

**RELIABILITY OF SIMULATION TO EVALUATE CLINICAL
COMPETENCE IN THE BASIC NURSING COURSE**

by

Lucky Cynthia Dlomo

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**Submitted in the fulfilment of the requirements for the Degree of M.A.
Curationis, Nursing Science Department, University of Zululand**

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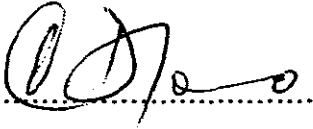
DEDICATION

This work is dedicated to:

- ▶ The training institutions and professionals of KwaZulu-Natal with the hope that the information obtained will influence them to a certain extent, in deciding whether simulation should be used for formative or summative evaluation.
- ▶ Nurse educators as a motivation for further research.
- ▶ My husband Pakisa, my two sons, Siga and Buyani and my late mother who laid the foundation of what I am today.

DECLARATION

I, Lucky Cynthia Dlomo hereby declare that this dissertation on “Reliability of simulation to evaluate clinical competence in the Basic Nursing Course” is my own work in conception and creation. All sources that have been used or quoted have been acknowledged by means of complete references.

A handwritten signature in black ink, appearing to read 'Lucky Cynthia Dlomo', written over a horizontal dotted line.

MRS LC Dlomo

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I wish to express my sincere gratitude and appreciation to the following people who gave their full support and assistance in various ways when the study was conducted:

- ▶ I am greatly indebted to my supervisor Prof TG Mashaba for her support, wise guidance, constructive comments and encouragement which contributed to the success of the study though she did not live to see its completion.
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- ▶ The Medical Superintendent, Administrators and the Nursing Service Managers of Ngwelezane, Benedictine and Nqutu hospitals. For granting permission to conduct the study at their institutions and for the information they personally helped me with.
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ABSTRACT

This is a descriptive study which aimed at:

- ▶ determining the views of reliability of simulation in evaluating the following selected competencies:
 - affective skills
 - cognitive skills
 - psychomotor skills
- ▶ determining the relations between the respondents views on the use of simulation in evaluation.
- ▶ determining the relations between respondents views on the objectivity in handling simulation during practical examination.

In 1994 the nurse educators of Ngwelezane, Benedictine and Nqutu colleges were interviewed to determine the reliability of simulation to evaluate competence. Questionnaires and interview schedules were used to determine the extent of reliability and possible solutions from nurse educators and professional nurses.

The major findings of the study suggested the following:

- ▶ that simulation is widely used by other professionals such as the medical profession, but is used for formative rather than summative evaluation.
- ▶ that most of the respondents perceived simulation as not depicting the real clinical situation.

- ▶ that simulation is neither consistent, precise, accurate nor stable to evaluate cognitive psychomotor and especially affective competencies or skills.
- ▶ that simulation be used for conditions which are not readily available.

The researcher made recommendations based on the above findings.

OPSOMMING

Hierdie is 'n beskrywende studie wat ten doel het om:

- menings rondom die betroubaarheid van simulاسie in die evaluering van die volgende geselekteerde vaardighede te bepaal:

affektiewe vaardighede

kognitiewe vaardighede

psigomotoriese vaardighede

- die verhouding tussen respondente se menings rondom die gebruik van simulاسie in evaluering te bepaal
- die verhouding tussen respondente se menings oor die objektiwiteit in die hantering van simulاسie gedurende praktiese eksamens te bepaal.

Gedurende 1994 is onderhoude gevoer met verpleegopvoeders van Ngwelezane, Benedictine en Nqutu Kolleges om die betroubaarheid van simulاسie van vaardighede te valueer. Vraelyste en onderhoude is as instrumente gebruik om die omvang van betroubaarheid en moontlike oplossings vir verpleegopvoeders en professionele verpleegkundiges te bepaal.

Die gevolgtrekkings van die studie suggereer dat:

- simulاسie wyd deur ander professionele groepe soos die mediese beroep, gebruik word, alhoewel dit eerder vir formatiewe as summatiewe evaluering

aangewend word

- dit meeste respondente simulاسie sien as 'n situاسie wat nie 'n werklike kliniese situاسie skep nie
- simulاسie nie konsekwent, presies, akkuraat of bestendig genoeg is om kognitiewe psigomotoriese en veral affektiewe bekwaamhede of vaardighede te evalueer nie
- simulاسie gebruik word in die plek van situاسies wat nie geredelik beskikbaar is nie.

Die navorser het aanbevelings gemaak wat op bogenoemde bevindings gegrond is.

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CHAPTER 1

ORIENTATION TO THE STUDY

1. INTRODUCTION

In order that nursing students become efficient practitioners on qualifying as professional nurses they need to learn different skills. Some of these skills are psychomotor performances that students learn through practice and others are affective and cognitive skills. In many cases practice on real patients may be difficult to obtain because it may involve risk or discomfort to patients. In such cases it is important to provide students with the opportunity to practise in a situation which closely resembles the real one but which does not carry any risks. This type of exercise is called simulation (Ewan & White, 1989:74). Whether the students practise in real situations or simulated ones, examinations have to be conducted in order to determine the extent to which the skill has been mastered. The skill consists of three aspects which are psychomotor, cognitive and affective domains.

The trend lately is to use objective structured clinical examinations (OSCE) as a method of evaluating competence in clinical practice. In this examination simulation is usually used. Each student goes through a series of stations or stalls and undertakes a variety of tasks. Evaluation instruments are prepared beforehand to ensure reliability of the scoring. All students are examined on the same criteria by the same examiners. An example of a tool for a station used in one of the examinations is shown below:

1.1 An evaluation instrument of an objective structured clinical evaluation station: number one

1.1.1 Nursing skill: checking of temperature orally, pulse and respiration: level 1

● **Objectives**

The students should be able to:

- ▶ read the thermometer correctly
- ▶ check pulse and respiration correctly
- ▶ record all findings correctly

	TOTAL MARKS	STUDENT'S MARKS
ASSESSMENT		
- Assess the condition of the mouth		
- Check if mouth has any sores	1	
- Check when last food or drink was taken	1	
PLANNING		
- Explain procedure and give relevant instruction	1	
IMPLEMENTATION		
*- Shake thermometer until mercury is below 35°C	1	
- Clean thermometer with hibitane swab before and after removing it from the mouth	1	
*- Place and leave thermometer for 2 minutes	1	
*- Identify and count pulse correctly for half or one minute	1	
*- Count respiration for 1 minute	1	
*- Read and record all findings correctly	1	
EVALUATION		
*- Interpret findings and report abnormalities	1	
	10	

Signatures: Examiner: External examiner:

Comments:

.....

KEY: * An asterisk is put in front of those activities which are regarded as crucial and omission of a crucial point means 30 % off from the total marks.

1.2. PLANNING FOR AN OSCE

Planning for an OSCE needs time and the planning must be done by nurse teachers who must focus on the following:

- ▶ Judging the students' performance objectively.
- ▶ Incorporating qualitative (i.e. how well the student can perform in the different aspects, does the student meet the standards expected) and quantitative (i.e. include most aspects of the syllabus taught at a particular level) aspects of the syllabus.
- ▶ Formulation of precise marking scheme concentrating on critical points.
- ▶ Detailed preparation of evaluation tools including all domains.
- ▶ Convening a meeting of personnel e.g. examiners who will participate in the examination. These prospective examiners discuss in order to reach consensus on the conducting of the whole OSCE.

1.3 IMPLEMENTATION OF AN OSCE

OSCE is implemented using as realistic a setting as possible and also using volunteers as patients.

1.3.1 Briefing

About 5-10 minutes are used by the subject head of the subject to state briefly and clearly exactly what is expected from the students.

1.3.2 Examination

At each station each student goes through the following steps:

- ▶ 1 minute is used by the student to read instruction and plan his or her action.
- ▶ the next 5-10 minutes are used by the student to undertake and complete the procedure.
- ▶ The last 1 minute is used by the student to relax in readiness for the next station.
- ▶ Each student moves through approximately 5 stalls spending 5-10 minutes in each. Movements are regulated by a time keeper who rings a bell to show that the time is up for a student to be in a particular stall.

1.3.3 Debriefing/feedback

All examiners assemble and feed students back on general students' performance in respect of good and weak points of students (Rodrigues, 1990:22; Records of Ngwelezana College).

1.4 MOTIVATION FOR THE STUDY

Most institutions have adopted objective structured clinical examinations as a method of evaluating students' clinical performance (Newble & Cannon, 1989:110). The researcher participates in clinical examinations at different levels in the college of nursing being studied and has observed that there appear to be problems and weaknesses in the use of simulation to test students' competence in skills to be mastered by students. Shortcomings relating to evaluators, the environment in which the examination takes place and questionability of measurement of affective skills in simulated situations seem not to be given proper attention. The foregoing have been a cause for concern and they have led the researcher to embark upon an investigation on the questionability of simulation used in evaluating clinical competence.

1.5 STATEMENT OF THE PROBLEM

Practical examination of student nurses using simulated clinical situations do not seem to address all aspects of nursing intervention that is, it does not seem to yield the appropriate information required to decide whether the student is ready to be a nurse practitioner or not. OSCE is popular at the college being studied, a number of students get marks as high as 90 % in these examinations. The annual pass rate is good, there seems to be wide spread reservations about the effectiveness of use of simulation in OSCE's. The monitored simulated situations inhibit the student from being his or her natural self. Apparently the student does not respond spontaneously to needs of clients or patients in such situations. Efforts to enhance effectiveness of simulation in an OSCE, e.g. crucial or critical points, and structured evaluation tools appear to be used leniently or at times not at all. Therefore, the question to be asked is : How reliable is simulation as a means of determining proficiency in nursing intervention.

1.6 SIGNIFICANCE OF THE STUDY

Studies which have been conducted on objective structured clinical examinations address aspects such as stress experienced by students when exposed to their first OSCE (Bower, 1988); shortcomings in the OSCE relating to evaluators, environment, measuring instruments used and simulated situations (Aswegen, 1989) and influence of simulation on clinical learning among first year students (Bruce, 1990). No studies according to literature reviewed have looked at the following; how reliable simulation is when used to evaluate clinical competence? Does it evaluate attainment of competence in all the domains of learning? The researcher intends providing information which will address these uncertainties concerning the reliability of simulation.

1.7 OBJECTIVES OF THE STUDY

This is a descriptive study. Instead of a hypothesis, the study will be guided by the following objectives:

- ▶ To determine the views on reliability of simulation in evaluating the following selected competencies:
 - i. affective skills
 - ii. cognitive skills
 - iii. psychomotor skills
- ▶ To determine the relation between the respondents views on the use of simulation in evaluation.
- ▶ To determine the relation between respondents views on the objectivity in handling simulation during practical examinations.

1.8 DEFINITION OF TERMS

1.8.1 Simulation

"It is a simplified reality, it represents the essence of physical or social systems of interaction. It attempts to replicate essential aspects of reality so that reality may be better understood or controlled (Swart, 1992:35).

According to De Young (1990:141) simulation is divided into three types namely simulation exercise, simulation games and role play. Simulation exercise is a "controlled representation of a piece of reality that learners can manipulate to better understand the corresponding real situations". The second type is simulation games, these being games "that represent real life situations in which learners compete

according to a set of rules in order to win or achieve an objective. The third type of simulation is role playing which is "a form of drama in which learners spontaneously act out roles in an interaction involving problems or challenges in human relations". Swart (1992) and De Young (1990) agree that through simulation some aspects of reality are presented to nursing students in order that this is comprehended and controlled. Human behaviour cannot be predicted all the time. This means that when patients or clients are represented by simulated performances, this gives ample opportunity to the nursing students to be able to manipulate the man-made circumstances.

1.8.1.1 Operational definition

Simulation is a man-made situation which closely resembles a real situation. This situation provides nursing students with opportunity to demonstrate competence in psychomotor skills in an environment which can be manipulated to render effective results. In this study simulation must be understood to include examples such as checking blood pressure using a nursing student posing as a patient, inserting a rectal suppository into a doll, using a sponge for suturing of a clean wound and administration of medication to a tutor posing as a patient and at the same time being an evaluator.

Further, in this study simulation is confined to that used in practical examination to determine if students of the basic course have attained the desired level of competence in order to become nurse practitioners.

1.8.2 Reliability

"It is a term used to indicate the consistency with which a test measures what it is designed to measure. It should yield similar results when used on two separate

occasions provided that the other variables remain similar (Quinn, 1980:258).

According to Gillis (1982) reliability means the degree of consistency with which a device measures whatever it is designed to measure.

1.8.2.1 Operational definition

For the purpose of this study reliability must be understood to mean the ability of practical examinations using simulation, to test how competent a student is in any clinical skill, in its cognitive psychomotor and affective dimensions, for students at first, second, third and fourth year level of the basic nursing course.

1.9 THEORETICAL FRAME WORK

This study will be based on Betty Neuman's adaptation model. The model deals with stimuli that produce tension and cause instability of a system. The system needs to deal with one or more stressors at any given time. The intensity of the stressor has an influence on the system's reaction or potential reaction to the encounter. The outcome can either be negative or positive.

When student nurses simulate practical situations, they are viewed as open systems interacting with the environment. There are factors from the environment which cause stress and students react to these stressful situations. The stressful environment can cause a student to fail. He/she is nervous and scared of examiners because the student does not know whether he/she will pass her examination. The students have to adjust to stressors, be calm because their performance is being evaluated (George, 1995:287).

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter contains specifically organised and summarized information gathered from national and international books, journals, publications, official documents, research reports and occasional papers of current and previous years to lay the foundation for this research study. Literature review focuses on the concepts comprehensive basic nursing courses, clinical competence or clinical evaluation, simulation in clinical evaluation and the issue of reliability in clinical evaluation.

2.2 THE COMPREHENSIVE BASIC NURSING COURSE

This type is a four year comprehensive nursing course. It is one of the nursing courses offered by Ngwelezane College in association with the University of Zululand. This institution is recognised by the South African Nursing Council (SANC) which is the statutory body. This course is offered by universities and nursing colleges in conjunction with universities which have a department or sub-department of nursing (Mellish, 1986:53)

2.2.1 Nature and scope of the comprehensive basic nursing course

The basic nursing course in its present form came into existence in 1986 according to the SANC Regulation No. R425. It was an improvement on the previous type of basic courses whereby students were prepared for general nursing and midwifery courses at a time. As the term “comprehensive” suggests, this basic course offers and prepares students to be able to eventually register with the SANC as nurse (general, psychiatric, community health) and midwife within the shortest possible

time, i.e. four years. Obviously, this comprehensive course has a wider scope of education and training of student nurses, thus potentially providing students with a wider range of interventive nursing skill.

The SANC sets guidelines for offering of the course as reflected in Regulation No. 425 for institutions which seek recognition by the SANC. Each college then states its own philosophy and course objectives, prepares its own curriculum which is then submitted to the SANC for approval. Ngwelezane College of Nursing conformed to this requirement (Ngwelezane College Official Records). The basic course prepares students to be qualified nurses who will be able to practice with the SANC scope of nursing practice Regulation No. 2598, (1984).

