE) to be used with relative ease. OSCEs have the benefit of all students being given the same challenge, while the same examiners utilize the same preset standards (Section 2.11). The Critical Care tutors indicated that the assessment was fair, consistent and uniform in their opinion (Section 5.2), while the overall indication was that students regarded the formative and summative assessment sessions in the CSC as meaningful. The students especially valued the formative assessment sessions with feedback from a Critical Care tutor (Section 5.3).

6.1.3 How do students spend the teaching time at the bedside with the Critical Care tutor?

The Critical Care tutors indicated that the CSC sessions were of particular benefit to the weaker students. Due to the fact that their practical procedures had been completed on

time in the CSC, these students could proceed to case presentations with their Critical Care tutor. This, however, gave rise to another problem, namely that some of the students started to cancel their practical appointments with the Critical Care tutors. This probably happened because there was no pressure to obtain competency in the practical procedures at the bedside, since competency had already been obtained in the CSC (Section 5.2.2).

The data gathered from the clinical logbooks (Section 5.4) indicated that students of 2007 spent more time at the bedside doing discussions/presentations of patients than the students of 2006. This could be the result of introducing the use of the CSC to complete the majority of practical procedures in simulation. Students could therefore afford to spend more time at the bedside to discuss their patients holistically with the Critical Care tutors.

6.2 RECOMMENDATIONS

In Chapter 1 of this thesis I postulated that I wished to investigate the feasibility through literature, and the perceptions of Critical Care nursing students and their tutors about the use of the Clinical Skills Centre to achieve competency in the practical procedures of their programme. By asking this group of students and tutors to communicate their perceptions and recommendations, and by utilizing the work of other researchers through literature, I can now offer more substantial results that might contribute to improving the Clinical Foundations Module of the Critical Care nursing programme. The following section outlines five issues which, based on the results of this study, need to be addressed:

Firstly, all practical procedures need to be included in the structured programme of the CSC, even the ones that need to be assessed at the bedside on a real patient. Students should be given demonstrations and practice opportunities for all 12 practical procedures in the CSC. Apart from the structured teaching, the students should have the opportunity to make appointments with a Critical Care tutor for additional practice and feedback sessions in the CSC. Additional learning materials, for example DVDs of the procedures, should be made available for students to watch in their own time. The CSC staff presenting the practical procedures to the students should ensure that they make use of the same principles when teaching. The five-step method described in the literature

review (Section 2.8.2) could be used as a guideline. In order to make the teaching more realistic, the practical procedures should be taught and learned as part of case scenarios. Planning to buy the necessary equipment needs to be done carefully, because although limited resources might be available in the environments where we work, it is essential for any scenario to be realistic.

Secondly, a system should be implemented where the Critical Care tutors can refer those students who do not perform well on real patients in the clinical areas to return to the CSC for more practice in simulation, where they will receive feedback on their performance.

Thirdly, I recommend that students should be required to have a minimum number of clinical contact sessions with their Critical Care tutor. The fact that they have achieved competency in their practical procedures in the CSC should not lead to students canceling their appointments with the Critical Care tutors at the bedside.

Fourthly, it seems important that better information regarding the teaching process in the CSC should be given to both students and tutors. The importance of the practical sessions should be explained to the students at the beginning of the programme. Students should be aware of the fact that once they have been found competent on the practical procedures, the Critical Care tutors can still expect them to perform these procedures under their supervision on the patients in the clinical settings. This is in order for the Critical Care tutors to assess whether learning has been transferred from the CSC to the clinical area. Critical Care tutors felt that they wanted to be more involved in the teaching offered in the CSC by the CSC staff, because this would guide them in their approach to bedside teaching.

Finally, teaching at the bedside used to be done on a somewhat ad hoc basis. With the teaching in the CSC now being much more structured, this necessitates the teaching at the bedside to be revisited and to be structured to a certain extent. The time at the bedside cannot be spent on the “ABCD” issues; it must rather be used to focus on integrated thinking and looking at the patients holistically.

6.3 OPPORTUNITIES FOR FURTHER RESEARCH

An in-depth study with a very specific focus on the teaching of the practical procedures in a specific Critical Care nursing programme was carried out. The reason for using a case study as a research approach is that insight might be gained by looking at an individual case that may have wider implications. In this study the focus on teaching in simulation as part of the practical component in a Critical Care nursing programme, and the specific areas that need to be investigated further, are the following:

The most effective method for teaching practical procedures in simulation needs to be investigated. Such a study could compare different teaching methods used in a CSC and simulation. The impact of the learning, as well as the use of additional learning material, e.g. DVDs, could form the joint focus of the study.

The issue of how successful the transfer of learning takes place, poses very valid questions when it comes to simulation. It is vital that students should be able to transfer the learning that has occurred in the CSC to another context. Further research on this subject could serve to establish whether students can apply the procedures they have been assessed on in the CSC equally well on real patients, or, if not, what measures can be implemented to facilitate this process.

It is not acceptable that Critical Care tutors continue their teaching at the bedside in an ad hoc manner. The structure of the bedside teaching needs to be investigated. Several approaches have been documented in the literature and should be tested in the programme.

