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EFFECT OF PRACTICE SETTING ON CLINICAL LEARNING AMONG FIRST YEAR STUDENT NURSES

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JOHANNESBURG 1992

ABSTRACT

Advanced technology and an increasing awareness of ethical-legal responsibility and accountability in terms of patients' rights, are among the main reasons for a more discriminate use of the patient care setting for teaching and practising psychomotor skills in nursing. The college laboratory, alternatively known as the simulated clinical laboratory became the answer. However, the environmental contrast its presents in relation to the patient care setting has lead nurse educators to question the efficiency and the validity of the college laboratory in the teaching-learning process. This dissertation studies the practice settings for learning selected psychomotor skills and skill-related knowledge among first year student nurses. The purpose of the research was to determine and compare the performance of nursing subjects in two different practice settings namely, simulated and non-simulated. Subjects were randomly assigned to either group A or group B for clinical learning in the aforementioned settings. Data on psychomotor performance were collected by direct observation using structured checklists. Objective tests were used to collect data on cognitive performance. Results of between-group comparison and statistical tests showed no significant difference in cognitive and psychomotor learning.

DECLARATION

I declare that this dissertation is my own unaided work. It is being submitted for the degree of Master of Science in Nursing in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

JBruce

JUDITH CHARMAIGNE MIRTEL BRUCE

20-3-92

DATE

DEDICATION

IN LOVING MEMORY OF MY DEAR PARENTS

JOHN PETER McKAY

(1932 - 1990)

and

LETTIE AMELIA McKAY

(1922 - 1991)

ACKNOWLEDGEMENTS

Completing a project of this nature could only be accomplished with the diverse contributions by the following persons and groups whom I wish to acknowledge with sincere thanks and appreciation:

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ABBREVIATIONS

TPR	–	Temperature, pulse rate and respiratory rate
BP	–	Blood pressure
PPC	–	Pressure parts care
MCQ's	–	Multiple choice questions
OSCE	–	Objective structured clinical examination
CVI	–	Index of content validity
LD	–	Lecture demonstration

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CHAPTER 1

1.1 INTRODUCTION

The need for a simulation system to prepare nursing students for clinical work and competence has given origin to the demonstration room or college laboratory for teaching and practising psychomotor skills. The use of such a system by nurse educators has become more and more popular, because contemporary clinical nursing units may not always be conducive to formal clinical teaching and learning.

These units may not meet the essential requirements for students to practise to become competent in psychomotor and cognitive skills.

At the Nursing College under study, 90% of clinical learning is done using simulation in a college laboratory. But does it prepare nursing students adequately for clinical work in the patient care setting?

While the use of the college laboratory has to a large extent facilitated the teaching - learning process, the environmental contrast when compared with the patient care setting, must be taken into consideration.

The college laboratory offers a well - controlled, relaxed, static learning environment where the students can practise mainly their psychomotor

skills with less emotional and ethical stress. The patient care setting on the other hand, is dynamic with uncontrolled factors and constraints which may influence skill learning. Since the practice of nursing occurs in clinical/patient care areas, alternative learning environments eg. the college laboratory should resemble the patient care area as closely as possible for effective clinical learning.

Thus to ensure efficiency, effectiveness and the validity of the college laboratory as a learning environment for psychomotor skills, it must include those factors which the tudent would encounter in the patient care setting.

Inclusion of such factors are necessary for students to pay selective attention to environmental stimuli and to formulate an appropriate motor plan during the prccess of skill learning. It can be deduced therefore that the absence of realism in the learning environment may interfere with essential phases of motor skill learning. Inclusion of all clinical environmental factors in the college laboratory is an essential yet formidable task. It seems more appropriate and practical a task to study the performance of psychomotor and cognitive skills in these two

different practice settings namely, the college laboratory (simulated practice setting) and the patient care setting (non-simulated practice setting).

1.2 PURPOSE OF THE RESEARCH

This study compares and describes two practice settings for learning psychomotor nursing skills and skill-related knowledge among nursing students. The purpose is to determine and compare the performance of the subjects in these two different practice settings viz., the college laboratory and the patient care setting, henceforth called setting A and setting B respectively. In so doing, this study addresses the following research questions:

- do student nurses who practise in the college laboratory (setting A) perform psychomotor skills at a significantly higher level than those who practise in the patient care setting? (setting B).
- does the level of skill-related knowledge differ between subjects who practise in setting A and setting B.

All fundamental nursing skills to be taught during the first week of the semester block were categorised as either "open" or "closed" skills. From the open skills three were randomly selected for the study.

Skills selected were: taking of temperature, pulse rate and respiratory rate (TPR), measurement of arterial bloodpressure (BP) and pressure parts care (PPC). While the researcher acknowledges the existence of an affective domain of learning, a literature survey indicated that this domain is not subjected to the same pedagogic actions as the psychomotor and cognitive domains. For this reason, the affective domain was excluded from the study. It should not be construed to be of lesser importance, but rather too complex and extensive for the scope of this study.

1.3 HYPOTHESES

In an attempt to answer the research questions, the following hypotheses have been formulated:

1.3.1 There will be no significant difference in the performance of selected psychomotor skills (TPR, BP and PPC) by nursing students who practise in setting A and in setting B.

1.3.2 There will be no significant difference in skill-related knowledge by students who practise in setting A and in setting B tested immediately after the lecture-demonstration and eight weeks later.

1.4 MOTIVATION FOR THIS STUDY

This study was prompted by the paucity of research

investigating the practice settings for psychomotor nursing skills. While the literature is replete with descriptions of simulations and instructional simulation, only two studies to date have drawn comparisons between student performance in simulated and non-simulated practice settings. (Gomez and Gomez, 1987 and Megal, Wilken & Volcek, 1987). Findings in these two studies, although different, offered useful recommendations for future research. Recommendations with reference to sample size, additional nursing skills and transfer of learning have been acknowledged in this research project.

Exponents of the open and closed motor skills theory maintain that different motor skills require different practice settings. Those skills performed in a stable, uncontrolled and unchanging environment (closed skill) can be practised in a college laboratory. Since most nursing skills are classified as open skills normally performed in a variable, dynamic environment, their viability in the college laboratory must be researched.

An additional motivating factor is the statement by Gomez and Gomez (1984:37) that:

"... research on transfer of learning has relatively neglected the environmental context in

which the skills are performed. Perhaps, as a result, a pervasive assumption exists among nurse educators that transfer of learning from practice to "real" setting is automatic ..."

Indeed this suggests that little or no empirical evidence exists regarding skill performance is the original practice setting and the patient care setting.

While the cognitive component has been given much attention in studies related to computer-assisted instruction, (a part of simulation) few studies to date dealt with the cognitive component in relation to the environmental context in which the psychomotor skill is being practised. Of particular interest to the researcher is the subject's level of skill related knowledge.

1.5 OPERATIONAL DEFINITIONS

CLINICAL LEARNING

Is the acquisition of cognitive and psychomotor nursing skills by student nurses.

COLLEGE LABORATORY/SIMULATED CLINICAL LABORATORY

A place on the hospital or college premises that is equipped with simulated material for nursing students to practice aspects of patient care.

EFFECT

Is the outcome of cognitive and psychomotor learning as assessed by objective tests (MCQ) and structured checklists respectively.

PATIENT-CARE SETTING/CLINICAL AREA

A place where nursing students are in contact with patients/clients for the purpose of patient care.

PHYSICAL/REFERENTIAL SIMULATION

Presents information about the real world by means of models eg. dolls which are difficult to distinguish from real life counterparts.

PRACTICE SETTING

An area where cognitive and psychomotor skills are acquired through active involvement of the student.

PSYCHOMOTOR SKILLS

Are those nursing actions which include muscular action and require neuromuscular coordination.

SIMULATION

A carefully controlled, simplified version of reality in which physical and social elements are represented.

SIMULATED PATIENT

A person who poses as a patient eg. a fellow student .

STUDENT NURSE

A person in his/her first year, registered for the four year Diploma in Nursing Science (general, community and psychiatric) and Midwifery at a Nursing College.

1.6 SUMMARY

The introductory statement of this chapter gave an overview of two different settings for practising nursing skills. The purpose, hypotheses and motivation for this study have been described.

A subsection of definitions has been included in this chapter for the purpose of explaining and clarifying terminology used in subsequent chapters of the research report.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the nature and scope of simulation is described after the available literature was studied. It covers physical, environmental and theoretical aspects related to psychomotor learning, cognitive learning and clinical evaluation. Practice settings are discussed in context with the open and closed motor skills theory for motor skill learning (Gentile, 1972:3). Particular emphasis is placed on the priorities of the learner and that of the patient. Previous research conducted in this area is described briefly with specific reference to the influence it has had on this Study.

2.2 SIMULATION

In an attempt to differentiate between simulated and non-simulated practice settings, it necessitated an overview of simulation in nursing education.

2.2.1 HISTORICAL OVERVIEW

The use of simulation as a teaching strategy dates back to the year 500 A.D. when the game of chess was invented in India. Since then, simulation as a teaching strategy has extended into the fields

of aviation, space aviation, marine, mining and less than twenty five years ago, formal education.

In early nursing education, clinical teaching and learning was achieved through the use of live patients. The majority of learning took place through observation, or by trial and error. As the body of nursing knowledge and technology burgeoned and the right of the patient to quality care became well recognised, the education of nurses changed. Simulation became the answer and the "college laboratory" was established.

Simulation in nursing education is now not only used for teaching nursing skills, but also to facilitate learning through practise and supervision. As an evaluation strategy, simulation has been used extensively in the form of an objective structured clinical examination (OSCE) to assess clinical competence in nursing.

2.2.2 NATURE AND USE OF SIMULATION

Simulation is used today for teaching, learning and evaluating. By definition, simulations are representations of reality and offer students valuable learning experiences during simulated decision-making and actions.

As a didactic tool, simulations can be used to teach students about practical aspects they are likely to encounter in the "real" setting. It encourages active student participation in the teaching-learning process and affords the student opportunities for creative, analytical thinking to solve a particular problem. As a strategy to facilitate student learning, simulations occupy an invaluable place in education. In psychomotor skill learning, the use of manikins, three-dimensional models and simulated patients afford the student frequent learning opportunities to practise particular skills. Learning becomes individualized, as students have the advantage of manipulating variables which may interfere with their learning.

Simulations can also be used as an evaluation strategy with reference to all domains of learning viz., psychomotor, cognitive and affective.

Objective structured clinical examination (OSCE), in the college laboratory and pen and paper simulations are examples of assessing psychomotor and cognitive learning respectively.

As its use and application become more diverse and complex, attempts have been made by several authors to describe and clarify the nature of

simulation. Early writings in 1957 by Thomas and Deemer define simulations as ...

> obtaining the essence of something without all aspects of reality.

Later writing by Klein (1978:14) emphasises that parts of reality must be included so as to allow participants to act as they would in the real situation. This gave a more refined meaning to the nature of simulation. Taylor (1978:3) describes simulation as ...

> a carefully controlled yet simplified model or representation of a more complex physical or social reality.

While being controlled and simplified, Miller (1987:35) emphasises the importance of the reality element in simulation. He states that ...

> effective simulations parallel reality and as such provide a means for the "practice of life" situations that should be a part of the educational experience of every health professional.

Common to all these definitions is the use of simulation to simplify and facilitate the teaching-learning process by creating an artificial setting which mimics the practical

aspects of the real situation. To comprehend fully the nature of simulation, it is important to embark on a further discussion of its types, advantages, limitations and validity as an educational strategy.

2.2.3 TYPES OF SIMULATION

According to Miller (1987:35) there are five categories of simulations. On presentation a variety of formats can be used depending on the degree of fidelity required. The term "fidelity" is used to describe how true to life the learning experience must be to accomplish the learning objectives. Table 2.1 depicts Miller's simulation types with their corresponding degrees of fidelity and examples of use. For the purpose of th Study, 3-D models and simulated patient types were used.

TABLE 2.1 TYPES AND USES OF SIMULATION

[Adapted from Miller (1984:36)]

TYPE	EXAMPLE	FIDELITY	TYPICAL USE
1. Written simulation	Paper and Pen Latent image	Very Low	To teach knowledge and assessment skills eg. patient care and diagnosis
2. Three-dimensional models	Manikins	Low	For demonstration and practise of skills eg. ... lval toilet.
3. Computer simulation	Micro-computer	...edium	To teach cognitive ski... /nroblem-solving an... ...t.ssment.
4. Multi-media simulation	Computer-linked video discs	High	To teach com...lex skills eg. C.R using Resusci-Anne.
5. Simulated patient	Trained individual	Very high	To teach interpersonal and assessment skills eg. a simulated mother.

2.2.4 ADVANTAGES OF SIMULATION

While it must be acknowledged that the real situation is in all probability superior to and more ideal for educational purposes, simulation has definite advantages over the real situation. These can be summarised as follows:

- firstly, simulation has the advantage of time compression. Clinical or patient events which may take days, weeks or months to develop in actuality can be compressed into a matter of minutes in simulation (Miller, 1984 : 40).

- secondly, simulation lends consistency in providing learning opportunities. It makes it possible for all students to engage in learning at the same basic level of understanding and problem-solving.

- similar to the above, simulation as an evaluation strategy also standardizes criteria against which the students' behaviours are assessed. Different students are exposed to the same patient stimuli and can consequently be assessed using the same criteria (Evens and Curtis, 1983 : 894).

- active student commitment to decision-making is another advantage. Simulations allow

students to make important decisions regarding patient care issues and face the consequences of their decision without the actual legal and ethical effects.

- finally, if simulation is used effectively, it is advantageous in the sense that it increases student participation in the learning process by stimulating interest and motivation. (Wittich and Schuller, 1979 : 291).

2.2.5 LIMITATIONS OF SIMULATION

While simulation as an educational strategy has its merits, there are certain limitations. These limitations should be seen as deficiencies in the choice of simulation and its format rather than deficiencies inherent in the strategy itself. Decisions to utilize simulation should be made after careful scrutiny of the learning and teaching objectives and by the fidelity it provides.

Other limitations may be cited as follows:

- it may be time-consuming to prepare and requires considerable expertise during the planning phase depending on the degree of complexity;

- three-dimensional models require craftsmanship for local construction; they are usually expensive and easily damaged; it is never the same as performing skills on the live patient. In this regard Guilbert (1977 : 223) cautions against wrong learning.

2.2.6 VALIDITY OF SIMULATION AS AN EDUCATIONAL STRATEGY

In terms of whether simulation does what it purports to do, [illegible]er (1984 : 40) identifies three types of [illegible]dity, namely, instructional validity, content validity and concurrent validity. In the first instance simulation must conform to standards as set out by the objectives of the learning programme so as to ensure that the learner attains specific learning objectives.

If simulation conforms to the programme objectives and specific objectives, it is said to have instructional validity.

With reference to content validity, a simulated programme must include all reality elements. Its content validity can be judged by the extent to which there is overlap between simulation and reality. (Miller, 1984 : 40).

For example, if no elements from reality are omitted, then it can be stated that the programme has perfect content validity.

Critique by Gomez and Gomez (1987 : 20) suggests that it is impossible to bring all reality elements into a simulated programme for psychomotor skill learning and therefore the content validity of simulation is questionable in this domain of learning. For example, during catheterization of the bladder on a manikin or pelvic model, reality elements such as locating the urethral meatus, degree of bladder distention, patient cooperation etc., cannot be included or guaranteed in a simulated programme. If one considers the content validity of such a programme against the supposition of Miller (1984 : 40), then simulation is not valid for some aspects of psychomotor learning.

Concurrent validity as applied to simulation, requires that the learner's performance during simulation be validated against some external criteria of performance. This is comparative to performance of the student in the real setting and in essence can be construed as transfer of learning. If the student can transfer what has been learnt in simulation to the "real" setting, with a high correlation between performance in simulation and that in reality, the programme is said to possess concurrent validity. A validation study conducted by Holzemer, Schleutermann,

Farrand and Miller (1981 : 139) showed little evidence to support the validity of simulations. They assessed nurses' problem-solving ability by using patient management problems (PMP) of the paper and pencil simulation variety. This study of Holzemer et. al. (1981 : 140) tends to negate concurrent validity of written simulations in particular. By assessing the subject's psychomotor performance in the patient-care setting, this study would determine the concurrent validity of physical simulation and simulated patients.

2.3 THE OPEN AND CLOSED MOTOR SKILLS THEORY

According to exponents of the open and closed motor skills theory, nursing skills can be categorized according to the environmental context or practice setting in which they are performed (Gentile, 1972 : 6). The origin of this theory lends itself to the earlier writings of several psychologists on man's adaptation to the environment in which he lives. They emphasise in particular the moulding of man's movements or actions in accordance with spatial, structural and temporal demands in the environment. For example, a child attempting to climb onto a chair, must learn to formulate a movement pattern that conforms to the height of the

chair, its shape etc. The child's movement pattern which will yield effective goal-attainment, is thus controlled by environmental characteristics surrounding the chair (Nash, Stoch and Harper, 1990 : 179). Central to this theory, however, is the abundance of stimuli, relevant and irrelevant, present in man's environment.

From these stimuli, he has to select those relevant for goal attainment and formulate his movement pattern accordingly. The relevant stimuli are also referred to as regulatory factors and irrelevant stimuli as non-regulatory factors.

Having looked at the origin of this theory, it is important to discuss its main constructs and its relevance to the learning of psychomotor skills.

2.3.1 MAIN CONSTRUCTS OF THIS THEORY

Practice settings are dichotomized into dynamic and stationary. A dynamic setting is unstable, changing and varied. It is characterized by a complex stimulus population comprising both regulatory and non-regulatory factors from which the individual in a skill learning situation has to select from to formulate a movement pattern (motor plan). On the contrary, a stationary setting is stable and unchanging. It has a less complex stimulus population comprising fixed,

regulatory factors and no or very few non-regulatory factors. It is theorized further that activities which occur in a dynamic setting are called open skills and those occurring in a stationary setting, closed skills.

2.3.2 APPLICATION TO SIMULATED AND NON-SIMULATED PRACTICE SETTINGS

As cited earlier, simulated conditions provide a safe, controlled and stable setting for practising motor skills. Non-simulated conditions are synonomous to the real situation, where the learner is confronted with the ethical and legal issues of reality. In a complex environment such as a hospital or patient care setting, the stimulus population is diverse, changing and unpredictable and thus nursing skills performed here may be categorized as open skills. The majority of nursing skills fall in this category (Gomez, 1984 : 37), including those selected for this study. Only a very few nursing skills with limited interactional ability, can be categorized as closed skills for example making an unoccupied bed and urine-testing. Several authors agree that simulated conditions are ideal for teaching and practising closed skills since the absence of non-

regulatory factors and the stationary practice setting facilitates the rapidity of skill acquisition. (Gentile, 1972 : 6, Gomez and Gomez, 1984 : 37 and Gomez and Gomez, 1987 : 20). The use of simulated practice settings for teaching and practising open skills has drawn criticism from several authors (Gentile, 1972:13, Klein, 1978:15 and McDonald, 1987:290) with the main emphasis on over-simplication of reality and impairing the selective attention stage of skill learning. However, these authors suggest the inclusion of all regulatory factors within the simulated setting in order to learn selective attention and a repetoire of movements necessary to attend to the regulatory factors. But, is this possible? If at all, it were possible, would the learner be able to contend with these complex stimuli in the simulated setting?

2.3.3 APPLICATION TO GENTILE'S MODEL OF SKILL ACQUISITION

2.3.3.1 STAGE 1 COGNITIVE OR EXPLORATORY STAGE

(a) The goal

Learning a motor skill starts with a goal. The learner organizes a motor pattern to solve a particular problem or to change something in the environment ie. to reach a set goal. For goal attainment, the

learner now has to adopt specific movements to match the demands in the practice setting. For example taking the temperature of a patient requires the student nurse to take cognisance of factors in the environment which may influence her task.

(b) Population of stimuli

This includes sensory stimuli plus environmental characteristics, however not all of these are relevant for goal-attainment. When learning a closed skill where the stimulus population is fixed and unchanging, less mental energy is used in the case of learning an open skill. Learning an open skill requires the learner to recognise only those regulatory factors for goal-attainment and pay specific attention to them.

(c) Selective attention

The learner is required to discern and attend to stimuli in the practice setting to form a motor pattern. In a complex stimulus setting this may not always be a simple task for the learner. In stationary practice settings this task is

somewhat easier for the learner. Selective attention is crucial for the performance of open skills and thus the practise of open skills in a stimulating, dynamic environment is appraised favourably by these authors.

(d) The motor plan

The motor plan comprises a pattern of movements which must conform to the practice setting demands. If all regulatory factors in the setting have not been selectively attended to, an ineffective motor plan will be formulated. This is a risk inherent in practice settings which do not include all regulatory factors for open skills.

(e) Execution, feedback, decision and response

Performance of the motor plan provides feedback to the learner about whether the pattern was performed as planned and whether or not the goal was attained. Based on this, the learner takes a decision to refine and retain the motor pattern (fixation) or alter it (diversification) in the next stage. See Figure 2.1.

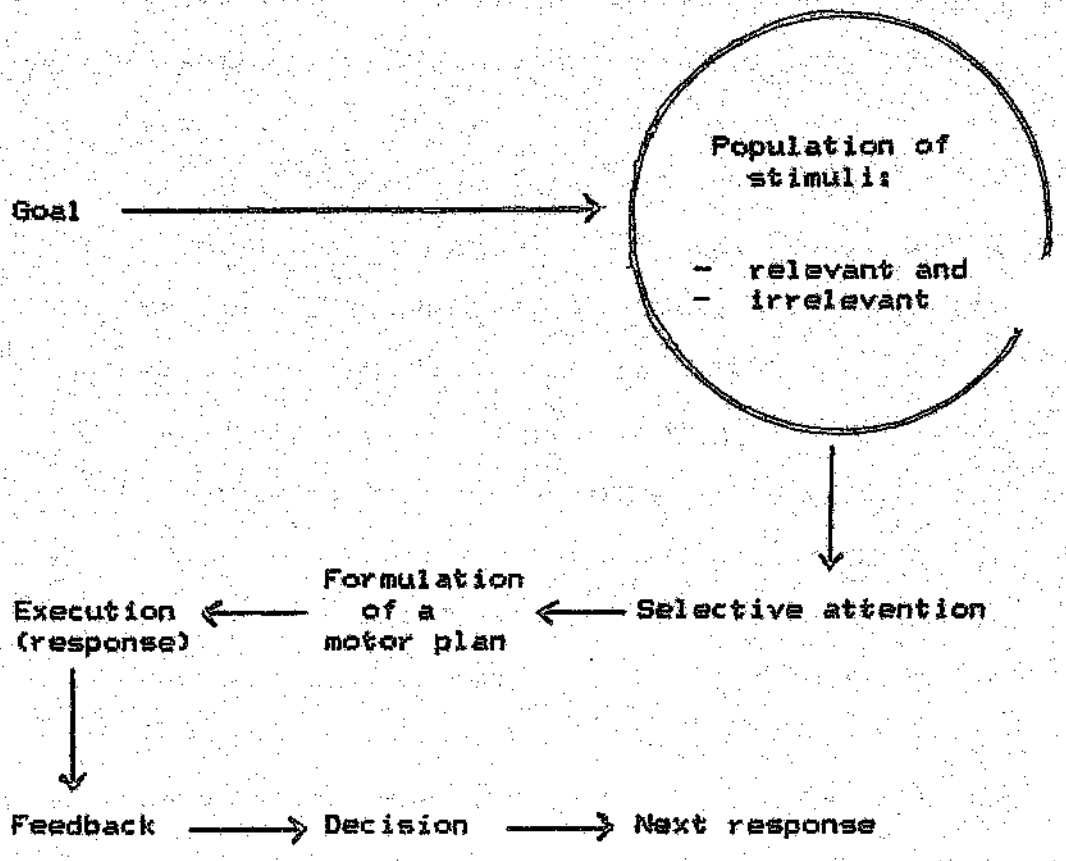


FIGURE 2.1 MODEL OF THE INITIAL STAGE OF SKILL ACQUISITION. (STAGE I)

(Gomez and Gomez, 1984 : 35)

2.3.3.2 STAGE II FIXATION/DIVERSIFICATION

Having acquired a general idea of the motor pattern which is effective for goal-attainment, the learner proceeds either to fixate on this motor pattern or alter it to produce a desirable outcome.