The College educates and trains its students and assesses and evaluates them to ensure that they are clinically competent enough to meet the expectations of the SANC. As the graduates of this basic course increased, misgivings were expressed about the quality of clinical evaluation of these graduates. There was a feeling (expressed in a departmental research study in evaluating the course), that these graduates are not thoroughly grounded in the clinical skills to render good quality nursing practice (Ntombela, Mhlongo, Mzimela and Mashaba, 1994) unpublished

It must be pointed out that although this basic course covers the nurse (general, psychiatric, community health) and midwife this study is confined to the general nurse aspect only. Further research of this nature could be done on the Psychiatric, community health nursing and midwifery if necessary.

2.3 POLICY FRAMEWORK

Policy framework in which this investigation is conducted includes the stand point

of the SANC as a statutory body, (that is the SANC philosophy, and nurse's scope of practice) and the SANC approved Ngwelezane College curriculum objectives.

2.3.1 South African Nursing Council Philosophy

SANC in its philosophy document explains its view about education and training of student nurses. This type of educational preparation is a socialising and developmental process covering the "personal and professional" aspects of a nurse. In other words, although nursing is an art and science, its education should be such that the student's personal qualities, capabilities and aspiration should be assisted to grow. The same applies to the growth of professional qualities and capabilities. In its philosophy statement SANC emphasizes that the student should change in the "cognitive, affective and psychomotor" dimensions. Nurse's education and training that provides predominantly for the acquisition of psychomotor skills, falls short. Further, SANC places utmost importance on the nurses ability for "analytical, critical, evaluative and creative thinking". During preparation the nurse needs to be grounded in the ability to handle and solve the many clinical problems of different patients and clients. Each of the foregoing abilities should equip the student nurse with confidence for relevant nursing intervention. Theoretical as well as clinical evaluation must be seen to test the students' performance also in areas of analytical, critical and creative thinking. It thus remains to be seen through findings of this investigation if instruction and clinical evaluation is holistic in line with the SANC philosophy.

2.3.2 The South African Nursing Council Nurses' scope of practice

The SANC further requires that on qualification nurses perform their tasks according to the scope of practice of a registered nurse. The scope of practice is the legislated and well circumscribed role of registered nurses in South Africa (SANC Regulation

R 2598 1994 as amended). Nurses undergo an extensive practical examination in order that they will become proficient and competent clinical practitioners. On completion of the course and passing of examinations the student becomes a registered nurse through getting registered with the SANC. The study therefore uses the scope of practice as a frame of reference because registered nurses will be expected to perform duties according to it. The scope of practice is outlined as follows in Regulation No. R 2598 of 30 November 1984 as amended. This document includes among others, the following skills:

- ▶ the execution of a program of treatment or medication prescribed by a registered person for a patient
- ▶ the treatment and care of and the administration of medicine to a patient, including the monitoring of the patient's vital signs and of his reaction to disease conditions, trauma, stress, anxiety, medication and treatment.
- ▶ the prevention of disease and promotion of health and family planning by teaching and counselling of individuals and groups of persons
- ▶ the supervision of and maintenance of a supply of oxygen to a patient
- ▶ the supervision of and maintenance of fluid, electrolyte and acid base balance of a patient
- ▶ the facilitation of the healing of wounds and fractures, the protection of the skin and the maintenance of sensory functions in a patient
- ▶ the facilitation of the maintenance of nutrition of a patient
- ▶ preparation for and assistance with operative diagnostic and therapeutic acts for the patient
- ▶ the provision of effective patient advocacy to enable the patient to obtain the health care he needs

- ▶ care of the dying patient and the care of a recently deceased patient within the execution of the nursing regimen.

This study is trying to determine the reliability of evaluation when simulation is used to test clinical proficiency among the diploma nurses at Ngwelezane College of Nursing. This calls for scrutiny of not only the nurse's scope of practice, but also the course of objectives of Ngwelezane College because these objectives were formulated or planned in such a way that they produce competent practitioner.

2.3.3 Ngwelezane college curriculum objectives

The objectives of the curriculum of the basic diploma course of Ngwelezane College are formulated in line with the SANC Regulation R 425 as amended and they are as follows:

the curriculum shall provide for personal and professional development of the student so that on completion of the course of study he:

- ▶ shows respect for the dignity and uniqueness of man in his social, cultural and religious context and approaches and understands him as a psychological, physical and social being within this context.
- ▶ is skilled in the diagnosing of individual, family, group and community health problems and in planning and implementing of therapeutic action and nursing care for the health service consumers at any point along the health/illness continuum in all stages of the life cycle and in evaluation thereof.
- ▶ is able to direct and control the interaction with health service

consumers in such a way that sympathetic and empathic interaction takes place.

- ▶ is able to maintain the ethical and moral codes of the profession and practice within the prescriptions of the relevant laws.
- ▶ endorses the principles that a comprehensive health service is essential to raise the standard of health of the total population and in practice contributes to the promotion of such a service, bearing in mind factors from within and outside the borders of the country which are a threat to health.
- ▶ is able to collaborate harmoniously within the nursing and multidisciplinary team in terms of the principle of interdependence and co-operation in attaining a common goal.
- ▶ is able to delineate personal practice according to personal knowledge and skill, practice it independently and accept responsibility thereof.
- ▶ is able to evaluate personal practice continuously and accept responsibility for continuing professional and personal development.
- ▶ evinces an enquiring and scientific approach to the problems of practice and is prepared to initiate and/ to accept change.
- ▶ is able to manage a health service unit effectively.
- ▶ is able to provide effective clinical training within the health service unit.

2.3.4 Evaluation of students' clinical competence: focus on reliability

Reliability is a “term used to indicate the consistency with which a test measures what it is designed to measure. It should yield similar results when used on two separate occasions provided that the other variables remain similar” (Quinn, 1980:258). According to Gillis (1982:216) reliability means the “degree of

consistency with which a device measures whatever it is designed to measure". Leedy (1980:190), Polit and Hungler (1990:179) and Mashaba and Brink (1994:180) concur with the view that reliability is defined as a "degree of consistency or dependability with which an instrument measures the attribute it is designed to measure".

2.3.4.1 Evaluation

It is a systematic process determining the extent to which educational objectives are achieved by students, a process involving frequent use of different kinds of techniques. It includes measurement but is broader in scope and is also an intellectual act (Sneider, 1984; Fawcett, 1984; De Tornyay & Thompson, 1982).

In analysing and interpreting findings the researcher will relate these to the foregoing official documents in order to determine to what extent is the whole educational and evaluative process based on sound basis and in particular the effectiveness of clinical evaluation using simulation as is done at Ngwelezane College.

2.4 SIMULATION

The amount of literature on simulation suggests either that simulation is progressively becoming popular, or that it is not so well understood or properly utilised. There could be many more reasons that result in research and publishing around this topic. In this chapter simulation is discussed particularly in its use in objective structured clinical examination as viewed by different writers.

2.4.1 Historical background of simulation

Origins of simulation can be traced back to the game of chess first played in India about 1 500 years ago (Maidment & Bronstein, 1979:9). In the years that followed

simulation became more used in different fields like the military, aviation, mining etc. In the 1950's and 1960's social scientists became interested in applying simulation in their field. According to Bramble (1994:60) authors like Barrows and Abrahamson described the use of a "programmed patient" for assessing the performance of medical students in clinical neurology in 1964. Frejlach and Corcoran first introduced simulation in nursing education in 1971. Thereafter the use of simulation in a variety of ways gained popularity in nursing education (Brambley, 1994). Taylor and Walford (1978) subscribe to the fact that simulation is many years old. However its adoption by general education is a fairly recent event.

2.4.2 The essence and use of simulation

The essence and characteristics of simulation are reflected in writings of different writers. MacGuire and Wezeman (1987:19) point out that simulation involves placing an individual in a setting that imitates some aspect of reality as well as designing a problem around that setting. The learner is required to actively participate in "initiating and carrying through a sequence of inquiries, decisions and actions" (McGuire & Wezelman, 1987:19). It is noteworthy that simulation does not resemble a real situation one hundred per cent. It merely focuses on certain aspects of reality. In this way the avoidable side issues are deliberately and carefully played down so as to heighten the value of learning a skill. Swart (1992:35) subscribes to this by saying that "simulation attempts to replicate essential aspects of reality, so that reality may be better understood and or controlled". Such understanding and controlling bring about positive transfer of learning. Such transfer leads to better performance on subsequent skills (Bramble, 1994:60). This means that simulation ensures demonstrating of things that are difficult to see or to understand in the natural state e.g. a model heart can be taken apart to visualise the

full picture of various chambers and valves.

Simulation can be characterised by the fact that a problem can be initiated and standardised. This standardised problem can be used by different students, each one evolving different ways of problem solving according to their unique interventive ability (McGuire & Wezeman 1987:19). Simulation becomes experiential learning in which the student participates actively and does what one would normally do in a particular situation (Du Plessis, 1994:9 ; Wilcox, 1994:15). Swart (1992:37) supports the view of active participation of students in one of the significant strategies. In such a case one does not pretend to be someone else, but is expected to be oneself dealing with the situation as oneself.

McGuire and Wezeman (1987:29) whose publication is supported by the World Health Organisation, raises pertinent points regarded as criteria for using simulation. These are that:

- ▶ there should be development and use of a simulator that is parallel to curriculum needs. Such a simulator will be an anchorage to the curriculum and to identified learner's needs and can subsequently be supported and applied by teaching members.
- ▶ the physical nature of a simulation device should satisfy the instructional accuracy in terms of texture, size, density of mobility. Anatomical replications that are commercially developed have been found to poorly meet the need of the experience.
- ▶ the student must be exposed to a simulated device at an appropriate time in one's training. For instance, for mastery of the pelvic examination one needs to firstly acquire the knowledge of basic

sciences and some fundamentals of obstetrics and gynaecology.

- ▶ in evaluating individual competence it is necessary to decide exactly what aspect of competence is to be measured at a particular education level of experience. For instance, it could be suturing of an episiotomy, safe giving of an intramuscular injection, and so forth. Then the appropriate technique enables one to perform a task resembling as close as possible the real-life performance for which one is being examined.
- ▶ objectivity or inter-rater reliability should be ensured. This means that different observers evaluating one, should agree on the quality of one's performance. This should be deliberately guarded against in structuring the environment and the simulation device. Further, reliability should be ensured by creating a sufficient number and variety of tasks, to judge the student's overall competence.
- ▶ Tansey and Unwin (1969) also advance decisions that should be made when an educator prepares for undertaking simulation. These writers suggest that organising and planning for use of simulation should also involve:
 - ▶ deciding specifically what one intends doing e.g. teaching facts, bringing out beliefs etc.
 - ▶ deciding on number of classroom hours to be used up in simulation.
 - ▶ what background knowledge must be given.
 - ▶ deciding on roles that individual will play, decision making and feedback methods.
 - ▶ specifying participants' objectives and resources.

The foregoing provides guidelines for nurse educators and evaluators to avoid mishandling simulation. Decisions to employ a type of simulation, where and when, all should be arrived at after careful considerations. Authors highlight objectivity in evaluation and inter-rater reliability - all being part of which this study will refer to on analysing data. This is reflected in Roberts (1981) words who predicts a potential for simulation. According to this author, some people feel that simulation is likely to become institutionalised in hospitals and be used not only as a teaching strategy, but also as a means of health planning of operational analysis and generally contribute to improving the health and well being of mankind. The next section discusses the varieties of simulation as reflected in literature.

2.4.3 Variety and types of simulation

There is a general agreement on the following types of simulation used for teaching and for evaluating or testing mastery of skills. This range covers the following:

- ***Reproduction of visual and auditory stimuli.*** This involves the use of photographic reproductions of X-rays, lesions, gross and microscopic specimen; tracings of electro cardiograms. These are presented in a form that imitates life as closely as possible. In addition, high quality video tapes showing patient interviews and examinations are used to present data combining sound, colour and movement (McGuire & Wezeman, 1987:20)
- ***Three dimensional models.*** Quite a number of this type of simulators has become more available. This includes manikins, model of breast,

prostrate, eye, ear, infusion arm, intubation, Resusci-Annie and others. Pathology is sometimes introduced into these devices so as to assist the student to learn and show mastery of skills (McGuire & Wezeman, 1987:21; Wilcox, 1994:5)

- ***Automated robots.*** McGuire and Wezeman (1987:22) explains these as “computer-managed, extraordinary life-like robot that can be programmed to present combinations of findings capable of modification in an almost infinite number of ways to simulate a variety of problems and to respond appropriately to different interventions of the anaesthetist”. These are used in training and testing of medical students.
- ***Written simulation.*** This is also called paper and pencil simulation where written simulation of clinical problems is designed to imitate the process of nursing intervention. It is said that these have proved valuable for diagnostic and management problems including psychosocial and organic issues (McGuire & Wezeman, 1987:22).
- ***Computer-aided simulation.*** This provides another opportunity for decision-making process in investigation and management of patients using the micro-computer. The strength of this type of simulation is that the learner is provided with immediate feed back on one’s decisions and record of one’s entire decision-making performance for objective analysis and evaluation (McGuire & Wezeman, 1987: 23; Taylor & Walford, 1978).

- ***Live simulations.*** Here, another student, another patient or almost anyone can be trained or “programmed” to simulate a patient in an interview setting. Such simulations are good in helping the student to develop. It is relatively easy to evaluate the quality of communication and interpersonal skills of the student (McGuire & Wezeman, 1987:23).

- ***Role playing.*** In a hypothetical situation the student is required to assume a new identity, pose as someone else and act/react as appropriately as possible. The other participants are able to see their relative position and attitudes. The feedback about one’s performance enables one to improve on the required skills (Van Ments, 1986; Taylor & Walford, 1978). No participant is allowed to be a passive observer. Participants are briefed prior and de-briefed after the play (Swart, 1992:27).

- ***Simulation Games.*** There is a whole range of games, each one focussing on a particular real-life situation. The players have functions, powers and responsibilities. They are guided by rules and winning is the final target which amounts to attaining objectives. Briefing constitutes orientation of players and the subsequent debriefing eases participants. Through such games students gain ability and confidence in handling particular aspects of real life (Swart, 1992:37; Tansey & Unwin, 1969).

- ***Simulation exercise.*** This means an organised and controlled representation of an aspect of reality. Students get a chance to

manipulate in order to understand the corresponding real situation. Students do not take up rides, but they are expected to behave and react in a way they feel most appropriate; not to pose as someone else (Swart, 1992:36; Smith, 1986)

- ***Animal tissue.*** There are times when teachers resort to finding certain parts of a slaughtered cow etc., to use as a substitute of parts of a human being for purposes of teaching and training. The reason is that some commercial models are found to have limitations e.g. high cost, inelastic tissue of certain models etc. For instance cow perineums obtained from the abattoirs were used to enable student midwives to practice the skill of suturing the perineum (Du Plessis, 1994:10).

The above-mentioned list does not cover everything. From time to time educators use their creativity and innovativeness to evolve better simulators. At times a piece of sponge is used for practising suturing and removal of sutures instead of practising on a real patient. Even a simulated ward unit is organised instead of a real one.