6.4 LIMITATIONS OF THE STUDY

There are a few points that need to be highlighted as possible limitations in this study. Firstly, the study was conducted over only one year and at one nursing department, and secondly, the groups of students and Critical Care tutors that took part in the investigation were not very big in number. Ideally this study should be repeated with another group of Critical Care nursing students at the same institution, or even at other similar institutions.

Thirdly, the simulation sessions held in the CSC were presented by different Critical Care tutors whose teaching strategies varied. This might have affected the students'

experience of the teaching and learning process in the CSC. For future studies it would be recommended that the teaching strategy used in the CSC should be agreed upon by the different tutors presenting the sessions, or, as an alternative, all the sessions should be presented by the same tutor using the same teaching strategy.
One therefore has to acknowledge the possibility of improving the quality of the study in the absence of the above-mentioned limitations.

6.5 CONCLUDING COMMENTS

The use of simulation in Health Sciences Education is something that has come to stay. Each programme needs to be planned in terms of how simulation is to be included in the curriculum to ensure that maximum learning takes place. The primary aim of this study was to investigate whether the simulation in the Clinical Skills Centre (CSC) could be used to effectively teach and learn the practical procedures required in a Critical Care programme at Stellenbosch University. In my study I investigated the perceptions of Critical Care students and tutors when using simulation, as well as how teaching time between the student and tutor was spent in the clinical area.

The results indicate that students and tutors valued the use of simulation and enjoyed the sessions in the CSC. However, attempts to make the teaching sessions in the CSC even more realistic would be advisable. In addition, students should be allowed ample time to practise the procedures under the supervision of a Critical Care tutor.

REFERENCES

Bailey, DM. 1997. *Research for the Health Professional. A practical guide*. Second edition. Philadelphia. FA. Davis Company.

Bhagwanjee S & Scribante J. 2007. National audit of critical care resources in South Africa – unit and bed distribution. *South African Medical Journal*. 97 **(12)**:1311-1313.

Birch L, Jones N, Doyle PM, Green P, McLaughlin A, Champney C, Williams D, Gibbon K & Taylor K. 2007. Obstetric skills drills: Evaluation of teaching methods. *Nurse Education today*. doi:10.1016/J.nedt.

Bloom BS (editor). 1972. *Taxonomy of educational objectives*. Seventeenth edition. Michigan. David McKay Company.

Boynton PM & Greenhalgh T. 2004. Selecting, designing and developing your questionnaire. *British Medical Journal*. 328:1312-1315.

Bradley P. 2006. The history of simulation in medical education and possible future directions. *Medical Education*. 44: 254-262.

Bruseberg A & McDonagh-Philp D. 2002. Focus groups to support the industrial/product designer: a review based on current literature and designers' feedback. *Applied Ergonomics*. 33: 27-38.

Buchanan JA. 2001. Use of simulation technology in dental education. *Journal of Dental Education.* November: 1225-1231.

Childs JC. 2002. Clinical Resource Centers in Nursing Programs. *Nurse Educator*.27 **(5)**: 232-235.

Clason DL & Dormody TJ. 2006. Analyzing data measured by individual Likert-type items. *Journal of Agricultural Education*. 35 **(4):** 31-35.

Cox KR & Ewan CE. 1988. *The medical teacher.* Edinburg: Churchill Livingstone.

Creswell JW. 1994. *Research design: Qualitative and quantitative approaches*. California. Thousand Oakes: Sage Publications.

Dahl J. 1994. Structured experience; a Risk free approach to reality based learning. *Journal of Nursing Education*. 23: 34-37.

Dawson SL & Kaufman J A. 1998. The imperative for Medical simulation. *Proceedings of the IEEE.* 86 **(3):** 479-483.

Denscombe, M. 2004. *The good research guide for small-scale social research projects.* Second edition. Glasgow: Open University Press.

Dent JA. 2001. Current trends and future implications in the developing role of clinical centres. *Medical Teacher.* 23 **(5)**: 483-489.

Dent JA & Harden RM. (Eds).2005. *A practical guide for medical teachers*. London: Elsevier.

Denton HG. 1994. Simulating design in the world of industry and commerce: Observations form a series of case studies in the United Kingdom. *Journal of Technology Education*. 6 **(1):** [online].

De Vos AS (Ed). 2002. *Research at grass roots. For the social sciences and human service professions.* Pretoria: Van Schaik.

Du Boulay C & Medway C. 1999. The clinical skills resource: A review of current practice. *Medical Education*. 33: 185 -191.

Dubrowski A & MacRae H. 2006. Randomised, controlled study investigating the optimal instructor: student rations for teaching suturing skills. *Medical Education*. 40: 59-63.

Ende J. 1983. Feedback in clinical medical education. *JAMA*. 250: 777-781.

Ewan C & White R.1996 *Teaching nursing: A self instructional handbook.* London: Chapman & Hall.

Freeth D & Fry H. 2005. Nursing students' and tutors' perceptions of learning and teaching in a clinical skills centre. *Nurse Education Today*. 25: 272-282.

George JH, Frank X & Doto MS. 2001. A simple five–step method for teaching clinical skills. *Family medicine*, 33 **(8)**: 577-578.