For closed skills, in which the regulatory factors are constant and controlled, there is fixation of a motor pattern very similar or the same as in Stage I. Modification of the original motor pattern is characteristic of open skills because of the dynamic and changing nature of its practice setting. Each time the regulatory factors are changed, the learner must alter his motor pattern for goal attainment. For example, level of consciousness of a patient is a changing, regulatory factor when performing the skill of back and pressure parts care. The student nurse is required to develop a repetoire of motor patterns to meet the demands posed by patients with varying degrees of consciousness. Thus, what is required of a learner during Stage II for an open skill is different than for a closed skill. Instead of fixing a specific motor pattern, the learner in an open skill situation needs to attend to several relevant stimuli in order to learn a number of motor patterns to attain the same goal. Does the simulated setting or college laboratory meet the learning demands of an open skill? Figure 2.2 presents the researcher's interpretation of Stage II of skill acquisition.

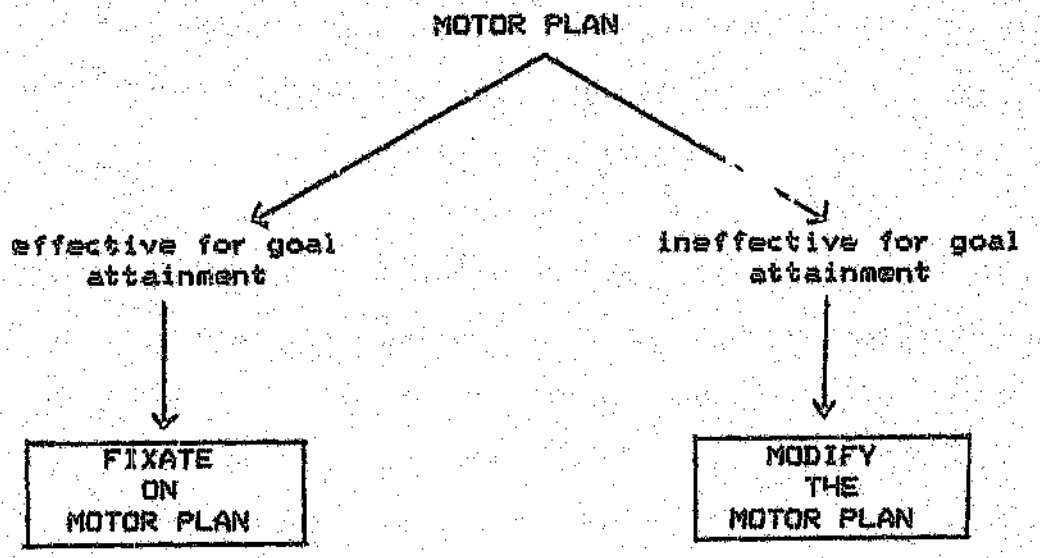


FIGURE 2.2 MODEL OF THE LATER STAGE OF SKILL ACQUISITION (STAGE II)

2.4 PRACTICE SETTINGS

Within the nursing context, clinical learning takes place in two distinct and separate practice settings viz. simulated and non-simulated. The college laboratory, also referred to as the demonstration room, represents the simulated setting and the patient care area, the non-simulated setting. These two practice settings will now be discussed separately.

2.4.1 THE COLLEGE LABORATORY

For most nursing colleges and nursing education institutions, the existence of a demonstration room or college laboratory is not a new concept.

However, its use on the basis of feasibility and desirability may vary from one institution to another. With the exclusion of isolated preferences, a literature survey indicates an increase in the use of the college laboratory to simulate the patient care setting. (Hallal and Welsh, 1984 : 35, Cook and Hill, 1985 : 344, McDonald, 1987 : 290, Megal, Wilken and Volcek, 1987 : 288, Gomez and Gomez 1987 : 20).

According to Hallal and Welsh (1984 : 34) the college laboratory is more economical since the instructor could effectively teach and supervise a greater number of students than in the patient care setting.

Also, students are not exposed to the continuous stimulation of the patient care setting and it eliminates violation of patients' rights by the student.

Environmental stressors are minimized in the college laboratory and students therefore experience less anxiety during the performance of nursing skills.

This in turn can improve the student's ability to concentrate and to receive and process information necessary for skill learning.

The essence of using a college laboratory is so that students learn to perform skills safely and

competently and the laboratory experience fosters accountability and self-responsibility. In contrast to this, the college laboratory may offer experiences devoid of ethical and legal consequences of student performance. Gomez and Gomez (1984 : 35 and 1987 : 20) argue against the use of the college laboratory for learning, using Gentile's open and closed motor skills theory as premise (1972 : 3). They maintain that a stable, unchanging, controlled environment as in the case of the college laboratory, is suitable for learning closed skills, for example making an unoccupied bed. On the other hand, when learning an open skill, all those stimuli or factors which may influence the skill must be included in the learning environment and thus should be created or brought into the college laboratory by the teacher. For example when taking a patient's blood pressure, factors such as noise, poor lighting, patient's arm width etc., should be brought into the college laboratory, but this is a formidable task for the teacher. With the increased emphasis on patients' rights, ethical concerns regarding the use of human subjects and current manpower shortages in Public institutions, should a patient care setting be used as a learning environment?

The researcher concedes that the patient care setting does have an important role in the learning experiences of nursing students, however ethical issues related to its use cannot be ignored. Rather, these should be explored to develop improved guidelines for effective use of the patient care setting.

2.4.2 THE PATIENT CARE SETTING

Experiential educationists tend to be in favour of the patient care setting as an effective learning environment as opposed to the college laboratory.

According to Quinn (1988:187) most clinical learning takes place in the patient care setting and it might well be argued that experiential learning is taking place all the time. But experiential learning should not be synonomous with undergoing an experience in the patient care setting, since little or no learning may result. However, the emphasis should be placed on how the learner utilizes the experience to promote growth in general.

(Corcoran, 1977 : 772, Quinn, 1988 : 188).

It is evident from the above that experiential learning is student-centered, goal-directed and has its main priority as that of learning. Are these aspects reconcilable with the emphasis,

purpose and priorities of the patient care setting? The author aligns herself with the following summations on the patient care setting for clinical learning:

- the emphasis in the patient care setting is patient-centered rather than student-centered and it may be construed that patients' rights take precedence over students' rights. On using the patient care setting, the possibility of a shift of emphasis onto the student does exist, however preservation of patients' rights may be entrenched in the ethical and philosophical foundations of the Nursing College.
- the purpose of the patient care setting is to provide quality service to clients, effectively and efficiently as opposed to a learning environment with its main purpose to promote academic and professional growth of the learner. Growth of the clients toward personal and social integrity could be undermined in the event of using the patient care setting for clinical learning.
- thirdly, the priority of a patient care setting is service (to patients) and the priority of a learning laboratory is learning, i.e. the students' needs are subordinate to

the patient's needs. When using the patient care setting for clinical learning, service may be provided in the process, but compromising the client's needs and quality of service rendered.

On the contrary, there are several arguments to justify the use of the patient care setting. Some educational principles can be used as a point of departure for argumentation in favour of the patient care setting. Firstly classroom learning is reinforced in the patient care setting by the nature of clinical opportunities it offers.

Health problems are exemplified in patients and this should afford the learner the opportunity to restructure his knowledge and thus promote transfer of learning.

Secondly, the principle of continuity is maintained when the student utilizes his previous and present experiences and knowledge, developing it into a more organised, professional skill in the patient care setting. Finally, the principle of interaction is maintained by the patient care setting providing variable and complex stimuli to which the learner is exposed to and required to interact with. Interaction with role models (effective as well as ineffective) and other

health professionals are important determinants of professionalism within a health team.

2.5 CLINICAL LEARNING

For the purpose of this study clinical learning is the acquisition of psychomotor and cognitive skills by nursing students. These components of clinical learning are described below.

2.5.1 PSYCHOMOTOR SKILLS

When one reflects momentarily on nursing care, motor skills form part of many fundamental and advanced nursing activities. The word "skill" has many usages. Butterfield, (1983:15) defines skill as ...

> a particular, more or less complex activity which require a period of deliberate training and practise and which often has some recognized, useful function.

The word skill can also be used in relation to the person's level of performance. The person is then said to be "skilled" or "having skill". Although its usage and semantics may differ, the common factor underlying a skill is movement or activity, hence the term "motor skill". Quinn (1988 : 90) goes further to state that procedural knowledge is an essential part of motor skills,

constituting the mental part of motor skills namely psychomotor skills.

2.5.1.1 CLASSIFICATION OF PSYCHOMOTOR SKILLS

The conditions necessary for skill acquisition will be determined largely by the type of skill and the nature of practice. Three classifications of skills are noted in the literature. These are summarised in table 2.2. The skills being assessed in this research project are all classified as manual skills.

TABLE 2.2 CLASSIFICATION OF PSYCHOMOTOR SKILLS IN NURSING

[Adapted from Reilly & Derman (1985:179)]

SKILL TYPE	DESCRIPTION	EXAMPLES
Fine Motor	* require muscular coordination * involving precision-oriented tasks.	* wound suturing * removal of sutures * administration of injections
Manual	* require eye-hand coordination * manipulative tasks	* BP measurement * physical assessment * bedbath
Gross Motor	* require movement of body * using large muscles	* LPR * Patient positioning * ambulation

2.5.1.2 ACQUISITION OF PSYCHOMOTOR SKILLS

Unlike other forms of learning, psychomotor skills require practise in ordur to be learnt or acquired. Practise consists of repetition of movements/actions of a procedure under specific conditions. Given these practice sessions and specific conditions, the acquisition of psychomotor skills is characterised by three consecutive phases:

- the cognitive phase which is concerned with the actual learning of the procedure. The duration of this phase is directly related to the complexity of the skill. The more complex the skill, the longer this phase will last.
- the associative phase which is characterized by progress and refinement of the skill or parts of the skill and the ability to eliminate irrelevant, interfering stimuli.
- the autonomous phase in which the skill becomes automatic and occurs without thinking.

These phases of skill acquisition are reconcilable with those of Gentile (1972:10) who has dichotomized skill acquisition into two stages:

- Stage I: Cognitive or exploratory stage during which the individual "gets an idea of the movement". A motor pattern is organised to solve a particular problem. Any information resulting from his motor pattern (feedback) can be utilized by the learner for refinement or alteration of the skill in the next stage.

- Stage II: Fixation or diversification occurs when the learner progresses by refining and perfecting movements necessary for goal attainment.

With continued practise, a highly stereotyped, automatic movement organization becomes evident, referred to by Gentile (1972:11) as becoming "habitual". This stage is in congruence with the autonomous phase of motor skill learning. Table 2.3 shows the researcher's assimilation between these two models producing three stages in motor skill learning.

TABLE 2.3 ASSIMILATION BETWEEN TWO MODELS FOR MOTOR SKILL LEARNING

	STAGE I	STAGE II	STAGE III
Fitts and Posner	Actual learning of the procedure.	Refinement of skill. Irrelevant interfering stimuli are eliminated	Movement becomes automatic.
Gentile	Organizes a motor pattern.	Refining and perfecting movements.	Movement becomes habitual with practise.

2.5.1.3 CONDITIONS FOR LEARNING PSYCHOMOTOR SKILLS

For the learning of any skill and particularly psychomotor skills, certain prerequisite conditions are needed to enhance learning. These conditions may be described as follows:

- Goal-setting and preparation

  Students must know what they are expected to do. Goal-setting and physical presentation of the skill to be learnt are important aspects to ensure goal-directed actions and knowledge of what is to be done. Audiovisual presentation of the skill can take the form of a lecture-demonstration, film, video recording and other instructional programmes.

- Presentation of the skill

  Most motor skills comprise a number of subskills which must be mastered before the student can perform the total skill. (Ewan and White 1987:75 and Quinn, 1988:93). For example, shaking down a mercury thermometer is a subskill and is an essential activity in temperature taking. Each of the component subskills must be presented to the student in any of the forms mentioned earlier so that the student's attention can be drawn to specific aspects for effective performance and goal attainment.

- Practice conditions

  As stated earlier, practise forms an integral part of motor skill learning. Of importance in practice conditions is the frequency and spacing of practice sessions. Two patterns of spacing have been identified namely massed (continuous) practice and distributed practice. Massed practice sessions are characterized by little or no rest for the learner from the beginning to end of practice. If resting is permitted, it is usually less than the length or duration of the practice session.

In distributed practice, there are rest periods equal to or greater than the length of the practice session. Research studies reported by Reilly and German (1985:186) found that distributed practice sessions were received more favourably by educationists. With reference to the length of the practice sessi n, short sessions in the early stages of skill learning are more profitable. This is particularly so for learning gross motor skills e.g. cardiopulmor ary resuscitation where learner fatique may become problematic. There are apparently no prescribed conditions for learning fine motor and manual skills, however, research suggests that gross motor skills are learnt more efficiently and rapidly with more frequent practise sessions spaced over a period of time.

- Performance feedback

The term feedback refers to the information received by the learner concerning the performance of a psychomotor skill. Such feedback must be immediate and may be received during the performance of the skill or on completion. Butterfield (1983:18), (basing her statement on the learning theory of reinforcement) emphasises that feedback is essential particularly during the first few practice sessions of learning a new skill. Knowledge of success or improved performance acts as a reinforcer and serves to perpetuate improved performance in the learner. Similarly, errors in performance can be corrected immediately and repetition of undesirable performance will be eliminated. The implications of performance feedback on motor skill learning, is that they enable modification of the learner's behaviours for goal attainment. For the purpose of this study, presentation of the

skill and its subskills took the form of a lecture demonstration. Four practice sessions were allocated and distributed over a four week period, during which performance feedback was given by trained research assistants.

2.5.1.4. TAXONOMY OF PSYCHOMOTOR SKILLS

Several taxonomies i.e. hierarchies of behaviours have been developed to identify the psychomotor progress of a student from novice to expert. In particular Anderson, Conklin, Watson, Hirst and Hoffman (1985:41) have used Dave's taxonomy for psychomotor skill performance.. This taxonomy includes five levels of psychomotor performance. In level 1 (P1.0) and level 2 (P2.0) the student's psychomotor behaviour is generally uncoordinated and less accurate. These two levels may be attained in the college laboratory. Level 3 (P3.0) is divided according to the practice setting: P3.1 is psychomotor learning in the college laboratory and P3.2 is in the patient care setting. In both, the performance behavior is more logical and coordinated. In level 4 (P4.0), coordination is at a high level in consideration with time and speed dimensions. In level 5 (P5.0), the student's psychomotor

behaviour is automatic and reflects professional competence: (Reilly and Oerman, 1985:196). Table 2.4 presents the five levels of skill performance and the expected student behaviours for each level.

This taxonomy is applicable in the teaching, practise and evaluation of psychomotor skills in nursing. Not all psychomotor skills applicable to nursing practice should be developed to the level of naturalization (P5.0). Reasons for this have been cited as the large quantity of skills the nurse practitioner has to contend with and the variability in the use of certain skills. Decisions for levelling of psychomotor skill performance should be based on the curricular content, stage objectives, situational need, frequency of skill in usual practice and the availability of practise opportunities.

In addition, the level at which the student is expected to perform i.e. the outcome level, must be realistic in terms of its potential for attainment by all students.

A psychomotor performance grid can be used to provide a framework for decisions about appropriate levels of performance for each skill.

TABLE 2.4 TAXONOMY OF PSYCHOMOTOR SKILL PERFORMANCE
(Reilly and Derman, 1985:195)

LEVEL	PERFORMANCE CRITERIA
P1.0 Imitation	- observed actions are followed - movements are gross - coordination lacks smoothness - errors are present - time and speed based on learner need
P2.0 Manipulation	- written instructions are followed - coordination of movements is variable - accuracy is consistent with written prescriptions - time and speed are variable
P3.0 Precision (3.1) (3.2)	- logical sequence of actions - coordination is at a high level - errors are minimal; not critical - time and speed are variable
P4.0 Articulation	- logical sequence of actions - coordination is at a high level - errors are limited - time and speed are within reasonable expectations
P5.0 Naturalization	- sequence of actions is automatic - coordination is consistent at a high level - time and speed are within reality - performance reflects professional competence

P = Psychomotor domain
P3.1 = Psychomotor learning in the college laboratory
P3.2 = Psychomotor learning in the patient care setting

Levelling of psychomotor skills do not form part of the programme of the College under study and therefore the use of a psychomotor performance grid was not employed during this research project.

Table 2.5 illustrates a performance grid based on oxygenation skills.

TABLE 2.5 EXAMPLE OF A PERFORMANCE GRID FOR LEVELLING A PSYCHOMOTOR SKILL - OXYGENATION
[Adapted from Anderson et.al (1985:42)]

SKILLS	OUTCOME	1ST YEAR	2ND YEAR	3RD YEAR
assessment of respiration; auscultation for breath sounds	P5.0 P4.0	P4.0 -	P5.0 P3.2	P4.0
positioning to facilitate breathing	P5.0	P3.1 P3.2	P5.0	
suctioning: -oropharyngeal -tracheostomy	P4.0 P4.0	P3.1 P3.2 -	P4.0 P3.1 P3.2	P4.0
assist with coughing and deep breathing postural drainage	P5.0 P3.0	P3.1 P3.2 -	P4.0 P3.1 P3.2	P5.0
O2 therapy: -mask and canulla -croupette	P4.0 P4.0	P3.1 P3.2 -	P4.0 P3.2 P4.0	

2.5.2 COGNITIVE SKILLS

The term cognition refers to those internal mental processes such as thinking, learning, problem-solving, remembering and perceiving. Cognitive, relating to the function of cognition, is often used synonomously with the term "knowledge". (Quinn, 1988:8).

The same author also differentiates between declarative knowledge and procedural knowledge. The former comprises factual information which can be transmitted verbally to others and the latter concerns the knowledge of how to perform something eg. bedbathing a patient. From this can be inferred that different strategies need to be implemented to evaluate the two types of knowledge. Procedural knowledge can be assessed by the person giving a return demonstration and the evaluator rating the learner's performance against predetermined criteria. Declarative knowledge on the other hand, can be assessed by various formats of written and oral tests. Despite its difference in types and in evaluation strategies required, knowledge is often viewed as the theoretical component of practice. Thus it forms an integral part of psychomotor skills and its performance in clinical nursing. However, this does not mean that the cognitive component

should be interjected while psychomotor skill learning is in process. Psychomotor learning is interfered with because of divided attention between the skill being practised and the question being asked.

Studies conducted by Brown, Tickner and Simmonds (as quoted by Reilly and Oerman, 1985:193) demonstrated that judgement and control skills were affected adversely while subjects were asked theoretical questions during skill performance. In addition, subject responses were less reliable and correct. In this study the cognitive component related to the psychomotor skill were evaluated separately in order to control variables which may interfere with skill learning. It can be deduced that while cognitive learning requires separate evaluation opportunities and strategies, it al equires specific conditions in which to take place. For the purpose of this Study, the conditions for cognitive learning will be discussed based on the writings of Ewan and White (1987:71).

2.5.2.1 CONDITIONS FOR COGNITIVE LEARNING

- Students must be presented with information in a form they can understand.

  The essence in this statement is that familiar vocabulary and concepts must be

used. Technical terms in nursing need to be clarified in order for the student to understand their relevance in forming a conceptual base for nursing actions.

- Students must be able to store information in a way which facilitates its functional retrieval.

  Incorporating new information into existing general principles already known to the student, will simplify the learning process. The student will now have to learn only specific details, as the general details or principles have already been registered in the long-term memory and only needs to be recognized and retrieved.

- Students must be able to use information they have learnt to perform tasks or to solve problems.

  In terms of cognitive learning, rehearsal or practise is essential to aid retention of knowledge, as it is essential to aid competence in psychomotor skills. To fulfill this requirement, only relevant or essential elements for effective practise must be taught. Redundant and "nice-to-know" elements should be excluded, as these

have no and little relevance for practice.

- Students must know the effectiveness of their use of information.

  Feedback on the students use of cognitive strategies is important in order to reinforce strengths and correct weaknesses. Feedback should be specific and aimed at improved utilization of knowledge by the student.

2.6 CLINICAL EVALUATION

Evaluation in nursing relates to the perception of nursing acts and/or events judged against the professional standards and values determined by the evaluator (Forgan Morley, 1984:80). With reference to psychomotor skills in nursing, evaluation is concerned with nursing actions toward patient care and is often referred to as clinical evaluation Clinical evaluation forms an integral component in the learning experience cycle of the student nurse. It offers information both to the learner and teacher about performance and attainment of learning objectives.

2.6.1 PROBLEMS IN CLINICAL EVALUATION

Several problems have been identified in the evaluation process itself and those inherent in the instruments used to evaluate psychomotor

skills. Evaluation in nursing is complicated by the fact that it is concerned not only with the exactness of the technical aspects of the skill, but also with the effectiveness of the nursing action performed. This can be translated into Pavlish's model for clinical evaluation which observes two essential elements: processes and products. Process evaluation refers to the exactness and sequence of steps followed in doing a task. Product evaluation refers to the effectiveness of the outcome of the task performed. It is therefore essential that any evaluation tool addresses both the processes and products of the nursing action.

Establishing measurable criteria, is also one of the major concerns in evaluation. Formulation of criteria for nursing actions provide a standard against which results or behavioural outcomes can be measured. In addition the degree of success determined by these criteria, provide feedback to the learner. The evaluation tools used in this study were designed to address both processes and products, based on the scientific principles of nursing care. Concrete and descriptive criteria were developed to measure processes and products.