2.4.4 Simulation in instruction and evaluation

Simulation is popularly used as a means of teaching on practical aspects that can subsequently be encountered in the real life situation. This provides opportunities for creative and analytical thinking in clinical problems that need to be solved. The various simulation methods also ensure development of psychomotor and interpersonal skills. A student experiments with or interacts with the device, thus providing more scope for practising and improving the skill. Learning in simulated devices creates ground for individualised learning and gaining confidence (Boocock & Schild, 1968; Law 1988)

As an assessment and evaluation means, simulation is used, especially in Objective Structured Clinical Examination (OSCE). In such situations students' mastery of skills is established in relation to predetermined objectives. Evaluation is conducted to ensure competence in collecting and interpreting clinical data, judgement in patient management, application of communication and interpersonal skills, acquisition of values and ethical stand points. Therefore simulation in evaluation can be used with cognitive, psychomotor and affective domains (Crookall, Klabbers, Coote, Saunders, Cecchini & Piane, 1989 ; Gredler, 1992).

2.4.5 Advantages of simulation

Among others, the following are the advantages of the use of simulation:

- ▶ It fosters enthusiasm in learning and provides for challenging opportunities. The prompt, specific and unambiguous feedback characteristics of a well designed simulation makes this a powerful tool for enhancement of learning (McGuire & Wezeman, 1987).
- ▶ It gives a participant a feeling of efficiency and of being able to control the world around one as opposed to a feeling of alienation.
- ▶ It takes learning out of the area of abstraction and provides for human reactions/interactions and emotions are involved. Learners are placed in a relatively safe and non-threatening learning environment (Crookall et al, 1989).
- ▶ It provides a structural framework with which to fix information in the memory (Bramble, 1991).
- ▶ It is one way of making classroom learning seem more personally relevant, captures the interest and enthusiasm because it gives much of

the responsibility of learning to students (Snelbecker, 1974).

- ▶ There is relatively low cost of an error in the simulation model compared to that of a similar error in real situations.
- ▶ Participants address the issues and problems seriously and conscientiously in a professional manner (Gedler, 1992).
- ▶ It can shorten the time needed to experience and gain mastery in handling a variety of nursing care situation (Swart, 1992). Simulations of a lifetime can be developed even for skills of a chronic condition ,within a half an hour (McGuire & Wezeman, 1987).
- ▶ Simulation makes it possible to predetermine precisely the exact task that students are to learn or demonstrate. A student can be confronted again and again with challenging variations of essentially the task.
- ▶ The examiners are enabled to standardise the task for all examiners without risk to any patient.
- ▶ It is possible to record students' performance in detail for subsequent feedback in a manner that maximises one's learning and to develop specific criteria for judging performance and train examiners in applying these criteria consistently (Bramble, 1991).

Despite the advantages of simulation discussed above some authors have reservations as stated below:

2.4.6 Disadvantages of simulation

- ▶ Simulation does not have a universal application in education, but only in certain areas (Tansey & Unwin, 1969)
- ▶ Simulation is not an appropriate method for teaching or for measuring all aspects of performance. The effectiveness of learning produced by

simulation has not been tested and proved (Boocock & Schild, 1968).

- ▶ The three-dimensional models have not been adapted to local conditions, they are more costly, easily damaged and they fall short in desirable attributes (Du Plessis, 1994).

2.5. EVALUATION OF STUDENTS' CLINICAL COMPETENCE: FOCUS ON RELIABILITY.

It is of concern that the college's teaching staff appears to have misgivings about effectiveness of evaluating of students' clinical competence . To begin the discussion here, some important concepts are going to be examined.

2.5.1 Crucial concepts

The term "evaluation" is defined by Sneider (1984) as a "systematic process of determining the extent to which educational objectives are achieved by students. It includes measurement but is broader in scope and is also an intellectual act". Another definition is:

In this study the term "evaluation" must be understood to mean the action whereby teachers, instructors and examiners strategies in order to determine if students meet clinical learning objectives. At the end of their level of study students need to demonstrate competence in clinical skills. This will show readiness for the students to either proceed to the next level or to complete the course of study. The process or means to test for and prove this competence is evaluation.

The term "clinical competence" according to Khoza (1996) is based on the nurses' ability to satisfactorily perform cognitive, affective an psychomotor activities. Although nursing consists of theory and practica, testing the student for mastery of

theory is usually done separately from testing mastery of practice or clinical abilities. The latter is usually accompanied by problems. Competence in clinical performance is also referred to as clinical evaluation for purposes of determining students achievement of outcomes (Mashaba & Brink, 1995:163; Ung, 1994:164). A related term is clinical proficiency which, according to Mason and Jinks (1994) means attainment of a skill or attainment of clinical expertise.

2.5.2 Historical development of clinical evaluation

As far back in South African history as times of Sr H. Stockdale in the middle of 1800's when she first introduced the formal nurses' course, the practical component of nurses' training was invariably given more emphasis seeing that nursing has always been a "hands-on" career. This attitude persisted during times of the South African Medical Council's control of nursing education in the 1920's (Searle, 1966:315). When the SANC took over complete control of nurses' education as from 1944 this council introduced reforms and brought nursing into scientific footing. Even in years that followed up to the 1970's various SANC regulations got published to maintain standards of among others, clinical teaching/training and clinical evaluation (Searle, 1966).

Due to modern developments such as medical and technological, SANC watched and monitored standards, especially of clinical teaching and evaluation. Up to the contemporary years, writers like Ung (1994) advocate effective clinical performance indicators as part of the on-going campaign to uphold good clinical performance. The foregoing shows that groups and individuals have, over the years, tried to maintain safe, ethical and effective clinical performance of students. This study is part of this movement.

2.5.3 Dimensions of clinical competence/performance

To be in line with the SANC's definition of nursing education, and the SANC's scope of nursing practice as well as the college's curriculum objectives presented earlier in this chapter, the components of clinical competence/performance need to be discussed. SANC (1982) states that personal and professional development of students involves the whole person, i.e. cognitive, affective and psychomotor aspects. Clinical evaluation to assess competence in skills then should of necessity address all the three domains of human behaviour, which, in turn, have rising levels or complexities of behaviour as put forward by Bloom in the following manner (Huckabay, 1978).

- ***Cognitive domain.*** This means intellectual activities whereby at its lowest or simplest level it involves recall of newly learned facts. The next level is comprehension or understanding of newly learned facts. This is followed by applying of facts in a practical situation; then comes analysis, synthesis ending with the sixth and most complex level of cognitive behaviour which is evaluation.
- ***Psychomotor domain.*** Psychomotor means physical abilities demonstrated by a learner, also occurring in rising complexities. The simplest level is that of observation when the learner is initially exposed to a skill. This is followed by the level of imitating, closely following instructions. Then comes the level of applying, where the learner practices doing skills independent of instructions. After this is the level of demonstrating, ending with the highest level where the learner shows the mastery of the ability to perform the skill.

- ***Affective domain.*** Affective states include feelings, emotions, attitudes that are inferred from one's behaviour. The taxonomy of the affective domain begins with the simplest level of paying attention. In other words the learner shows awareness of a particular behaviour. After this the learner responds towards the particular behaviour by taking some initiative to expose oneself more and more to that behaviour. At the third level the learner shows more interest and spends more in even recruiting people to support or contribute to this behaviour. At the fourth level the learner models this behaviour, thus making oneself the example that other people could imitate. Lastly is the stage when the learner shows that one has adopted this particular behaviour so that it becomes a way of life.

Bloom's taxonomy of cognitive, psychomotor and affective domain is used as an effective basis for evaluation and assessment of mastery of learnt subject content. However, Khoza (1996:25) presents the domains in terms of clinical indicators that can be used as basis to determine clinical competence. Creative nurse educators are capable of using Bloom's taxonomy and Khoza's hierarchy of clinical indicators in relation to each other for best results. These two sets mutually complement each other because they cover the same ground at different levels. Khoza (1996:25) advocates that the following set of clinical competences can be used to evaluate newly qualified nurses' performance:

- ▶ the cognitive domain involves problem solving, research, clinical judgement, teaching, management and critical thinking and decision making.
- ▶ the psychomotor domain contains manual and technical skills.

- ▶ the affective domain consists of adaptive or adjustment states, interpersonal relationship or communication; caring and ethical viewpoint of man.

In view of the fact that Benner (1984) distinguishes between different stages of clinical ability, there is need to establish where our term clinical competence falls, so as to apply it correctly.

2.5.4 Dreyfus model of skill acquisition

Using the Dreyfus model of skill acquisition, Benner (1984) explains that a nurse goes through five stages of skill competence, i.e. novice, advanced beginner, competent, proficient and lastly, the expert level.

Novice refers to beginners that have no experience of the situation in which they are expected to perform. They gain experience for skill development by being tough in terms of objectives set for that particular level. They cannot work out priorities. First year student nurses who have recently been introduced to the basic nurses course fit into the novice stage. After gaining reasonable experience the novice becomes an advanced beginner who can demonstrate marginally acceptable performance although still lacks adequate experience. It appears as if student nurses that are still tackling their basic courses could very well fit into this category. They are familiar with the clinical area to a certain extent, but their experience is still shallow. The next stage is that of a competent practitioner where the nurse is able to plan her work effectively for a longer period of time. She assesses all those for whom she will care, she attends to immediate needs and prioritises her work. She displays a feeling of mastery. Student nurses who are completing their basic course bear resemblance to this group, because they have acquired confidence in the

clinical services they reach the proficient practitioner stage. By now they have accumulated rich past experience. They are fast and efficient and can see the situation as a whole rather than in terms of aspects. A qualified nurse who remains in the same practice area for years is the one who is likely to become proficient. They would in time display the above described characteristics of a proficient practitioner. Finally the nurses get to the expert practitioner stage, which is reached in approximately two to three years. The great amount of their experience enable them to quickly identify a potential problem, on condition that they remain practising in the same area. Attaining expertise in nursing practice is not very common. Many newly qualified nurses reach only competence level.

It is possible and desirable for a qualified nurse to reach expert practitioner level. This study is confined to the attainment of competence abilities of third level of the Dreyfus model; because the student nurses of this college are expected or capable of attaining the competence practitioner, abilities. According to literature during practical examinations at each year level or stage the policy at Ngwelezane College is to judge students' clinical performance or assess clinical competence using the objective structured clinical examination (OSCE).

2.5.5 The Concept: Objective Structured Clinical Evaluation

Bramble (1994:59) describes this type of clinical evaluation. From Bramble's presentation the following ideas emerge. OSCE is a method of assessing students' clinical competence which is objective rather than subjective. It consists of clinical and static stations. Students are assessed by rotating through these stations.

All this indicates that OSCE is a model of conducting examinations to establish student nurses' efficiency to perform clinical skills. This is a departure from the

conventional way of conducting practical examinations whereby examiners observe and pose questions to a candidate. These examiners then follow the candidate around as she gives an aspect of care to a patient chosen for an examination. One to two hours could be spent on one candidate. Although the conventional way is time-consuming and labour-intensive, some institutions still maintain conventional methods alongside the OSCE because of the value attached to the older methods.

The OSCE has advantages of being objective as opposed to subjectivity in conventional ways; being structured and organised and therefore more time-saving unlike conventional ways where examination items for each candidate can vary. OSCE can combine a whole range of competencies to be measured (Bujack et al, 1991). In this way students can be examined within a relatively short time. It is alleged that even if students get an average pass, if they request they can be re-evaluated on specific stations failed (Rodrigues, 1990:24).

In countries like the United States of America, Australia and others the term Objective Structured Clinical Assessment (OSCA) is used. South Africa tends to use OSCE. Apart from the difference in the last word i.e. E for examination an A for assessment, and the objectives of the exercise, the format of the model is almost identical. In this discussion OSCE will be used, as this is used at Ngwelezane College.

2.5.6 Historical development of Objective Structured Clinical Evaluation

Literature sources reveal that OSCE (and OSCA in some places), began with medical education in 1975 in the United Kingdom and other countries. In 1988 OSCE was used for technical-procedural skills performance for Canadian nursing students. In 1988 OSCA was used at a College of Education in Sydney, Australia.

In 1982 it was reported to be successful as OSCE in nursing students of Medunsa, Pretoria in South Africa (Bramble, 1994; Bujack et.al, 1991). Although, South African literature on OSCE is scanty, there is a growing tendency in a number of schools of nursing to adopt the use of OSCE (Aswegan, 1990).

Ngwelezane College of Nursing adopted OSCE for each of its four levels of training as from 1986 (Ngwelezane College Official Records). This includes clinical examination for general nursing, Community Health, Psychiatric nursing and Midwifery. Data collecting tool for this study was deliberately limited to clinical examinations for general nursing science's first to fourth year students. The aim for this was to keep data collection and analysis to a manageable volume. As Bujack et.al (1991) state in respect of the Sydney, Australia situation, the OSCE in Ngwelezane College is constructed with requirements of the comprehensive nursing practice in mind. However Rodrigues (1990:24) warns that the disadvantage of OSCE is that "simulation is not as effective as the real situation. In the real situation it would not be possible to examine a student so comprehensively within the relatively short period of one hour".

2.5.7 Highlights of OSCE

Bramble (1994) maintains that in OSCA there are three variables, i.e. the patient, the examiner and the clinical situation. Simulated trained patients are preferable because they can portray the same situation consistently and repeatedly. In simulated OSCA (OSCE) the examiners are also controlled in that they are trained ahead of time to assess students performance based on a checklist and only checklist items are used by the examiners to reduce examiner bias (Rodrigues, 1990). The selected clinical situations are such that each one is tailored to testing one aspect of clinical competence and they are allocated equal time.

Another feature of OSCA (OSCE) according to Bujack et.al, (1990) is the “inclusion of student self assessment strategies as a key aspect of problem-based learning”. Further is reported that OSCA if properly done is labour-intensive for staff, including paying for simulated patient training, use and debriefing (Bujack et al, 1991).

The general discontent at Ngwelezane College about the effectiveness of using simulation in OSCE should be seen against the foregoing features and highlights of OSCA. If simulation in OSCE is popularly used in other institutions it is possible that the problem at Ngwelezane College is not with the use of simulation. The problem could be the way or precautions taken with OSCE features e.g. intensive training of simulated patients, handling of checklists (e.g. critical points in the checklists), students self-assessment, training of examiners and others. However, this remains to be proved. The problem being investigated is whether the use of simulation in clinical evaluation is really reliable, in comparison to the views of the use of a real life situation.

2.5.8 The issue of reliability in clinical evaluation using simulation

Reliability is a “term used to indicate the consistency with which a test measures what it is designed to measure. It should yield similar results when used on two separate occasions provided that the other variables remain similar” (Quinn, 1980:258). Further, reliability means “the degree of consistency with which a device measures whatever it is designed to measure” (Gillis, 1982). The foregoing definitions reveal that the concept reliability involves dependability of an instrument or action or method. In this case dependability and accuracy of simulation in OSCE is being challenged. Studies that have established reliability of simulation as a means of clinical evaluation, have not been identified.

Authors that report on use of OSCE/OSCA express positive viewpoints. Bujack et.al (1991) have come out strongly in favour of authenticity of the OSCA which employs simulation. These authors state that “the reliability of the OSCA was established by carefully training the simulated patients and the use of standardised assessment criteria”. In addition, a formal evaluation of the Macarthur OSCA to establish the validity and reliability of the approach was warranted. Another positive view is by Rodrigues (1990:22) who states that OSCE was introduced in their hospital to “improve on the reliability and validity of the traditional methods of evaluation”. However, Recker and O’Brien (1995:21) state that although measures of reliability and validity are important in test construction, reliability and validity of examinations are difficult to establish. It is this difficult that results in arguments among nurse educators as to whether use of simulated patients, objects, situations etc , do test, persistently, what is supposed to be tested. This study will attempt to establish subjective perceptions of stakeholders about existence or non-existence of reliability in clinical evaluation (OSCE) where simulation is used.