Gillham B. 2000. *Case study research methods*. London: Continuum.

Gomez GE & Gomez EA. 1987. Learning of Psychomotor Skills. Laboratory versus patient care setting*. Journal of Nursing Education*. 26 **(1)**: 20-24.

Government gazette. Volume 508 no. 30353. 5 October 2007

Harrison T K & Gaba D M. 2005. Safe Passage – using simulation to teach patient safety. *Clinical Teacher*. 2 **(1):** 37-41.

Henneman EA & Cunningham H. 2005. Using clinical simulation to teach patient safety in an acute critical care nursing course. *Nurse Educator* . 30 **(4):** 172-177.

Henning E. 2004. *Finding your way in Qualitative Research*. Pretoria: Van Schaik.

Hesse-Biber SN & Leavey P. 2006. *The practice of qualitative research.* California: Thousand Oakes: Sage Publications.

Hodkinson P & Hodkinson H. 2001. *The strengths and limitations of Case study research.* Proceedings of the Learning and Skills Development Agency conference. Cambridge. 5-7 December 2001.

http://www.businessballs.com/bloomstaxonomyoflearningdomains.html. *Bloom's taxonomy – learning domains*. [Internet] [Accessed 15 February 2008].

http://www2.chass.ncsu.edu/garson/pa765/cases.htm. *Case studies*. [Internet] [Accessed 07 April 2008].

http://www.che.ac.za. Council on Higher Education *Act No. 101 of 1997*. [Internet] [Accessed 7 April 2008].

http://www.nlink.com/donclark/hrd/bloom.html. *Learning domains or Bloom's taxonomy. The three types of learning*. [Internet] [Accessed 5 March 2007].

http://changingminds.org/explanations/research/measurement/likertscale.htm. *Likert Scale.* [Internet] [Accessed 30 April 2008).

http://www.evensenwebs.com/validity.html. *Questionnaire validity*. [Internet] [Accessed 15 April 2008].

http://www.SANC.co.za. South African Nursing Council. *Nursing Act 1978* (act no. 50 of 1978) [Internet] [Accessed 16 April 2008].

http:www.SANC.co.za. South African Nursing Council. 1997. *Regulations relating to the course in Clinical nursing science leading to registration of an additional qualification*. [Internet] [Accessed 16 April 2008].

http://www.SANC.co.za. South African Nursing Council. *Nursing Act 2005* (act no.33. of 2005) [Internet] [Accessed 16 April 2008].

http://coe.sdsu.edu/eet/Articles/surveyquest/start.htm *Types of survey questions*. [Internet] [Accessed 15 April 2008].

Huit W.2003. *The psychomotor domain*. [Internet] Available at http;//Chiron.valdosta.edu/whuitt/col/behavsys/psymtr.html. [Accessed 24 July 2008].

Kneebone R, Kidd J, Nestel D, Asvall S, Paraskevas P & Darzi A. 2002. An innovative model for teaching and learning clinical procedures. *Medical Education*. 36: 628-634.

Kneebone R. 2003. Simulation in surgical training: educational issues and practical implications. *Medical Education*. 37: 267-77.

Kneebone R, Scott W, Darzi A & Horrocks M. 2004. Simulation and clinical practice: Strengthening the relationship. *Medical Education.* 38: 1095-1102.

Kneebone R. 2005. Evaluating clinical simulation for learning procedural skills: A theory based approach. *Academic Medicine*. 80 **(6**): 549-552.

Knight MC & Mowforth GM. 1998. Skills centre: why we did it, how we did it. *Nurse Education today.* 18: 389-393.

Knight MC, Moule P & Desbottes Z. 2000. The grid that bridges the gap. *Nurse Education Today.* 20: 116-122.

Lamb D. 2006. Could simulated emergency procedures practiced in a static environment improve the clinical performance of a Critical Care Air Support Team (CCAST)? A literature review. *Intensive and Critical Care Nursing.* 23: 33-42.

McFetrich J & Price C. 2006. Simulators and scenarios: training nurses in emergency care. *Medical Education*. 40 .139.

Medley CF & Horne C. 2005. Using simulation technology for undergraduate nursing education. *Journal of Nursing Education*, 44 **(1):** 31-34.

Meyers MD. 1997. *Qualitative research in information systems*. [Internet] Available at http://www.qual.auckland.ac.nz. [Accessed 07 April 2008].

Morton PG. 1997. Using a Critical care simulation laboratory to teach students. *Critically Care Nurse*, 17 **(6):** 66-69.

Mouton J. 2005. *How to succeed in your Master's & Doctoral studies*. Pretoria: Van Schaik.

Nair BR, Coughlan & Hensley MJ. 1997. Student and patient perspective on bedside teaching. *Medical Education*. 31: 341-346.

Neary M.1997. Project 2000 students' survival kit: a return to the practical room (nursing skills laboratory). *Nurse Education today*. 17: 46-52.

Newble D & Cannon R. 2001. *A handbook for medical teachers*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Nicol N and Glen S. 1999. *Clinical skills in nursing. The return of the practical room.* LTD, London: Macmillan.