A third problem lends itself to the fact that clinical evaluation is based on direct

observation. Since human observation is a subjective process, bias and subjectivity are inherent problems. It would appear from the literature, that there is a perpetual search for objective criteria in order to eliminate subjective judgement. Efforts should be directed to the evaluation tool where the interpretation of grading standards by different evaluators, is one of the major sources of subjectivity. For this reason, a checklist as opposed to a rating scale was developed for this Study.

The environment in which the student is being evaluated may complicate the evaluation process significantly. This aspect will be discussed later in this section. Because of the skewed student-teacher ratio, the evaluation of an individual student's performance is inevitably based on a sample of the student's total clinical experience in the nursing unit.

It is not only impossible but also uneconomical to achieve a constant 1:1 observation period with a student while student-teacher ratios may be equal to or higher than 1:8 (Wood, 1982:12). Figure 2.3 depicts the researcher's illustration of the conditions of clinical evaluation and the problems they create.

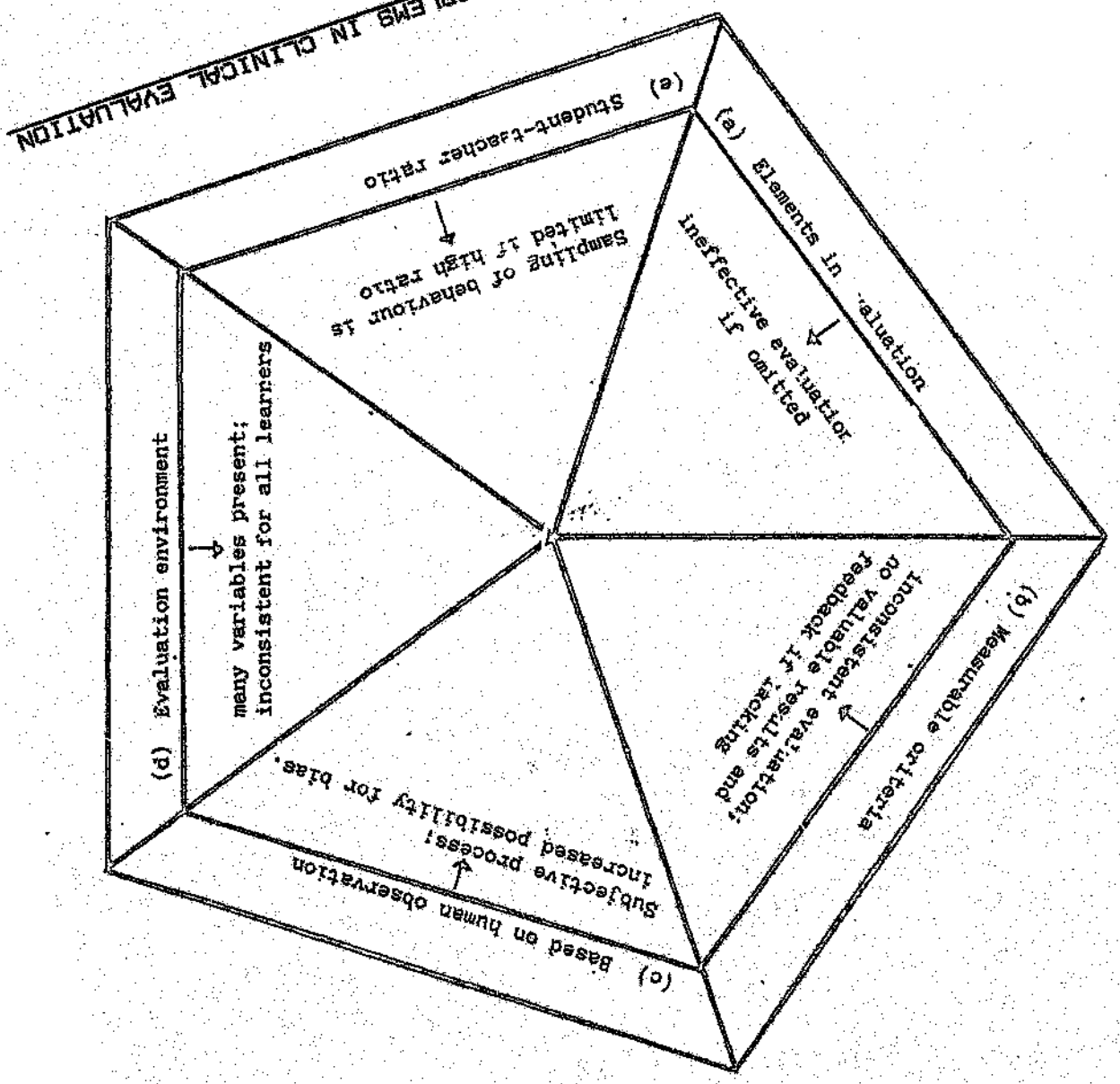


FIGURE 2.3 CURRENT PROBLEMS IN CLINICAL EVALUATION

2.6.2 APPROACHES TO CLINICAL EVALUATION

With reference to the time of evaluation in relation to learner maturity, two approaches to evaluation have been identified. These approaches are described as follows:

(a) Formative evaluation

Formative evaluation occurs during the learning experience when learner maturity is low. It provides feedback about the student's progress toward the learning objectives. It is an assessment of that which "forms" learning by reinforcing strengths and identifying weaknesses in clinical performance. Based on androgogical principles of learning, formative evaluation is best achieved through self-assessment by the student. (Dolphin and Holtzclaw, 1983:143). It is here where the taxonomy of psychomotor performance criteria, described earlier, is most applicable.

(b) Summative evaluation

In this type of evaluation, performance is evaluated at the end of the educational programme. It occurs during high learner maturity and evaluates the student's achievement of the learning objectives. It "sums up" how well the learning objectives were met.

According to Beare (1985:73), not all evaluation must take place within the patient care setting; formative evaluation occurring in the college laboratory prior the student's clinical experience. In the patient care setting, both formative and summative evaluation should be done to assess attainment of clinical learning objectives.

2.6.3 METHODS OF EVALUATION

Methods of evaluating learning have been identified in the literature as criterion - referenced and norm-referenced. The criterion-referenced method of evaluation utilizes specific predetermined criteria or standards against which student performance is judged (Pavlish, 1987:339). These criteria relate to the learning objectives and each student is rated by his ability to demonstrate chosen behaviour according to the established criteria. This method of evaluation has the advantage that precise achievement in direct relation to specified behaviours is demonstrated and the student has knowledge of his/her progress (Forgan-Morley, 1984:82).

The normative method reveals the performance of an individual student in relation to other

students following the same course (at the same level). In this instance the group score is regarded as the norm or standard against which individual performance is judged. Such performance may be expressed in marks or grades eg. A, B, C system or by levels of competency eg. good, above average, unacceptable etc.

Regardless of the method of evaluation, difficulties often lie in the choice of a grading system which is compatible with the theoretical framework of the nursing education institute. According to Forgan-Morley (1984:83), the educational philosophy of a particular institute should serve as a guideline in the choice of the evaluation method and grading. However, there is a tendency to the simultaneous use of more than one method in nursing education. For the purpose and comparative nature of this Study, both evaluation methods were employed. Set standards were used against which to judge students' clinical learning; expressed as percentages to enable group comparisons.

2.6.4 ENVIRONMENT FOR CLINICAL EVALUATION

For the purpose of this study, environments for the evaluation of psychomotor skills will be confined to the college laboratory and the patient care setting.

2.6.4.1 THE COLLEGE LABORATORY

During the early stage of the student's clinical learning experience, learner maturity is usually low and the cognitive (exploratory) phase of skill learning is the focal point. Formative evaluation is ideal during this stage of skill learning accompanied by constructive performance feedback by the teacher. The ideal setting would be a simulated one, since it provides a non-threatening milieu where learners can receive formative evaluation as they progress through their practice sessions. (Reilly and Oerman, 1985:189). Germane to the evaluation of psychomotor skills in the college laboratory, is the level at which the student is expected to perform. Such performance expectations are based on the taxonomy of psychomotor skills as described earlier. Minimum acceptable levels of performance must be established prior to evaluation and must be communicated to the student. According to Anderson et.al. (1985:43), performance at the level of precision (P3.0) or the level of articulation (P4.0) should be evaluated in the college laboratory. Consequently the student will have to perform at the designated achievement level before performing the skill on an actual patient.

2.6.4.2 THE PATIENT CARE SETTING

Once students have achieved the predetermined level of performance under simulation, they will proceed to the patient care setting for further practise and evaluation. Wood (1982:12) highlights two major problems when evaluating psychomotor skills in the patient care setting. Firstly, students have to contend with a multitude of variables which may have both positive and negative effects on learning and complicate evaluation significantly. The student has to adjust to clients, staff and environmental demands of the unit during the four to six week allocation period. At the same time she is applying what has been learnt in the college laboratory. During this adjustment and learning period, she is also being evaluated; a less than ideal situation, as it may not represent a true reflection of the student's clinical performance. These and other stressors in the patient care setting complicate evaluation of skills significantly. A second problem arises when comparable learning experiences are to be devised for each student. Because of the dynamics and diversity in the patient care setting, it is impossible for the teacher to evaluate different students

in similar settings. Acknowledgement of this dilemma has introduced the OSCE in an attempt to standardize evaluation opportunities.

2.7 PREVIOUS RESEARCH

A similar study was designed by Gomez and Gomez in 1987, to investigate practice conditions when learning a psychomotor skill in a Baccalaureate degree program in nursing. Subjects were randomly assigned to one of two groups for practice viz. the college laboratory or patient care setting. The skill being practised was BP taking. Subjects were required to practise this skill eight consecutive times in their predetermined practice settings. While these researchers were generous in terms of the number of practice sessions, the aspect of supervised practices lends itself to critique. In this study, feedback by a trained instructor was given only after the fourth and seventh practice session.

With reference to the learning theory of reinforcement and several articles on the acquisition of psychomotor skills, feedback is absolutely essential particularly during the first few practice sessions. Performance errors in the first two to three trials tend to persist in subsequent practice sessions. This makes "unlearning" of performance errors more difficult and prolongs the

practice sessions unduly. While alternative forms of extensive feedback do exist, no mention of the utilization thereof was made in the research done by Gomez and Gomez. This has led the author to believe that feedback during practice trials were inadequate for learning a psychomotor skill. With reference to the spacing of practice trials, Gomez and Gomez have selected massed practices as opposed to distributed practices. While research in this field of psychomotor learning notes no difference in the amount of learning between massed and distributed practice, several authors tend to favour distributed practice sessions in view of practical considerations such as avoiding learner fatigue and lowered motivation. This raises the question whether the final evaluation of the students subjected to continuous practice sessions is both fair and valid. Furthermore, the 1-5 scale used to evaluate the subjects' degree of confidence demonstrated during BP taking, depended solely on the rater's opinion and judgement. Although having a high interrater correlation coefficient, it does not preclude rater subjectivity and bias. A similar study conducted by Megal, Wilken and Volcek later in 1987 evaluated nursing students' performance during the administration of injections in the College laboratory and the linical area. The

purpose of the study was to determine the accuracy of nursing students' administration of injections and the relationship of performance errors to students' anxiety. The author believes that important extraneous variables were not sufficiently controlled in this study and therefore could have had a confounding influence on the findings of the research. To begin with, the sampling procedure forms the weakest aspect of this study. A non-probability sampling plan was used in which a convenient sample was selected. Thirty five subjects from a target population of one hundred and thirty volunteered to participate in the study. This fact has alerted the author to sampling bias and that the subjects (volunteers) might be atypical of the population with regard to the critical variables being measured. These subjects might already have possessed greater confidence and lower anxiety than their non-participating colleagues, misleading the researchers regarding their levels of confidence and anxiety. In the methodology, the lack of standardizing the initial instruction/ demonstration of the skill and the control over the number of the practice trials, has led the author to speculate on the influence of extraneous variables. The subjects seemingly were allowed independent study of material provided by the

faculty. In addition, the number of practice trials ranged from 1 to 10 with a mean of 4. Subjects were therefore not exposed to "standardized" conditions of practice and has led the reader to believe that subjects who had deficient trials committed the most errors in skill performance. Perhaps the significance lies in the relationship between performance errors and number of practices rather than between performance errors and the practice environment.

2.8 SUMMARY

This chapter gave a descriptive overview of the literature consulted and its relevance to this study. In particular it addressed all those aspects which influence the acquisition, performance and evaluation of psychomotor skills - both directly and indirectly. Cognitive skills, although seen as an integral component of psychomotor skills, were discussed separately in this chapter and researched independently of the motor skill component. The main constructs of Gentile's open and closed skills theory were described with its application to psychomotor learning in nursing. Previous research in this area, was discussed critically, with due cognisance of factors relevant for this study.

CHAPTER 3

THE RESEARCH DESIGN

3.1 INTRODUCTION

The performance of first year student nurses during cognitive and psychomotor learning was investigated to determine whether a significant relationship exists between the level of skill performance and the setting in which the skill was learnt. Evaluation of student performance was done both in the original practice setting and the patient care setting to determine whether they performed significantly better or not.

3.2 RESEARCH METHOD

This is a descriptive multimethod study, involving

- instrument development and validation
- reliability testing of instruments
- data collection on cognitive and psychomotor performance utilizing the above instruments.

Subjects' performance of psychomotor and cognitive skills were assessed using checklists and MCQ's designed for three nursing skills. These skills were randomly selected after being sorted out as oper. skills to be taught during the first week of the subjects' semester block:

- measurement of temperature, pulse rate and respiratory rate (TPR)

- measurement of arterial blood pressure (BP)
- pressure parts care (PPC)

Because of the ongoing quest to find a valid, reliable and effective instrument for data collection, development of the instruments suited for this study must be discussed.

3.3 INSTRUMENT DEVELOPMENT AND VALIDATION

3.3.1 INSTRUMENTS FOR PSYCHOMOTOR PERFORMANCE

During the development phase, applicable standards (construct variables) for each of the nursing skills being studied had been drawn up by the standardization committee of the campus hospital and college after a comprehensive literature study. Content validity was based on recent literature and the expert judgement of five clinical tutors. Statistical analysis of the validity (quantification) of these standards necessitated the use of a 4-point scale to calculate an index of content validity (CVI). A 4-point ordinal Likert grading scale as used by Muller (1987:227) was implemented to determine the CVI for each standard. The key to the grading scale was as follows:

1 = standard not applicable

2 = standard not clear, application questionable; possible reword

3 = standard applicable

4 = standard most applicable and well formulated

These standards and instructions for validation were dispatched to six nurse educators at different local educational institutes (appendix A, B, C and D). On return of these records, the average score of each item / standard was calculated to obtain the index of content validity. According to Lynn (1986:335), an item is valid, when it obtains an average CVI of 3 to 4. This is dependent upon the degree of consensus reached by the persons validating the standards. The standard deviation (SD) was also calculated to confirm the degree of consensus. All valid items were reorganized to form the checklists (Appendix E, F and G), described below. Statistical calculation of content validity is discussed and tabulated in Chapter 4.

3.3.1.1 THE FORMAT

A standard applicable to the nursing skill is stated at the beginning of the instrument to serve as a measure with which the outcome / student performance is compared. The objectives on the instrument are competency objectives. These objectives are directly related to the student behaviours marked with an

asterix (*). These are called critical behaviours as they are absolutely essential or critical for the student to attain the competency objectives.

The instrument (checklist) design was based on the nursing process. The assessment phase checks whether the student has assessed the situation and factors which may have an influence on her subsequent actions. The planning phase evaluates the student's ability to prepare the patient, the environment, the requirements and herself for the nursing skill. The student's ability to perform the nursing skill in a logical sequence and with accuracy, is evaluated during the implementation phase. The evaluation phase tests the student's ability to record the nursing action and any observations which may stem from it.

3.3.1.2 THE SCORING SYSTEM

The choice of a checklist as opposed to a rating scale (5 point scale) was an attempt to reduce bias and subjectivity which were inherent in the evaluation tools used at the time of the research. Restrictions of time and resources to re-train research assistants in the use of the rating scale further necessitated the use of a checklist. The

scoring system may be summarized as follows:

- All student behaviours have a value of one (1) point each except the critical behaviours (#) which have a value of five (5) points each.
- Behaviours which are not applicable (N/A) are subtracted from the maximum score before obtaining the student's score.
- All behaviours which are correctly performed are added to obtain the student's score.
- If one to two critical behaviours are incorrectly performed or omitted the student fails summarily with 45 %.
- If three to four critical behaviours are incorrectly performed or omitted the student fails with 35 %.
- If five to six critical behaviours are incorrectly performed or omitted the student fails with 25 %.

The index of discrepancy which appears on the TPR and BP checklists, served as a control measure for the researcher, to compare accuracy between the subject's and the evaluator's readings.

3.3.2 INSTRUMENTS FOR COGNITIVE PERFORMANCE

A test comprising fifteen multiple choice questions (MCQ's), was compiled for each of the

aforementioned skills, to determine students' skill - related knowledge. (Appendix H, I and J) MCQ's were chosen by the researcher as these are best suited for the assessment of factual recall and interpretation of data (Mitchell, 1985:7). Secondly, MCQ's meet three basic criteria for good assessment namely, objectivity, validity and reliability. Correct and incorrect responses were decided in advance and were therefore not subject to the researcher's whim and bias. The contents of the objective tests were derived from the curricular stage objectives and student study guides. The tests were validated by recent literature and a discussion with experts in the setting of MCQ's. Final content validation was done by an expert and author of a book on MCQ's, at a local university.

3.3.2.1 THE FORMAT

The cognitive instruments each consisted of fifteen concise, factual statements or questions. Each question in turn has five responses from which the student has to select the correct response/responses by ticking the appropriate box/boxes. As stated previously, correct and incorrect responses were determined in advance and remained permanent throughout cognitive assessment.

3.3.2.2 THE SCORING SYSTEM

The perennial problem of students' guessing was eliminated by subtracting marks proportional to the marks for a correct response (all positive marks equal all negative marks within a question). This penalty was introduced to prevent students from scoring 100 % in the event of them ticking all statements as correct. However, the researcher did not employ negative marking and thus the range of scores was 0 to 100 %. The total value of each question was 1.2 marks and thus a total of 18 marks would be 100 %.

3.4 RELIABILITY TESTING OF INSTRUMENTS

3.4.1 CHECKLISTS FOR PSYCHOMOTOR PERFORMANCE

Testing the checklists for reliability involved the characteristics stability, equivalence and internal consistency. To determine stability of the instruments, the test-retest method was used. This test was done on 26 subjects of the target population, with retesting after two weeks. A correlation coefficient (Pearson r) between the test and retest scores were computed. Reliability coefficients above 0.70 are considered sat. factory according to Polit and Hungler (1987:388) and suggests a reliable instrument. The Pearson r values for TPR, BP and

PPC were 0.79, 0.93 and 0.77 respectively. Consult table 3.1. Inter-rater reliability for the equivalence of the instruments was determined by comparing the scores of two raters who simultaneously observed students' performance in all three nursing skills. A correlation coefficient using Pearson r was once again calculated. High interrater reliability was reflected by r-values of 0.85, 0.97 and 0.98. The internal consistency of the instruments was determined by the split half method. Pearson r was calculated and all three values were above 0.70 suggesting reliable instruments. Table 3.1 reflects the reliability coefficients of the psychomotor instruments (checklists).

TABLE 3.1 RELIABILITY COEFFICIENTS OF PSYCHOMOTOR INSTRUMENTS

SKILLS	RELIABILITY TESTING		
	TEST RETEST	INTERRATER	SPLIT HALF
TPR	0,79	0,85	0,89
BP	0,93	0,97	0,92
PPC	0,77	0,98	0,71

3.4.2 TESTS FOR COGNITIVE PERFORMANCE

Reliability was determined statistically by the test-retest method to assess stability and hand calculated item (factor) analysis to determine the internal consistency of the instruments. In the test-retest method, reliability was reflected in similar mean scores for each of the aforementioned skills. High correlation coefficients (0,96, 0.87 and 0.83) between the two sets of scores were found. All three tests were considered reliable as their r-values were above 0.70. Consult table 3.2 for the test, retest and correlation values. In this study, item analysis addressed two basic elements in objective test construction as follows:

- ITEM DIFFICULTY, which refers to the percentage of respondents correctly answering a given item. The lower the percentage the more difficult the item. Using Nunnaly's criteria, MCQ's with four or more alternatives (as those used in this study) should have a range of 35 % - 80 % or 0,35 - 0,80 for it to be reliable in terms of item difficulty. (Jenkins and Michael, 1986:11).
- ITEM DISCRIMINATION, measures the extent to which an item discriminates between high and low scores. A discrimination index ranges from

-1 to +1. The higher the index, the more discriminating the item.

Statistical analysis of items in the objective tests is discussed in Chapter 4.

TABLE 3.2 MEAN SCORES AND RELIABILITY COEFFICIENTS OF COGNITIVE INSTRUMENTS

SKILLS	MEAN SCORES		r
	TEST	RETEST	
TPR	51	55	0,96
BP	44	48	0,87
PPC	53	55	0,83

3.5 SAMPLING METHOD

The target population comprised all first year nursing students (group 1) who registered for the Diploma in Nursing Science and Midwifery at a Nursing College (N=42). Subjects with prior nursing experience were excluded from the study because of their existing knowledge and skills which could interfere with the study. Only two subjects were found to have previous nursing experience and were excluded from the sample. The remaining students constituted the sample (n=40) and were randomly assigned to Group A and Group B. Demographic variables of the subjects such as age,

gender and scholastic achievement were documented, because of their possible extraneous effects on the findings.

3.6 THE RESEARCH ASSISTANTS

The design of the study necessitated the employment of research assistants. Their functions were to supervise the practice sessions for psychomotor learning and to evaluate the students' performance during the final return demonstration in the original practice setting and then in the patient care setting.

3.6.1 CRITERIA FOR SELECTION

Eight research assistants were selected for these functions. They were carefully matched for academic qualifications and area of subject specialization. All research assistants were nurse educators (tutors) registered with the South African Nursing Council and specialized in the teaching of General Nursing Science. Since the clinical teaching department has been incorporated into the Nursing College for the past five years, these tutors have had equal exposure to and experience in student assessment in the clinical units and in the college. The development, testing and utilization of evaluation instruments in conjunction with the associated

University form an intergral part of their job description. To eliminate researcher bias, the researcher was not directly involved with the assessment of psychomotor skills, but rather controlled and coordinated activities during this stage of data collection.

3.6.2 PREPARATION OF THE RESEARCH ASSISTANTS

The assistants were informed in writing about the nature and purpose of the research and also the procedures they were required to follow. This information was structured in point form and was accompanied by a timetable reflecting the skills content, time schedules and area allocation.

The research assistants were each issued with the standardized procedures and evaluation instruments for the three nursing skills being studied. Interrater reliability for six of the research assistants was obtained through concurrent observation by the researcher during the months prior to the study. The remaining two assistants had taken part in the pilot study and were therefore not subjected to the same scrutiny. No formal training was indicated by these observations. Assessment of these tutors' clinical teaching and evaluation abilities was done by the Head of the Clinical Teaching Department and therefore competency was implied by her evaluation reports.