2.6 CONCLUSION

Through this presentation the researcher has provided a variety of different as well as similar points of view on the terms that are crucial to the area being researched. This will be the basis for analysing data and arrive at findings.

CHAPTER 3

THE RESEARCH METHODOLOGY

3.1 Introduction

In order to meet the objectives of this study which are already stipulated in chapter one, data collection was done using quantitative research method.

3.1.1 Quantitative research

A quantitative research approach was used to determine how different the views on simulation and its uses are, how reliable simulation is in evaluating specific selected competences and how objective can evaluators be during practical examinations. According to Polit and Hungler (1983) quantitative research entails manipulation of numerical data through statistical procedures for assessing the magnitude and reliability of relationships among the subjects under study.

3.2 The research design

The research design used was the survey design. This design was chosen because it relies heavily on verbal report characterized by similarities and differences in order to explore, analyse, compare and solve a problem. It also requires standardised information collected from subjects who would have been selected from a large population. The survey design commonly uses questionnaire and interview as tools for collecting data. For the purpose of this study a survey technique was used.

The researcher used a carefully developed set of questionnaire referred to as an interview schedule. Secondly questionnaires were distributed to the sample

personally. Because of the fact that respondents differ considerably in their reading levels and in their ability to communicate in writing, questionnaires were not merely printed but great care was taken in their development. This was done in order to word questions clearly, simply and unambiguously (Polit & Hungler, 1983:155).

3.3 Scope and delimitation of the study

The study was conducted at Ngwelezane College and its campuses. This College lies in region D of the 8 regions of KwaZulu Natal's Department of Health. It is affiliated to the Department of Nursing Science of the University of Zululand. It consists of Ngwelezane campus in the vicinity of Ngwelezane Hospital which is situated 10 kilometres south of Empangeni town. The second campus is that of Benedictine in the vicinity of Benedictine Hospital near Nongoma town. Lastly comes the Charles Johnson Memorial (CJM) campus at CJM Hospital in the Nquthu town.

3.4 The target population

The target population consisted of the following people:

	Benedictine Hospital/Campus	C J M Hospital/Campus	Ngwelezane Hospital/Campus	Total
Nurse Educators	16	22	23	61
Ward Professional Nurses	137	125	240	502
Basic Diploma Student Nurses				
1 st Years	31	55	35	121
2 nd Years	26	22	26	74
3 rd Years	21	1	47	69
4 th Years	14	21	30	65
TOTAL	245	191	385	892

3.5 The Sample and Sampling

In each institution a change list roster was utilized as a sampling frame to select a sample of ward professional nurses. A sample was drawn by means of random systematic sampling. This was done by selecting every 4th name of ward professional nurses from the sampling frame. The sample of student nurses was selected from those who were allocated to the wards and those who were on block at the college.

They were selected by means of random systematic sampling from class lists of different groups kept at the college. Every 4th student nurses' name was chosen. A convenience sample of nurse educators was used to complete the questionnaire. The sample was obtained by utilizing all the nurse educators who were at work on the day the questionnaires were distributed by the researcher. A sample of one hundred and sixty (160) was selected to complete the questionnaire. This number of respondents was obtained after adding the total number of the sample in the

different institutions. One hundred and sixty (160) was 18 % of the total population. According to Polit and Hungler (1983) specification of a sample size is a complex issue. They maintain that there is no simple equation that can automatically tell the researcher how large a sample should be but researchers should always use the largest sample possible to minimize sampling error.

According to Cohen and Manion as quoted by (Behr 1988:13) the researcher must obtain the minimum sample size that will accurately represent the population under survey. Huysamen (1994:48) supports Polit and Hungler (1983) by saying that the larger the sample, the less are the chances of a sampling error but researchers should always bear in mind that “in determining the sample size, the number of subjects for whom usable data will eventually be obtainable, may be much smaller than the number which was drawn originally. Respondents may refuse to participate in the research, and some may not provide all the necessary information or may not complete their questionnaires, so that their information may need to be discarded”.

According to Behr (1988:14) researchers should try and choose samples which are not biased and more representative, by using a sample which is so constituted that every member of the population has an equal chance of being chosen. The researcher attempted to go by the foregoing guidelines.

3.6 Operationalizing the Variables

It became expedient to operationalize the variables that are crucial, not only in understanding the discussion of data, but also in explaining the basis for formulating questions in the research instrument. These variables were reduced into indicators. Narayanasamy (1991) subscribes to the practice of stipulating indicators that constitute elements of performance to be tested.

As discussed in the problem statement in chapter one, this study focuses on the views of reliability when evaluating students' clinical competence using simulation in the particular institution under study. The variables; "reliability", "clinical competence" and "simulation" were operationalized by reducing them to indicators as follows, in order to base the formulation of the research tool.

3.6.1 Indicators for the Concept: Reliability

The chosen means or techniques to test if during practical examinations students are competent, crucial, clinical competencies had to be related to the pre-determined objectives. The techniques had to measure what they are intended to measure in order to be regarded as reliable. Respondents were given the following indicators or predictors in the questionnaire.

- ▶ Elements of reliability included:
 - ▶ accurate
 - ▶ consistent
 - ▶ precise
 - ▶ stable.

The respondents had to indicate, in respect of each action stated in the questionnaire, the degree of accuracy, consistency, etc. in measuring competence of specified simulation technique, in their opinion. Use was made of the semantic differential scale, in which indicators were arranged in bipolar adjectives at each extreme end. At the one extreme the positive adjective i.e. “accurate”, carried more weight (5 points). Along the continuum this weight decreases until it reached 0 point at the other extreme where there is a negative adjective i.e. “inaccurate”(Wilson, 1989:349; Waltz & Bausell, 1986:53).

3.6.2 Indicators for the concept: Simulation

As explained in Chapter two, simulation is a presentation of reality. In certain clinical examinations it becomes more convenient to use simulation than the real situation. In relation to reality, simulation, imitate, feign, resemble and mimic real clinical units, patients, clients, babies, wounds, health personnel, and so on. Respondents had to express their opinions about relevance of these indicators.

Statements in the questionnaire covered a variety of different types of simulation, including the following:

- ▶ life-size doll
- ▶ baby doll
- ▶ an anatomical model
- ▶ man-made boil
- ▶ sponge instead of a real wound
- ▶ healthy normal child instead of a sick child
- ▶ live nurses posing as patients
- ▶ other patients posing as a real family

3.6.3 Indicators for the concept: Clinical Competence

Clinical competence was reduced to its component elements for purposes of studying the authenticity of practical examinations of this college in relation to pre-determined objectives. Firstly the scope of this competence covered the following:

- ▶ psychomotor
- ▶ cognitive and
- ▶ affective measurements

However the affective dimension received more attention than the other two aspects because of the underlying perception that evaluation of affective aspects of students is the weakest. In the questionnaire some statements focussed on the cognitive and psychomotor dimensions but the bulk of the statements were on the affective domain. Secondly the scope of the variable: competency, also extended to the various levels or stages of the course of student's education and training, that is first,

second, third and fourth years of the students' basic nursing course. Thirdly the questionnaire included a sample of first, second, third and fourth year nursing skills.

3.7 Research Instruments for Data Collection

To be able to collect data relevant to the objectives of the study the researcher had to use questionnaires which consisted only of close-ended questions. According to Treece and Treece (1986) close-ended items are generally more efficient in the sense that a respondent is normally able to complete more closed than open ended questions in a given amount of time. Subjects may be less willing to compose a written response than to simply check off or circle the appropriate alternative. The questionnaire consisted of demographic data, the second section was on views on simulation; the third section was on views on reliability of simulation in evaluating competencies.

For this section the semantic differential technique was designed where concepts were quantified in terms of their word meaning or semantic/attitudinal properties. According to Waltz and Bausell (1986:53) the semantic differential is one of the most valid measure of meaning. The last section of the questionnaire consisted of views on performance of evaluators, designed on a rank order scale.

3.8 Testing the Tools for Validity

The reliability of a measuring instrument is a major criterion for assessing its quality and adequacy. It is the degree of consistency with which it measures the attribute it is supposed to be measuring (Polit & Hungler, 1983:323). This means that before an instrument is used in a major study it has to be tested on a small group of people to check if it will measure what it is supposed to measure. Behr (1988:121) says that a purpose of a test is to discover what a person can do and the usual method is

to get him to answer questions or perform tasks and then assess the degree of success with which he does so. Treece and Treece (1986) refer to the test as pretest to check if the instrument does evaluate such factors as its length, wording and validity. They go on to say that “during the pretest the researcher should keep in mind the purpose of the study and at the same time be aware of the aim and specific intent of each question. Researchers should check if the question is understood and answered by the respondents in the manner intended. The researcher should be alert to the respondents’ every reaction, comment and non verbal cue and should carefully record them. Alternative wording of questions should be done so as to replace those that are not clear. Reliability goes hand in hand with validity which refers to the degree to which an instrument measures what it is supposed to measure. According to Treece and Treece (1986) a measuring device that is not reliable cannot possibly be valid.

In view of the facts which are stated by the different authors, the researcher tested the instrument on ten (10) professional nurses, seven of whom are allocated in the clinical department and the other three in different departments. The 10 professional nurses were not included in the major study. This was not difficult to do because most of them were allocated to the clinical department and when collecting data for the major study the clinical department was excluded. The names of the other three were known, so their names would have been rejected if they had been systematically randomly selected.

3.9 Ethical Considerations

Permission to conduct the study was obtainable from the Senior Medical Superintendent of Ngwelezane Hospital. The nurses were also asked for their consent, and they were assured that no harm was going to result from their

participation in the study. Nurses were further assured that confidentiality and anonymity will be ensured.

CHAPTER 4

ANALYSIS OF DATA

4.1 INTRODUCTION

This chapter details data presentation, data analysis and discussion of findings of the study. Data is presented by means of tables, bar charts and figures and then interpreted simultaneously for coherence and continuity.

4.2 AFFECTIVE COMPETENCIES

Table 1 below shows the consistency of simulation when evaluating students in handling of pain and emotion, effective communication, human dignity, listening skill and sensitivity to patients fear and anxiety.

(N = 160)

ITEM NO	VERY CONSISTENT	CONSISTENT	NEUTRAL	INCONSISTENT	VERY INCONSISTENT
1.1	7	5	15	32	96
1.2	5	11	19	21	99
1.3	8	16	20	20	90
1.4	14	12	18	24	86
1.5	16	25	27	21	65
1.6	4	17	26	31	76
4.7	10	22	24	21	77
1.8	28	21	29	16	60
1.9	13	21	16	29	75
1.10	15	27	40	22	50
TOTAL	120	177	234	237	774
Percentage	8	11	15	15	50

Table 1 reveals an increase in percentage from 8 % to 50 % across the continuum of very consistent to very inconsistent. About 65 % of the subjects perceive the use of simulation to evaluate competence as inconsistent. Only 19 % of the subjects regard the simulation stalls as being done consistently. A negligible 15% of the subjects were undecided about the matter.

TABLE 2 below shows the accuracy of simulation when evaluating students in handling of pain and emotion, effective communication, human dignity, listening skill and sensitivity to patients fear and anxiety.

(N = 160)

ITEM NO	VERY ACCURATE	ACCURATE	NEUTRAL	INACCURATE	VERY INACCURATE
1.1	5	9	21	25	94
1.2	6	11	16	31	91
1.3	13	14	21	30	76
1.4	4	14	30	24	81
1.5	14	30	25	31	54
1.6	12	14	27	38	63
1.7	10	11	32	35	66
1.8	15	13	20	15	33
1.9	12	14	33	28	67
1.10	16	22	36	29	51
TOTAL	107	152	261	286	676
Percentage	7	10	18	19	46

Table 2 shows an increase in percentage from 7 % to 46 % across the continuum of very accurate to very inaccurate. About 65 % of the subjects perceive the use of simulation to evaluate competence as inaccurate. Only 17 % of the subjects regard the simulation stalls as being done accurately. A negligible 18 % of the subjects were undecided about the matter.

TABLE 3 below shows the precision of simulation when evaluating students in handling of pain and emotion, effective communication, human dignity, listening skill and sensitivity to patients fear and anxiety.

(N = 160)

ITEM NO	VERY PRECISE	PRECISE	NEUTRAL	NOT PRECISE	COMPLETELY NOT PRECISE
1.1	4	9	34	23	84
1.2	3	9	26	32	84
1.3	6	17	32	23	76
1.4	2	13	31	28	80
1.5	8	15	50	20	61
1.6	4	22	36	27	65
1.7	7	24	25	28	70
1.8	22	23	34	28	47
1.9	6	23	36	28	61
1.10	14	29	39	31	44
TOTAL	76	184	343	268	672
Percentage	5	12	22	17	44

Table 3 reveals an increase in percentage from 5 % to 44 % across the continuum of very precise to completely not precise. About 61 % of the subjects perceive the use of simulation to evaluate competence as not precise. Only 17 % of the subjects regard the simulation stalls as being done precisely. A negligible 22 % of the subject were undecided about the matter.

TABLE 4 below shows the stability of simulation when evaluating students in handling of pain and emotion, effective communication, human dignity, listening skill and sensitivity to patients, fear and anxiety.

(N = 160)

ITEM NO	VERY STABLE	STABLE	NEUTRAL	UNSTABLE	VERY UNSTABLE
1.1	7	12	27	23	85
1.2	4	13	32	16	90
1.3	7	2	24	31	69
1.4	2	21	33	15	81
1.5	6	33	29	31	55
1.6	9	25	29	29	62
1.7	11	32	28	21	62
1.8	21	30	31	21	51
1.9	7	32	22	24	69
1.10	15	32	31	24	52
TOTAL	89	232	286	235	676
Percentage	6	15	19	15	45

Table 4 reveals an increase in the percentage from 6 % to 45 % across the continuum of very stable to very unstable. About 60 % of the subjects perceive the use of simulation to evaluate competence as unstable. Only 21 % of subjects regard the simulation stall as being stable. A negligible 19 % of the subjects were undecided about the matter.

4.3 COGNITIVE COMPETENCIES

TABLE 5 below shows the consistency of cognitive stalls when evaluating students' competence in getting across appropriate knowledge of the subjects, problem solving skills, setting measurable objectives, planning and strategizing, application of gravitational force and application of relevant principles.

(N = 160)

ITEM NO	VERY CONSISTENT	CONSISTENT	NEUTRAL	INCONSISTENT	VERY INCONSISTENT
1.1	19	28	33	11	63
1.2	12	31	31	22	62
1.3	21	21	21	16	66
1.4	19	45	45	23	44
1.5	8	23	23	19	80
1.6	19	14	14	21	68
TOTAL	98	162	168	112	383
Percentage	11	18	18	12	41

Table 5 indicates an increase in the percentage from 11 % to 41 % across the continuum of very consistent to very inconsistent. About 53 % of the subjects perceive the use of simulation to evaluate competence as inconsistent. Only 29 % of subjects regard the simulation stalls as being consistent. A negligible 18 % of the subjects were undecided about the matter.