Nikendei, Zeuch, Diekmann, Roth, Schafer, Volkl, Schellberg, Herzog & Jungerer, 2005. Role-playing for more realistic technical skills training. *Medical Teacher.* 27 **(2)**: 122-126.

O'Neil A. 2002. Preparation for Practice: Clinical Skills (Nurse Education) Project Report. [Iinternet] Available at http://www.nes.scot.nhs.uk/documents/publications/classa/FinalreportFeb2003.doc. [Accessed 9 April 2007].

Parr, MB, Sweeney, NM 2006. Use of human patient simulation in an undergraduate critical care course. *Critical Care Nurse*. 29 **(3)**: 188-198.

Perkins GD. 2007. Simulation in resuscitation training. *Resuscitation.* 73 **(2):** 202-211.

Quinn FM. 1996. *The principles and practice of nurse education.* London: Chapman & Hall.

Rauen CA, 2004. Simulation as a teaching strategy for nursing education and orientation in cardiac surgery. *Critical Care Nurse*. June: 46-51.

Rose M & Best D. 2005. *Transforming practice through clinical education, professional supervision and mentoring.* London. Elsevier.

Reid A. 2007. Simulation in acute care supports clinical nurse educators. *The Canadian Nurse.* 103 **(2)**: 6-7.

Schunk DH. 2004. *Learning theories. An educational perspective*. Pearson. New Jersey. "Selecting a delivery strategy" *Faculty development at Honolulu community college*. [Internet] Available at http://honolulu.hawaii.edu/intranet. [Accessed 08 May 2007].

Scribante J & Bhagwanjee S. 2007. National audit of critical care resources in South Africa – nursing profile. *South African Medical Journal*. 97 **(12):** 1315-1318.

Smith B. (2006). From simulation to reality – breaking down the barriers. *The Clinical teacher.* 3: 112-117.

Smith MK. 1996. *David A Kolbe on experiential learning*. [Internet] Available at http://www.infed.org/biblio/b-explrn.htm [Accessed 14 September 2007].

Stark P & Fortune F. 2003. Teaching clinical skills in developing countries: Are Clinical Skills Centres the answer? *Education for Health*. 16 **(3)**: 298-306.

Talbot M. 2004. Monkey see, monkey do: a critique of the competency model in graduate medical education. *Medical Education*. 38: 587-592.

Tan T, Tan K & Tee JCS. 2007. An end to "See one, Do one and Teach one" Residence Training Programme – Impact of the Training, Education, Surgical Accreditation and

Assessment programme on Medical Care and Patients' safety. *Annals Academy of Medicine. Singapore*. 36: 756-759.

Treadwell I & Grobler S. 2001. Students' perceptions on skills training in simulation. *Medical Teacher*. 23 **(5)**:476-482.

Urden LD, Stacy KM & Lough ME. 2006. *Thelan's Critical care nursing. Diagnosis and management.* Missouri: Mosby.

Verschuren PJM. 2003. Case study as a research strategy: some ambiguities and opportunities. *International Journal of Social Research Methodology*. 6 **(2**): 121-139.

Watts N T. 1990. *Handbook of Clinical Teaching*. London: Churchill Livingstone.

Wilson LO. 2006. Wilson's curriculum pages – *Beyond Bloom – A new version of the cognitive taxonomy.* [Internet] Available at www.uwsp.edu/education/lwilson/curric/newtaxonomy.htm. [Accessed 3 May 2007].

Ziv A, Small SD & Wolpe PR, 2000. Patient safety and simulation-based medical education. *Medical Teacher*. 22 **(5):** 489-495.

APPENDIX A

Discussion points for Critical Care tutors' consensus discussion group interview:

Background:

The motivation behind the use of the Clinical Skills Centre as part of the practical component consists mainly of the following reasons:

Students can all be taught to do the procedures in a simulated environment. Simulation can be used very successfully, because it is not threatening, students can learn from one another and they can repeat procedures as often as they need to, without harming themselves or the patients.

The Clinical Skills Centre can and will NEVER replace real clinical contact at the bedside, but can be used very effectively to supplement clinical training. The two modes should therefore be seen as complementary, and not as opposing each another.

The Clinical Skills Centre will be utilized to help the students to achieve competence in their practical competencies.

The CSC will be used to achieve the following:

- Demonstrations of practical procedures.
- Creating opportunities for students to practise and gain confidence doing the procedures.
- Assessment of the practical procedures.

Students are then encouraged to utilize the clinical contact times with the Critical Care tutor at the bedside for patient discussions and presentations, and not only to complete a list of competencies. By using the opportunities to discuss the patients with the Critical Care tutor, students will eventually be empowered to integrate and better understand their patient's condition, as well as findings regarding. the pathophysiology, signs and symptoms and treatment.

With the students spending more time discussing the critically ill patients with the Critical Care tutor, it will hopefully result in the following:

- The case presentations could be experienced as less threatening.

- Once students are qualified, they should have more insight, and be equipped to work as Critical Care nurses who can integrate, understand and care holistically for any critical ill patient.