3.6.3 ALLOCATION OF THE RESEARCH ASSISTANTS

Groups A and B were divided into subgroups of 5 students each. Each research assistant was randomly assigned to a group of five students. The assistants were required to alternate the practice sessions between Group A and Group B to reduce the propensity to group bias or favouritism. The research assistants allocated to Group B used selected wards for practice sessions and those allocated to Group A used the college laboratory for practice sessions. The allocation of the research assistants was done by the researcher who also exercised control by rotating between the assistants during each practice session.

3.7 THE RESEARCH SETTING

Data were collected in the college classroom, the college laboratory and the patient care setting.

3.7.1 THE CLASSROOM

A classroom, with a capacity for about 80 students, equipped with desks and chairs, adequate lighting and ventilation, was used to test the cognitive component of learning. Here, students were required to complete the pretest and posttests, and hand them in to the researcher before leaving the classroom.

3.7.2 THE COLLEGE LABORATORY (Setting A)

This locale consisted of two large and two smaller rooms with equipment and supplies comparable with the patient care setting. An exception was the presence of four 3-D models on which the students would perform the nursing skill PPC. The skills TPR and BP would be performed on fellow colleagues. The college laboratory was used for the practise of psychomotor skills by group A.

3.7.3 THE PATIENT CARE SETTING (Setting B)

Four medical wards were selected for the subjects in group B to practise psychomotor skills. These wards were chosen because of their environmental uniformity for each of the groups of five students. Also, the selected nursing skills were routinely performed in these wards, thus little or no disruption of ward routine was intended. The registered nurse in charge of the ward was informed by the Matron about the proposed study in her unit and was provided with a time-table similar to that of the research assistants. The patients on whom the nursing skills were performed, were selected by the researcher on the morning before commencement of the practice session. A full explanation was given to the patient by the researcher and a verbal agreement on the part of the patient implied permission to carry out the nursing skill.

3.8 THE PILOT STUDY

A pilot study was conducted using ten (10) first year student nurses who registered for the Diploma in Nursing Science and Midwifery in the year preceding the study. These subjects possessed similar characteristics to those used for the major study. Two research assistants were employed, each being assigned to a group of five students. The nursing skills selected for the pilot study were: BP and PPC. One group practised in the college laboratory and the other group in the patient care setting. Research assistants were rotated between the two groups, with the researcher acting as co-observer at each practice session. As a result of the pilot study the following changes were brought about:

- the third nursing skill, namely taking of temperature, pulse and respiratory rate was introduced. The same procedure (described in the methodology) was applied for skill selection.
- the time limit of one week, for the evaluation of psychomotor learning in the patient care setting, was reduced to two days. This meant that the subject had to be evaluated immediately during her FIRST TWO DAYS of being allocated to the patient care setting in order to minimize the influence of intervening variables. This was also a precautionary measure to exclude the

possibility of extra practise to attain competency which the student might not have attained with only the predetermined number of practice sessions.

The major study could only be implemented one year after the pilot study because of the current student intake policy at the institution.

3.9 DATA COLLECTION

Information relating to the three nursing skills was given by means of a lecture - demonstration to all the subjects simultaneously on three consecutive days during the first week of the semester block. Data collection took place in two phases viz. phase 1 and phase 2.

3.9.1 PHASE 1

During this phase, data on students' knowledge were collected by administering tests that contained MCQ's pertaining to the nursing skills, TPR, BP and PPC. The tests were given during the semester block according to the teaching timetable. A pretest was administered immediately before the subjects received information related to the aforementioned nursing skills through a lecture - demonstration (LD). The purpose of the pretest was to determine the knowledge base already possessed by the subjects and to equate

groups A and B in terms of their knowledge level. A posttest, containing the same items as the pre-test was administered immediately after the lecture - demonstration, to assess their cognitive gains in each of the three skills (hereafter called posttest 1). After receiving an initial lecture - demonstration, students were given the opportunity to practise these skills in their previously assigned groups. For manageable purposes, subjects were further assigned to eight groups of five each. A research assistant was in control of each of the five students during a practice session. While the assistants rotated between the student groups at each different practice session, the groups themselves remained permanent throughout the study. Practice sessions were scheduled on four consecutive Friday afternoons from 13:00 to 16:00. During this time period, students were instructed to practise each skill at least once. The purpose of the research assistant was to supervise each individual student, giving meaningful, constructive feedback and guidance during skill performance. To collect data on the psychomotor performance, direct observation (with checklists) was used during the fourth (final) practice session. The research assistants evaluated the

students' performance, during a return demonstration, in each of the aforementioned nursing skills. The appropriate checklists were completed and handed to the researcher on the same day. The final practice session marked the end of their semester block after which they were allocated to their respective patient care areas.

3.9.2 PHASE 2

This phase of data collection was done during the first two days of the students being allocated to the patient care setting in order to control the influence of extraneous variables on the students' performance. Students were evaluated once again by the research assistants, using the same checklists for the nursing skills being studied. This phase of data collection enabled the researcher to compare the two groups' psychomotor performance in the patient care setting. To compare their cognitive performance, the second posttest (posttest 2) could be administered for practical reasons, only 8 weeks later when both groups returned to the college. The researcher acknowledges this factor as a limitation to the study.

Table 3.3 reflects activities during the data collection phase.

TABLE 3.3 Evaluation, activities, phases and techniques

TIME		TEACHING - LEARNING VENUE	STUDENT ACTIVITY	TARGET GROUP	EVALUATION	
					Domain	Instrument
WEEK 1	day 2	Classroom and College Laboratory	TPR L-D by Tutor A	Group A (n = 20) and Group B (n = 20)	Knowledge (written test)	TPR Pretest & Posttest 1
	day 3		BP L-D by Tutor B			BP Pretest & Posttest 1
	day 4		PPC L-D by Tutor C			PPC Pretest & Posttest 1
WEEK 2 ↓ WEEK 4	day 5	Setting A (College Laboratory)	Supervised practices: - TPR - BP - PPC	Group A (4 groups of 5)	psychomotor (practical)	no formal evaluation
		Setting B (Medical wards)		Group B (4 groups of 5)		
WEEK 5	day 5	Setting A	Student return demonstrations: - TPR - BP - PPC	Group A (4 groups of 5)	psychomotor (practical)	Phase 1 Structured checklists
		Setting B		Group B (4 groups of 5)		
WEEK 6	day 1 or day 2 (depends on duty roster)	Setting B (different to practice setting)	Student return demonstrations: - TPR - BP - PPC	Group A and Group B	psychomotor (practical)	Phase 2 structured checklists
WEEK 14	day 1	Classroom	In College for semester block	Group A and Group B	Knowledge (written test)	TPR Posttest 2
						BP Posttest 2
						PPC Posttest 2

3.10 ETHICAL CONSIDERATIONS

In an attempt to conform to the moral, ethical and legal standards of a scientific investigation, certain procedures were embarked upon prior to the major study. These can be described as follows:

- the Study involved the direct use of human subjects and required clearance of the research protocol by the Committee for Research on Human Subjects. A copy of the clearance certificate can be seen in Appendix K.
- Written informed consent was obtained from subjects (students) through the attached consent form (Appendix L).
- informed consent was obtained from the patient on whom the nursing skills were performed. A verbal agreement on the part of the patient, implied permission to perform the nursing skills.
- application was made to the Superintendent of the local Hospital for permission to conduct research in the medical wards of the hospital (Appendix M).
- application was made to the Matron-in-charge of patient care via the Chief Matron to permit subjects of Group B to practise nursing skills on designated patients in the medical wards (Appendix N).

- permission from the Principal to use the college laboratory for Group A, was obtained verbally and confirmed on a weekly basis during the research project.
- research assistants were recruited on a voluntary basis, provided they fulfilled the selection criteria. Their willingness to participate, implied consent and their continuance was guaranteed by financial remuneration in accordance with current rates specified by the local University.

3.11 SUMMARY

This chapter addressed the research and sampling methods for the purpose and nature of this study. Data collection techniques were discussed with special emphasis on the development of instruments used and the role of the research assistants. The research setting was delineated with application to the procedures employed in each area. Significant changes in the major study, as a result of the pilot study were described as well as the ethical issues pertinent to the Study. Reliability and validity of the instruments used were discussed, however statistical analysis thereof was not dealt with in this chapter.

CHAPTER 4

ANALYSIS OF DATA

4.1 INTRODUCTION

All data collected from subjects were hand sorted and categorised into the three nursing skills being studied; group A and group B data being kept separately. Research data were summarised using descriptive statistics. To test the null hypotheses, inferential statistics were used. The data were presented in two classes, in accordance with the two domains of learning that were studied:

- data related to the psychomotor performance of subjects were analysed using descriptive and inferential statistics followed by
- an analysis of data related to the cognitive performance (knowledge level) of subjects.

4.2 ANALYSIS OF DEMOGRAPHIC DATA

Although not consistent with the purpose of the research, it was intended to collect and analyse demographic variables of the sample, to assess their possible effect on the research findings. This data comprised age, gender, type of school (public or private) and level of senior certificate expressed in symbol aggregate. The mean ages for group A and B were 19 and 19,5 respectively. Female students comprised 98 % of the sample; the only

male student belonging to group B. Subjects who have attended public schools constituted 95 % of the sample and the remaining 5 % (which belonged to group A) attended private schools. Fifteen percent of students in group A obtained an overall C-symbol (60-69%) on school leaving as opposed to 5% in group B. Both groups had an equal number of D-symbols (50-59 %), constituting 35 % of the subjects. Fifty percent of students in group A and 60 % in group B obtained an overall E symbol (40 - 49 %) matriculation certificate.

Consult table 4.1 for an analysis of demographic data in both Group A and Group B. (N = 20 for each group).

TABLE 4.1 DEMOGRAPHIC VARIABLES OF THE SAMPLE

DEMOGRAPHIC VARIABLES										
SUBJECTS	MEAN AGE	GENDER		TYPE OF SCHOOL		LEVEL OF SENIOR CERTIFICATES				
		FEMALE	MALE	PUBLIC	PRIVATE	A	B	C	D	E
Group A	19	20	0	18	2	-	-	3	7	10
Group B	19,5	19	1	20	0	-	-	1	7	10

4.3 STATISTICAL ANALYSIS OF INSTRUMENT VALIDITY AND RELIABILITY

4.3.1 INSTRUMENTS FOR PSYCHOMOTOR SKILLS

As discussed previously, a 4-point ordinal Likert grading scale was used to calculate the index of content validity (CVI). The key to the grading scale was as follows:

1 = standard not applicable

2 = standard not clear, application questionable, possibly reword

3 = standard applicable

4 = standard most applicable and well formulated.

A mean score of the respondents' grading for each item (standard) was calculated to obtain the CVI. According to Lynn (1986 : 335), an item is valid when it obtains an average CVI of 3,0 - 4,0; content validity being dependent upon the degree of consensus between the respondents. For the purpose of this study, a mean CVI of 3,3 - 4,0 was used to accept an item as valid. To determine the degree of consensus between the respondents, the standard deviation (SD) was calculated.

4.3.1.1 MEASUREMENT OF TPR

This instrument consisted of 14 items. The validation results are shown in Table 4.2. All

items except 1.1 and 3.9 were accepted as valid. On account of their CVI of 2.83 and 3.33 respectively, these items were omitted from the instrument.

TABLE 4.2 VALIDATION RESULTS - ITEMS IN TPR CHECKLIST

	CVI	SD
1. ASSESSMENT:		
1.1 Identify the patient	2.83	0.753
1.2 Observe factors which may influence nursing action	3.66	0.516
2. PLANNING:		
2.1 Collect requirements	4.00	0
2.2 Inform patient about nursing action	4.00	0
3. IMPLEMENTATION:		
3.1 Ensure that Hg column is below 35 C	3.66	0.516
3.2 Place thermometer under patient's tongue	4.00	0
3.3 Place middle & index finger lightly over radial pulse	3.83	0.408
3.4 Count accurately the number of pulsations for 1 minute	3.82	0.408
3.5 Count accurately the number of breaths for 1 minute	4.00	0
3.6 Remove thermometer after 2 minutes	3.83	0.409
3.7 Wipe off with swab from distal end to bulb	3.50	0.548
3.8 Read temperature from themometer accurately	4.00	0
3.9 Cleans thermometer	3.33	0.516
4. RECORDING		
4.1 Complete record accurately	4.00	0

4.3.1.2 MEASUREMENT OF ARTERIAL BP

The validation results of each of the 23 items of the instrument are shown in Table 4.3. Items 1.1 and 3.12 were rejected because of their low CVI. (CVI = 3.33 and 2.66 respectively).

TABLE 4.3 VALIDATION RESULTS: ITEMS IN BP CHECKLIST

	CVI	SD
1. ASSESSMENT		
1.1 Identify the patient	3.33	0.516
1.2 Check nursing prescription	3.50	0.548
1.3 Observe factors which influence nursing action	3.50	0.548
2. PLANNING:		
2.1 Inform patient about nursing action	4.00	0
2.2 Collect requirements	4.00	0
2.3 Place baumanometer on horizontal surface	3.83	0.400
2.4 Position patient comfortably	4.00	0
3. IMPLEMENTATION:		
3.1 Expose upper arm	3.50	0.548
3.2 Extend arm with palm facing upwards	4.00	0.548
3.3 Position/support arm at heart level	3.66	0.516
3.4 Apply cuff correctly by:	4.00	0
a) placing rubber bag over upper brachial artery	3.66	0.516
b) approximately 2cm above the antecubital space	3.83	0.408
3.5 Palpate brachial/radial pulse	3.83	0.408
3.6 Obtain preliminary systolic BP	4.00	0
3.7 Position stethoscope firmly over brachial artery in antecubital space	4.00	0
3.8 Reinflate cuff +/- 20mmHg above systolic BP	3.83	0.408

	CVI	SD
3.9 Deflate cuff at rate of +/- 2mmHg per second	3.50	0.548
3.10 Obtain systolic BP accurately	4.00	0
3.11 Obtain diastolic BP accurately	4.00	0
3.12 Dissemble the apparatus	2.66	0.516
3.13 Assist patient with comfort	3.50	0.548
4. RECORDING:		
4.1 Record BP accurately	4.00	0

4.3.1.3 PRESSURE PARTS CARE

This instrument consisted of 20 items of which one item was not accepted as valid. On the grounds of its CVI of 3.16, item 1.1 was eliminated from the instrument.

Consult Table 4.4 for the validation results.

TABLE 4.4 VALIDATION RESULTS - ITEMS IN PPC CHECKLIST

	CVI	SD
1. ASSESSMENT:		
1.1 Identify the patient	3.16	0.408
1.2 Check nursing prescription	3.66	0.516
1.3 Observe factors which influence nursing action	3.50	0.548
1.4 Assess bedlinen, bed attire etc	3.83	0.408
2. PLANNING:		
2.1 Inform patient about the nursing action	3.83	0.408
2.2 Collect basic requirements	4.00	0
2.3 Collect additional requirements	3.66	0.516
2.4 Prepare environment by:	3.83	0.408
a) closing nearby window/door	3.66	0.516
b) removing bed accessories onto chair/stool	3.83	0.408
c) fold bedlinen down, except bunny blanket	3.83	0.408
3. IMPLEMENTATION:		
3.1 Screen the bed	3.83	0.408
3.2 Position patient laterally or according to assessment	3.66	0.516
3.3 Expose only pressure points to be attended to	3.83	0.408
3.4 Attend to appropriate pressure points	4.00	0
3.5 Dry skin thoroughly	4.00	0
3.6 Attend to bedlinen appropriately	3.83	0.408
3.7 Reposition patient comfortably	4.00	0
3.8 Replace bed accessories and other aids	3.83	0.408
4. EVALUATION:		
4.1 Evaluate patients comfort	3.66	0.516
4.2 Record/report appropriately	4.00	0

4.3.2 INSTRUMENTS FOR COGNITIVE SKILLS

Statistical analysis of reliability of items comprising the MCQ's addressed the two elements item difficulty and item discrimination. To determine the difficulty of an item, student scores were ranked in descending order (N = 39). The number of correct responses from both the upper and lower thirds of the ranked scores were added and then divided by the total number of responses in the analysis (N = 26). Using Nunnaly's criteria as discussed in Chapter 3, an item is reliable in terms of its degree of difficulty, when it has a range of 35 % - 80 % or 0.35 - 0.80. The index of item discrimination was determined by subtracting the number of correct responses in the lower third from the number of correct responses in the upper third. This value was then divided by one half the total number of scores in the analysis (N = 13). A discrimination index may range from -1 to +1. The higher the index, the more discriminating the item. An index of 0, indicates that the item does not discriminate and it can therefore be accepted that an index higher than 0 renders an item statistically reliable. (Jenkins and Michael, 1986 : 12).

TABLE 4.5 ITEM ANALYSIS FOR MCQ ON TPR

	ITEM NUMBER		INDEX OF DIFFICULTY		INDEX OF DISCRIMINATION
	1.		0.50		0.4
	2.		0.41		0.2
	3.		0.52		0.3
	4.		0.50		0.4
	5.		0.66		0.3
	6.		0.77		0.3
	7.		0.56		0.4
	8.		0.58		0.4
	9.		0.75		0.5
	10.		0.70		0.5
	11.		0.73		0.4
	12.		0.63		0.4
	13.		0.64		0.4
*	14.	*	0.86		0.1
*	15.		0.68	*	0

Item 14 in Table 4.5 can be regarded as an easy item because of its high value of 0.86 or 86 % . It also discriminates marginally poor (index = 0.1) between students' higher and lower scores. Item 15 has a good index of difficulty, however it does not discriminate. If an item does not discriminate, its index of difficulty is of little value (Jenkins and Michael, 1986: 12). Both items 14 and 15 were subject to revision.

TABLE 4.6 ITEM ANALYSIS FOR MCQ ON BP

	ITEM NUMBER		INDEX OF DIFFICULTY		INDEX OF DISCRIMINATION
	1.		0.61		0.2
	2.		0.76		0.3
	3.		0.60		0.2
*	4.		0.45	*	0
	5.		0.45		0.4
	6.		0.45		0.3
	7.		0.66		0.3
*	8.	*	0.89		0.1
	9.		0.56		0.3
	10.		0.63		0.5
	11.		0.65		0.4
	12.		0.72		0.5
	13.		0.70		0.3
	14.		0.78		0.3
*	15.	*	0.96		0.1

Item 4 in the above table does not discriminate between higher and lower scores, even though it has a fairly good index of difficulty (0,45). Item 8 and 15 discriminates marginally poor (indices = 0,1) and have poor indices of difficulty as reflected in the high percentage of student's choice (89 % or 0,89 and 96 % or 0,96) respectively. These three items were reviewed.

TABLE 4.7 ITEM ANALYSIS FOR MCQ ON PPC

	ITEM NUMBER	INDEX OF DIFFICULTY	INDEX OF DISCRIMINATION
	1.	0.75	0.2
	2.	0.70	0.3
	3.	0.77	0.4
	4.	0.77	0.2
	5.	0.68	0.5
	6.	0.63	0.5
	7.	0.43	0.5
	8.	0.66	0.3
*	9.	* 0.83	0.2
	10.	0.63	0.2
	11.	0.63	0.4
	12.	0.71	0.4
	13.	0.72	0.4
	14.	0.74	0.3
	15.	0.68	0.3

On the basis of Nunnaly's criteria, item 9 in table 4.7 was reviewed in terms of its degree of diffi . Its high index of difficulty (83 % or 0,83) renders item 9 an easy item, even though it discriminates between high and low student scores.

4.4 ANALYSIS OF RESEARCH DATA

Non-parametric statistics namely the Mann-Whitney U test was used to determine whether the one group has significantly higher scores than the other in their psychomotor and cognitive abilities. Each hypothesis was tested by means of a t-test for signigicant differences between the group means. All comparisons were evaluated by a two-tailed test since the hypotheses were non-directional. The

level of statistical significance had been set at 0,05. A summary of data on psychomotor and cognitive performance is presented in Tables 4.8 to 4.12.

4.4.1 ANALYSIS OF PSYCHOMOTOR PERFORMANCE

Data on psychomotor performance are presented in table 4.8 and figures 4.1 and 4.2.

The mean scores for TPR, BP and PPC were calculated for Group A and Group B in setting A and setting B respectively. There were no significant differences between the groups with reference to TPR and PPC during phase 1 and phase 2. However, the skill BP measurement reflected a significantly higher mean score in group A during phase 1 in setting A ($U = 110,5$; $p < ,05$). The high score by Group A could possibly be explained by the relative absence of dynamic patient factors such as arm width, position in bed and other environmental stimuli with which the student in the simulated setting has to contend. Thus selective attention was less complex and more confined to the subskills of BP measurement. However, when both group A and B were assessed in the patient care setting during phase 2, they reflected similar mean scores of 72 and 74 respectively, group B improving from a mean score of 60.

During phase 2, Group B obtained higher mean scores in all three skills when assessed in setting B. However, these differences were not statistically significant ($p > ,05$). Consult table 4.8 and figure 4.2.

TABLE 4.8 COMPARISON OF PSYCHOMOTOR PERFORMANC

PSYCHOMOTOR SKILLS	MEAN SCORES		U-VALUE	P-VALUE
	GROUP A	GROUP B		
TPR				
Phase 1	75,4	69,8	183,0	0,634
Phase 2	78,5	85,7	234,5	0,335
BP				
Phase 1	78,4	60,5	110,5	0,013 *
Phase 2	71,6	74,0	203,0	0,933
PPC				
Phase 1	71,3	74,8	235,0	0,334
Phase 2	75,0	84,5	241,0	0,263

Results of the t-tests performed on the mean psychomotor scores in phase 1, indicated no significant differences between Group A and Group B for all three skills ($df = 38$; $p > ,05$). Similarly, t-test results were not significant in phase 2 with reference to the group mean psychomotor scores. ($df = 38$; $p > ,05$). Consult table 4.9.

TABLE 4.9 MEAN PSYCHOMOTOR SCORES: STANDARD DEVIATION & t-TEST RESULTS

PHASES AND GROUPS	PSYCHOMOTOR SKILLS								
	TPR			BP			PPC		
	M	SD	t	M	SD	t	M	SD	t
Phase 1									
Group A	75,4	27,8	0,57	78,4	26,1	2,07	71,3	23,3	0,54
Group B	69,8	27,8		60,5	26,2		74,8	24,1	
Phase 2									
Group A	78,5	25,3	-0,95	71,6	27,1	-0,25	75,0	24,1	-1,52
Group B	83,7	21,3		74,0	25,6		84,5	17,6	

M = Mean
SD = Standard Deviation
t = t-test results

TABLE 4.9 MEAN PSYCHOMOTOR SCORES; STANDARD DEVIATION & t-TEST RESULTS

PHASES AND GROUPS	PSYCHOMOTOR SKILLS								
	TPR			BP			PPC		
	M	SD	t	M	SD	t	M	SD	t
Phase 1									
Group A	75,4	27,8	0,57	78,4	26,1	2,07	71,3	23,3	0,54
Group B	69,8	27,8		60,5	26,2		74,8	24,1	
Phase 2									
Group A	78,5	25,3	-0,95	71,6	27,1	-0,25	75,0	24,1	-1,52
Group B	85,7	21,3		74,0	25,6		84,5	17,6	

M = Mean
SD = Standard Deviation
t = t-test results

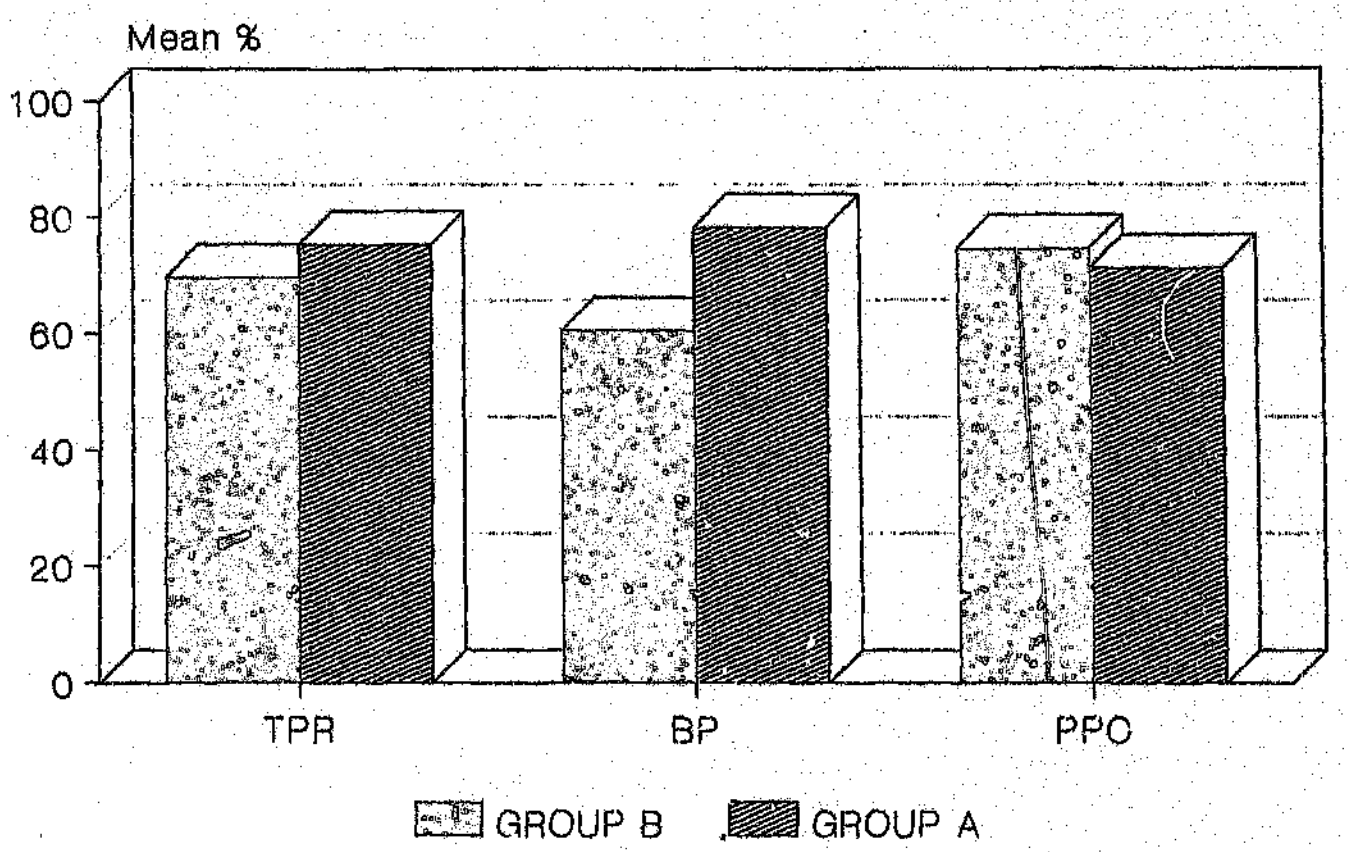


FIGURE 4.1 MEAN PSYCHOMOTOR PERFORMANCE IN ORIGINAL PRACTICE SETTINGS (PHASE I)

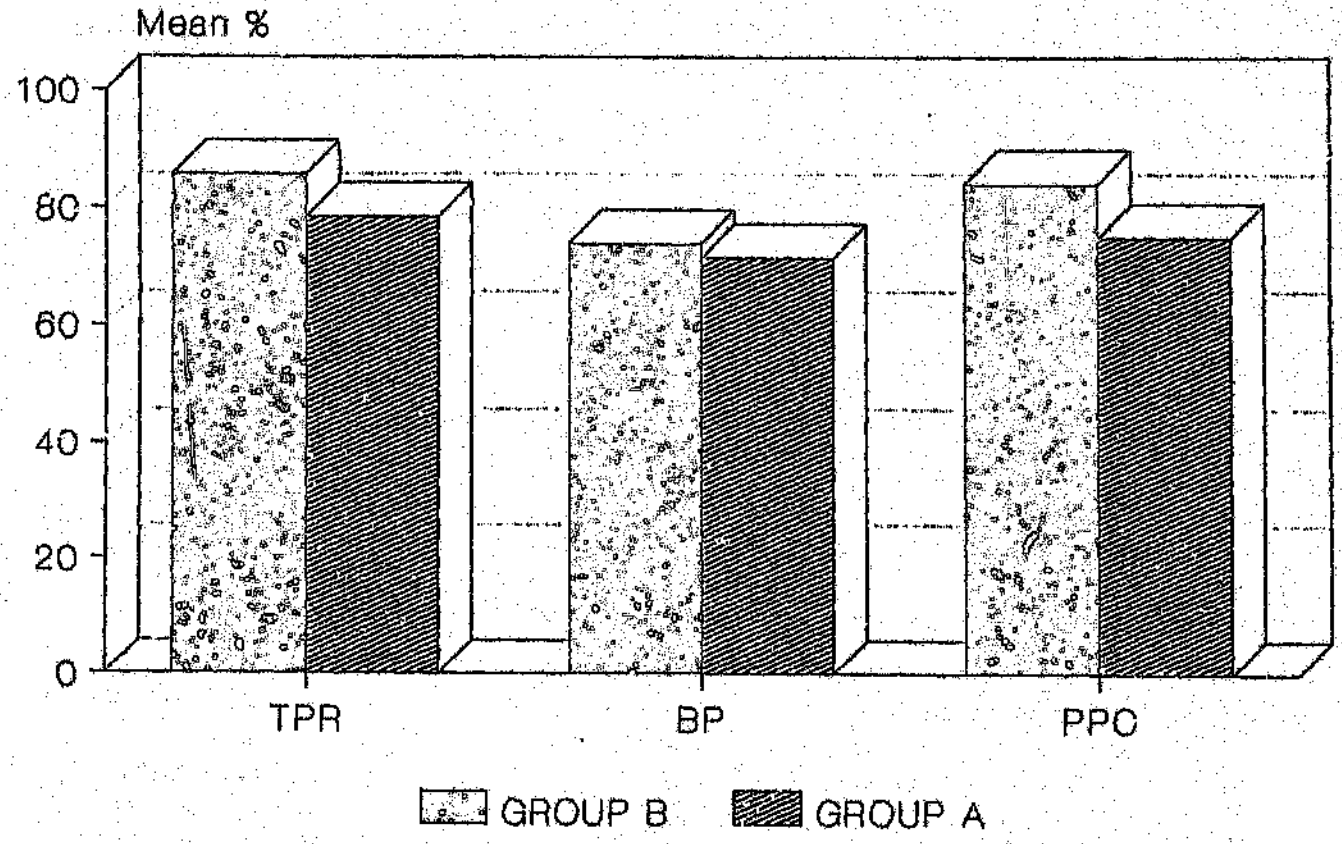


FIGURE 4.2 MEAN PSYCHOMOTOR PERFORMANCE IN PATIENT CARE SETTING (PHASE 2)

4.4.2 ANALYSIS OF COGNITIVE PERFORMANCE

The initial knowledge base of the two groups were assessed using the pretests. Table 4.10 and figure 4.3 reflect the mean scores for each of the skills being studied. There was a significant difference in the TPR knowledge base; Group A showing a better performance (U = 118,0; p < ,05). In the TPR posttest 1 there was a significantly better performance by group A (U= 114,0; p < ,05). Also this group performed slightly better in the BP and PPC posttests as reflected in their means, nowever this difference was not statistically significant (p > ,05). Consult table 4.10 and figure 4.4 for the group mean in posttests 1.

Figure 4.5 reflects the mean scores of both groups when posttest 2 was administered eight weeks later. The TPR and PPC posttest 2 results for Group A showed slightly higher mean scores, but these were not statistically significant (p > ,05). The mean BP posttest 2 scores for Group A and Group B were 53.7 and 49.1 respectively with p = ,002. Group A thus had a significantly better cognitive performance than Group B. Of great concern, is the low range of scores (49 % - 57 %) in the second posttests for all three skills. Statistical analysis of their index of difficulty, rendered all three tests reliable and therefore these tests were not too difficult.

TABLE 4.10 COMPARISON OF COGNITIVE PERFORMANCE

COGNITIVE SKILLS	MEAN SCORES		U-VALUE	P-VALUE
	GROUP A	GROUP B		
TPR				
Pretest	27,0	19,3	118,0	0,026 *
Posttest 1	44,2	34,6	114,0	0,019 *
Posttest 2	53,3	50,2	147,5	0,154
BP				
Pretest	12,7	10,7	182,5	0,634
Posttest 1	33,0	31,4	156,5	0,238
Posttest 2	53,7	49,1	87,5	0,002 *
PPC				
Pretest	19,7	21,5	212,5	0,734
Posttest 1	48,0	47,0	189,5	0,776
Posttest 2	57,3	56,2	188,0	0,744

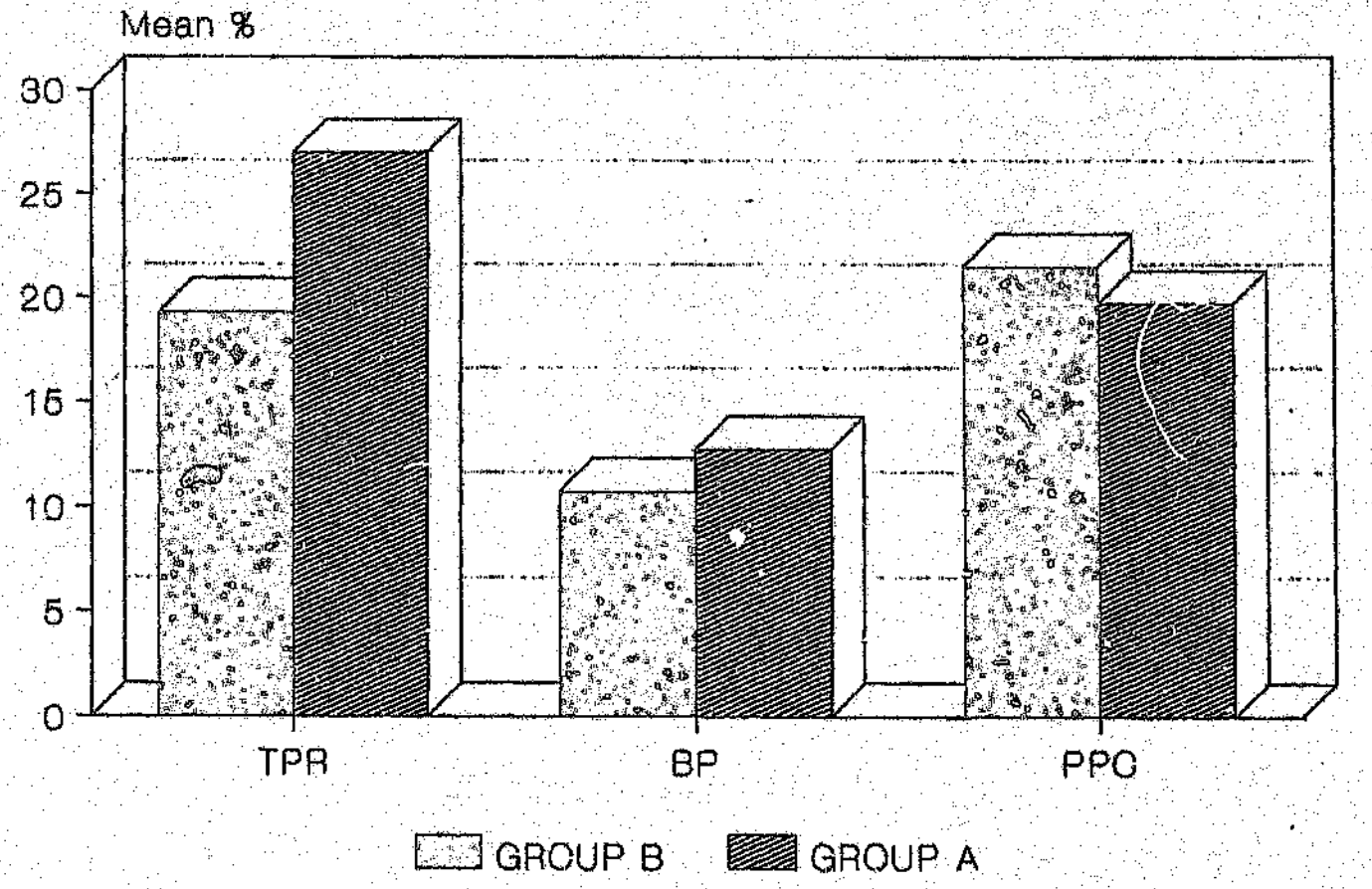


FIGURE 4.3 MEAN PRETEST SCORES

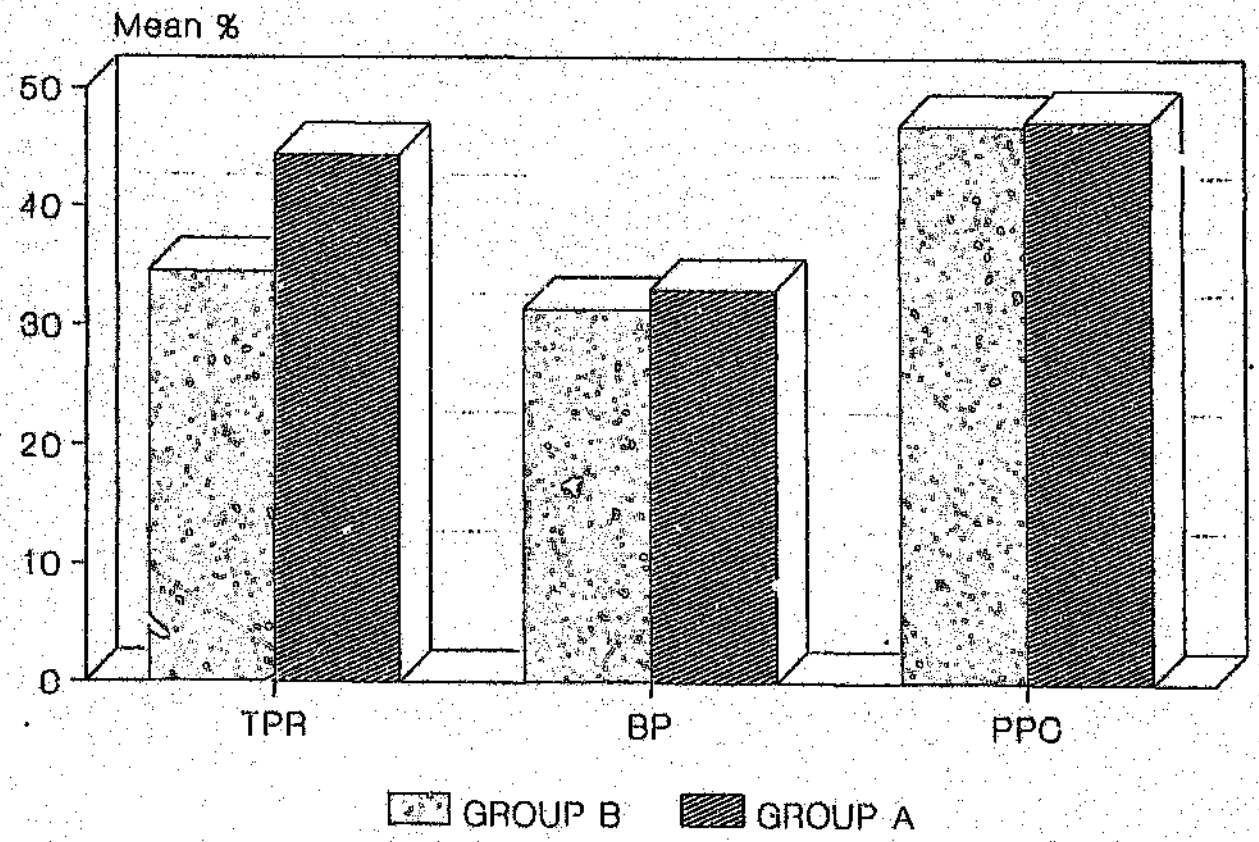


FIGURE 4.4 MEAN POSTTEST 1 SCORES

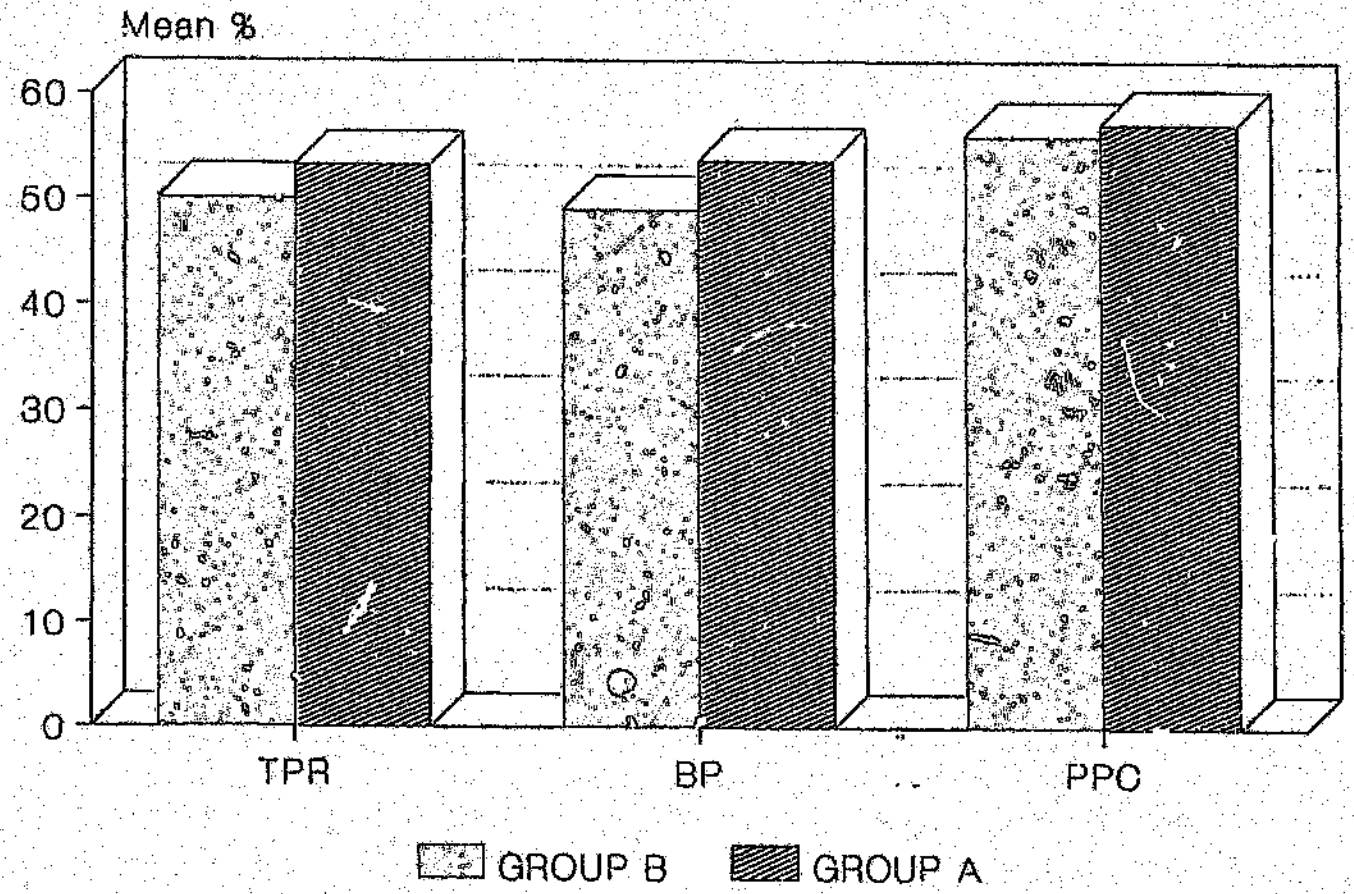


FIGURE 4:5 MEAN POSTTEST 2 SCORES

Table 4.11 reflects results of t-tests performed on the mean cognitive scores of subjects' performance in TPR, BP and PPC. Results of the t-test for three cognitive variables (TPR pretest, TPR posttest 1 and BP posttest 2) showed a significant difference between the groups; the t-values being 2.42, 2.50 and 2.70 respectively. The remaining six cognitive variables showed no significant difference between the groups.

4.5 DISCUSSION OF RESULTS

The major findings of the study were as follows:

- there was no significant difference between the groups in psychomotor learning.
- there was no significant difference between group A and group B in cognitive learning.

The hypotheses were stated as follows:

- Hypothesis I

  There will be no significant difference in the performance of selected psychomotor skills by nursing students who practise in setting A and setting B.

- Hypothesis II

  There will be no significant difference in skill-related knowledge by nursing students who practise in setting A and setting B.

In terms of the first null hypothesis, results of the statistical test fell short of significance to support the hypothesis. Hypothesis I was therefore

TABLE 4.11 MEAN COGNITIVE SCORES: STANDARD DEVIATION & t-TEST RESULTS

TESTS AND GROUPS	COGNITIVE SKILLS								
	TPR			BP			PPC		
	M	SD	t	M	SD	t	M	SD	t
Pretest									
Group A	27,0	10,4	2,42	12,7	10,2	0,68	19,7	9,2	-0,58
Group B	19,3	10,6		10,7	8,3		21,5	10,8	
Posttest 1									
Group A	44,2	10,5	2,50	33,0	6,8	0,55	48,0	10,4	0,31
Group B	36,4	12,1		31,4	9,3		47,0	9,7	
Posttest 2									
Group A	55,3	8,3	1,05	53,7	3,4	2,70	57,3	7,4	0,50
Group B	50,2	9,6		49,1	6,7		55,2	6,5	

M = Mean
SD = Standard Deviation
t = t-test results

accepted ($p > ,05$). Although three out of nine cognitive variables showed a significant difference the t-test results were inadequate to reject the second null hypothesis. On this basis, hypothesis II too, was accepted ($p > ,05$).

4.7 ADDITIONAL FINDINGS

Although not consistent with the research questions, within - group comparisons were made to determine whether learning had taken place in either of the groups. The apparently wide range in the difference of the psychomotor mean scores of Group B in particular, has prompted this comparison. The t-test was applied to determined whether the amount of learning in each group was significant. With reference to TPR, Group B who practised in the patient care setting, learnt significantly more ($t = 2.357$; $df = 19$; $p < ,05$) than Group A ($t = 0.422$; $df = 19$; $p > ,05$). With reference to the skill BP and PPC, neither of the groups learnt significantly, although the trend observed in Group B was in the direction of significance (see table 4.12).

TABLE 4.12 WITHIN-GROUP COMPARISON: PSYCHOMOTOR LEARNING

SKILLS	GROUP A			GROUP B		
	D.M.	S.E.M.	t	D.M.	S.E.M.	t
TPR	15,85	6,72	2,357	3,10	7,34	0,422
BP	14,50	7,34	1,975	-6,75	9,18	0,735
PPC	9,75	6,49	1,502	3,65	7,46	0,489

DM = difference in means (phase 1 & 2)
S.E.M. = standard of the mean
t = t-test result

4.7 SUMMARY

Statistical methods used to analyse data and to test the null hypotheses were discussed in this chapter. Data on instrument validity and reliability and the statistical analysis thereof were tabulated, followed by a brief discussion of items not accepted as valid or reliable. Cognitive and psychomotor data obtained from the two groups were analysed, tabulated and discussed with reference to significant findings differentiating the two groups. The major findings were described in relation to the null hypotheses.

CHAPTER 5

SUMMARY, IMPLICATIONS, RECOMMENDATIONS, LIMITATIONS AND CONCLUSION

5.1 SUMMARY

While the use of the college laboratory has to a large extent facilitated the teaching - learning process, the environmental contrast when compared with the patient care setting is an important consideration. The college laboratory offers a well-controlled, static learning environment where nursing students can practise mainly their psycho-motor skills with less emotional and ethical stress. The patient care setting on the other hand, is dynamic with uncontrolled factors and contraints which may influence skill learning. When planning practice sessions for skill learning, the environmental setting in which the skill eventually will be performed, must be taken into account (Gomez and Gomez, 1987:20). Using Gentile's (1972:3) open and closed motor skills theory as premise, the same authors state that skills performed in a dynamic, varied environment (open skills) such as the patient care setting, require a different practice setting as compared to skills performed in stable, unchanging environments (closed skills). Since most nursing skills are categorised as open skills, it is essential that

the practice setting closely resembles the eventual area for nursing care. It is therefore incumbent upon nurse educators to include essential clinical environmental factors in the college laboratory as a practice setting. But is this at all possible? As an alternative response, it seemed more appropriate and practical to study the performance of psychomotor and cognitive skills in these two different practice settings namely, the college laboratory (simulated practice setting) and the patient care setting (non-simulated practice setting).

5.1.1 PURPOSE

The purpose of this study was to investigate the effect of practice setting on clinical learning among first year student nurses. Two practice settings, namely the college laboratory (Setting A) and the patient care setting (Setting B) were utilized, to assess and compare students' performance in cognitive and psychomotor nursing skills. These nursing skills were randomly selected for the study in accordance with the first year curriculum. Hence the students' performance in the skills TPR, BP and PPC were assessed in the college laboratory and the patient care setting. In so doing, this study addressed the following research questions:

- do students who practise in the college laboratory (Setting A) perform psychomotor skills at a significantly higher level than those who practise in the patient care setting (Setting B)?
- does the level of skill-related knowledge differ between students who practise in setting A and setting B?

5.1.2 HYPOTHESES

Given two groups of students (group A in Setting A and group B in Setting B), two hypotheses were developed:

- Hypothesis I

  There will be no significant difference in the performance of selected psychomotor skills by nursing students who practise in setting A and setting B.

- Hypothesis II

  There will be no significant difference in skill-related knowledge by nursing students who practise in setting A and setting B.

5.1.3 METHODOLOGY

This study necessitated a descriptive multi-method design involving:

- instrument development and validation

- reliability testing of instruments
- data collection by direct observation and written tests using the above mentioned instruments.

5.1.3.1 SUBJECTS

The subjects were 40 first year student nurses (from a population of 42), registered for the Diploma in Nursing Science (general, community, psychiatric) and Midwifery at a Nursing College. Subjects with prior nursing experience were excluded from the sample. The subjects were randomly assigned to group A or group B to practise their nursing skills in setting A and setting B respectively (N = 20 for each group). Each group in turn formed 4 subgroups of 5 students; each subgroup being supervised by a trained research assistant during practise. The subjects demographic data were as follows: mean age = 19, female = 98 % of sample, 95 % attended public schools versus private schools. The groups' academic achievement on school leaving was as follows:

15 % in group A obtained an overall C-symbol (60 - 69 %) as opposed to 5 % in group B.

35 % of both groups obtained a overall D-symbol (50 - 59 %).

50 % of group A and 60 % of group B obtained an overall E-symbol (40 - 49 %) matriculation certificate.

5.1.3.2 RESEARCH SETTINGS

(a) The classroom

A classroom, equipped with desks and chairs for approximately 80 students, was used to assess the cognitive component of learning. Here, subjects were required to complete the pretest and posttests, and submit it to the researcher before leaving the classroom.

(b) The college laboratory (Setting A)

This setting consisted of 4 rooms fitted with necessary equipment and 3-D models on which the subjects practised PPC. The skills BP and TPR were practised on fellow students who posed as simulated patients. The college laboratory was used for practise by group A.

(c) The patient care setting (Setting B)

This setting comprised 4 medical wards in the campus hospital and were used by subjects in group B. These wards were selected because of their environmental uniformity they present for each of the 5 subgroups of students. Also, the nursing

skills being studied were routinely performed in these wards, thus no disruption of patient care and ward routine was intended.

5.1.3.3 INSTRUMENTS

(a) Psychomotor skills

All nursing skills to be taught during the subjects' first semester block (week 1) were categorized as either open or closed skills. Three skills were randomly selected from those classified as open skills. These were: measurement of temperature, pulse rate and respiratory rate (TPR), measurement of arterial blood pressure (BP) and pressure parts care (PPC).

Instrument development and validation culminated in checklists, which were used to assess the subjects' psychomotor performance in the aforementioned nursing skills.

The choice of a checklist as opposed to a 5-point rating scale, was to reduce bias and subjectivity which were inherent in the evaluation tools used at the time of this research. The format of the instrument was based on the nursing process, incorporating the phases of

assessment, planning, implementation and evaluation. (See appendix E, F and G). Content validity of the instruments was based on recent literature and the expert judgement of five clinical tutors. Statistical analysis of items in the check lists was done using a 4-point ordinal Likert grading scale to calculate the index of content validity (CVI). A mean CVI of 3.5 - 4.0 was used to accept an item as valid. Reliability testing of the instruments involved the characteristics stability, equivalence and internal consistency. The test - retest method, interrator testing and the split-half method were used to assess the above characteristics respectively. A correlation coefficient (Pearson r) was calculated for each reliability test. A coefficient value above 0,70 rendered the instrument reliable.

(b) Cognitive skills

Objective tests comprising fifteen multiple choice questions (MCQ's),were compiled for each of the aforementioned skills to determine subjects' skill-related knowledge (Appendix H, I and J). The reason for

selecting MCQ's as opposed to other cognitive tests, was its suitability to assess factual recall and interpretation of data (Mitchell, 1988:7). Content validity was based on recent literature and discussions with experts in the setting of MCQ's at a local University.

Reliability was determined statistically by the test - retest method to assess stability and hand-calculated item analysis to assess item difficulty and item discrimination. A correlation coefficient of above 0.70 for each of the tests rendered the test reliable. A range of 0.35 - 0.80 was used to accept an item reliable in terms of item difficulty. A discrimination index between 0 and 1 was used to accept an item as reliable in terms of item discrimination.

5.1.3.4 PROCEDURE

A pilot study was done using subjects similar to those of the major study. As a result of the pilot study, the third nursing skill, namely measurement of temperature, pulse rate and respiratory rate (TPR) was introduced. All subjects simultaneously received information relating to the skills TPR, BP and PPC via a

lecture demonstration (LD) on three consecutive days during the first week of the semester block. However, assessment of their cognitive and psychomotor skills took place in their previously assigned groups in two distinct phases namely phase 1 and phase 2.

(a) Phase 1

Data on the subjects' knowledge base prior to the lecture demonstration (LD) were collected by means of a pretest (MCQ) for each nursing skill. Immediately after the LD, posttest 1 (same as pretest), was administered to assess their cognitive gains in each of the three nursing skills. After the LD, subjects were given the opportunity to practise these skills on four consecutive Friday afternoons in their respective groups; group A practised in setting A and group B practised in setting B. Each group formed 4 sub-groups of 5 which were each supervised by a trained research assistant. Data on the subjects' psychomotor performance were collected on the fourth practise during a return demonstration to the research assistant. Direct observation was used and appropriate checklists were completed simultaneously

by the research assistants. The final practice session marked the end of the subjects' semester block after which they were allocated to their respective patient care areas.

(b) Phase 2

To compare the psychomotor performance of group A and group B in the patient care setting (setting B), the same checklists were completed by the research assistants during the subjects' return demonstration. These data were collected during the first two days of the subjects being allocated to the patient care setting in order to control the influence of extraneous variables e.g. extra practice sessions, wrong learning etc.

To compare the subjects' cognitive performance, posttest 2 was administered 8 weeks later when both groups returned to the college.

5.1.3.6 RESULTS

The major findings of the study were as follows:

- there was no significant difference between the groups in psychomotor learning

- there was no significant difference between group A and group B in cognitive learning.

The hypotheses were stated as follows:

- Hypothesis I

  There will be no significant difference in the performance of selected psychomotor skills by nursing students who practise in setting A and setting B.

- Hypothesis II

  There will be no significant difference in skill-related knowledge by nursing students who practise in setting A and setting B.

In terms of the first null hypothesis, results of the statistical test fell short of significance to support the hypothesis. Hypothesis I was therefore accepted ($p > ,05$). Although three out of nine cognitive variables showed a significant difference, the t-test results were inadequate to reject the second null hypothesis. On this basis, hypothesis II too, was accepted ($p > ,05$). Additional findings of within-group comparison, indicated that Group B had learnt significantly more ($t = 2.357$; $df = 19$; $p < ,05$) than Group A ($t = 0.422$; $df = 19$; $p > ,05$) in psychomotor aspects of TPR. Although neither of the groups learnt

significantly in the skills BP and PPC, the trend observed in Group B was in the direction of significance. It is the researcher's assumption that the patient care setting could effect a significant amount of learning in a shorter period of time than the laboratory setting.

5.2 IMPLICATIONS AND RECOMMENDATIONS

With reference to Gentile's open and closed motor skills theory, acceptance of both null hypotheses holds several implications. In the first instance, the nursing skills used in the study were classified as "open skills" according to Gentile's theory Thus they are not suitable for practise in the college laboratory unless this setting closely mimics the patient care setting. Hence, the student learns to contend with all patient care factors incorporated into the college laboratory. The findings imply that the contemporary college laboratory does not differ significantly from the patient care setting provided it is equipped and utilized with the same determination as the patient care setting. The college laboratory thus has an important role in psychomotor learning and in particular, formative evaluation of such learning. Summative evaluation should ideally be conducted in the patient care setting by virtue of the humanis-

tic nature of nursing. While the above is practised only at certain educational institutions, it should be entrenched in the philosophy and curriculum of all institutions concerned with nursing education. This further implies the use of a taxonomy of student learning behaviours which reflect levels of competency to be reached in a specific practice setting. Levelling of learning behaviours similar to those of Anderson et. al. (1985:42), as discussed in Chapter 2, must be specified in the stage objectives of the educational institution and the study guide or clinical learning objectives of the student. With reference to the additional findings of this research, it is further recommended that a bigger sample be used to determine whether subjects learn significantly more in the patient care setting than in the college laboratory. By increasing the sample size to > 40, the standard error can be decreased. (In this research project, the sample was drawn from a total population of 42). The greatest challenge in clinical learning lies in the acquisition of affective nursing skills in simulated versus patient care settings. The affective domain is a significant force in nursing practice, for it provides for the humanistic expression of the theories and skills which are germaine to nursing (Reilly, 1980:54).

It is therefore a major recommendation of this study that the effect of practice setting on affective learning be researched in order to utilize the college laboratory without reservation.

5.3 LIMITATIONS AND DELIMITATIONS

The scope of this study has been delimited to the following:

Firstly, simulation has not been referred to in its broad context, but rather confined to the practice setting in which clinical learning takes place. Of relevance to this study, was the use of medical manikins and simulated patients in the college laboratory setting. Secondly, while the researcher acknowledges the three domains of learning namely, cognitive, affective and psychomotor, only cognitive and psychomotor learning were included in this study.

The affective skills should not be construed as irrelevant, but the measurement of all three was considered too complex and extensive for the scope of this study. In summary, the research was delimited to the current day "demonstration room" and clinical nursing units where cognitive and psychomotor skills of nursing students were practised and assessed. Limitations to this research varied from deficiencies inherent in most observational studies to restrictions imposed by curricular demands, time

limits and the number of nursing skills to be practised and assessed. The curriculum and classroom teaching programme coupled with the block system at the college, restricted the researcher in the selection of nursing skills and the number of practice sessions. Fundamental nursing skills taught during the first week of the semester block were randomly selected for the purpose of this study; the remaining four weeks being utilized for the one three - hour practice session per week. A further limitation, is the assessment of subjects' cognitive performance (during phase 2) after 3 weeks when the subjects returned to the college. Although its purpose was served, cognitive assessment would have been more meaningful in the patient care setting. In addition, the 8 week period may have contributed to poor retention of knowledge as reflected in the low range of scores (49 - 57 %) in the second posttests.

5.4 CONCLUSION

This chapter concludes the research report with a brief discussion of the major findings and its implications for nursing education at local level. Recommendations for further research in learning and evaluating affective nursing skills have been offered with specific reference to the effect of practice setting. Factors which placed limitations on the research project have been identified and described in this chapter. Delimitations to the scope of the study have been discussed and served as premise for the researcher's recommendations regarding affective learning.

REFERENCES

1. Alexander, M. 1983. Learning to nurse: Integrating theory and practice. Edinburgh: Churchill - Livingstone.

2. Anderson, B., Conklin, D., Watson, L., Hirst, S. and Hoffman, J. 1983. Psychomotor Skills for Baccalaureates. The Australian nurses journal, 15 (3): 40-43.

3. Bauman, K., Cook, J. and Larson, L. 1981. Using technology to humanize instruction: An approach to teaching nursing skills. Journal of nursing education, 20 (3): 27-31.

4. Beare, P. 1985. The clinical contract - an approach to competency-based clinical learning and evaluation. Journal of nursing education, 24(2): 75-77.

5. Bell, M. and Siklos, P. 1984. Recording blood pressure. Accuracy of staff and equipment. Nursing Times, 80 (7): 32-34.

6. Bell Meisenhelder, J. 1987. Anxiety: A block to clinical learning. Nurse educator, 12(6): 27-30.

7. Bell Meisenhelder, J. 1982. Clinical evaluation - An instructor's dilemma. Nursing outlook, 30 (6): 348-351.

8. Bitzer, M. 1966. Clinical nursing instruction via the Plato simulated laboratory. Nursing research, 15(2): 144-150.

9. Bradley, J. 1983. Nurses' attitudes towards dimensions in nursing practice. Nursing research. 32(2); 110-115.

10. Brink, H.I.L. 1987. Statistics for nurses. Pretoria: Academica.

11. Brink, H. 1988. Individual differences in learning or cognitive style. Nursing R.S.A. 3(1): 11-13.

12. Burns, K.A. 1984. Experience in the use of gaming and simulation as an evaluation tool for nurses. The journal of continuing education in nursing. 15 (6): 213-217.

13. Butterfield, S.E. 1983. In defence of the demonstration room. International nursing review. 30 (1): 15-20.

14. Cook, J.W. and Hill, P.M. 1985. The impact of successful laboratory system on the teaching of nursing skills. Journal of nursing education. 24 (8): 344-347.

15. Corcoran, S. 1977. Should a service setting be used as a learning laboratory? An ethical question Nursing outlook. 24 (12): 771-776.

16. Cottrell, B., Cox, B. and Kelsey, S. 1986. A clinical evaluation tool for nursing students based on the nursing process. Journal of nursing education. 25 (7): 270-274.

17. Cowan, D. and Wiens, V. 1986. Mock hospital: A pre-clinical laboratory experience. Nurse educator. 11 (5): 30-32.

18. Dahl, J. 1984. Structured experience: A risk-free approach to reality-based learning. Journal of nursing education. 23 (1): 34-37.

19. Davis, B. 1983. Research into nursing education. London and Canberra; Croom Helm Ltd.

20. Dolphin, P. and Holtzclaw, B. 1983. Continuing Education in nursing: strategies for lifelong learning. Reston, Virginia; Prentice Hall Company

21. Ehlers, V.J. 1988. Using everyday games. Nursing R.S.A. 3 (7): 38-41.

22. Evens, S. and Curtis, P. 1983. Using patient simulators to teach telephone communication skills to health professionals. Journal of medical education. 58 (11): 894-898.

23. Ewan, C. and White, R. 1987. Teaching nursing: A self-instructional handbook. London: Croom Helm Ltd.

24. Feldman, H. 1969. Learning transfer from programmed instruction to clinical performance. Nursing research. 18 (1): 51-54.

25. Flately Lunde, K. and Durbin Lafferty, E. 1986. Evaluating clinical competency in nursing. Nursing management. 17 (8): 47-50.

26. Foley, R. and Smilansky, J. 1980. Teaching techniques: A handbook for health professionals. New York: McGraw-Hill Book Company.

27. Forgan Morle, K.M. 1984. The problems in evaluating student nurses. Nurse education today. Longman Group Ltd.

28. Gass, D.A. and Curry, L. 1983. Physicians' and nurses'retention of knowledge and skill after training in cardiopulmonary resuscitation. Canadian medical association journal. 128(3): 550-551.

29. Gagne, R. 1985. Conditions of learning and theory of instruction. New York: Holt, Reinhart and Winston.

30. Gaston, S. 1980. Knowledge, retention and attitude effects of computer-assisted instruction. Journal of nursing education. 27 (1): 30-34.

31. Gennaro, S., Thielen, P., Chapman, N., Martin, J. and Barnett, D. 1982. The birth, life and times of a clinical evaluation tool. Nurse educator. 7 (1): 27-32.

32. Gentile, A.M. 1972. A working model of skill acquisition with application to teaching. Quest, 17 (1): 3-23.

33. Goldstone, L.A. and Goldstone, J. 1982. The Norton score: an early warning of pressure sores. Journal of advanced nursing, 7 (1): 419-426.

34. Gomez, G. and Gomez, E. 1987. Learning of psychomotor skills: Laboratory versus patient care setting. Journal of nursing education, 26 (1): 20-24.

35. Gomez, G. and Gomez, E. 1984. The teaching of psychomotor skills in nursing. Nurse educator, 9 (10): 35-38.

36. Griffiths, D.A. 1979. Use of 3-D models in medical education. Medical teacher, 1 (2): 76-81.

37. Guilbert, J.J. 1987. Educational handbook for health personnel. Geneva: WHO offset Publication No. 35.

38. Hallal, J. and Welsh, M. 1984. Using the competency laboratory to learn psychomotor skills. Nurse educator, 9(4): 34-38.

39. Hamm, B.J. and Brodt, D. 1982. Teaching assertiveness skills by simulation and gaming. Nursing research, 31 (4): 246-247.

40. Helfer, R., Black, M. and Teitelbaum, H. 1975. A comparison of peadiatric interviewing skills using real and simulated mothers. Pediatrics. 55 (3): 397-400.

41. Hentinen, M. and Sinkkonen, S. 1985. A programme for developing nurses' skills and nursing practice. Journal of advanced nursing. 10 (1): 405-426.

42. Hinchcliff, S.M. 1987. Teaching clinical nursing. Edinburgh and New York: Churchill Livingstone.

43. Hodson, K., Bringham, C., Hanson, A. and Armstrong, K. 1988. Multimedia simulation of a clinical day. Nurse educator. 13 (1): 10-13.

44. Holzemer, W., Schleutermann, J., Farrand, L. and Miller, A. 1981. Simulations as a measure of Nurse Practitioners' problem-solving skills. Nursing research. 30 (3): 139-144.

45. Holzemer, W.L. 1986. The structure of problem solving in simulations. Nursing research. 35 (4): 231-235.

46. Horn, B.J. 1980. Establishing valid and reliable criteria: A researcher's perspective. Nursing research. 29 (2): 88-90.

47. Huckabay, L., Anderson, N., Holm, D. and Lee, J. 1979. Cognitive, affective and transfer of learning consequences of computer-assisted instruction. Nursing research. 28 (4): 228-233.

48. Huckabay, L.M. 1980. Conditions of learning and instruction in nursing. St. Louis: C.V. Mosby Company.

49. Hunsley, J. 1985. Test anxiety, academic performance and cognitive appraisals. Journal of educational psychology. 77 (6): 678-682.

50. Ignatavicius, D. and Naumann, P. 1984. The technical competency of Registered Nurses in the administration of oral medications. Journal of nursing education. 23 (8): 332-337.

51. Infante, M.S. 1981. Toward effective and efficient use of the clinical laboratory. Nurse educator. 6 (1): 16-19.

52. Jackson, R. 1987. Approaching clinical teaching and evaluation through the written word: A humanistic approach. Journal of nursing education. 26 (9): 384-385.

53. Jenkins, H. and Michael, M. 1986. Using and interpreting item analysis data. Nurse educator. 11 (1): 10-14.

54. Keen, L. 1987. Transfer of classroom learning into clinical situation in basic nursing education. Johannesburg: University of the Witwatersrand.

55. Klein, A. 1978. An experimental study investigating the effects of instructional simulation utilizing simulated patients. Michigan: University Microfilms International.

56. Kolmitz, E., MacKenzie, I. and Christian, J. 1986. Evaluation tools and techniques: The development of a structured critical factor assessment tool at Carinus Nursing College. Curationis 9 (4): 14-18.

57. Kozier, B. and Erb, G. 1987. Fundamentals of nursing. Concepts and procedures. Menlo Park, California: Addison-Wesley.

58. Lee, L.A. 1979. An investigation of the effects of clinical experience on cognitive gains. Journal of nursing education. 18 (7): 27-36.

59. Lynn, M.R. 1986. Determination and quantification of content validity. Nursing research. 35 (6): 382-385.

60. Makar Joos, J.R. 1984. A teacher's guide for using games and simulations. Nurse educator. 9 (8): 25-29.

61. McCabe, B.W. 1985. The improvement of instruction in the clinical area: A challenge waiting to be met. Journal of nursing education. 24 (6): 255-257.

62. McDonald, G.F. 1987. The simulated clinical laboratory Nursing outlook. 35 (6): 290-292.

63. McDowell, J., Nardini, D., Negley, S. and White, J. 1984. Evaluating clinical performance using simulated patients. Journal of nursing education. 23 (1): 37-39.

64. Megal, M., Wilken, M. and Volcek, M. 1987. Nursing students' performance: Administering injections in laboratory and clinical area: Journal of nursing education. 26 (7): 288-293.

65. Mellish, J.M. and Johnston, S.U. 1986. Evaluation in clinical nursing. Durban: Butterworths Publishers.

66. Menard, J. 1979. Methods of measuring arterial pressure. In: Gross, F. and Robertson, J. Arterial hypertension. Kent: Pitman Medical.

67. Miller, M.D. 1987. Simulations in medical education: a review. Medical teacher. 9 (1): 35-41.

68. Miller, M.D. 1984. The use of simulations in training programmes; a review. Educational technology. 24 (11): 39-41.

69. Mitchell, G. 1985. Guidelines for compiling multiple choice questions. Johannesburg: University of the Witwatersrand Medical School.

70. Moses, N. and Friedman, M. 1986. Using humor in evaluating student performance. Journal of nursing education. 25 (8): 328-333.

71. Mulder, M. and Olivier, N. 1988. Practical guide for general nursing science. Pretoria: Educational Publishers.

72. Muller, M.E. 1989. Verpleegdienststandaarde vir privaathospitale. Johannesburg: Randse Afrikaanse Universiteit.

73. Nash, E., Stoch, B. and Harper, G. 1990. Human behaviour. Cape Town: Juta and Co., Ltd.

74. Neil, R.M. 1985. Effects of computer-assisted instruction on nursing student learning and attitude. Journal of nursing education. 24 (2): 72-75.

75. Newble, D. and Cannon, R. 1986. A handbook for clinical teachers. Cape Town: Juta and Co., Ltd.

76. Norman, G.R. 1985. Objective measurement of clinical performance. Medical education. 19 (1): 43-47.

77. Novak, S. 1988. An effective clinical evaluation tool. Journal of nursing education. 27 (2): 83-84.

78. Olson, E.M. 1983. Baccalaureate students' perceptions of factors assisting knowledge application in the clinical laboratory. Journal of nursing education. 22 (1): 18-21.

79. Oxendine, J. 1984. Psychology of motor learning. New Jersey: Prentice - Hall.

80. Paton, F. 1988. Simulation games: A promising teaching strategy for nursing education. Nursing R.S.A. 3 (10): 30-32.

81. Pavlish, C. 1987. A model for clinical performance evaluation. Journal of nursing education. 26 (8): 338-339.

82. Polit, D. and Hungler, B. 1987. Nursing research Principles and methods. Philadelphia: J.B. Lippincott Company.

83. Quinn, F.M. 1988. The principles and practice of nurse education. London: Chapman and Hall.

84. Reilly, D.E. 1980. Behavioural objectives - evaluation in nursing. New York: Appleton - Century - Crofts.

85. Reilly, D.E. and Oerman, M. 1985. The clinical field: it's use in nursing education. Connecticut: Appleton - Century - Crofts.

86. Reineck, C., Kornegay, E. and Valentin-Cintron, J. 1982. Transfer of learning: classroom to clinical setting. Military Medicine. 147 (8): 635-640.

87. Rhode, M., Kauchak, D. and Eggen, P. 1980. Skill acquisition in nurse - midwifery education. Journal of nursing education. 19 (7): 27-35.

88. Rinne, C. 1987. The affective domain - equal opportunity in Nursing Education? The journal of continuing education in nursing. 18 (2): 40-43.

89. Roberts, K. and Thurston, H. 1984. Teaching methodologies: Knowledge acquisition and retention. Journal of nursing education. 23 (1): 21-26.

90. Roos, A.M.E. 1987. Simulasie - spel as onderriqmetode vir studentverpleegkundiges. Johannesburg :Randse Afrikaanse Universiteit.

91. Ross, N. 1987. The use of an extended simulation in ward management training: rationale for development and design criteria. Nurse education today. 8 (7): 4-8.

92. Sanson-Fisher, R. and Pode, A. 1980. Simulated patients and the assessment of medical students' interpersonal skills. Medical education. 14 (1): 249-251.

93. Seaman, C.H. 1987. Research methods. Principles practice and theory for nursing. Connecticut: Appleton and Lange.

94. Sheehan, J. 1985. Assessing learning: continuous assessment versus final examination. Nurse education today. 5 (2): 49-55.

95. Smith Ullione, M. 1983. Simulation gaming in Nursing Education. Journal of nursing education. 22 (8): 349-351.

96. Spaeth, R.K. 1973. Skill acquisition under variable, temporal contraints. Dissertation abstracts international. 34 (10): 6435-A.

97. Sprinthall, N. and Sprinthall, R. 1987. Educational psychology: A developmental approach. New York: Random House.

98. Stone, D. and Nielsen, E. 1982. Educational psychology: The development of teaching skills. New York: Harper and Row Publishers.

99. Strayer, P. 1979. The effect of simulation versus traditional instructional strategies on achievement and attitude. Michigan: University Microfilms International.

100. Swendson Voss, L.A. 1985. Teaching for clinical competence. Nurse educator. 10 (4): 8-12.

101. Tower, B. and Majewski, T. 1987. Behaviourally based clinical evaluation. Journal of nursing education. 26 (3): 120-123.

102. Taylor, A.J. 1978. A comparison of simulation games with three selected teaching methods. Michigan: University Microfilms International.

103. Taylor, J. and Cleveland, P. 1984. Effective use of the learning laboratory. Journal of nursing education. 23 (1): 32-34.

104. Turkosi, B. 1978. Reducing stress in nursing students' clinical learning experience. Journal of nursing education. 26 (8): 335-337.

105. Van Niekerk, J.G.P. 1982. The O.S.C.E. experiment at Medunsa. Curationis. 5 (1): 44-48.

106. Venter, A.M. 1982. Die evaluering van gesindheid in kliniese onderrig. Curationis. 5 (1): 49-52.

107. Williams, M.L. 1979. Effects of clinical setting on anxiety and achievement in Psychiatric Nursing Education. Journal of nursing education. 18 (2): 4-14.

108. Witt, V. 1979. Skill acquisition under variable, temporal constraints: The effect of practice conditions. Dissertation abstracts international. 41 (9): 3945-A.

109. Wittich, W. and Schuller, C. 1979. Instructional technology - its nature and use. New York: Harper and Row Publishers.

110. Wood, V. 1982. Evaluation of student nurse clinical performance - a continuing problem. International nursing review. 29 (1): 11-17.

APPENDIX A

CONTENT VALIDITY OF STANDARDS

INSTRUCTIONS FOR VALIDATION

1. Kindly view the proposed standards for each of the following nursing actions for content validity:
   - pressure part care
   - measurement of arterial blood pressure
   - measurement of oral temperature, pulse and respiratory rate.

2. Evaluate each standard and its sub-standard by placing an (X) in the most appropriate box. The scale for evaluating is a follows:

1	Standard not applicable
2	Standard not clear; applicability questionable; possibly reworded
3	Standard applicable
4	Standard most applicable and well formulated.

3. If a standard is rated at 3 or 4, please indicate if this standard should be critical or non-critical by placing an (X) in the appropriate box.

   [Critical standards are those essential for competency and non-critical standards are those not essential for competency.]

4. Spaces are provided for comments if it is deemed necessary.

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I.D. NO.: ☐ ☐

MEASUREMENT OF ORAL TEMPERATURE, PULSE RATE AND RESPIRATORY RATE

1. Assessment

1.1 Identifies the patient | 1 | 2 | 3 . 4 | Non critical | Critical |

The patient is identified correctly when the student:

- compares the patient's name and hospital number on his identification band with the hospital folder | 1 | 2 | 3 | 4 |
- confirms correctness with the evaluator | 1 | 2 | 3 | 4 |
- asks the patient's name if unsure. | 1 | 2 | 3 | 4 |

Comments: _____

_____

1.2 Assesses the patient's needs/condition | 1 | 2 | 3 | 4 | Non critical | Critical |

The patient's needs/condition are assessed when the student:

- enquires about and responds to the patient's elimination needs | 1 | 2 | 3 | 4 |
- observes any factors which may influence nursing actions eg. exercise, hot drinks etc. | 1 | 2 | 3 | 4 |

Comments: _____

_____

2. Planning

2.1 Collects requirements | 1 | 2 | 3 | 4 | Non critical | Critical |

The student collects the following requirements:

- thermometers in plastic container marked "clean" | 1 | 2 | 3 | 4 |
- container for "used" thermometers | 1 | 2 | 3 | 4 |
- cotton wool swabs; paper bag for soiled swabs | 1 | 2 | 3 | 4 |

Comments: _____

_____

2.2 Informs/explains to patient | 1 | 2 | 3 | 4 | Non critical | Critical |

The student informs the patient:

- what is to be done and why it is necessary | 1 | 2 | 3 | 4 |

2/....

- the purpose of the evaluatpr's presence | 1 | 2 | 3 | 4 |

Comments: _____

3. Implementation

3.1 Correct handling of thermomater | 1 | 2 | 3 | 4 | Non critical | Critical |

The thermometer is handled correctly when it is:

- held at the distal end between the index finger and thumb and | 1 | 2 | 3 | 4 |
- shaken down until the mercury column is below 35° | 1 | 2 | 3 | 4 |

Comments: _____

3.2 Correct placement of thermometer | 1 | 2 | 3 | 4 | Non critical | Critical |

The thermometer is correctly placed when it is:

- under the patient's tongue | 1 | 2 | 3 | 4 |
- held in place by the patient's lips in a closed position | 1 | 2 | 3 | 4 |

Comments: _____

3.3 Select/locate pulse | 1 | 2 | 3 | 4 | Non critical | Critical |

The pulse is correctly located when the student:

- places three middle fingers lightly over appropriate pulse area eg. radial pulse | 1 | 2 | 3 | 4 |

Comments: _____

3.4 Obtains pulse rate accurately | 1 | 2 | 3 | 4 | Non critical | Critical |

The pulse rate is obtained accurately by:

- counting the number of pulsations for 1 minute | 1 | 2 | 3 | 4 |

Comments: _____

/....

3.5 Obtains respiratory rate accurately | 1 | 2 | 3 | 4 | Non critical | Critical

The repiratory rate is obtained accurately by:

- counting the number of breaths for 1 minute | 1 | 2 | 3 | 4 |
- while keeping the fingers on pulse area after counting pulse rate (so that patient is unaware) | 1 | 2 | 3 | 4 |

Comments: _____

_____

3.6 Correct removal of thermometer | 1 | 2 | 3 | 4 | Non critical | Critical

The thermometer is removed correctly by:

- allowing 2 minutes to pass (during which pulse and respiratory rate was counted) | 1 | 2 | 3 | 4 |
- wiping thermometer with cotton wool from distal end to mercury bulb | 1 | 2 | 3 | 4 |

Comments: _____

_____

3.7 Obtains thermometer reading accurately | 1 | 2 | 3 | 4 | Non critical | Critical

The thermometer is read accurately by:

- holding it horizontally at eye level | 1 | 2 | 3 | 4 |
- rotating thermometer until mercury column is visible | 1 | 2 | 3 | 4 |
- read the point on calibrated scale at which the mercury column rests | 1 | 2 | 3 | 4 |

Comments: _____

_____

3.8 Cleans thermometer | 1 | 2 | 3 | 4 | Non critical | Critical

The thermometer is cleaned correctly by:

- washing it carefully with soap and water | 1 | 2 | 3 | 4 |
- rinsing it under cold running water | 1 | 2 | 3 | 4 |
- soaking it in Chlorhexidine for 3 minutes | 1 | 2 | 3 | 4 |
- removing and drying it thoroughly | 1 | 2 | 3 |

Comments: _____

_____

4. Evaluation

4.1 Record accurately

1	2	3	4	Non critical	Critical

Recording is done accurately when:

- the patient's documents reflect the exact temperature, pulse and respiration measurements obtained.

1	2	3	4

Comments: _____

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BLOOD PRESSURE MEASUREMENT (ARTERIAL)

1. Assessment

1.1 Identifies the patient | 1 | 2 | 3 | 4 | Non critical | Critical |

The patient is correctly identified when the student:

- compares the patient's name and hospital number on his identification band with his hospital folder | 1 | 2 | 3 | 4 |
- confirms correctness with the evaluator | 1 | 2 | 3 | 4 |
- asks the patient's name if unsure | 1 | 2 | 3 | 4 |

Comments: _____

1.2 Checks nursing prescription | 1 | 2 | 3 | 4 | Non critical | Critical |

The student checks nursing prescription to:

- determine the frequency (interval) for measuring the BP eg. 1 hourly | 1 | 2 | 3 | 4 |
- determine any specification in positioning eg. sitting or supine position.- | 1 | 2 | 3 | 4 |

Comments: _____

1.3 Assesses the patient's needs/condition | 1 | 2 | 3 | 4 | Non critical | Critical |

The patient's needs and condition are assessed when the student:

- enquires about and responds to the patient's elimination needs | 1 | 2 | 3 | 4 |
- determine factors in the patient's condition which may inf'uence the nursing action | 1 | 2 | 3 | 4 |

Comments: _____

2. Planning

2.1 Informs/explains to the patient | 1 | 2 | 3 | 4 | Non critical | Critical |

The student informs the patient about:

- what is to be done and why it is necessary | 1 | 2 | 3 | 4 |
- the purpose of the evaluator's presence | 1 | 2 | 3 | 4 |

Page /2....

Comments: _____

2.2 Collects the requirements | 1 | 2 | 3 | 4 | Non critical | Critical

The student collects the following:

- a stethoscope, baumanometer and the correct size cuff | 1 | 2 | 3 | 4

Comments: _____

2.3 Prepares the apparatus | 1 | 2 | 3 | 4 | Non critical | Critical

The apparatus is prepared correctly if the student:

- places the baumanometer in an upright position on a level surface | 1 | 2 | 3 | 4
- as close to the arm as possible | 1 | 2 | 3 | 4

Comments: _____

2.4 Prepares the patient | 1 | 2 | 3 | 4 | Non critical | Critical

The patient is prepared correctly if the student:

- places the patient in the supine position or in accordance with assessment in 1.2 and 1.3 | 1 | 2 | 3 | 4
- allows the patient to rest/be still before taking the BP. | 1 | 2 | 3 | 4

Comments: _____

3. Implementation

3.1 Exposes the arm | 1 | 2 | 3 | 4 | Non critical | Critical

The arm is exposed correctly if the student:

- rolls up the sleeve until the upper arm is completely visible or slips off the sleeve if too constricting | 1 | 2 | 3 | 4

Comments: _____

3.2 Positions the arm | 1 | 2 | 3 | 4 | Non critical | Critical

The arms is positioned correctly if it is:

- in extension and supination | 1 | 2 | 3 | 4

- supported comfortably at heart level | 1 | 2 | 3 | 4 |

Comments: _____

3.3 Applies the cuff | 1 | 2 | 3 | 4 | Non critical | Critical |

The cuff is applied correctly when it is:

- wound evenly but not loosely around upper arm with rubber bag over brachial artery | 1 | 2 | 3 | 4 |
- approximately 2cm above antecubital space | 1 | 2 | 3 | 4 |
- secured by tucking in the end of the cuff. | 1 | 2 | 3 | 4 |

Comments: _____

3.4 Obtains preliminary systolic BP | 1 | 2 | 3 | 4 | Non critical | Critical |

The preliminary systolic BP is correctly obtained by:

- palpating the brachial or radial pulse | 1 | 2 | 3 | 4 |
- inflating the cuff until the pulse disappears | 1 | 2 | 3 | 4 |
- deflating the cuff completely. | 1 | 2 | 3 | 4 |

Comments: _____

3.5 Positions the stethoscope | 1 | 2 | 3 | 4 | Non critical | Critical |

The stethoscope is correctly positioned when it is:

- placed over the brachial artery in the antecubital space and held in position. | 1 | 2 | 3 | 4 |

Comments: _____

3.6 Re-inflates the cuff | 1 | 2 | 3 | 4 | Non critical | Critical |

The cuff is re-inflated correctly when:

- the screw valve is closed and the cuff inflated until the mercury column rises approximately 20mm above preliminary reading. | 1 | 2 | 3 | 4 |

Comments: _____

3.7 Obtains the systolic BP | 1 | 2 | 3 | 4 | Non critical | Critical

The systolic BP is correctly obtained when the:
- screw valve is opened carefully allowing the mercury to drop at a rate of 2mm/second. | 1 | 2 | 3 | 4 |
- the height of the mercury column at which the first sound is heard, is noted. | 1 | 2 | 3 | 4 |

Comments: _____

3.8 Obtains the diastolic BP | 1 | | 3 | 4 | Non critical | Critical

The diastolic BP is obtained correctly when:
- the height of the mercury column at which the pulsating sound changes abruptly, becoming dull, is noted. | 1 | 2 | 3 | 4 |

Comments: _____

3.9 Disassembles the apparatus | 1 | 2 | 3 | 4 | Non critical | Critical

The apparatus is disassembled correctly when:
- the cuff is unfolded from the arms | 1 | 2 | 3 | 4 |
- and secured appropriately with the baumanometer | 1 | 2 | 3 | 4 |

Comments: _____

3.10 Assists patient with comfort | 1 | 2 | 3 | 4 | Non critical | Critical

The patient is assisted with:
- rolling down his sleeve or replacing removed clothing | 1 | 2 | 3 | 4 |
- actions necessary to relieve discomfort. | 1 | 2 | 3 | 4 |

Comments: _____

4. Evaluation

4.1 Record accurately | 1 | 2 | 3 | 4 | Non critical | Critical

Recording is done accurately when:
- the patient's document reflects the exact systolic and diastolic BP that has been obtained. | 1 | 2 | 3 | 4 |

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PRESSURE PART CARE

1. Assessment

1.1 Identifies the patient | 1 | 2 | 3 | 4 | Non critical | Critical

The patient is identified correctly when the student:

- compares the patient's name and hospital number on his identification band with his hospital folder | 1 | 2 | 3 | 4
- confirms correctness with the evaluator | 1 | 2 | 3 | 4
- asks the patient's name if unsure | 1 | 2 | 3 | 4

Comments: _____

1.2 Checks nursing prescription | 1 | 2 | 3 | 4 | Non critical | Critical

The student checks the nursing prescription to:

- determine the frequency for pressure part care and repositioning | 1 | 2 | 3 | 4
- implement any special treatments or devices eg. splints. | 1 | 2 | 3 | 4

Comments: _____

1.3 Assesses the patient's needs | 1 | 2 | 3 | 4 | Non critical | Critical

The patient's needs are assessed when the student:

- enquires about and responds to the patient's elimination needs | 1 | 2 | 3 | 4
- observes factors in the patient's condition which may influence the nursing action | 1 | 2 | 3 | 4
- observes condition of bed linen, bed attire, pressure points etc. | 1 | 2 | 3 | 4

Comments: _____

2. Planning

2.1 Informs/explains to the patient | 1 | 2 | 3 | 4 | Non critical | Critical

The student informs the patient about:

- what is to be done and why it is necessary | 1 | 2 | 3 | 4

Page /2....

- the purpose of the evaluators presence | 1 | 2 | 3 | 4 |

Comments: _____

_____

2.2 Collects requirements | 1 | 2 | 3 | 4 | Non critical | Critical |

The student collects the following basic requirements:

- basin with warm water, soap and towel | 1 | 2 | 3 | 4 |
- any other requirements eg. clean linen in accordance with assessment in 1.3 | 1 | 2 | 3 | 4 |

Comments: _____

_____

2.3 Prepares the environment | 1 | 2 | 3 | 4 | Non critical | Critical |

The environment is correctly prepared when the student:

- closes windows and door near the bed | 1 | 2 | 3 | 4 |
- removes bed accessories onto a chair or bed stool | 1 | 2 | 3 | 4 |
- fold bedlinen except bunny blanket, to footend or remove it in accordance with assessment in 1.3 | 1 | 2 | 3 | 4 |

Comments: _____

_____

3. Implementation

3.1 Maintains privacy | 1 | 2 | 3 | 4 | Non critical | Critical |

The student maintains privacy by:

- screening the patient's bed | 1 | 2 | 3 | 4 |
- exposing only those body parts which will be treated (one at a time) | 1 | 2 | 3 | 4 |

Comments: _____

_____

3.2 Turns/positions patient | 1 | 2 | 3 | 4 | Non critical | Critical |

The patient is positioned:

- laterally (with back facing student) or in accordance with assessment in 1.3 | 1 | 2 | 3 | 4 |
- with appropriate action to maintain safety eg. support, enlisting the help of a second person etc. | 1 | 2 | 3 | 4 |

Comments: _____

_____

3.3 Attends to appropriate pressure areas | 1 | 2 | 3 | 4 | Non critical | Critical

Skin care is appropriately and correctly done when the student:

- washes the pressure area eg. the back using soap and water | 1 | 2 | 3 | 4
- massages the pressure points in accordance with 1.3 EXCEPT when there is redness or an existing pressure sore | 1 | 2 | 3 | 4
- dries the skin thoroughly | 1 | 2 | 3 | 4

Comments: _____

3.4 Attends to bedlinen | 1 | 2 | 3 | 4 | Non critical | Critical

Bedlinen is attended to correctly when the student:

- corrects factors (in the bedding) which predispose to pressure lesions eg. straighten creases and folds, removing crumbs, replacing damp linen etc. | 1 | 2 | 3 | 4

Comments: _____

3.5 Repositions the patient comfortably | 1 | 2 | 3 | 4 | Non critical | Critical

The patient is repositioned comfortably when:

- placed in an alternate position in relation to his condition/health problem | 1 | 2 | 3 | 4
- with adequate support eg. extra pillows if necessary. | 1 | 2 | 3 | 4

Comments: _____

3.6 Replaces bed accessories/ aids | 1 | 2 | 3 | 4 | Non critical | Critical

Bed accessories and other aids are replaced correctly when:

- it relieves pressure or reduces friction in appropriate areas eg. ring cushion under heels and sheep skin under back. | 1 | 2 | 3 | 4

Comments: _____

- 4 -

4. Evaluation

4.1 Evaluates patient's comfort | 1 | 2 | 3 | 4 | Non critical | Critical |

The student evaluates the patiert's comfort by:

- enquiring about and responding to patient's discomfort. | 1 | 2 | 3 | 4 |

Comments: _____

_____

2.1 Record/reports | 1 | 2 | 3 | 4 | Non critical | Critical |

The student records/reports in the nursing records:

- what has been done for the patient | 1 | 2 | 3 | 4 |
- the condition of the patient's skin and pressure points. | 1 | 2 | 3 | 4 |

Comments: _____

_____

General comments and information: _____

_____

_____

_____

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JCNB
1989 09 25

CORONATION NURSING COLLEGE

CLINICAL TEACHING DEPARTMENT

CHECK LIST: MEASUREMENT OF ORAL TEMPERATURE, PULSE & RESPIRATORY RATE

STANDARD

The student measures the oral temperature, pulse rate and respiratory rate accurately.

OBJECTIVES FOR COMPETENCY

1. Measure the patient's temperature accurately.
2. Obtain the pulse and respiratory rate with reasonable accuracy (a difference of no more than 2 beats/breaths between evaluator and student)
3. Complete the appropriate record accurately.

SCORING SYSTEM

1. All behaviours have a value of one (1) point each except the critical behaviours (*) which have a value of five (5) points each.
2. Behaviours which are not applicable (N/A) are subtracted from the MAXIMUM SCORE before obtaining the student's score.
3. All behaviours which are correctely performed are added to obtain the student score.
4. If one to two critical behaviours are incorrectly performed or omitted, the student fails summarily with 45%
5. If three to four critical behaviours are incorrectly performed or omitted, the student fails with 35%.
6. NOTE: The incorect performance or omission of one behaviour may influence another eg. 3.4 may influence 4.1.

NURSING ACTION: MEASUREMENT OF TPR

STUDENT'S NAME: _____

DATE: _____

STUDENT'S BEHAVIOUR	BEHAVIOUR PERFORMED		BEHAVIOUR NOT PERFORMED		SPECIFIC COMMENTS
	Correct	Incorrect	Omitted	N/A	
1. ASSESSMENT:					
1.1 Observe factors which may influence nursing action (ask student)					
2. PLANNING:					
2.1 Collect requirements viz. – thermometer in clean tray					
– swabs					
– container for used thermometer and swabs					
2.2 Inform patient about the nursing action					
3. IMPLEMENTATION:					
3.1 Ensure that Hg column is below 35°					
3.2 Place thermometer under the patient's tongue					
3.3 Place middle and index fingers lightly over radial pulse (note not thumb)					
*3.4 Count accurately the number of pulsations for 1 minutes					
*3.5 Count accurately the number of breaths for 1 minutes					
3.6 Remove thermometer after 2 minutes					
3.7 Wipe off with swab from distal end to bulb					
*3.8 Read temperature from thermometer accurately					
4. RECORDING:					
*4.1 Complete record accurately					
MAXIMUM SCORE = 30					

STUDENT SCORE: _____ PERCENTAGE: _____

INDEX OF DISCREPANCY

	T°	P	R
SUBJECT:	_____	_____	_____
EVALUATOR:	_____	_____	_____

CORONATION NURSING COLLEGE

CLINICAL TEACHING DEPARTMENT

CHECK LIST: MEASUREMENT OF ARTERIAL BLOOD PRESSURE

STANDARD

The student measures the arterial blood pressure (BP) accurately.

OBJECTIVES FOR COMPETENCY

1. Obtain the preliminary systolic BP correctly.
2. Measure the systolic and diastolic BP with reasonable accuracy (a difference of not more than .5 mmHg between the evaluator & student for either reading)
3. Record the BP accurately.

SCORING SYSTEM

1. All student behaviours have a value of one (1) point each except the critical behaviours (*) which have a value of five (5) points each.
2. Behaviours which are not applicable (N/A) are subtracted from the MAXIMUM SCORE before obtaining the student's score.
3. All behaviours which are correctly performed are added to obtain the student's score.
4. If one to two critical behaviours are incorrectly performed or omitted the student fails summarily with 45%.
5. If three to four critical behaviours are incorrectly performed or omitted the student fails with 35%.
6. NOTE: The incorrect performance or omission of one behaviour may influence another eg. 3.6 may influence 3.10 and 4.1

NURSING ACTION: MEASUREMENT OF ARTERIAL BLOOD PRESSURE (BP) STUDENT'S NAME: _____

DATE: _____

STUDENT'S BEHAVIOUR	BEHAVIOUR PERFORMED		BEHAVIOUR NOT PERFORMED		SPECIFIC COMMENTS
	Correct	Incorrect	Omitted	N/A	
1. ASSESSMENT:					
1.1 Check nursing prescription					
1.2 Observe factors which influence nursing action (ask student)					
2. PLANNING					
2.1 Inform patient about the nursing action.					
2.2 Collect requirements viz.					
- stethoscope					
- baumanometer					
- appropriate cuff size					
2.3 Place baumanometer on a horizontal surface					
2.4 Position patient comfortably					
3. IMPLEMENTATION					
3.1 Expose upper arm					
3.2 Extend arm with palm facing upward.					
3.3 Position/support arm at heart level					
3.4 Apply cuff correctly by:					
- placing rubber bag over upper brachial artery					
- approximately 2cm above the antecubital space					
3.5 Palpate branchial/radial pulse.					
*3.6 Obtain preliminary systolic BP					
3.7 Position stethoscope firmly over brachial artery in the antecubital space.					
3.8 Reinflate cuff ±20 mmHg above systolic BP					
3.9 Deflate cuff at rate of ±2mmHg per second					
*3.10 Obtain systolic BP accurately					
*3.11 Obtain diastolic BP accurately					
3.12 Dissemble the apparatus					
3.13 Assist patient with comfort					
4. RECORDING					
*4.1 Record the BP accurately					

MAXIMUM SCORE = 39

STUDENT SCORE: _____ PERCENTAGE: _____

INDEX OF DISCREPANCY

	SYSTOLIC	DIASTOLIC
SUBJECT:	_____	_____
EVALUATOR:	_____	_____

CORONATION NURSING COLLEGE

CLINICAL TEACHING DEPARTMENT

CHECK LIST: PRESSURE PART CARE

STANDARD

The student provides pressure part care safely and correctly

OBJECTIVES FOR COMPETENCY

1. Provide pressure care to appropriate pressure points.
2. Ensure safety and comfort of the patient throughout.
3. Attend to immediate factors predisposing to pressure lesions.

SCORING SYSTEM

1. All student behaviour have a value of one (1) point each except the critical behaviour (*) which have a value of five (5) points each.
2. Behaviours which are not applicable (N/A) are subtracted from the MAXIMUM SCORE before obtaining the student's score.
3. All behaviours which are correctly performed are added to obtain the student's score.
4. If one to two critical behaviours are incorrectly performed or omitted the student fails summarily with 45%.
5. If three to four critical behaviours are incorrectly performed or omitted the studen with 35%.
6. If five to six critical behaviours are incorrectly performed or omitted the student ..... with 25%.

NURSING ACTION: PRESSURE PART CARE

STUDENT'S NAME: _____

DATE: _____

STUDENT'S BEHAVIOUR	BEHAVIOUR PERFORMED		BEHAVIOUR NOT PERFORMED		SPECIFIC COMMENTS
	Connect	Inconnect	Omitted	N/A	
1. ASSESSMENT					
1.1 Check nursing prescription					
1.2 Observe patient factors which may influence nursing action (ask student)					
1.3 Assess bedlinen, bed attire etc.					
2. PLANNING					
2.1 Inform patient about the nursing action					
2.2 Collect basic requirements:					
– warm water					
– soap					
– face cloth					
– one towel					
2.3 Collect additional requirements according to assessment					
2.4 Prepare environment by:					
– closing nearby windows/door					
– removing bed accessories onto chair/ stool					
– fold bedlinen down bunny blanket.					
3. IMPLEMENTATION					
3.1 Screen the bed					
*3.2 Position patient laterally on according to assessment					
3.3 Expose only pressure areas to be attended to					
*3.4 Attend to appropriate pressure areas					
*3.5 Dry the skin thoroughly					
*3.6 Attend to bedlinen appropriately					
*3.7 Reposition patient comfortably					
*3.8 Replace bed accessories and other aids.					
4. EVALUATION					
4.1 Evaluate patients comfort by enquiring					
4.2 Record/report appropriately					
MAXIMUM SCORE = 46					

STUDENT'S SCORE: _____ PERCENTAGE: _____

INSTRUMENT TO TEST KNOWLEDGE RELATED TO TEMPERATURE, PULSE AND RESPIRATION

NAME: _____

FOR OFFICE USE

PHASE OF DATA COLLECTION

PRETEST | | POSTTEST | |

ID.NO. _____ SCORE: _____

QUESTIONS

1. Body temperature is the
   (a) quantity of heat present in the body
   (b) balance between heat production and heat loss
   (c) actual amount of heat produced in the body
   (d) amount of heat lost from the body
   (e) difference between heat gain and heat loss

2. Which of the following is the normal temperature range for an adult.
   (a) 37° - 38°C
   (b) 35° - 37°C
   (c) 36° - 37°C
   (d) 35,5° - 37,1°C
   (e) 36° - 38,5°C

3. A temperature state of 38,2°C is called
   (a) hyperpyrexia
   (b) pyrexia
   (c) hypothermia
   (d) hyperthermia
   (e) normothermia

4. Which of the following may increase heat production
   (a) shivering
   (b) physical exertion
   (c) sweating
   (d) starvation
   (e) absorption of ultraviolet rays from the sun

5. When heat production is greater than heat loss
   (a) the amount of body heat decreases
   (b) less sweat will be secreted
   (c) it results in a fever
   (d) the skin blood vessels will dilate
   (e) the person will have rigors

2/.....

6. The oral route for temperature taking should not be used in
(a) unconscious patients
(b) confused patients
(c) patients with breathing problems
(d) uncontrolled epileptics
(e) babies

7. A pulse can be
(a) felt where an artery crosses a bone
(b) felt where an artery lies near a firm body structure.
(c) palpated in arteries and veins
(d) heard using a stethoscope
(e) palpated in the veins only

8. The pulse rate in an adult
(a) increases due to a rise in body temerature
(b) decreases due to blood loss
(c) is between 60-80 beats per minute (BPM)
(d) is between 90-100 beats per minute (BPM)
(e) increases during exercise.

9. Tachycardia is
(a) a pulse rate less than 60 BPM in adults
(b) a pulse rate more than 100 BPM in adults
(c) a faster than normal rate in babies
(d) an abnormality in the rhythm of the pulse
(e) an abnormality in the volume of the pulse

10. Which of the following may influence the pulse rate
(a) certain drugs
(b) age
(c) hypertension
(d) fear
(e) unconsciousness

11. Which of the following sites are used for taking the pulse in the lower limbs.
(a) radial
(b) brachial
(c) femoral
(d) popliteal
(e) tibial

12. Respiration
(a) involves the intake of oxygen
(b) ensures delivery of nutrients to the cells
(c) is controlled by the respiratory centre
(d) involves the excretion of carbon dioxide
(e) ensures removal of wastes from the cells

13. A respiratory rate of 16-20 per minute is
 (a) slower than normal in an adult
 (b) normal for an adult
 (c) slow for a newborn baby
 (d) called tachypnoea in an adult
 (e) adequate for oxygen intake in a resting adult

14. Shallow breathing is called
 (a) bradypnoea
 (b) apnoea
 (c) hypoventilation
 (d) hyperventilation
 (e) dyspnoea

15. Which of the following increases the respiratory rate
 (a) an increase in body temperature
 (b) an increase in blood pressure
 (c) exposure to cold
 (d) a decreased O_2 supply to the cells
 (e) increased activity

MAXIMUM SCORE: 18

STUDENT'S SCORE: ____

PERCENTAGE: ____

INSTRUMENT TO TEST KNOWLEDGE
RELATED TO ARTERIAL BLOOD PRESSURE

NAME: _____

FOR OFFICE USE

PHASE OF DATA COLLECTION			
PRETEST		POST TEST	

ID. NO: _____ SCORE: _____

QUESTIONS

I. Which of the following best describes the meaning of arterial blood pressure (BP)

(a) pressure exerted by the heart on the blood
(b) pressure exerted by the arterial walls on the blood
(c) pressure within the blood circulation.
(d) pressure exerted by the blood on the arterial walls
(e) pressure of the blood within the arteries.

2. The pressure within the aorta during contraction of the heart is known as the:

(a) pulse pressure
(b) systolic pressure
(c) diastolic pressure
(d) arterial pressure
(e) central venous pressure

3. The normal systolic BP for a 30 year old is:

(a) 80 mmHg
(b) 65 mmHg
(c) 110 mmHg
(d) 125 mmHg
(e) 150 mmHg

4. The normal diastolic BP for a 30 year old is:

(a) 50 mmHg
(b) 65 mmHg
(c) 70 mmHg
(d) 80 mmHg
(e) 120 mmHg

5. A normal arterial BP is essential for the following reasons:

(a) for a constant supply of oxygen to the tissues
(b) for normal cell functioning
(c) for a continuous blood circulation
(d) to provide nourishment to the tissues
(e) for a normal cardiac output.

2/....

6. A BP reading of $^{140}/_{95}$ for a 75 year old may be interpreted as:

(a) high diastolic pressure
(b) high systolic pressure
(c) low systolic pressure
(d) normal diastolic pressure
(e) normal systolic pressure



7. The pulse pressure is:

(a) the difference between the systolic and diastolic BP
(b) the pulsation felt in the arteries
(c) between 60-80 mmHg
(d) between 30-50 mmHg
(e) none of the above



8. Which of the following patient factors influence BP:

(a) age
(b) sex
(c) exercise
(d) position
(e) body temperature



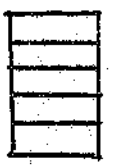
9. A drop in BP may be due to:

(a) a decrease in cardiac output
(b) haemorrhage
(c) dilation (widening) of the bloodvessel
(d) an increase in blood viscosity (thickness)
(e) dehydration



10. Which of the following may increase the BP

(a) fever
(b) increased blood volume
(c) external heat
(d) loss of arterial elasticity
(e) anxiety



11. When the bloodvessels are constricted (narrowed) the following occurs:

(a) peripheral resistance increases
(b) blood pressure decreases
(c) blood pressure increases
(d) blood volume decreases
(e) cardiac output decreases



12. An increase in blood viscosity will

(a) cause a slower pulse rate
(b) result in a slower blood flow
(c) increase the blood pressure
(d) cause the blood to be more resistant to flow
(e) increase the blood flow.



- 3 -

I3. When the cardiac output drops

(a) less blood is pumped out by the heart
(b) less oxygen is delivered to the cells
(c) the systolic BP drops
(d) the diastolic BP drops
(e) the blood volume drops

I4. A BP reading of $^{80}/_{50}$ could be obtained from

(a) a newborn baby
(b) an 18 year old
(c) a 2 year old
(d) a shocked patient
(e) a bleeding patient

I5. A person with BP lower than normal is said to be

(a) fainting
(b) shocked
(c) hypotensive
(d) hypertensive
(e) normotensive

MAXIMUM SCORE: 18

STUDENT'S SCORE: ____

PERCENTAGE: ____

INSTRUMENT TO TEST KNOWLEDGE
RELATED TO PRESSURE SORES AND ITS PREVENTION

NAME : _____

FOR OFFICE USE

PHASE OF DATA COLLECTION

PRETEST | | POST TEST |

ID. NO.: _____ SCORE: ____

QUESTIONS

I. Which of the following best describes a pressure sore

(a) a small superficial ulcer
(b) a localized area of tissue necrosis (death)
(c) a lesion resulting from pressure ischaemia
(d) tissue necrosis due to bedrest
(e) a deep gangrenous lesion

2. In the supine position (on the back) the following body parts are subjected to pressure:

(a) heels
(b) scapula
(c) iliac crest
(d) sacrum
(e) knees

3. In which of the following positions are the iliac crest and the ankles subjected to pressure at the same time

(a) supine
(b) prone (on the stomach)
(c) semi prone
(d) left lateral
(e) right lateral

4. Which of the following shows the complete sequence of how a pressure sore develops

(a) preceding burning pain followed by redness followed by excoriation
(b) redness followed by excoriation and pain
(c) redness followed by a burning pain followed followed by excoriation
(d) congestion followed by redness followed by a burning pain
(e) a preceding burning pain followed by congestion followed by excoriation

5. Prolonged pressure on tissues

(a) irritates the skin
(b) impairs the oxygen supply to tissue cells
(c) compresses the lumen of its blood vessels
(d) causes skin abrasions
(e) leads to tissue necrosis.

2/....

6. Pressure may be relieved by
(a) using a bed cradle
(b) two-hourly turning
(c) massaging the pressure points
(d) using a ring cushion
(e) applying a pressure dressing

7. Prolonged dampness on the skin
(a) creates a good growth medium for microbes
(b) lowers the body's resistance
(c) causes maceration of the skin
(d) causes the skin to cool down
(e) lessens the bloodflo to the skin

8. A sheepskin may be used to
(a) prevent skin injuries
(b) reduce friction against the skin
( ) reduce the effects of dampness on the skin
(d) promote blood circulation
(e) relieve pressure by redistributing it

9. Which of the following factors place a patient at risk to develop pressure sores
(a) tiredness
(b) obesity
(c) unconsciousness
(d) paralysis
(e) soiled linen

10 The elderly patient is more prone to developing pressure sores because of
(a) restlessness
(b) incontinence
(c) dry inelastic skin
(d) thinning of the skin
(e) possible poor nutritional state

11. Injury of the skin
(a) offers entry to micro-organisms
(b) leads to skin infection
(c) may be caused by restlesness in bed
(d) may be due to creases in bedlinen
(e) reduces skin sensation

12. Principles in the prevention of pressure sores include
(a) protecting the skin from injury
(b) softening the skin
(c) promoting blood circulation to the skin
(d) protecting the skin from moisture
(e) providing adequate rest

13. Bloodflow to devitalised tissues may be improved by
(a) passive exercise
(b) massaging the skin
(c) bedrest
(d) giving an adequate diet
(e) two-hourly turning

3/....

I4. Which of the following can be used to improve the skin's resistance to pressure sores
(a) waterproof ointments (barrier creams)
(b) skin drying agents
(c) moisturizers
(d) antiseptic agents
(e) hot water

I5. The use of a water mattress to reduce the incidence of pressure sores is based on the following scientific principle
(a) for every action there is an equal opposite reaction
(b) pressure exerted on the water is transmitted undimished throughout the mattress
(c) pressure exerted by the patient is spread evenly throughout the water to all parts of his body in contact with the mattress
(d) the patient is supported by a force equal to his weight
(e) none of the above

MAXIMUM SCORE: 18

STUDENT'S SCORE: _____

PERCENTAGE: _____

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS
(REF. R14/49)

CLEARANCE CERTIFICATE PROTOCOL NO: 7/10/89

PROJECT :- SIMULATION : ITS INFLUENCE ON CLINICAL LEARNING AMONG FIRST YEAR STUDENT NURSES AT CORONATION NURSING COLLEGE

INVESTIGATOR/S : MRS J C M BRUCE

DEPARTMENT : NURSING EDUCATION, CORONATION NURSING COLLEGE

DATE CONSIDERED 27/10/89

RECOMMENDATION OF COMMITTEE-:

APPROVED [X]

Committee felt that your study was too simplistic for a postgraduate degree.

Date : 30/10/89 CHAIRMAN : Professor P E Cleaton-Jones

Guidelines for written "Informed Consent" attached where applicable

---

DECLARATION BY INVESTIGATOR/S
To be completed in duplicate and ONE copy returned to Miss S M Boshoff, Office of the Deputy Registrar (Research), Room 10002, 10th Floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorised to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions.

Should any departure be contemplated from the research procedure as approved I/We undertake to resubmit the Protocol to the Committee.

DATE : 4.12.89 SIGNED : Bruce

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS
(REF. R14/49)

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DEPARTMENT : NURSING EDUCATION, CORONATION NURSING COLLEGE

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Date : 30/10/89 CHAIRMAN : .....
Professor P E Cleaton-Jones

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Should any departure be contemplated from the research procedure as approved I/We undertake to resubmit the Protocol to the Committee.

DATE : 4.12.89 SIGNED : C Bruce.

CONSENT FORM

PURPOSE OF THE STUDY: To evaluate the performance of student nurses when practising certain nursing procedures

WHAT IS EXPECTED OF YOU: To practise the nursing procedures below under the supervision of a tutor

(a) Procedures: BP, TPR and pressure part care

(b) Frequency of procedure: Once a week for four weeks

(c) Length of time: Between 13:00 - 16:00 on Fridays

RISKS INVOLVED: None

BENEFITS: You will become competent and confident in these procedures

CONFIDENTIALITY AND ANONYMITY: Findings will be published in a research report, however personal results will be confidential

RIGHT TO NON-PARTICIPATION OR WITHDRAWAL: Once you have registered and signed, you may not withdraw.

I, the undersigned have read the information above and hereby agree to participate in the study:

SIGNATURE OF SUBJECT _____ DATE _____

SIGNATURE OF WITNESS _____ DATE _____

SIGNATURE OF RESEARCHER _____ DATE _____

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SIGNATURE OF WITNESS _____ DATE _____

SIGNATURE OF RESEARCHER _____ DATE _____

APPENDIX M

T.P.H. 49

TRANSVAALSE PROVINSIALE HOSPITALE

Telegrafiese Adres
Telegraphic Address

Telefoon Nr.
Telephone No.

IN ANTWOORD VERMELD ASB.
IN REPLY PLEASE QUOTE

No.

Alle korrespondensie moet aan die Superintendent gerig word.
All communications to be addressed to the Superintendent.

TRANSVAAL PROVINCIAL HOSPITALS

CORONATION HOSPITAAL / HOSPITAL

PRIVATE BAG

NEWCLARE 2112

6.9.1988

Mrs J Bruce
Senior Tutor
CORONATION HOSPITAL

RE: REQUEST TO CONDUCT A RESEARCH PROJECT AT CORONATION HOSPITAL

Your letter dated the 16th August 1988 refers.

Permission is granted for youto conduct the abovementioned research project for a Master of Science degree in Nursing.

Recognition must be given to the Coronation Hospital, and all personal information must be treated as confidential.

I wish you well in your project.

DR M H E KALMYN
FOR SUPERINTENDENT
/cbs

APPENDIX N

T.P.H. 49

TRANSVAALSE PROVINSIALE HOSPITALE

Telegrafiese Adres
Telegraphic Address

Telefoon Nr. MRS V PALM
Telephone No. 673 4200

IN ANTWOORD VERMELD ASB.
IN REPLY PLEASE QUOTE

No.

Alle korrespondensie moet aan die Superintendent gerig word.
All communications to be addressed to the Superintendent.

TRANSVAAL PROVINCIAL HOSPITALS

CORONATION HOSPITAAL
HOSPITAL

PRIVATE BAG

NEWCLARE

2112

PROV. ADMINISTRASIE TVL
CORONATION HOSPITAAL
PRIVATE BAG
23 JAN 1989
NEWCLARE. TRANSVAAL
CORONATION HOSPITAL
TVL PROV. ADMINISTRATION

1989 01 23
VP/pm

Mrs Bruce
c/o Coronation Nursing College
CORONATIONVILLE

Dear Mrs Bruce

I am in receipt of your letter dated 16th January 1989 for which I thank you and wish you every success with the pilot study.

Ward one will be available to you for the duration of your study.

Please be assured of our support.

Best wishes and good luck.

V Palm
for SUPERINTENDENT

Author: Bruce J.C.M
Name of thesis: Effect of practice setting on clinical learning among first year student nurses

PUBLISHER:
University of the Witwatersrand, Johannesburg
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