TABLE 6 below shows the accuracy of cognitive stalls when evaluating student's competence in getting across appropriate knowledge of the subject, problem solving skills, setting measurable objectives, planning and strategizing, application of gravitational force and application of relevant principles.

(N = 160).

ITEM NO	VERY ACCURATE	ACCURATE	NEUTRAL	INACCURATE	VERY INACCURATE
1.1	15	31	30	28	50
1.2	22	26	30	24	52
1.3	15	16	39	20	64
1.4	20	39	42	19	18
1.5	10	22	23	31	68
1.6	14	31	26	22	60
TOTAL	96	165	190	144	312
Percentage	11	18	21	16	34

Table 6 shows an increase in the percentage from 11 % to 34 % across the continuum of very accurate to very inaccurate. About 50 % of the subjects perceive the use of simulation to evaluate competence as inaccurate. Only 29 % of subjects regard the simulation stalls as being accurate. A negligible 21 % of the subjects were undecided about the matter.

TABLE 7 below shows the precision of cognitive stalls when evaluating students' competence in getting across appropriate knowledge of the subjects, problem solving skills, setting measurable objectives, planning and strategizing, application of gravitational force and application of relevant principles.

(N = 160)

ITEM NO	VERY PRECISE	PRECISE	NEUTRAL	NOT PRECISE	COMPLETELY NOT PRECISE
1.1	10	26	40	18	60
1.2	18	17	33	31	55
1.3	20	13	31	37	53
1.4	37	43	34	23	17
1.5	9	24	29	27	65
1.6	10	22	44	26	53
TOTAL	104	145	211	162	303
Percentage	11	16	22	18	33

Table 7 reveals an increase in the percentage from 11% to 33 % across the continuum of very precise to completely not precise. About 51 % of the subjects perceive the use of simulation to evaluate competence as not precise. Only 27 % of the subjects regard the simulation stalls as being precise. A negligible 22 % of the subjects were undecided about the matter.

TABLE 8 shows the stability of cognitive stalls when evaluating students' competence in getting across appropriate knowledge of the subject, problem solving skills, setting measurable objectives, planning and strategizing, application of gravitational force and application of relevant principles.

(N = 160)

ITEM NO	VERY STABLE	STABLE	NEUTRAL	UNSTABLE	VERY UNSTABLE
1.1	12	27	38	21	56
1.2	16	25	28	26	58
1.3	20	17	41	24	52
1.4	35	41	33	20	15
1.5	15	25	25	17	72
1.6	15	18	36	18	67
TOTAL	113	153	201	126	320
Percentage	12	17	22	14	35

Table 8 shows an increase in the percentage from 12 % to 35 % across the continuum of very stable to very unstable. About 49 % of the subjects perceive the use of simulation to evaluate competence as unstable. Only 29 % of the subjects regard the simulation stalls as being stable. A negligible 22 % of the subjects were undecided about the matter.

4.4 PSYCHOMOTOR COMPETENCIES

TABLE 9 shows the consistency of psychomotor stalls when evaluating students' ability to properly remove stitches within stipulated time, handling of effective communication, prevention of further injury to an already sore eye, ability to avoid passing of the tube into the lungs and ability to apply relevant principles adhering to the policy of the hospital and to the provisions of the appropriate Act.

(N = 160).

ITEM NO	VERY CONSISTEN T	CONSISTEN T	NEUTRAL	INCONSISTENT	VERY INCONSISTENT
1.1	16	19	23	24	76
1.2	24	23	29	22	56
1.3	8	22	24	18	81
1.4	9	9	18	14	103
1.5	20	34	24	29	49
TOTAL	77	107	118	107	365
Percentage	10	14	15	14	47

Table 9 indicates an increase in the percentage from 10 % to 47 % across the continuum of very consistent to very inconsistent. About 61 % of the subjects perceive the use of simulation to evaluate competence as inconsistent. Only 24 % of the subjects regard the simulation stalls as being consistent. A negligible 15 % of the subjects were undecided about the matter.

TABLE 10 shows accuracy of psychomotor stalls when evaluating students' ability to properly remove stitches within stipulated time, handling of effective communication, prevention of further injury to an already sore eye, ability to avoid passing of the tube into the lungs and ability to apply relevant principles adhering to the policy of the hospital and to the provisions of the appropriate Act.

(N = 160)

ITEM NO	VERY ACCURATE	ACCURATE	NEUTRAL	INACCURATE	VERY INACCURATE
1.1	10	18	28	27	71
1.2	16	24	33	24	57
1.3	14	15	31	30	64
1.4	12	6	10	38	86
1.5	28	26	34	20	47
TOTAL	80	89	136	139	325
Percentage	10	12	18	18	42

Table 10 shows an increase in the percentage from 10 % to 42 % across the continuum of very accurate to very inaccurate. About 60 % of the subjects perceive the use of simulation to evaluate competence as inaccurate. Only 22 % of the subjects regard the simulation stalls as being accurate. A negligible 18 % of the subjects were undecided about the matter.

TABLE 11 shows precision of psychomotor stalls when evaluating students' ability to properly remove stitches within stipulated time, handling of effective communication, prevention of further injury to an already sore eye, ability to avoid passing of the tube into the lungs and the ability to apply relevant principles adhering to the policy of the hospital and to the provisions of the appropriate Act.

(N = 160)

ITEM NO	VERY PRECISE	PRECISE	NEUTRAL	NOT PRECISE	COMPLETELY NOT PRECISE
1.1	12	11	32	30	69
1.2	14	31	27	20	62
1.3	19	16	32	25	71
1.4	8	12	11	24	89
1.5	16	35	32	24	47
TOTAL	69	105	134	123	338
Percentage	9	14	17	16	44

Table 11 shows an increase in the percentage from 9 % to 44 % across the continuum of very precise to completely not precise . About 60 % of the subjects perceive the use of simulation to evaluate competence as not precise. Only 23 % of the subjects regard the simulation stalls as being precise. A negligible 17 % of the subjects were undecided about the matter.

TABLE 12 shows stability of psychomotor stalls when evaluating students' ability to properly remove stitches within stipulated time, handling of effective communication, prevention of further injury to an already sore eye, ability to avoid passing of the tube into the lungs and ability to apply relevant principles adhering to the policy of the hospital and to the provisions of the appropriate Act.

(N = 160).

ITEM NO	VERY STABLE	STABLE	NEUTRAL	UNSTABLE	VERY UNSTABLE
1.1	14	14	29	26	71
1.2	21	24	26	23	59
1.3	14	20	24	22	74
1.4	12	18	12	30	82
1.5	22	27	28	28	50
TOTAL	83	103	119	129	336
Percentage	11	13	15	17	44

Table 12 reveals an increase in the percentage from 11 % to 44 % across the continuum of very stable to very unstable. About 61 % of the subjects perceive the use of simulation to evaluate competence as unstable. Only 23 % of the subjects regard the simulation stalls as being stable. A negligible 15 % of the subjects were undecided about the matter.

4.5 VIEWS ON SIMULATION AND ITS USES

4.5.1 Description of simulation

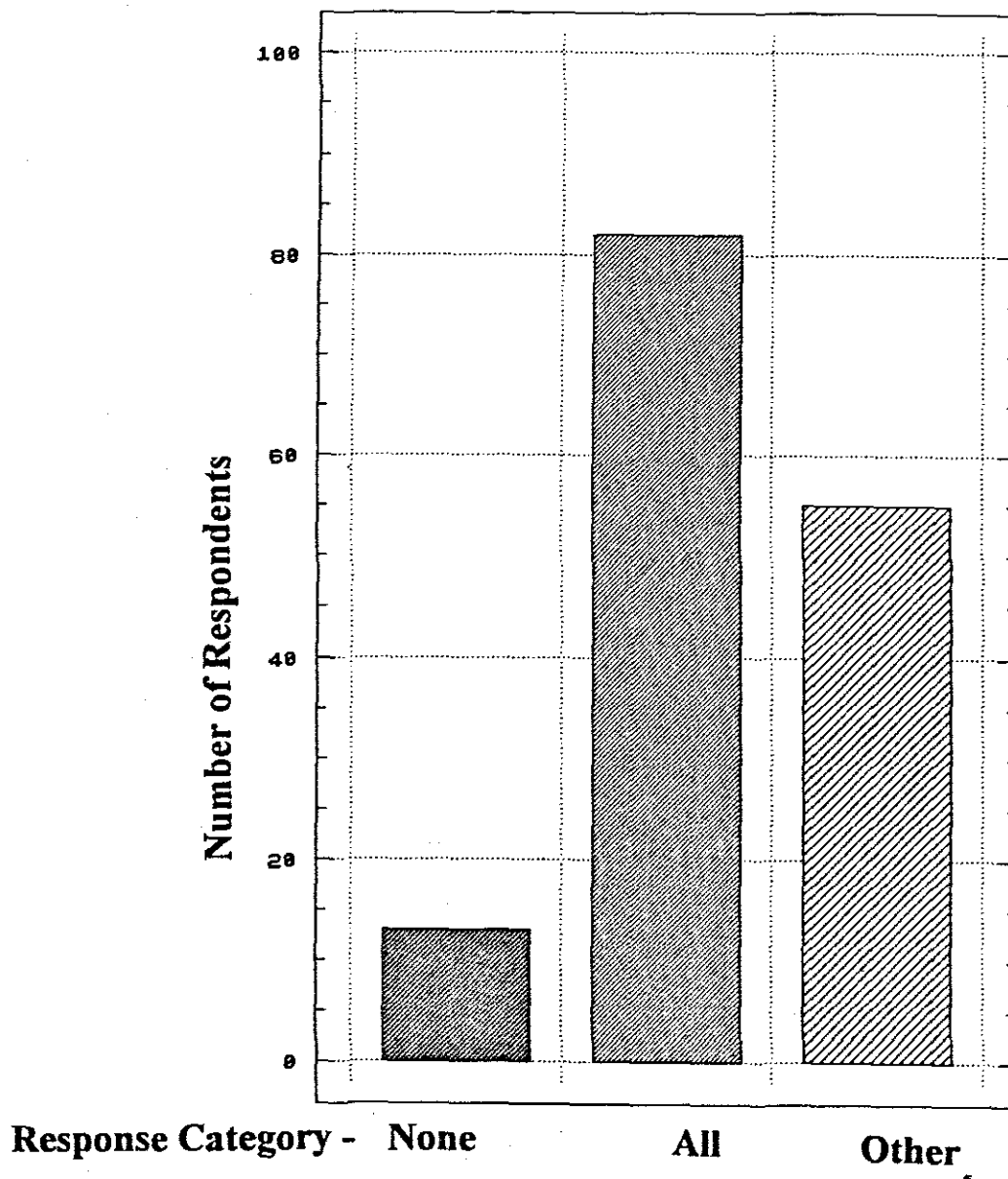


Figure 4.5.1: *Description of simulation by the subjects*

Keys: Y - Axis = Number of Respondents

X - Axis = Response Category

Figure 4.5.1 shows that about 9 % (13) of the subjects perceived terms as not describing simulation, 55 % (82) of the subjects perceived the terms to be describing simulation and 36 % (55) of the subjects perceived to mimic reality as the term which best described simulation.

4.5.2 Extent of depiction of the real clinical situation or an illness by simulation

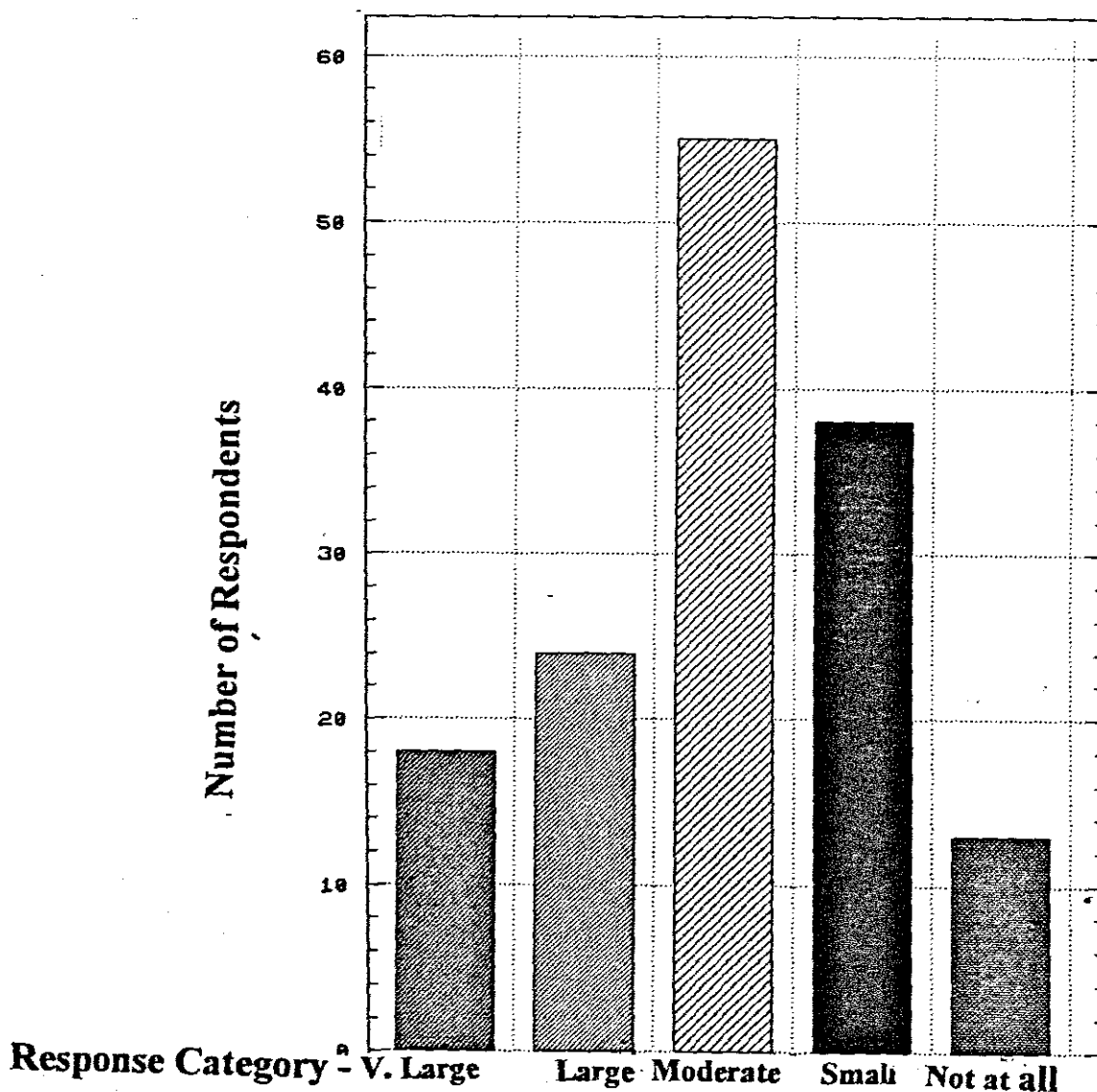


Figure 4.5.2: Extent to which simulation depicts the real clinical situation or an illness.