Please indicate which of the following procedures you think will be suitable to demonstrate, practise and assess in the Clinical Skills Centre:

Procedure	**Yes, please motivate why you say so**	**No, please motivate why you say so**	**Any other comments**
Administer IV medication			
Assessment of neurological status			
Assess an abnormal blood gas			
Assess a chest x-ray			
Assess a 12 lead ECG			
Maintain haemodynamic monitoring			
Perform open ET suctioning			
Care of a ventilated patient			
Extubate a patient			
Care of patient with VDD insitu			
Care of patient post-TPM insertion			
Maintain epidural analgesia			

This questionnaire will be followed by a focus-group discussion amongst the clinical tutors to reach consensus on the practical procedures and activities.

APPENDIX B

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

Using the Clinical Skills Centre to achieve competency in the practical procedures in a Critical Care Nursing Programme.

REFERENCE NUMBER:
PRINCIPAL INVESTIGATOR:
Elize Archer

ADDRESS:
40 Jan Celliers Street, Parow North, 7530

CONTACT NUMBER:
021 938 9647 (work) or 082 856 2315 (cell)

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 or doctor any questions you may have 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. 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 Committee for Human Research 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 about?

- *The study will be done in the Clinical Skills Centre during the practical programme of your course.*
- *The aim of the study is to determine whether teaching and learning the practical competencies and activities required of you during your course in the Clinical Skills Centre will provide you and the Critical Care tutor with more time at the bedside. This time can then be used to develop the skills of integrated thinking, enabling you to grasp the nursing care priorities of a critically ill patient more effectively.*

Why have you been invited to participate?

- *All students enrolled for the Critical Care nursing programme during 2007 and the clinical tutors involved in their training have been invited to take part in the study.*

What will your responsibilities be?

Students: It will be expected of you to:

- *keep your clinical register up to date as required by your Critical Care tutor, so that it can be used for data collection by the end of the programme.*
- *complete a questionnaire at the end of you practical component regarding your experiences in the Clinical Skills Centre.*

Critical Care tutors: It will be expected of you to:

- *participate in a consensus group discussion at the beginning of 2007 to reach consensus on the competencies and practical activities that can be taught in the CSC.*
- *Participate in a focus-group discussion by the end of 2007 to discuss the experience of using the CSC as part of the practical component of the programme.*

Will you benefit from taking part in this research?

- Not directly, but future students will benefit from this research, because positive results will be implemented in the practical curriculum of future students.

Are there any risks involved in participating in this research?

- None.

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

- *You are not obliged to take part in the study.*

Who will have access to your academic records?

- *The information collected will be treated as confidential and protected. If it is used in a publication or thesis, the participant will remain anonymous. Only the researcher, Elize Archer, will have access to the records.*

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

- ***Not applicable***

Will you be paid to participate in this study and are there any costs involved?

- ***No, you will not be paid to participate in the study and 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 Sr. Elize Archer at tel 938 9647 if you have any further queries or encounter any problems.***
- ***You can contact the Committee for Human Research 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 **Using the Clinical Skills Centre to achieve competency in the practical procedures in a Critical Care Nursing Programme.**

I declare that:

- I have read or had read to me this information and consent form and that it is written in a language in which I am fluent and with which I am comfortable.
- I have had an opportunity 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 participate.
- 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 interest, or if I do not follow the study plan, as agreed to.

Signed at (*place*) .....…….. on (*date*) ……..…….. 2007.

..... **.....**

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 an interpreter. (*If an interpreter is used,he/she must sign the declaration below).*

Signed at (*place*) .....…….. on (*date*) ……..…….. 2007.

..... **.....**

Signature of investigator 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*) ……..…….. 2005.

..... **.....**

Signature of interpreter Signature of witness

APPENDIX C

Questionnaire for the research study conducted by Elize Archer on

Using simulation in the Clinical Skills Centre to achieve competency in the practical procedures in a Critical Care nursing programme.

Thank you very much for taking the time to complete this questionnaire. This questionnaire will take approximately 20 minutes of your time. You are kindly requested to answer each question and reflect your true reaction when doing so.

The *purpose* of the study is to determine whether using the Clinical Skills Centre (CSC) to assist in the teaching and learning of the practical procedures required of you during your course, will provide you and the Critical Care tutor with more time at the bedside. This time can then be used to develop the skills of integrated thinking (doing case presentations), thus allowing you to be empowered to grasp the nursing care priorities of a critically ill patient more effectively.

The *importance* of the study is that future Critical Care nursing students will benefit from this research, because positive results will be implemented and incorporated in the practical curriculum of the Critical Care nursing programme.
In order to obtain valuable feedback, all the students enrolled for the Critical Care nursing course during 2007 have been invited to take part in the study.
The information collected will be treated as *confidential* and protected. If it is used in a publication or thesis, the participant will remain *anonymous*. Only the researcher, Elize Archer, will have access to the records.

The questionnaire is aimed at determining the following:
Your experience in the use of the CSC to reach competency in the identified practical procedures.
Indicate your choice by marking the appropriate block with an "X".
For example:

	Strongly agree	Agree	Uncertain /neutral	Disagree	Strongly disagree
The Stellenbosch University is the best university in the Western Cape.		X			
1. In the CSC I can repeat practical taks until I am confident that I am performing them correctly.					
2. In the CSC we learn a long or complicated procedure in small parts.					

	Strongly agree	Agree	Uncertain /neutral	Disagree	Strongly disagree
3. In the CSC I can get adequate help when I am struggling with something.					
4. Practising in the CCS is too artificial to be useful.					
5. It is good to be able to make mistakes and know that no one will get hurt.					
6. Things I do in the CSC help me to make sense of some of the theory I have been taught.					
7. Time spent in the CSC results in progressive improvement of my clinical skills.					
8. Practising in the CSC makes me more confident when I perform the same procedure with the patient.					
9. In the hospital I often make use of the skills learnt in the CSC.					
10. Practice in the CSC improves my performance on clinical rotations.					
11. Practice in the CSC makes my conduct on clinical rotations safer for patients.					
12. In the CSC I find helpful suggestions from my peers about how I can improve what I do					
13. I learn best when tutors demonstrate a skill to me before I have to do it myself.					
14. I learn best with a group of peers when we help one another.					
15. Assessing my skills in the CSC is a reasonable measure of my skills in practice.					
16. Skills taught and practised in the CSC could equally well be done in an ordinary classroom.					
17. Skills taught and practised in the CSC could be better done in a clinical area.					
18. Even when I can do a skill in the CSC, I need practice with real patients.					

19. The manikins are realistic enough to help develop my skills.					
20. I perform better in the CSC than with real patients.					
21. I perform better with real patients than in the CSC.					
22. I have enjoyed using the CSC.					
23. I have learnt a lot in the CSC.					
24. The preparation sessions before the assessment of the procedures helped me a lot.					

Please complete the following questions:

26. What is your age? _____years

27. Number of years since completing your training as a registered nurse? _____years

28. Number of years working in the Critical Care environment? _____years

29. Any recommendations on teaching & learning of practical procedures in the CSC?

_____

_____

_____

30. Any additional comments on teaching and learning of practical procedures in the CSC?

_____

_____

_____

Thank you very much.

APPENDIX D

Clinical Contact Log

date, time, unit	discussion, procedures, demonstrations, presentations, etc

APPENDIX E

Focus-group interview transcript

Permission was obtained from all the Critical Care tutors involved with the group of students. They were given the assurance that they may withdraw at any time. The group consisted of 6 people, which, according to De Vos (2002), is the ideal size in the sense that this will allow everyone to participate and still elicit a range of responses.

I emailed all of the participants a month in advance to set the location, date and time for the session. It was decided to have the focus-group interview on 6 November 2007 at the Clinical Skills Centre at the Faculty of Health Sciences, Stellenbosch University. One day ahead of the scheduled date, the participants were reminded of the interview by sending them a SMS.

Developing the questions for the focus-group interview

As the researcher I set up the issues I wanted to be discussed and then handed the document to a Critical Care educator for feedback. I also requested this person to act as co-facilitator and to take notes during the interview.

The focus-group interview

Before the participants arrived I, as the facilitator, ensured that the room where I was planning to conduct the interview had been set up comfortably. Chairs were arranged in a circle with tea, coffee and muffins available. The recorder was placed behind the chair that I was meant to sit on, so that it would not be visible to the participants when I was seated.

When the participants arrived I allowed about 5 minutes for conversation to put them at ease, while they helped themselves to the refreshments. We then proceeded as follows:

I thanked all the participants for attending the session, assuring them that all their input was valuable, and that they should feel free to share their ideas with the group. A big advantage was that I already knew all the participants personally and most of them knew one another, which meant that the atmosphere was already relaxed and non-threatening. We decided that English would be spoken during the discussion, seeing that one of the participants did not understand much Afrikaans. I pointed out, however, that Afrikaans-speakers should feel free to give their comments in Afrikaans.

I started the session by introducing all the Critical Care tutors to one another.

I then gave a brief overview of my study with special mention of its purpose and importance. The topic of my research, forming part of my studies for the degree Master of Philosophy in Higher Education was introduced, namely:

Using simulation in the Clinical Skills Centre (CSC) to achieve competency in the practical procedures in a Critical Care nursing programme.

I explained that the *purpose* of the study was to determine whether using the CSC to assist in the teaching and learning of the practical procedures required of the students during their course would provide them and the Critical Care tutors with more time at the bedside. This time could then be used to develop the skills of integrated thinking and to do more case presentations.

Referring to the *importance* of the study, I pointed out that future Critical Care nursing students were expected to benefit from this research, because positive results would be implemented and used a foundation in the practical curriculum of the Critical Care nursing programme.

In order to obtain valuable feedback, all of the 2007 Critical Care enrolled students and Critical Care tutors involved during that year had been invited to take part in the study.

The assurance was given that information collected would be treated as *confidential* and protected. If used in a publication or thesis, the participant will remain *anonymous*. Only the researcher, Elize Archer, will have access to the records.

The students had also received questionnaires to determine their experiences in the use of the CSC as a measure to equip them for the identified practical procedures and to help them attain the necessary clinical competencies.

The aim of the session was announced as follows:

- To identify and to describe how the critical care tutors of 2007 had experienced the use of the Clinical Skills Centre to determine student competency in the identified practical procedures.
- To determine whether the participants had experienced an improvement regarding the utilization of time in the clinical setting during clinical contact sessions.

Question one: Describe how you experienced the inclusion and use of the Clinical Skills Centre in the practical programme in general.

I probably experienced this side of presenting the skills in the Clinical Skills laboratory more extensively than anybody else and I think, taking into consideration that it was

being used for the first time, it worked very well indeed. Amongst ourselves, Elize and I have managed to identify a few aspects that we could improve on to make it an even better experience for future groups. But I think by using this environment first of all for practicing purposes (and some of the students practiced quite a lot, over and above the time that had we spent here) and secondly also to assess students, worked fairly well. It is more fair and consistent, because one does not have the situation of one student in the unit being assessed on suctioning a patient with a head injury, and another student performing the procedure on a patient with pneumonia. So in that respect the assessment takes place in a uniform way. It is obviously not perfect, but can definitely work well.

Question two: Did those of you who followed up the students in the units experience anything that you think was a consequence of the time that the students had spent in the Clinical Skills Lab?

Personally I think that they learned the skills in the Clinical Skills lab , but I do not think that the students used the time that was gained: appointments with the Critical Care Tutors were cancelled, where in the past we had more clinical contact with the students. We then did clinical skills with them and then, as a spin-off, were doing other things at the same time, where now they think they go to the skills lab to do it. I am not saying that it is a bad thing, but the time gained was not used to spend more time with the Critical Care tutors. Students tended to cancel appointments with their tutors, because there was no pressure to obtain competency, as it had already been obtained in the lab.

On one or two occasions when I went to see students in the unit, when I spoke to them for the first time, they would have the attitude of “what do we have to do with you? ” and I actually had to take the lead and say, OK let us talk about “xyz”. I do not think that the students have realized that responsibility of identifying what they need to know. This could be because of the way that we all have been trained.

At the beginning of the course we should consider explaining to the students how the Skills lab and time available in the units could be utilized more profitably.

I think that this, if we might call it an experiment, has certainly highlighted other areas and those are “Do the students really know what they should be learning at the bedside?

Do we as tutors really know??" From my perspective I think we should keep the competencies in the CSC and look at the way of teaching at the bedside. We need to focus less on getting the suction catheter down the ET tube and more on everything that happens around the bed. This experience has certainly opened my eyes to how we must teach the students at the bedside. I know that the time around the bed cannot focus on ABCD, etc, but must focus on critical thinking and the patient holistically.

I think that the 2 competencies that we decided to do at the bedside, the Glasgow coma scale and the nursing care of the ventilated patient must definitely stay there, but I had to find a couple of students incompetent and had to redo them at the bedside. I wondered whether we cannot demonstrate and practise those 2 competencies in the lab and then still do the assessment at the bedside.

Question three: So you think that for those 2 procedures there is a place for demonstration and practice in the lab and assessment in the practice?
Ja en ek moet saamstem dat ek die studente ook baie minder gesien het die jaar, wat my las baie minder gemaak het, maar aan die ander kant ek hou daarvan om te kyk as hul 'n prosedure doen. As hul bv. 'n suiging doen, staan ek by om te kyk en dan het hul die gesindheid van hul het dit al gedoen, en hul is al klaar daarop geëvalueer, so ek moenie kyk nie. Dit is tog nie waaroor dit gaan nie! Ek as dosent kyk reeds om te sien of hul dit elke keer reg doen. Die studente trek dit wat hul in die lab geleer het dalk nie deur na die hospitaal nie.

Question 4: **Wat jy daar sê bring my reeds by een van die vrae wat ek later wou vra. Ek weet dit is moeilik om te evalueer , maar daar is altyd die vraag dat as jy iets in simulasie geleer is, of jy dit wel kan oordra na die praktyk? Kon jul bv. optel dat iemand wat klaar geassesseer is in die lab by die bed totaal onbevoeg is?**
Ek sal nie dit sê nie, maar mens moet hul tog leiding gee omrede die omgewing heeltemal anders is.

I also share that concern. Some students do not take what they learn here in the lab to the hospital, they do not look to see what the pressure is on the suction catheter, and they just do, instead of thinking a bit.

I hear what you say and I think we can expand the simulation sessions in the lab much more. We can, for example, use a real working suction unit, put out a variety of suction catheters and not pre-connect the standard no. 12, like we have done this year. One can force the simulation to be even more realistic, but the truth is that nothing can replace the real life situation. We will always use that bedside teaching part.

I was also wondering how we can incorporate the competencies in the case presentations. We can require the student to do a competency during the case presentation. So when you do a neurological case it is natural to say that the student must do the neurological observations competency. So in that way you actually deliberately pull in competency skills in the case presentations.

And students must know that they can be assessed on it again although they have already been signed off in the skills lab.

Maybe if they do not do the competencies correctly, we can send them back to the skills lab, I do not know?

There should actually be somewhere on the case presentation form, a place where you can say that the student is not meeting the requirement at the bedside and that they need to go back to practise in the lab. If we then start sending all the students back to the lab it is saying to you in the skills lab that something is wrong somewhere. So it is a kind of a feedback for you.

If we adapt the case presentations form with a place saying: these are the problems that have been identified and that you require Elize's signature in the lab to ensure that they come back to the lab to practice.

I think I need to make a much bigger effort in the beginning of the year to explain to the students the importance of the practical sessions. I have seen it over the last 5 years that if the students know what they are doing in the practice, the theory side is a relative breeze. The more you push the practical side, the more you push them theoretically. The exams showed me again that the people that did reasonably well in their practical case, presentations did fairly well in the exam.

Question five: Taking us to the next question is whether you still agree that the 10 clinical competencies that we identified in the beginning of the year to be demonstrated and assessed in the skill lab were appropriate for this teaching method?

From our experience that we had this year we did have a problem with the interpretation of the chest X-ray. It just did not work. It was too long and the students did not know how to write down what they were thinking. I think it could have helped them if they could have spoken.

The X-ray needs to be linked with a patient and a scenario.

The students were given a scenario, but that was not the problem. The problem was that they could not write down what they were thinking. And it was the same with the pacemaker and the interpretation of the ECG.

But I think the fundamental issue is that the teaching of the competencies needs to stay in the lab, and the application of it needs to happen in the units with a real patient.

I will still assess the mentioned competencies in the lab, but some of them I will approach in a slightly different way.

What I have seen was that those students who had the biggest problem to interpret the X-ray were the ones that had not read a lot, if any, in the units before the assessment. So maybe we must require the students to have for example practised at least 5 or 10 X-rays, or ECGs before the assessment date.

Dit het ek ook al geleer, ek lees nie die eerste x-straal of EKG met die studente as ‘n evaluasie nie, hulle moet eers bietjie oefen.

It is coming back to making the students understand clearly how the practical component works.

Some of you tutors might have been involved in the skills lab training, but some of us do not really know what has been done in the skills lab. We do not know how you approach the teaching here and we would like to see how you teach here.

That is a reasonable request; once we in the skills lab have put the programme for the year together we will make sure that you receive it, so that you know exactly what we are doing when with the students.

I also started during the course of the year, so I was also not very clear about what was happening with the students in the skills lab and what was expected of me next to the bedside. I would have like to know what was expected of me with the students much more clearly.

Question six: The one aspect is the CSC, where the competencies were taught and assessed. But for most of you the question is really whether you think that you saw any benefit to the students by using the skills lab. I know it is difficult to judge this fairly, but if you had to compare the previous groups that you have had to this group, do you feel that there is any difference?

It feels to me that this is a better group altogether. It is always the weak students who avoid and cancel their appointments. I feel that the clinical contact sessions I had with students were far more productive this year. I could do proper stuff and not "waste time" on repeating competencies. I found the students were very competent in some competencies, e.g. blood gasses.

It is difficult to bring a competency like an X-ray into the case presentation, because the students take so long to read it

So surely when you had clinical contact with students it was productive and worthwhile. Do you think there is a way of forcing the students to have a minimum number of clinical contact sessions with their tutor, not allowing them to cancel appointments?

Yes, we have discussed that and we will do it next year.

Appointments should be about one hour; and a case presentation is 45 minutes. Practically it is difficult to see students for longer that one hour. They start to need them in the unit and their attention spans are not that long.

What we need to do in the CSC in future is to use it for case presentations. This will add another layer to simulation. We can for example change the lung sounds on the manikin and the students have to identify it.

We will also have to educate the students about simulation and how to react to the manikin, because they often feel that it is just a doll. Students often ask: “Do I really have to listen to the lungs?” Literature says that younger students adapt easier to simulation that older student. So we have to prepare our older students properly on how to react in simulation.

I think we need to have another meeting like this in a couple of months’ time. The students from our institution have been placed in other areas and we have not seen our students much to comment on differences that we experienced.

We have covered most of the areas in our conversation now, thanks. What I find very interesting, is that the time that was gained by doing the competencies in the lab was not necessarily used with the critical care tutors. As part of the research I am also going to have a look at the students’ logbooks and compare that to the previous group’s books to try and see the difference in the amount of time spent on various actions.

This was definitively to the advantage of the weaker students. Last year the strong students’ competencies were done early in the year and the weaker students were repeating all the time. With the latter we never got the opportunity to get to case presentations, because we battled though the competencies, but at least we had contact with the students. The students could use it to their advantage, but they do not see it that way, they want to do as little as possible.
That is just how students are?!

Can we somehow demonstrate to students what we expect of them by the end of the course? The end result is not to just do the 12 competencies, but can they see the big picture and think critically?

More students come in with little experience and I specifically think those students benefit with the sessions in the CSC.

We need to let the students think what we want by the end of the year and force them to think why there are doing some things. Those who started to think about why and how, have grown very much in knowledge. Some of the male nurses did have a problem with

reflecting in the beginning. The attitude was one of they did not want to think about what they are thinking and doing and why they were there.

We also want to create an ICU environment in the skills lab with a ventilator, etc. It will help the students to put everything together and to better integrate if they can use it constantly.
I would like to thank all of you for taking part in the discussion as well as for supporting me through the year with this initiative. I think that this course has a very strong practical component because of this very dynamic group of people that we have.