Figure 4.5.2 shows that only 16 % (18) of the subjects perceived simulation as depicting the real clinical situation to a very large extent, 21 % (24) to a large extent. About 50 % (56) of the subjects perceived simulation as depicting the real clinical situation to a small extent and 13 % (14) as not depicting the real clinical situation at all.

4.5.3 Simulation as a means of evaluation

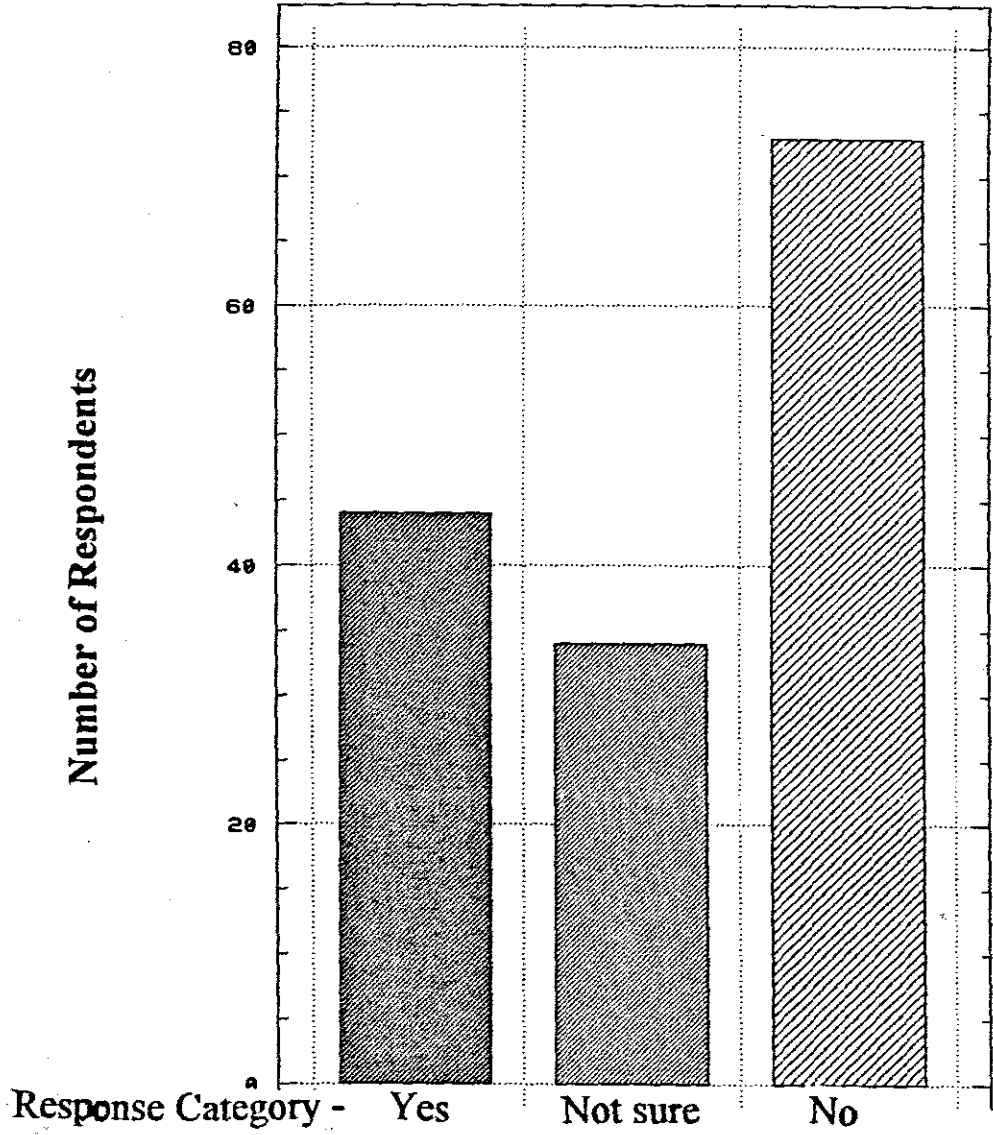


Figure 4.5.3: *Is simulation to be used as means/strategy for evaluation?*

Figure 4.5.3 indicates that about 49 % (74) of the subjects suggested that simulation should not be used as a strategy for evaluation. Only 29 % (44) of the subjects suggested that simulation be used as a strategy. A negligible number of 32 % (34) of the subjects were undecided about the matter.

4.5.4 Level of training for simulation

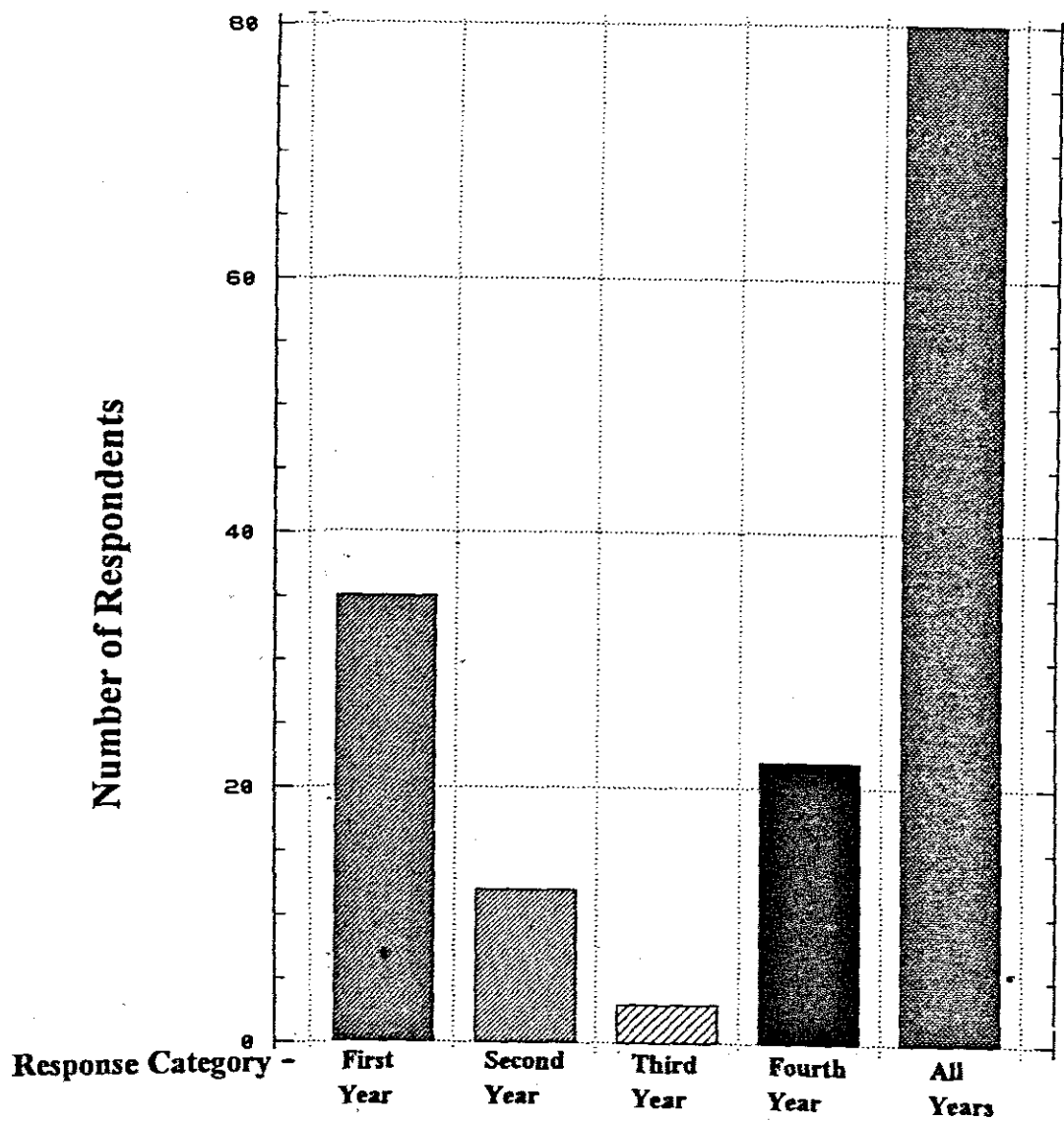


Figure 4.5.4: *Level of training at which students should be evaluated through simulation.*

Figure 4.5.4 indicates that about 23 % (35) of the subjects suggested that first year student nurses should be evaluated through simulation, 8 % (12) suggested that the second year students be evaluated through simulation, 2 % (3) suggested that the third year students be evaluated through simulation. Only 14 % (22) of the subjects suggested that simulation be used to evaluate fourth year students and 53% (80) of the subjects suggested that simulation be used for all the levels of training.

4.5.5 Reliability of simulation to determine competence

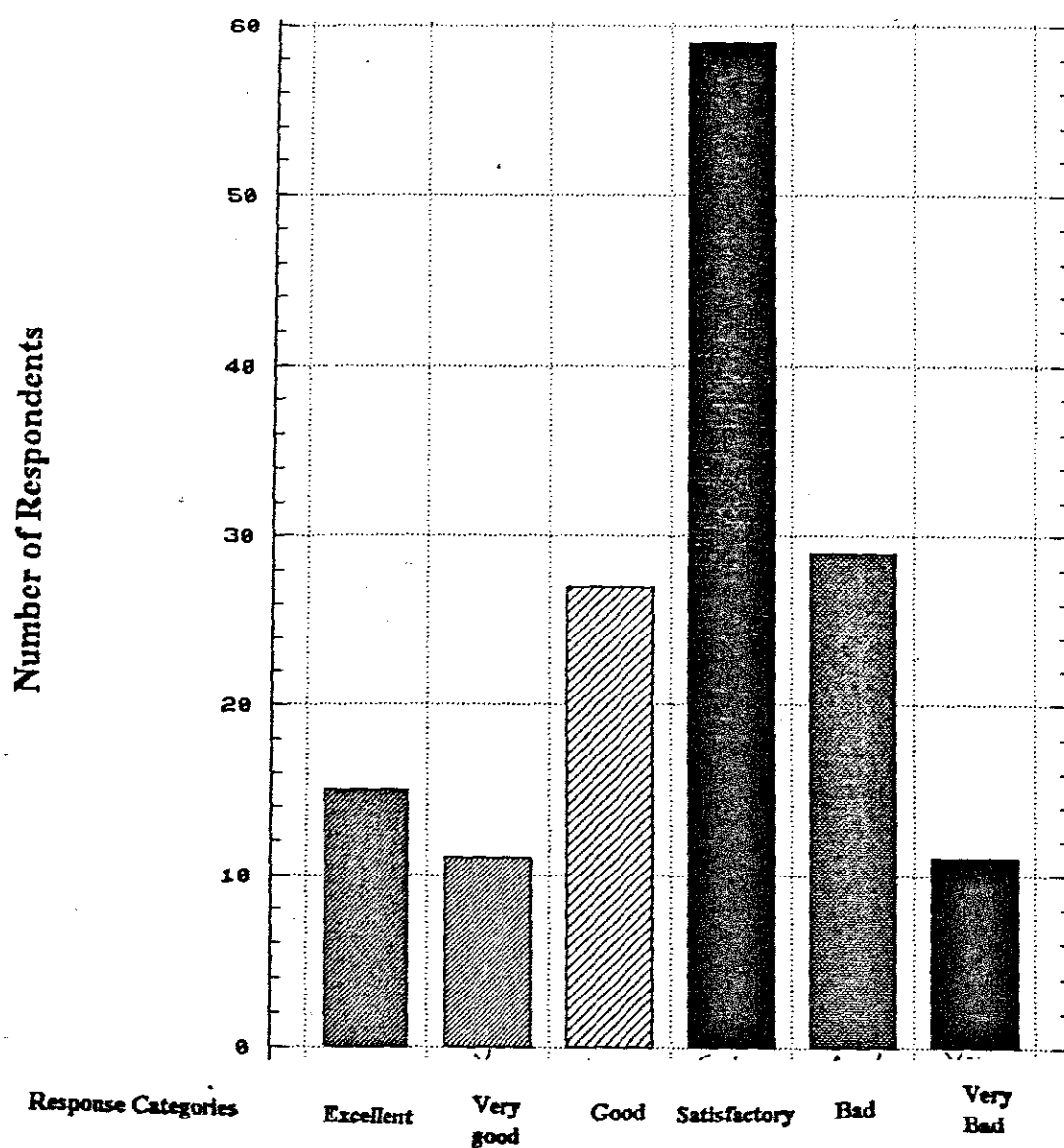


Figure 4.5.5: *Reliability of simulation to determine competence*

Figure 4.5.5 indicates that about 10 % (15) of the subjects perceived simulation as being excellent in determining competence in nursing intervention, 7 % (11) of the subjects perceived it as being very good, 18 % (27) as being good, 38 % (58) as being satisfactory, 19 % (29) as being bad and 8 % (11) as being very bad.

4.6 Objectivity of evaluators

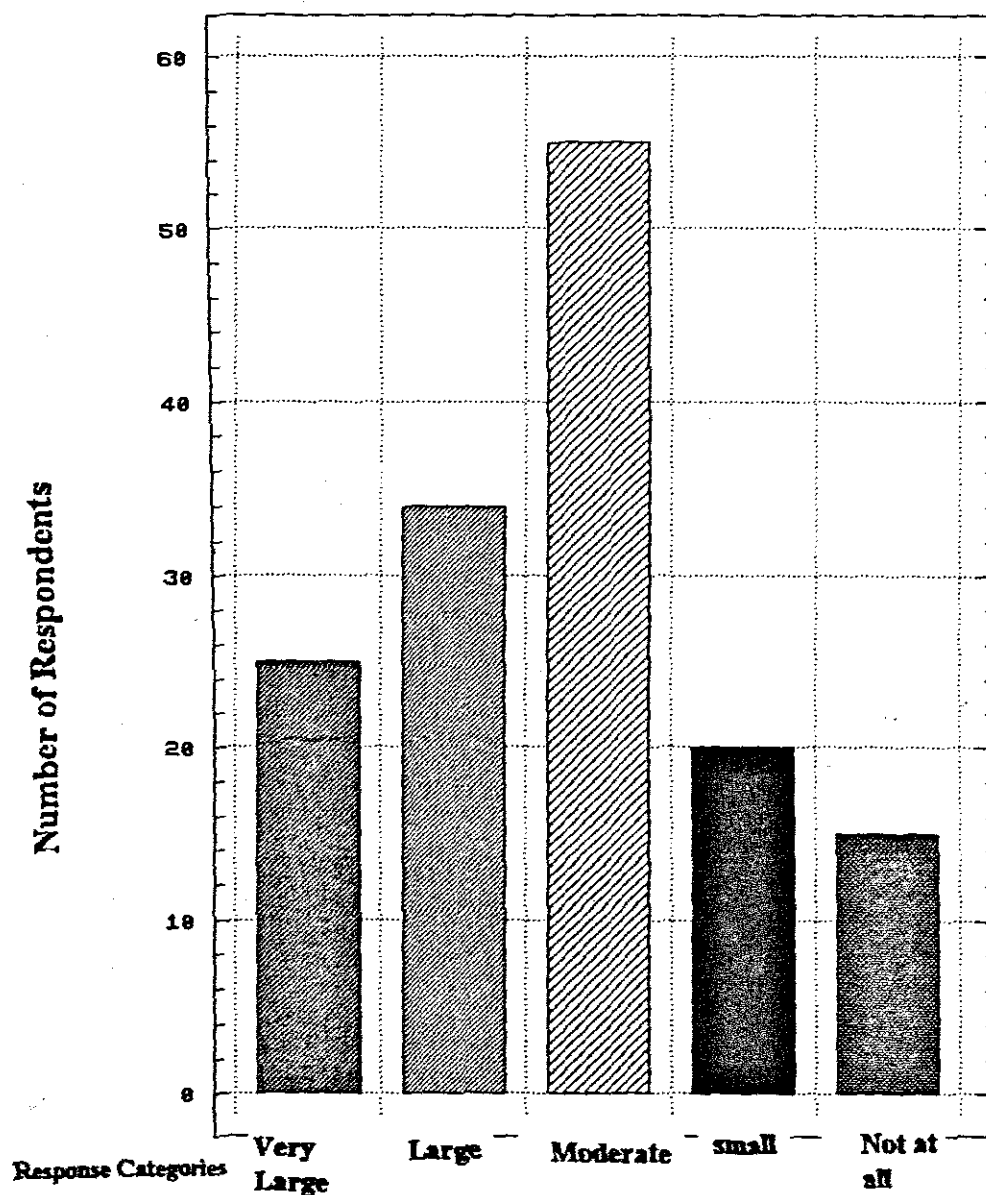


Figure 4.6.1: Extent to which two or more evaluators can give same/similar mark

Figure 4.6.1 reveals that about 20 % (25) of the subjects suggested that two or more6 evaluators could to a very large extent give the same mark, 26 % (34) suggested that it could be to a large extent, 42 % (54) suggested it could be to a moderate extent and 12 % (15) suggested that there was no chance at all that evaluators could give the same marks.

4.6.2 Possibility of evaluator passing a student whilst another fails the same student.

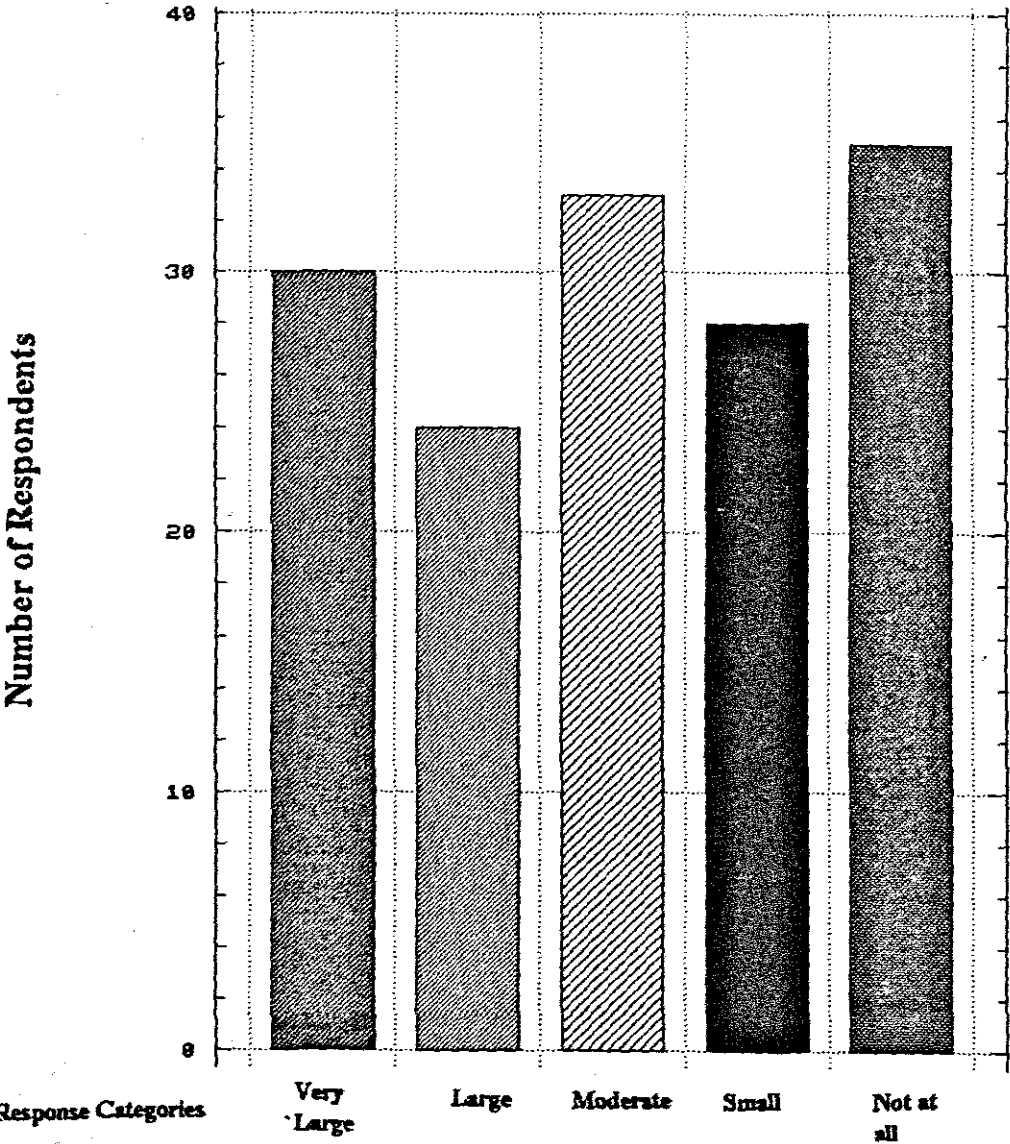


Figure 4.6.2: Possibility of evaluator passing a student whilst another fails the same student

Figure 4.6.2 reveals that about 20 % (30) of the subjects perceived the possibility of an evaluator passing a student whilst another fails the same student as being very large, 16 % (24) of the subjects perceived the situation as being large, 22 % (33) as being moderate, 19 % (28) as being small whereas 23 % (35) of the subjects perceived the situation as something which could never happen.

4.6.3 Avoidance of subjectivity and bias

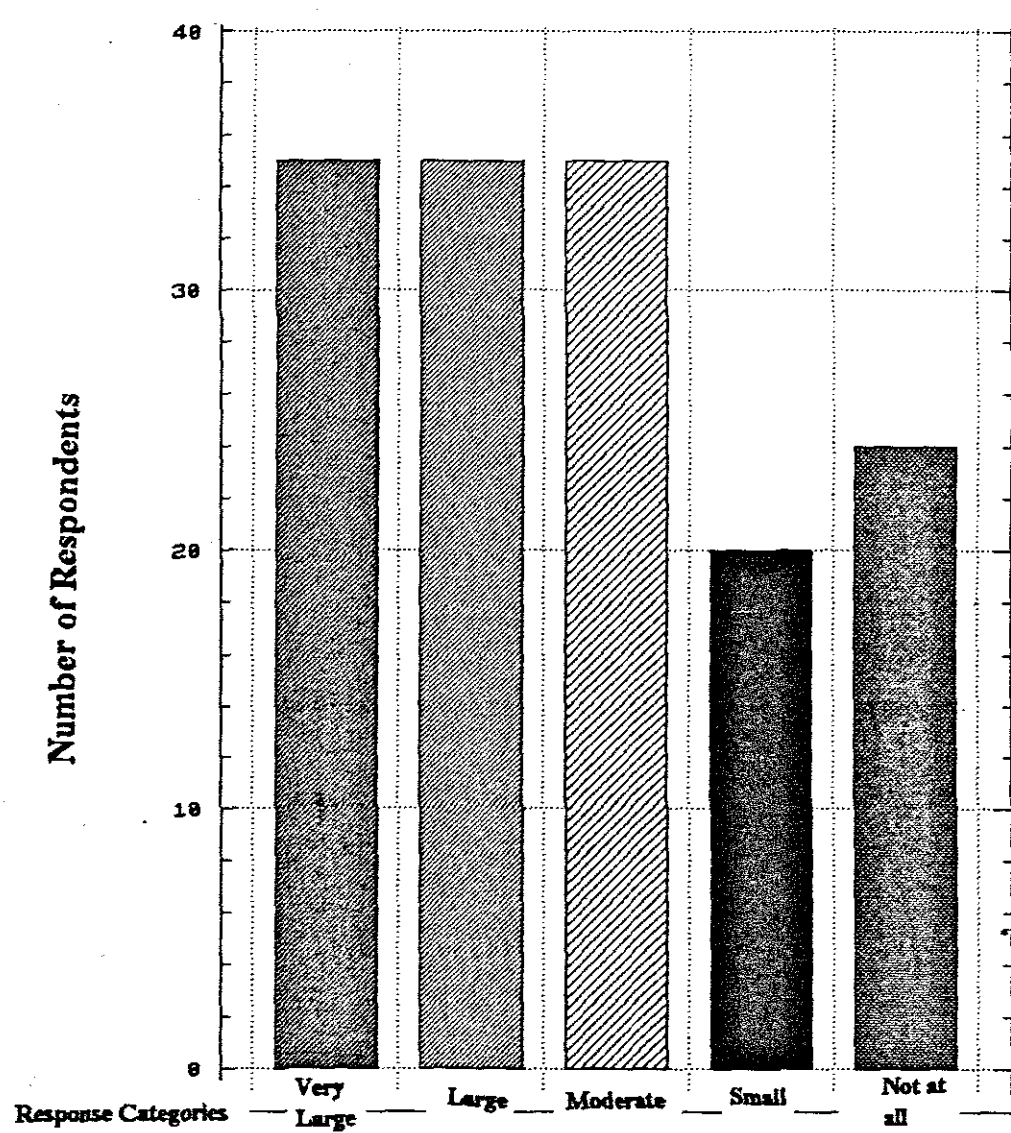


Figure 4.6.3: *Extent to which two evaluators can avoid subjectivity and bias*

Figure 4.6.3 reveals that about 45 % (35) of the subjects suggested that bias and subjectivity could be avoided to a large extent. Only 25 % (20) of the subjects suggested that It could be avoided to a small extent and 24 suggested that it could not be avoided at all.

4.7 Discussion of findings

The findings suggest the following to the researcher:

- The use of a doll does not give students practice in showing sympathy to patients. According to Quinn (1995:170) the aim of simulation is to create a situation which is very close to a real-life situation that a student is likely to encounter. Nurses themselves can be utilized to pose as patients with conditions which are required. By doing this a student will be in a better position to react normally to given circumstances.
- Care and love cannot be shown on a baby doll. Mellish (1986:4) defines nursing as “an art and science directed at providing a human health care service which is based on scientific principles. It requires knowledge derived from the biological and natural as well as the human sciences in order to apply personalised treatment and care.....”. Henderson (1966) as cited by Doheny, Cook and Stopper (1982:15) agree that nursing involves caring. According to the researchers experience the caring aspect forms the core of nursing. This implies that the caring aspect should be effectively and adequately evaluated from the students and this is only possible if a real patient is utilized or the nursing activity is performed on a real patient.
- A diabetic child should not be substituted with a healthy child to evaluate students’ competence in meaningful and effective communication. Atkinson

(1977) as cited by Clarke suggests that alternative strategies should be considered prior to selecting simulation as an evaluation method of choice. If it is chosen as the method, an essential question should be asked when designing one, which is “how much reality information is needed to achieve learning objectives and involve the learner”. Atkinson (1977) further says that if the nurse educator whittles down a situation to its basic core elements but still discovers that the learning objectives will not be met, then simulation should not be used at all.

- A doll should not be used to evaluate students competence in showing respect of human dignity. According to Newble and Cannon (1986) if a student or patient is to pose as a different character, a protocol should be drawn up of the facts that are relevant to that condition. The simulator should then learn the role including non-verbal cues. There should be a trainer to test the simulation so that modifications are made and further practice sessions conducted if necessary. This implies that a doll which is used to evaluate students competence in showing respect of human dignity cannot be taught anything, which simply means that students cannot react or behave naturally when using a doll. One’s reaction (affective domain) towards a real person is different from the reaction to an inanimate object.
- Although some of the subjects perceived that a group of students could pose as patients and make complaints whilst a student and an evaluator did a ward round to evaluate the student competence in listening skills, some of the subjects perceived this to be inconsistent. The views that it could be consistent could be attributed to the fact that students could pretend to have genuine complaints because of exposure and constant interaction with

patients. According to the researcher's experience this could be role played by nurses very well. Newble and Cannon (1986) do emphasize the importance of nursing human beings when simulating because they can be taught and drilled on how to behave in a particular manner. They can still be checked if they behave as expected.

- The use of other patients posing as a family in evaluating students competence and anxiety is not good enough. According to the researcher 's experience it is not very easy to role play a part which involves emotions unless one is professional actor.

4.7.1 Cognitive competencies

The findings suggest the following to the researcher:

- That simulation of giving health education to a mother whose baby is admitted with kwashiorkor and using a student to pose as a mother does not adequately evaluate students' competence in getting across the appropriate knowledge of the subject and its implications to health because of the following reasons:
 - ▶ The nurse's knowledge and feelings about the baby's condition versus that of the mother. This means that the nurses will remember more when evaluated and not because she was taught. This will be due to the previous knowledge.
 - ▶ Ability of a nurse to learn is different from that of a mother whose baby could be suffering from kwashiorkor.

- ▶ Concentration levels. A mother whose baby is ill will concentrate more because she will be eager to know more about the baby's illness.
- The simulation of management of conflict between a first year student nurse and a patient using two student nurses posing as a first year student and a patient does not effectively evaluate students' competence in problem solving skills. Conflict goes hand in hand with emotions, it is not easy to pretend that one is angry when one is not in actual fact angry, hurt or disappointed. Mellish (1982) agrees with the subjects because she says that simulation techniques can be used to make physical forms resemble the real thing very closely and are used in clinical teaching. Mellish suggested that simulation be used in clinical teaching situation and not evaluation for competence.
- Simulating identification of learning needs of new student nurses using a demonstration room and senior students posing as new students do not adequately evaluate students competence in setting measurable objectives and attaining them. The researcher had hypothesised that this was one incident where students could role play the part well because they know exactly what they themselves needed at first year level.
- Simulation of a duty roster using a given list of names of an imaginary ward to evaluate students competence in planning and strategizing for adequate ward coverage. The subjects perceived simulation to, be appropriate in this case. According to Quinn (1992) simulation aims at putting students in positions where they can experience some aspect of real life by becoming involved in activities that are closely related to it. This means that a list of names could be safely used to construct off duties because even if it had been

the staff allocated to that particular ward they would have still been constructed the same way.

- Simulating putting up of an intravenous infusion using a doll does not evaluate students competence in application of gravitational force. The fluid flow is influenced by position, intravenous resistance, patient movement etc, which are absent in the doll.
- Simulating administration of medicines using a student nurse to pose as a patient does not evaluate competence in application of relevant principles in administration of medicines. According to the researcher's experience relevant principles cannot be applied because the individual posing as a patient will simply keep the tablet in his or her hand. The acting student will also only be given one or two tablets whereas some patients are given a handful of big pills (e.g. TB pills) which are more difficult and unpleasant to swallow.

4.7.2 Psychomotor competencies

The findings suggest the following to the researcher:

- Simulating removal of sutures using a sponge does not evaluate a student's ability to properly remove all the stitches within the stipulated time and causing minimal pain and discomfort to the patient. Students need to be assessed on how they handle complaints of pain and some stitches can become very embedded in reality and this cannot occur in a sponge. The clips if not well pressed cause pain and tissue damage which cannot be evaluated in a sponge.

- Simulation of administration of scheduled drugs using a tutor to evaluate or pose as a patient does not effectively evaluate student's handling of effective communication. It is not easy for an individual to play a role effectively if the individual is not properly trained to play the role. In the case of a tutor posing as a patient and being an evaluator at the same time, is even more highly questionable. Can she effectively monitor what the student is doing when she plays a role of a patient as well?

4.8 Conclusion

The researcher concludes that views of respondents pertaining to reliability of simulation in evaluating affective, cognitive and psychomotor skills were easily identified. The reason being that the majority of the respondents came out clearly about where they stood.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter the summary, conclusions, limitations and recommendations will be discussed.

5.2 SUMMARY OF THE STUDY

The study was aiming at determining the views about the reliability of simulation to evaluate clinical competence at Ngwelezane College and its campuses. Literature reviewed showed that simulation in objective structured clinical evaluation (OSCE) is not only used in South Africa but in other countries as well. In overseas countries it is known as objective structured clinical assessment (OSCA). According to the literature reviewed it is used for formative summative evaluation. It is also used by other professionals such as the medical profession. Literature also suggested that simulation is progressively becoming popular and that it is not well understood or properly utilized.

A quantitative research approach was used to determine how different the views on simulation were, how reliable simulation was in evaluating specific selected competencies and also how objective evaluators could be during practical examinations.

A sample of one hundred and sixty (160) was selected to complete the questionnaire.

This number of respondents was obtained after adding the total number of the sample in the different institutions.

5.3 CONCLUSIONS

The objectives of the study were:

- ▶ To determine the views on reliability of simulation in evaluating the following selected competencies:
 - affective skills
 - cognitive skills
 - psychomotor skills
- ▶ To determine the relation between the respondents views on the use of simulation in evaluation.
- ▶ To determine the relation between respondents views on the objectivity in handling simulation during practical examinations.

5.3.1 Views on the use of simulation to evaluate affective skills

About 65 % of the subjects perceived the use of simulation to evaluate affective competence as inconsistent. A negligible 15 % of the subjects were undecided about the matter.

5.3.2 Views on the use of simulation to evaluate cognitive skills

About 53 % of the subjects perceived the use of simulation to evaluate competence as inconsistent, 29 % as being consistent and 18 % as being undecided.

5.3.3 Views on the use of simulation to evaluate psychomotor skills

About 61 % of the subjects perceived the use of simulation to evaluate competence as inconsistent and only 24 % perceived it as consistent.

5.3.4 Relationship between respondents views on the use of simulation

About 50 % of the subjects perceived simulation as depicting the real clinical situation to a small extent, 16 % to a very large extent, 21 % to a large extent and 13 % as not depicting the real clinical situation at all.

5.3.5 Simulation as a means of evaluation

About 49 % of the subjects suggested that simulation should not be used as a strategy for evaluation, only 29 % suggested that it be used and 29 % were undecided about the matter.

5.3.6 Level of training at which simulation should be used

About 23 % of the subjects suggested that first year student nurses should be evaluated through simulation. About 8 % suggested that it should be the second year students, 2 % suggested that it should be third year students, 14 % suggested that it should be the fourth year students and 53 % suggested that simulation should be used for all levels of training.

5.3.7 Reliability of simulation to determine competence

About 35 % of the subjects perceived simulation as being good in determining competence in nursing intervention, 38 % as being satisfactory and 30 % perceived it as being bad.

5.4 Relation between respondents views on the objectivity in handling simulation during practical examinations

- ***Extent to which two or more evaluators can give same/similar mark.*** About 46 % of the subjects suggested that two or more evaluators could give a similar mark to a large extent, 42 % suggested that it could be to a moderate extent and 12 % suggested that there was no chance at all that evaluators could give the same marks.
- ***Possibility of evaluators passing a student whilst another fails the same student.*** About 36 % of the subjects perceived the possibility of an evaluator passing a student whilst another fails the same student as being large, 22 % as being moderate and 42 % as something small.
- ***Avoidance of subjectivity and bias.*** About 45 % of the subjects suggested that bias and subjectivity could be avoided to a large extent. Only 25 % suggested that it could be avoided to a small extent and 30 % suggested that it could not be avoided at all.

5.5 Limitations of the study

- ▶ Because of time and financial constraints, the researcher was unable to explore opinions of more professional people in other institutions.
- ▶ The basis of a research undertaking of this nature is to be able to predict from the facts, i.e. extrapolate. This is limited to some extent by the scope of the sample being drawn from one college and two of its campuses. Such a sample

was chosen for practical considerations.

- ▶ Survey research by nature employs the one off point contact technique with the respondent base. Such an approach benefits especially in evaluating from adequately informed respondent system. This cannot be said to be the case in this study because the nurse educators from the three campuses had not, as yet, engaged in their own ongoing critical evaluation of the OSCE model. Such feedback, if it were available, would have been very useful.

5.6 Recommendations

The researcher recommends the following:

- ▶ It should be human beings who are used in simulation because they can be taught how to behave and be drilled. This will enable evaluators to assess the expected behaviour or response from a student who is being evaluated (Newble and Cannon, 1986:63).
- ▶ It is always debatable whether there is transfer of learning where simulation is concerned or not. The question to be asked is, should we then use simulation for practice or for examinations? (Quinn, 1985:171).
- ▶ Situations where life is not directly involved could be simulated such as constructing an off-duty list.
- ▶ Aids being so common nowadays, students could actually break the news on real patients and family members. We cannot afford to protect the students because he/she will be alone to face such circumstances when

qualified.

- ▶ Conditions which are not readily available should only be the ones to be simulated, drill, role players and then simulate.
- ▶ Procedures such as putting up of intravenous fluids should not be simulated because they involve gravitational force and they are usually available in the wards.
- ▶ According to data analysed, the majority of the respondents suggested that simulation be used for conditions which are not readily available and that it be used for formative rather than summative evaluation.
- ▶ Further research investigation should be done on opinions of all the different categories of the professional nurses as to whether simulation should be used for formative or summative evaluation and on reliability of simulation to evaluate competence in Basic Nursing Degree Course in all provinces of South Africa.

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ANNEXURE 1

RESEARCH QUESTIONNAIRE

INTRODUCTION

This study is conducted toward meeting requirements of a Masters Degree. The purpose of the study is to gather information about the reliability of simulation as an evaluation tool for clinical competence.

SECTION A

VIEWS ON RELIABILITY OF SIMULATION IN EVALUATING SPECIFIC SELECTED COMPETENCIES

INSTRUCTION

Please respond to each question by putting a cross in the spaces that best reflect your views against all the four variables.

Example:

How reliable is crying in showing a student's feeling of fear/anxiety?

consistent	5	4	3		1	inconsistent
accurate	5	4		2	1	inaccurate
precise		4	3	2	1	not precise
stable	5		3	2	1	unstable

1. AFFECTIVE COMPETENCIES

- 1.1 When simulating a bed bath on an adult who was involved in a car accident fractured a leg and lost a child how reliable is the use of a life-size doll in evaluating student's competence in handling show of unexpected pain/emotion e.g. crying, excitement, etc. (Please place a cross on the appropriate columns against each variable.

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 1.2 When a student is expected to show care and love on a child while inserting a nasogastric tube how reliable is the use of a baby doll in evaluating student's competence in handling show of unexpected pain or emotion.

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	stable

- 3 When changing a bottle for underseal water drainage how reliable is the use of a life-size doll in evaluating student's competence in handling show of unexpected pain/emotion?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 1.4 When simulating examination of an ear through an auroscope how reliable is an anatomical model, or manikin in evaluating students competence in handling show of unexpected pain or emotion?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 1.5 When preparing a 14 year old diabetic child for discharge how reliable is the use of a 14 year old healthy child in evaluating students competence in meaningful and effective communication?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable .

- 1.6 When a student is expected to manage anxiety on a patient while assisting in incision and drainage of a huge boil, how effective is a simulated man-made boil

on a healthy person in evaluating student's competence in handling show of unexpected pain or motion?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

1.7 When a student is asked to help a doctor perform dilatation and curettage on a patient, how reliable is the use of a life-size doll in evaluating student's competence in showing respect of human dignity?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

1.8 If a student is supposed to listen to patient's problems whilst doing rounds in a unit, how reliable is the use of a group of nurses posing as patients and a tutor or evaluator posing as a professional nurse in-charge of a unit, in evaluating student's competence in listening skill?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

1.9 If a student is asked to break unpleasant news of an incurable disease to a family, how reliable is the use of other patients posing as a family in evaluating student's competence in showing sensitivity to patients fear, anxiety and pain?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

1.1 If a senior student nurse is expected to show junior student nurses that she can still care and empathize with patients even when the ward is busy (i.e. operation day/admission or intake day) how reliable is the use of student nurses posing as patients in evaluating students competence in listening skill, communication skill and patience?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

2. COGNITIVE COMPETENCIES

- 2.1** When simulating giving of health education to a mother whose baby is admitted with kwashiorkor, how reliable is the use of a student nurse posing as a mother in evaluating student's competence in getting across the appropriate knowledge of the subject and its implications to health?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 2.2** When simulating management of conflict between a first year student and a patient, how reliable is the use of two student nurses posing as a first year student and a patient, in evaluating student's competence in problem solving skills?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 2.3** When simulating identification of learning needs of new student nurses who are in the ward for the first time, how reliable is the use of a demonstration room and senior students posing as new students in evaluating students competence in setting measurable objectives and attaining them.

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

2.4 When simulating planning of a duty roster for a week in a unit, how reliable is the use of a given list of names of staff of an imaginary ward unit and requests book in evaluating students competence in planning and strategizing for adequate ward coverage.

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

2.5 When simulating putting up of an intravenous infusion, how reliable is the use of a doll in evaluating student's competence in application of gravitational force?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

2.6 When simulating administration of medicines, how reliable is the use of a student nurse posing as a patient in evaluating student's competence in application of

relevant principles in administration of medicines (e.g. giving of water with a tablet or capsule, NB the posing nurse is not going to swallow the tablet or pill)

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

3. PSYCHOMOTOR COMPETENCIES

- 3.1 When simulating removal of sutures, how reliable is the use of a sponge with a cut in evaluating a student's ability to properly remove all the stitches within the stipulated time and causing minimal pain and discomfort to the patient

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

- 3.2 When simulating administration of scheduled drugs how reliable is the use of a tutor or evaluator posing as a patient and evaluating a student at the same time, in evaluating a student's handling of effective communication and getting simulated patient to obey instruction and directions?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

3.3 When simulating eye swabbing and instillation of eye drops how reliable is the use of a manikin/anatomical model in evaluating student's competence in prevention of further injury to the already sore eye?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

3.3 When simulating eye swabbing and instillation of eye drops how reliable is the use of a manikin/anatomical model in evaluating student's competence in prevention of further injury to the already sore eye?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

3.4 When simulating nasogastric tube insertion and feeding how reliable is the use of a doll in evaluating students ability to avoid passing the tube into the lungs?

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

3.5 When simulating ordering and receiving dependency producing drugs, how reliable is the use of an artificial situation in evaluating a student's ability to apply relevant principles/adhering to the policy of the hospital and to the provisions of the appropriate Act.

consistent	5	4	3	2	1	inconsistent
accurate	5	4	3	2	1	inaccurate
precise	5	4	3	2	1	not precise
stable	5	4	3	2	1	unstable

SECTION B

VIEWS ON SIMULATION AND ITS USES

1. Which of the following terms in your opinion best describes simulation in relation to the real patients/situation:
 - a) imitate
 - b) feign
 - c) resemble
 - d) mimic reality

None	
All	
Other (Specify)	

2. To what extent does simulation depict the real clinical situation or depict an illness?

(Please tick in the appropriate space)

Very large	
Large	
Moderate	
Small	
Not at all	

3. Should simulation be always used as a means/strategy for evaluation?

Yes	
Not sure	
No	

4. At which level of training can students be evaluated through simulation?

Third Year	
Second Year	
Third Year	
Fourth	
All years	

5. How reliable is simulation as a means of determining competence in nursing intervention?

(Place a cross X in the appropriate space on the scale)

Excellent	
Very Good	
Good	
Satisfactory	
Bad	

4. **SECTION C**

- 4.1 To what extent can two or more evaluators give the same/similar mark when evaluating competence in a student nurse's intervention in a simulated disaster situation?

Very large	
Large	
Moderate	
Small	
Not at all	

4.2 Is it possible that an evaluator passes a student whilst another fails the same student in a simulated situation of breaking bad news to a doll used as a patient?

Very large	
Large	
Moderate	
Small	
Not at all	

4.3 To what extent can two or more evaluators avoid subjectivity and bias in evaluating competence in a student who is well-mannered, well behaved, confident and has a good command of English in a simulated situation.

Very large	
Large	
Moderate	
Small	
Not at all	

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Ref./Verw.

10 April 1996

The Superintendent
Ngwelezana Hospital
Private Bag X20001
Empangeni
3880

Dear Sir

Request for permission to conduct a research study

I would like to request that you grant me permission to conduct a research study at Ngwelezana Hospital.

The topic of my study is :
**RELIABILITY OF SIMULATION TO EVALUATE CLINICAL COMPETENCE IN THE
BASIC NURSING COURSE.**

I will need to collect data from a sample which will constitute different levels of Student Nurses, Professional Nurses and Tutors only.

Yours Faithfully

L.C.DLOMO (M^{rs})
University of Zululand Employee - Dept of Nursing Science

ANNEXURE 3.

H/W32/1/3

KWAZULU DEPARTMENT OF HEALTH

RECOMMENDATION AND APPROVAL FOR CARRYING OUT RESEARCH

1. Personal Details and Researcher

Name: MRS L. C. DLOMO Official Title: MRS
Address: P.O. Box 346 Kwa-Ndlangeni 3886
Employer: UNIVERSITY OF ZULULAND

2. Research Title: RELIABILITY OF SIMULATION
TO EVALUATE CLINICAL COMPETENCE IN THE
BASIC NURSING COURSE

3. Recommendations by Institution/Regional Officer/Study Leader

This research study is recommended

4. Chairman of Research Committee:

Remarks: N/A

Confirm that the project has been approved by the
research Committee

SIGNED: DATE:

5. Superintendent or Regional Officer

Remarks: No objections

1. Confirm that use of facilities will not, in my opinion,
disrupt the routine of the institution.

SIGNED: [Signature] DATE: 15/4/96

6. Head of professional group of researcher:

Remarks:.....*Recommended*.....
.....

SIGNED:.....*J. G. Maslaba*..... DATE:.....*11. 04. 96*.....

7. Head of Pharmaceutical Services. (In the case of clinical trials)

Remarks:.....
.....

SIGNED:..... DATE:.....

8. HEAD OF DEPARTMENT

THIS PROJECT IS APPROVED / ~~NOT APPROVED~~

Remarks:

Conditions:.....

Copy of report to be submitted to this dir
.....
.....
.....
.....
.....

[Signature]

SMS
SECRETARY FOR HEALTH

pp

15/4/96

DATE: