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COMPARATIVE ANALYSIS OF THE EFFECTS OF TWO CURRICULAR APPROACHES TO THE DEVELOPMENT OF CLINICAL REASONING ABILITIES IN NURSING STUDENTS FOLLOWING COMPREHENSIVE BASIC NURSING PROGRAMMES

BY

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SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE MASTERS CURATIONIS DEGREE.

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DECLARATION

I, FANISWA HONEST MFIDI, DECLARE THAT ***"A COMPARATIVE ANALYSIS OF THE EFFECTS OF TWO CURRICULAR APPROACHES IN THE DEVELOPMENT OF CLINICAL REASONING ABILITIES IN NURSING STUDENTS FOLLOWING COMPREHENSIVE BASIC NURSING PROGRAMMES"*** *IS MY ORIGINAL WORK. I HAVE GIVEN FULL ACKNOWLEDGEMENT OF THE RESOURCES REFERRED TO THIS TEXT.*

Mfidi ..... 22/02/02 .....

Ms F. H. MFIDI **DATE**

DEDICATION:

The realisation of this long cherished dream is dedicated with love and gratitude to my late grandfather, ***Bhengeza*** who laid the first foundation in my educational endeavours; my late mother, ***Nomsesane*** who despite all odds, took over to ensure that this dream could true; ***"Oom Jan"*** a great hero in my life and a wonderful father whose love for education served as a source of inspiration and to my beloved sons ***Luvuyo & Athisiviwe*** who have been supportive and understanding when their time with me was sacrificed to ensure that this dream comes true.

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ABSTRACT

A comparative analysis was undertaken using descriptive survey and cross-sectional design to explore the effects of two curricular approaches (Problem-based learning and traditional) used in Comprehensive basic nursing programme on the development of clinical reasoning abilities of nursing students was undertaken. Triple Jump Exercise as the data collection instrument was used to evaluate students' abilities in clinical reasoning.

Using quota sampling technique, a convenience sample of 87 subjects was selected from two nursing institutions using these two approaches. These were student nurses in their 1st, 2nd and 4th year levels of study. Using individual interviews, subjects were required to think aloud and verbalize their clinical reasoning after being presented with a clinical scenario. Subjects' verbalizations were quantified, based on the criteria specified in the evaluation form of the data collecting instrument, and total scores were obtained. Analysis using computer software package (SAS) was done to provide for descriptive and statistical summarisation. Though descriptive analysis through mean scores of clinical reasoning showed slight differences resulting from the curricular approaches used, this was not confirmed statistically as the two factor ANOVA and Tukey's method revealed no significant differences by approaches nor their interaction with level of study. Only levels of study had significant differences at p=0,0001, with senior levels outperforming their juniors. These findings therefore conclude that PBL and the traditional approach perform on a similar level in clinical reasoning. Nurse educators are therefore challenged to identify effective strategies to enhance and nurture clinical reasoning. One strategy, which this study recommends, is the use of case-based approaches in CBNP.

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CHAPTER 1

1.1 INTRODUCTION AND BACKGROUND

The grounding of nursing education within higher education has potential for major challenges to the professional role of a nurse. The major paradigm shift in higher education that resulted in the change of focus from curricular content to curricular outcome has been mirrored by changes adopted in the nursing education system in its basic programmes, aiming at ensuring that nursing graduates are equipped with skills in analysing, reasoning, research skills and decision making (Rane-Szostak & Robertson, 1996). Societal demands for consumer-focused care and quality service delivery, changes in the nature of health and diseases, and technologic and scientific advances also have significantly influenced the practice of professionals in the field of health care (Vaughan-Wrobel & Henderson, 1997). Kramer (1993) also asserts that the above factors require nurses who can synthesise and integrate multiple forms of knowledge in order to achieve and make health affirming decisions that embody changing values.

Governmental policies, e.g National Health policy on redistribution of health services, also contributed to changes in the health care delivery system with the resultant adoption of a Primary health care approach (ANC, 1994). These policies, therefore according to Khumalo & Gwele (2000), challenge the nursing education system of South Africa to aim at producing nurse professionals who are capable and competent in the delivery of primary health care.

The increasingly complex and demanding nature of nursing practice in today's modern, comprehensive health systems focused on primary care, requires nurses to possess expert outcome-oriented clinical reasoning skills displayed through abilities to make quick decisions and formulate independent judgements about patient care strategies (Fowler, Herman & Pesut, cited in McCloskey & Grace, 1997).

Clinical reasoning has been viewed by McCloskey & Grace (1997) as similar to but not synonymous with critical thinking and they cite Higgs & Jones' definition of clinical reasoning as the thinking and decision making processes that are integral to clinical practice Various conceptualizations of clinical reasoning and critical thinking as related concepts have been found in nursing literature. These, amongst others, include Girot's (2000) view of critical thinking as a complex cognitive process requiring higher order thinking and applicable in clinical decision-making in clinical practice. Brookfield (1987) and Kramer (1993) view critical thinking and clinical reasoning as related skills basic to nursing practice; skill-based practices incorporating social, affective and embodied ways of knowing.

Clinical reasoning is also viewed as critical thinking embedded in practice or as an essential component of clinical decision-making, the outcome of which is clinical judgement (Pardue, 1987; Kataoka-Yahiro & Saylor, 1994; Maynard, 1996; Fowler et al in McCloskey & Grace 1997).

A definition by Bandman & Bandman (1995) and Watson & Glaser (1991) cited by Girot (2000) states that critical thinking is the ability to solve a problem, to reason logically, to analyse information and form conclusions. This definition clearly indicates the interdependency and interrelatedness of the two concepts to each other.

The growing interest in nurses' reasoning skills, with current emphasis on critical thinking, has raised important questions regarding modes of reasoning necessary for practice and how these develop and ways to foster their development. Studies undertaken by various authors into the impact of nursing education on the development of clinical reasoning provided mixed findings, with some asserting the existence of the influence of educational preparations on clinical judgement, decision making and critical thinking whilst others refuted the existence of such correlation (Pardue, 1987; Brooks & Shepherd, 1990; and Kintgen-Andrew,1991 cited Matthew & Gaul, 1979; Scoloveno, 1981; Frederick & Mayer, 1977). Clinical reasoning and critical thinking were found to have no significant relationship as research subjects who scored high in critical thinking as measured by the Watson & Glaser Critical thinking Appraisal tool did not necessarily score highly in clinical decision making skill. Though nursing students of different educational preparations (e.g. diploma, baccalaureate degree and master's programmes) showed some differences in critical thinking skills, none significant in their clinical decision making skills was marked (Pardue,1987; Brooks & Shepherd, 1990; Vaughan-Wrobel et al, 1997; Pepa Brown & Alverson, 1997). Concerns about the mixed findings of these studies led to numerous recommendations by various researchers on a need to explore further and to search for better methods to teach and develop clinical decision making, critical thinking and clinical reasoning skills in undergraduate nursing students (Padrick,1987; Tanner, 1993; Roberts, 1999; O'Neil, 1999; Taylor, 2000). Taylor (2000) further emphasized the need to understand cognitive problem-solving strategies used by nurses in clinical practice.

In response to these recommendations various teaching-learning strategies and models to develop these practice-based skills have been introduced.

The nursing process seen as the linear problem solving model in nursing has been heavily used to teach and evaluate students' clinical reasoning (problem solving) skills. Though Pardue (1987) asserts that the nursing process has been regarded as encompassing decision-making as well as general cognitive skills in all its phases, the problem-solving approach has met wide criticism. Criticism is levelled at the deductive nature of problem-solving, which fails to capture all the thought processes involved in clinical decision making (Taylor, 2000). Pesut et al (1985) in McCloskey & Grace (1997) and Taylor (2000) view the limitations of the nursing process as impeding the acquisition of clinical reasoning abilities required of nurses in today's practice and describe the nursing process as problem-oriented rather than outcome-focused as it serves as a tool of planning care and does not represent the actual complex cognitive processes involved in care giving. An outcome-focused model that has steps to ensure reflective judgement and contribute to quality patient care have been advocated by Pesut et al in McCloskey & Grace (1997), namely the Outcome, Present state Testing Model (OPT).

Pre-registration nursing programmes have been targeted as they, according to Roberts (1999), are regarded as the chief vehicles for development of specific competence skills, one of which is clinical reasoning, in novice practitioners
Basic nursing programmes have been upgraded with nursing regulatory bodies, both internationally and locally, endorsing emphasis on the development of the abilities for critical, analytic and creative thinking in nursing students in basic programmes (SANC,1985; NLN,1983, cited in Strickland & Waltz, 1988). From 1986, transformations of undergraduate nursing programmes were taking place, the 3-year hospital-based diploma being replaced by the 4-year Comprehensive Basic Nursing Programme (CBNP) offered in the nursing colleges affiliated to the Universities.

Some universities with nursing departments have already adopted problem-based learning as an approach used in their basic nursing degrees. These include among others the University of Natal and the University of Transkei. Currently nursing colleges, have been challenged to follow suit in adopting problem-based learning as an alternative educational strategy.

The adoption of problem-based learning as an educational strategy has been viewed as an effort to move away from content-focused learning approach as its earlier proponents Barrows (1985) and Boud & Felleti (1996) advocated it as an innovative tool to develop students' critical and clinical reasoning skills together with self directed learning. Its emphasis on the use of clinical problem situations endorses the importance of context in the learning process. According to Barrows (1994) the early immersion into the culture of caring as a professional, makes students conversant with ambiguities of practice, the limits of knowledge, moral and ethical dilemmas in health care delivery and thus enables them to apply what they have learnt in class in a practice setting and to use thinking processes required in clinical work (Barrows, 1994). This approach is believed to be a remedy to the theory-practice gap and enhances development of clinical reasoning skills.

The bridging of the theory-practice gap, according to Quinn (1985), requires an environment that fosters a learning climate conducive to the teaching and learning process. Alfaro-Lefevre (1995) emphasises that one of the attributes of such a learning environment includes intellectually challenging clinical experiences and opportunites that stimulate thinking like a nurse in realistic client-nurse interactions. Story in Strickland & Waltz (1988) also, argues that what is needed is a clinical learning atmosphere that is open, allowing students to risk-making their decisions and also where risk taking is rewarded.

All clinical nurse practitioners, clinical instructors and preceptors are challenged to ensure that such clinical learning environments conducive to student learning are promoted and ascertain whether clinical practice settings do offer students crucial learning experiences and socialise them to be clinical reasoning agents.

As problem-based learning has been a new concept in South African nursing education system, only limited research work has been undertaken on the concept in a few nursing institutions where the approach has already been implemented in their nursing programmes. The few studies have mainly been based on exploring attitudes of nurse educators to problem-based learning and its implementation (Mhlauli, 1999; Khumalo & Gwele, 2000). Most empirical work on problem-based learning has been found in medical education, with the focus being to compare problem-based learning (PBL) approach with traditional approach and/or a mixed approach where both are used (Bouhuijs et al, 1993; Regan-Smith & Woodward cited by Barrows, 1994; Deretchin, Hamilton, Hawkins & Contant, 1999; Davis & Harden, 1999)..

Most of these studies reveal that significant differences appear between medical students trained in the traditional approach and those of PBL in the learning behaviours and styles, internal motivation and self directedness. In these aspects the PBL students performances scored higher than those who followed the traditional approach (Barrows, 1994). In nursing education few studies comparing the two approaches have been found. A study undertaken by Mtshali (1999) using students undertaking a basic nursing degree following PBL, and diploma students of Comprehensive Basic Nursing programme .(CBNP) using the traditional approach, compared them on their ethical decision making skills. The findings revealed no significant differences between the two different groups of students using these two approaches.

It is therefore evident that though much has been written regarding the potential benefits of problem-based learning there is little empirical evidence as to how the outcomes might differ from those of the traditional curricular approaches (Bouhuijs et al 1993). To the researcher's knowledge, there has been no study comparing curricular approaches in nursing programmes with regard to the development of clinical reasoning abilities in nursing students. This therefore gave the researcher the impetus that this study be undertaken to compare the effects of the two approaches, namely, problem-based learning and traditional approaches, on enhancing clinical reasoning abilities of basic nursing students.

1.2 PROBLEM STATEMENT

Recent reforms in nursing education curricular approaches, mostly in pre-registration programmes have carried the assumption that the reforms will benefit nursing practice. Many sources highlight the advantages and benefits these reforms should bring, but their effects in nursing education programmes have not been well evaluated (Bouhuijs et al, 1993).

The use of these two curricular approaches, namely traditional and problem-based learning, in pre-registration nursing programmes offered either at diploma and/or degree level, has also raised much interest and debate as to which of the two approaches in the nursing education system more effectively ensures production of an efficient, competent nurse practitioner with expert clinical reasoning skills essential for providing highly skilled quality care grounded in a sound knowledge of the science of nursing.

In a clinical teaching situation where endeavours are made to link what is taught in classroom and what is experienced in a clinical practice setting thus bridging the theory-practice gap, concerns are to ensure development of competent practitioners with the ability to provide safe, competent care which Taylor (2000), describes as depending on good clinical problem solving skills. It is therefore imperative to gain better understanding of cognitive problem solving strategies used by nurses in clinical practice and approaches that best enhance their development.

The question arises as to which of the two approaches, namely traditional and PBL approaches, enhances the development of nurses' clinical reasoning skills better?

1.3 PURPOSE OF THE STUDY

This study seeks to explore and describe the effects of the two different approaches in enhancing the development of clinical reasoning skills in nursing students following Comprehensive Basic Nursing programmes (CBNP).

1.4 RESEARCH QUESTIONS

The answer to these questions will be sought:

- How do clinical reasoning abilities of basic nursing students following CBNP but using two different approaches, compare?

- Is there progression in the development of clinical reasoning skills from beginning to the end of students' training programmes offered in two varying approaches?

1.4.1 Research Objectives:

The answers to the above questions will also ensure that the objectives are met. These are to :-

-determine the differential effects of the two approaches on the development of clinical reasoning;

-compare the clinical reasoning abilities of nursing students from the two curricular approaches;

-determine and describe any progression levels in the development of the clinical reasoning skills of basic nursing students following two different curricular approaches, from the beginning to the end of their training programmes.

1.4.2 Research Hypotheses:

It could be hypothesised that within the two groups of nursing students following CBNP:-

- Clinical reasoning skills are better developed in students following the PBL approach than those following the traditional approach.

- The progression in the development of clinical reasoning skills from entry to end of training programmes is more marked in students of PBL than those of traditional approach.

1.5 SIGNIFICANCE OF THE STUDY

A better understanding of the strategies for enhancement of critical thinking and clinical reasoning has been deemed essential to facilitate curricular decisions by nurse educators (Angel, Duffey & Beylea, 2000). Considering the current reforms in nursing education systems, the findings of this study should have an influence on various transformations, specifically pertaining to curricular approaches in nursing programmes.

The concept of clinical reasoning has become the core of today's nursing practice, therefore the aim of this study to examine and gain more insight into this concept in Comprehensive Basic Nursing Programmes will add information that will benefit the nursing profession. As one of the approaches in this study, i.e. PBL, is still a new concept in nursing education, findings of this study should add to the theoretical underpinnings concerning this approach and reveal whether PBL aims are actually demonstrable or not.

A thorough practice-based understanding of the development of clinical reasoning skill, will assist nurse educators in developing and structuring clinical nursing methodologies that are more reflective of clinical practice and thus help to narrow the educational-practice gap (Jenks, 1993).

It is hoped that this study will reflect refinement and progression levels of the clinical reasoning skills of each group of students during their training and that these results in turn will enable nurse educators to evaluate their basic nursing curricula for evidence of strategies or approaches that best foster development of these skills in clinical practice areas.

1.6 BRIEF METHODOLOGICAL SYNOPSIS

Though this aspect of this study will be detailed in subsequent chapters to follow, a brief overview of what it entails is discussed here.

A comparative descriptive study using a cross-sectional design will be undertaken. This design is deemed suitable for this study because of the time frame the researcher is allowed her study. The study population comprises of students following basic nursing programmes of two different approaches i.e traditional and problem-based learning at their 1st, 2nd and 4th year levels of training. Two universities with nursing departments utilising two curricular approaches (PBL and traditional) in their undergraduate nursing programmes at degree level, were used as the research site.

Quota sampling technique which incorporated convenience sampling of subjects from the two groups of nursing students was done.
The Triple Jump Exercise was used as a data collection instrument and scores on its evaluation form were analysed statistically using SAS.

1.7 STRUCTURAL OUTLINE

The structural outline of this study is organized into five chapters. Each chapter begins with a brief introduction to the central theme of the chapter and ends with the main conclusions. The conclusion gives a brief reflection on important issues raised in the chapter.

In Chapter 1, an introduction to and background information about the study problem are given. The purpose of the study was to determine the effect of the two different approaches on the development of clinical reasoning skills of students following a Comprehensive Basic Nursing Programmes (CBNP). The researcher also aimed at establishing the differences in clinical reasoning between the two groups of basic nursing students using two different approaches i.e. the traditional approach and the problem-based learning approach.

In Chapter 2, a review of literature is presented. The literature includes theoretical and empirical literature pertaining to clinical reasoning of nurses in clinical practice. Different aspects related to clinical reasoning were explored. Concepts used interchangebly with clinical reasoning during the literature search include clinical judgement, clinical decision making, critical thinking and/or problem solving.

In Chapter 3, the study design, research settings, data collection and data analysis methods are explained.

In Chapter 4, the data analysis and interpretation of findings are presented.

In Chapter 5, the summary and implications of the findings of the study, study limitations, and recommendations are discusses

1.8 DEFINITION OF TERMS

Clinical reasoning: This term refers to the concurrent, creative, critical thinking process used by nurses in making decisions as to nursing diagnoses and courses of actions for these diagnostic interpretations of data to arrive at a diagnosis and identify appropriate nursing actions (Reilly & Oerman, 1992). In this context of this study clinical reasoning has been defined as a dynamic, cyclic, reiterative process in which observation, analysis, synthesis, deduction, induction, hypothesis generation, hypothesis testing, inquiry-strategy design and the skills of examination are interrelated (Barrows & Pickel, 1991, p125). The terms clinical judgement, clinical decision making and problem solving have been used throughout the study synonymously and interchangeably..

Student : This concept is used in this study to mean a person who is studying or training basic nursing programme under South African Nursing Council regulation R425 of 1985.

Comprehensive basic nursing programme : an integrated basic nursing programme offered either at a degree or diploma level, with duration of 4 years, leading to registration as a general nurse, midwife, psychiatric and community health nurse (SANC, 1985)

Approaches : In this study context, approaches are strategies of instruction and learning used in the teaching-learning situation during the implementation of nursing educational curricula. The two considered here are the traditional and the problem-based learning approaches.

Traditional approach : In this approach a didactic model to deliver instruction both in classroom and clinical settings is used with more reliance on content coverage and objective testing (Loving & Wilson, 2000). A block system for theoretical instruction is used and clinical settings are used for correlation of theory and practice with specific objectives to guide students' clinical learning.

Problem – based learning : In this approach active involvement on the part of the students is fostered and the role of a teacher is facilitative with learning resulting from the process of working towards the understanding or resolution of a problem.

This approach utilises experiential learning by initially assigning students in a clinical setting. Thereafter learning issues are identified and pursued to enrich the understanding of them (Barrows, 1980)

1.9 CONCLUSION:

In this chapter, the problem to be researched has been clearly stated, based on the background knowledge which was the prime motivation for the pursuit of this study. The purpose and significance of the study has been described.

The research questions this study seeks to answer are delineated and a brief synopsis of the methodology to be used is given. These aspects will be discussed in more detail in relevant, subsequent chapters. Concepts commonly used in this study have been provided with operational definitions to ease the measurability of the variables in the study.

CHAPTER 2

2. LITERATURE STUDY

2.1 Introduction

The literature reviewed in this chapter was focused on literature pertaining to the theoretical as well as empirical works on the concept of clinical reasoning. The reviewed literature was used to estimate the potential for success of the proposed study since empirical literature revealed few studies that compared the two curricular approaches, namely, problem-based learning and traditional approaches, and none that focused on the effect these approaches had in enhancing development of clinical reasoning abilities of nursing students doing Comprehensive Basic Nursing Programmes (CBNP) A need was thus shown for further research in this area. Conceptual models of clinical reasoning in this study provided the researcher with a context for examining the problem under study and served as guides to identify systematically the relationship between variables, i.e two different approaches in CBNP and the consequent clinical reasoning abilities of nursing students.

The librarians in the main campus of University of Natal in Durban assisted with local and inter-library literature search and loans. Libraries within the researcher's locality were also used. The literature surveyed was sought out by use of the computer and the Cumulative Index for Nursing and Allied Health Literature (CINAHL). During the survey for relevant literature the following concepts were used as key and related words: clinical reasoning, clinical judgement, decision-making, diagnostic reasoning, critical thinking and problem solving.

2.2 Major changes in health care delivery system and their impact on nursing education

Changes in nursing education developed from changes in health care system and societal needs. Professional nursing continually changes and evolves in response to major trends in medical and human sciences and technology, in consumer health problems and needs and in health care delivery systems as well (Deloughery, 1998).

Advances in medical science such as diagnosing and treatment of HIV/AIDS and advanced technology such as use of computer imaging of the brain and laser surgery, have also had a major impact on nursing. The need for advanced specialization to cope with technological and scientific advances in human sciences also influences nurse education and training and the type of health care provided. The increasing range of treatment available for hospitalized persons and their need for a specialised care with advanced technology such as cardiac, respiratory and oxygen monitors also put great demand on nurses' decision making abilities. Nurses in these areas of acute illness are required to be highly skilled and able to use critical, creative and analytic thinking as they make life and death decisions based on interpretation of information provided by advanced technological equipment (Deloughery, 1998, p89).

Concerns as to how health care systems can deliver cost effective and quality health care services accessible to everyone, resulting in positive health outcomes, have been widely debated and pose major challenges to the health care delivery system and nursing education system. Contemporary societal expectations also influence the nursing professions.

Today's health care consumers are knowledgeable about their rights and their role in health care decision making. They demand consumer-focussed care and quality service delivery from health care providers. In response to the consumers' expectations of quality service delivery in health care services and as part of the Reconstruction and Development Programme, the South African government has adopted working principles of ensuring provision of customer care and client-focused care in service delivery applicable to all its public servants. These are the nine "BathoPele" principles applicable in every public service including health care services, where people are the prime and first consideration (SAMDI, 1999). As more responsibility for health matters is now vested in health care consumers, periods of stay in hospital are minimised with discharges effected during their acute stages and community or home-based care being advocated. This therefore requires nurses to make quick decisions and formulate independent judgement about patient care strategies (Rane-Szostak & Robertson, 1996).

Societal trends, together with governmental policies, have also affected the health care delivery systems. The National Health plan to address inequalities in health service access especially in rural and deprived communities, led to the adoption of the Primary Health Care approach (ANC, 1994). This system demands accountabiltiy in minimising client costs whilst maximising care outcomes. Nurses will be required to possess expert outcome-oriented clinical reasoning abilities. The greater degree of responsibility placed on the nurse professional in the Primary Health Care system challenges the nursing education system of South Africa to producing nurse professionals who are efficient and competent in the delivery of primary health care (Khumalo & Gwele, 2000).

Considering all these changes and challenges, the nursing education system of this country has been forced to exercise an unprecedented vigilance in ensuring that highly effective, efficient and competent nurse professionals are produced. Nursing education programmes therefore have had to be transformed, especially the pre-registration programmes. From 1986 to date, reform in pre-registration nursing curriculae has been in process. The current focus on community-based education and problem-based learning in most of the nursing undergraduate programmes has been seen as the right response to meeting current health care needs and societal demands.

Community-based education (CBE) has been advocated as the system of sensitizing nursing students to community needs and problems early in their training, and this earlier involvement with their communities is an effort to pave the way for their future practice, that will ultimately be community-based. Hunt & Zurek (1997) identify community-based nursing skills and competencies that need to be developed through community-based education in nursing students as including critical thinking and clinical reasoning skills that will assist the nurse to find options for solving client-care problems. These problems may call on the nurse to identify signals of an emergency situation, the need to summon a doctor and/or make adaptations to facilities within the client's home to cater for his/her condition and also to help individuals and families to develop critical thinking skills to be used while working through their own problems (Hunt & Zurek, 1997). Problem-based learning and community-based education are the most appropriate educational-learning approaches to equip nursing students with the essential skills needed in both comprehensive and primary health care delivery systems.

Clinical reasoning skills therefore have been seen as the cornerstone of successful nursing practice and various authors support the notion that, the need to better understand and develop these cognitive skills essential in nursing practice, is manifest (Tanner, 1993; O'Neil, 1999 & Taylor, 2000).

2.3 Clinical reasoning and models of clinical reasoning

Clinical reasoning has been conceptualised by various authors as encompassing all the thinking processes nurses engage in during nursing practice. Barrows & Pickel define clinical reasoning as :

> "a dynamic, cyclic, reiterative process in which observation, analysis, synthesis, deduction, induction, hypothesis generation, hypothesis testing, inquiry-strategy design, and the skills of examination are all interrelated" (1991:125)

Clinical reasoning, clinical decision making, clinical judgement and scientific method are seen as terms used interchangeably to refer to problem solving processes clinicians employ with patient problems.

Pesut et al in McCloskey & Grace (1997) highlight the interrelatedness of clinical reasoning, critical thinking and decision making. The clinical reasoning is defined as the concurrent, creative and critical thinking processes nurses use to juxtapose and test the match between a patient's present state and his or her desired outcome state, whilst clinical decision-making is viewed as supporting clinical reasoning and is a process of selecting interventions from repertoire of actions that facilitate the achievement of desired outcome state. Critical thinking is seen as a component of problem solving and clinical reasoning in nursing practice (McCloskey & Grace, 1997, p89 & Girot, 2000).

Kataoka-Yahiro & Saylor (1994) in their model of critical thinking for nursing judgement, in an attempt to provide domain-specific definition, define critical thinking as a reflective and reasonable thinking about nursing problems without a single solution which is focused on deciding what to believe and do. They further stress that critical thinking competencies in clinical situation and more specifically in nursing, include diagnostic reasoning, clinical reasoning, clinical decision making and the nursing process (Kataoka-Yahiro & Saylor, 1994). These conceptualizations therefore accounts for the overlapping use of the terms, clinical reasoning, critical thinking and clinical decision-making in various studies that focused on the clinical judgement or problem-solving process used by physicians, nurses and allied health professions.

Theorists of decision making have taken varied approaches in describing decision-making of nurses in different kinds of nursing situations. Some view decision-making or clinical reasoning as an outcome of cognitive processes, the content of which is based on the individual's knowledge basis whilst others assert that clinical reasoning encompasses all cognitive skills implied in patient management and evaluation (Barrows & Tamblyn, 1985; Jenks, 1993; Lauri, Salantera, Chalmers, Ekman, Kim, Kappeli & MacLead, 2001). Lauri et al (2001) identified two types of cognitive processes namely, analytical and intuitive cognitive processes as being implicated in decision making.

- **Analytical cognitive process:**

The analytical process is viewed as a step by step, conscious, logically defensive decision-making process characterised by slow information processing, use of sequential cues, logical rules and task-specific organisation (Lauri et al, 2001).

Hallet, Austin, Caress & Luker (2001) also describe three theoretical perspectives of this process as postulated by different theorists who align themselves with the view that decision making process is a reducible. objectively understood step-by-step process. These are:-

- Pragmatists:

These theorists view decision making as based on certain sources of information, namely, knowledge based on research and tested theories; knowledge based on practice and arising out of nursing experiences and knowledge which is common sense and current in everyday life (Luker & Kenrick cited by Hallet, et al, 2001). Studies by these theorists reveal that practice-based knowledge is the largest category of source of influence This approach is seen to have influence and has developed further as is shown by the move towards evidence-based practices adopted in both nursing and medicine.

- Systematisers:

Their focus is on the decision making process itself which is seen as a structured, schematic entity with a series of definable steps. The stages of decision-making are described as follows;-
Recognition and formulation of a problem; generation of alternatives; information search; judgement or choice; action and feedback.

- Diagnosticians:

These theorists see decision making as a process of diagnostic reasoning.

They highlight four major cognitive activities, similar to those of systematisers, on which diagnotic reasoning depends, namely:-

-attending to available cues;

-generating tentative hypothesis about cues;

-gathering data about tentative hypotheses and

-evaluating each hypothesis based on the data to decide on the diagnosis (Hallet et al, 2001).

- **Intuitive process:**

Intuition is viewed by theorists as problem-solving and use terms like "gut feeling", "pattern recognition", "know-how" and "tacit knowledge" to describe it (Jenks, 1993; Hallet et al, 2001 & Lauri et al, 2001). Intuitive cognitive process is viewed as independent of any linear problem-solving process, with its key characteristics being rapid, effortless information processing which can be validated (Lauri, et al, 2001). Intuition is based on a number of techniques; i.e

-pattern recognition;

-ability to grasp a fact, truth or situation as a whole and

-capacity to draw on a range of past experiences to draw out salient points in the encountered situation which according to Jenks (1993) is described as the third theory in decision making, that of experiential pattern of knowing.

Jenks (1993) describes the experiential pattern of knowing as based on the notion that nurses move from a novice stage of reliance on theory and reducing situations into discrete parts, to a stage of expert decision making based on experience-driven paradigms of the whole situations.

This theoretical construct of the influence of experience in decision making can be observed further in the development of abilities to perceive directives for action and a growing sense of responsibility for patient outcomes in the nurses' clinical practice.

Besides the two cognitive processes of clinical reasoning discussed above, i.e analytical and intuitive cognitive processes, Barrows & Tamblyn (1985) identify important aspects within the clinician that are valuable in clinical reasoning. These are seen as adding personal art to the science of clinical reasoning. The clinician's personal style in ensuring effective interpersonal rapport, communication and compliance; his ability to adapt his approach and manner to perception of the personality, needs and expectations of patients, showing sensitivity to the human elements, use of body language and probing in order to encourage patients to relate concerns all contribute to effective clinical reasoning (Barrows & Tamblyn,1985).

Cognitive aspects of decision making have been seen as complex and highly variable (Jenks, 1993). Cognitive approaches in decision making are varied in response to the type or complexity of the clinical situation the clinician is faced with Various models have been designed to gain understanding of the clinical reasoning process and different theories of clinical decision-making form the basis of these models. For this study, three of these clinical reasoning models found in medical and nursing literature will be discussed. These include the following:-

2.3.1 Nursing process model

The nursing process has been seen as a scientific method used to provide a structural framework for nursing practice. Barnum (1998) defines it as a tool and methodology of nursing profession used to help nurses to arrive at a decision and to predict and evaluate consequences

A great deal of conceptualization about the nursing process model has been found in nursing literature with various authors describing the nursing process as providing a structure using a systematic, rational and linear approach for nursing care, leading to sound judgement and actions. Some view it as a deliberate intellectual activity comprised of five components that are orderly, invariant and inflexible (McFarlane of Llandaff and Castledine, 1982; Christensen & Kenney, 1990; Mellish, Brink & Paton, 1998; Barnum, 1998; Roberts, 1999;). Kataoka-Yahiro & Saylor (1994) view the nursing process not as an all-encompassing competency but one of the critical thinking competencies with its format unique to the discipline of nursing. Dowie cited by Harbison (1991), describes it as a general inductivistic model of reasoning because of its reliance on gathered data, before any decision can be made, and its orderly process of data sorting and classification. Harbison also sees it as derived from a rationalist perspective with its linear progression through the stages of its process. Seen as a five-staged process with interrelated stages in which conclusion of one stage depends on those reached in the prior stage, the nursing process comprises of the following stages that flow in an unvaried, prescribed and inflexible sequence:

- Assessment : which comprises data collection through interviews, history taking, examination and review of patient records.

- Diagnosis: which entails data analysis and synthesis through identifying gaps, categorising, recognising patterns and comparing norms and models to declare diagnostic statements of actual and potential concerns.

- Planning : entails establishing priorities, goal/objectives, selecting strategies then writing nursing orders and describing rationale.

- Implementation: which is performing interventions, collaborating, ongoing assessment, updating of plans and documentating of responses.

- Evaluation: which involves comparing responses to objectives/goals and determining progress and revising plan of care. (Christensen & Kenney, 1990)

The nursing process has been a universal model used in colleges of nursing to teach the problem-solving approach to nursing care and also in the evaluation of students and clinical practitioners in their care-planning skills (Harbison 1991). It has also been used in nursing research studies on the problem-solving process as a framework (Roberts, 1999). Despite its wide use as a valuable tool in nursing practice, there has been much criticism by various authors of the nursing process as a model of problem-solving process. Jones & Brown, cited by Kataoka-Yahiro (1994) and Pesut et al (1995), in McCloskey & Grace (1997) argue that the nursing process may impede the profession's development as a legitimate science since it may not include the complex thinking processes involved in nursing practice.

Benners (1984), cited in Deloughery (1998) asserts that the rigidly controlled system of the nursing process is better used at lower levels with novice practitioners and would not be suited to expert nurses as it would impair their work. Its deductive nature is seen to obscure complex thinking processes involved in clinical reasoning and reduces the nursing process to just a tool for planning care activities (Tanner, 1987; Pesut et al (1995), in McCloskey & Grace, 1997; Taylor, 2000).

The nursing process has therefore been viewed as a problem-oriented tool and not outcome-focused. A need for an outcome-focused model that would ensure reflective judgement and contribute to quality patient care has been voiced by Pesut et al (1995), cited by McCloskey & Grace (1997) namely, the Outcome, Present state Testing model (OPT)

2.3.2 Outcome, Present state Testing Model

This model views clinical reasoning as a nonlinear-iterative process that takes into consideration the outcome state of the client, present state of client and testing for the match or mismatch of the two states (Pesut et al, in McCloskey & Grace, 1997). Its components comprise:-

- **reflection :** which consists of self, task and strategy knowledge as well as skills in monitoring and analysis;
- **cue logic:** which is a strategy to organise data either inductively or deductively that is used to frame the test;
- **testing :** entails reflexive comparison of the client's outcome state with his present state, to reach clinical judgements which are the conclusions and decisions based on the test (Pesut et al,1995, cited by McCloskey & Grace, 1997).

Clinical decision-making, according to this model, will ensue as a process of selection of nursing interventions that enhance client transitions from the present to the desired outcome state If untoward matching results are obtained, reflection reactivates concurrent processing of available cues using clinical reasoning and creative decision making about the client in context to come up with the best intervention.

When a match between desired outcome state and the present state of the client is obtained, the reasoning task is finalised (Pesut et al, 1995, in McCloskey & Grace, 1997). According to this model clinicians use cognitive operators and cognitive strategies when engaged in clinical reasoning. Cognitive operators are defined as reasoning processes that produce judgements about incoming information and facilitate self regulatory judgement while cognitive strategies are heuristics nurses use to reduce cognitive strains when processing multiple cues and include induction, deduction cue connection, hypothesising and reflexive comparison (Pesut et al, 1995, in McCloskey & Grace 1997).

This model has been seen as a move beyond and alternative to the problem-oriented nursing process model. The strengths of the model lie in its foundation of reflective judgement and its iterative and recursive nature which honours the holistic nature of nursing and that it supports the revolution in clinical reasoning. Despite these advantages, this model has not been widely used as a basis in research studies of clinical reasoning. McCloskey & Grace (1997) suggest a need to develop this model further.

2.3.3 Hypothetico-deductive model of clinical reasoning

This model emanated from the empirical works of Elstein & Bordage (1979), cited in Harbison (1991) who analysed the judgements of physicians who believed that their judgements were intuitive. Their study revealed that the physician's decisions were not intuitive but rather based on a cognitive strategy - called the hypothetico-deductive reasoning approach (Harbison, 1991). Barrows (1994) describes this model of clinical reasoning as a logical reasoning process used by clinicians to deal with the challenges offered by the patient's problems. This is the model which is widely and commonly used in problem-based learning curriculae of medical education and most literature refers to it as the physician method of clinical reasoning. In this study, this model is used to provide conceptual framework that will form a basis for the variables under study. The following stages comprise this model:-

- Initial concept formation

This is the first step in hypothetico-deductive reasoning and it is activated by the initial encounter with the patient. It is assumed that even before the actual encounter with patients, the clinician has some information about the patients, for instance from the notes of the referral letters they bring. During interaction with the patients additional information is gathered through observing some cues within the patients' initial presenting complaints, such as general appearance etc.

This process, according to Eddie & Clanton, in Harbison (1991), is the selection of pivotal findings which could provide the bridge from the problem into the extensive knowledge base possessed by an expert clinician.

The information perceived at the beginning of an encounter is continually analysed and assembled into an initial concept through the reasoning process.

- Generation of multiple hypotheses

As the clinician assembles the initial concept, a number of hypotheses emerge in his mind. Generation of hypotheses is defined by Barrows (1994) as an inductive, lateral thinking activity used by clinicians to think of possible conditions suggested by the patient's problems and forms the creative aspect of patient problem solving. Hypotheses are ideas, guesses, hunches and impressions that serve as label of patients' condition.

Hypotheses are brought about by association of the patients' complaints with a number of patient observations e.g. patients' age, sex, manner and body habits, these representing diagnostic entities, syndrome, physiological or pathological mental representation in the professional's mind. Hypotheses provide guidelines as to what kind of data and/or examinations could be pursued in order to define the patient's problem and be able to manage it successfully. Usually two to five hypotheses can be generated.

- Inquiry strategy

This is the step activated by the hypotheses generated and it is a means to obtain new information beyond that initially presented. Barrows & Pickel (1994) view the inquiry process as a disciplined, logical, vertical, deductive cognitive process used to select particular strategies and clinical skills to be used in collecting data to support or weaken the hypotheses.

Clinical skills selected include psychomotor skills used in the interaction with the patient as well as interpersonal and communication skills e.g.history taking and physical examinations.

- Data analysis and synthesis

Accumulated data gathered during the inquiry needs to be organised or condensed into some forms that would enable the formulation of patient's problem.
Analysis is done against the hypotheses to ascertain whether these are accepted or rejected and the cause and effect relationship is identified. Barrows (19985) explains this stage as an ongoing concise statement of important data to strengthen/weaken hypotheses. Through data synthesis the present and changing shape of the structure of the patient's problem is recorded.

- Diagnostic and treatment decision

This is the end result of clinical reasoning that ends the encounter with a patient. The clinician decides what the underlying responsible mechanism involved in the patient's problem is and selects strategies to modify, correct or manage the problem identified.

2.3.3.1 Pitfalls of hypothetico-deductive clinical reasoning

Round (2001) explains these pitfalls as cognitive biases commonly occurring during the clinical reasoning process. Several common features of these biases which Barrows (1994) describes as pathologies in clinical reasoning include:

- Anchoring:

This is the clinging to one initial hypothesis throughout the patient encounter despite additional information that suggest refuting such a hypothesis, because the student does not look for this information or negates it.

- Premature closure:

This is a variation of the above. The initial hypothesis is accepted as correct immediately supportive data is obtained. No alternative hypotheses are pursued and validated.

- One hypothesis at a time:

This is an inefficient and time-consuming process as students will take one hypothesis, verify data, search for solutions and when a diagnosis cannot be establish the process is re-started.

- No hypothesis:

Students may deliberately ignore the hypothesis or not generate one and depend on memorised questions. Their inquiry will be menu-driven, that is using a long list of organ system review.

- Incomplete set of hypothesis

Too narrowly generated hypotheses or lack of an important hypothesis may lead to incorrect diagnosis

- Disengaged inquiry:

A good set of hypotheses may be generated but no inquiry strategies are carried out. Instead a routine set of questions are asked. Eventually no better idea ia gained of the probable diagnosis than the student had initially.

- Ineffectual inquiry:

No logical, deductive strategies are used to separate, differentiate and evaluate competing hypotheses.

- Endless inquiry without decision:

Inconclusiveness and continuous data gathering even after reasonable information for diagnostic purpose has been obtained.

- Forcing diagnosis:

This is jumping into a conclusion about disease entities, especially those that are commonly known, and asking direct and implying questions to confirm this diagnosis. Overreading and overinterpreting questionable or equivocal patient responses may also lead one to jump to a conclusion (Barrows, 1994)

The existence of the problems listed above within clinical reasoning endorses the belief that hypothetico-deductive reasoning process is a complex skill which requires repeated practice with feedback to develop fully (Barrows, 1994). Clinical practice settings have been deemed the arena to develop students' reasoning abilities.

This study used the hypothetico-deductive model as a basis to determine variations, if any, of clinical reasoning skills among nursing students of differing curricular approaches in their Comprehensive Basic Nursing Programmes.

2.4 Teaching and evaluation of clinical reasoning:

Various clinical reasoning models, including some discussed above have been used as bases for teaching and evaluating clinical reasoning in nursing practice.

For instance, the nursing process has long been the main vehicle to teach problem-solving, despite suggestions that it may not in reality reflect the way individuals think (Roberts, 1999). Andrew & Jones assert that one recent educational method for promoting clinical reasoning is problem-based learning using hypothetico-deductive technique, the model previously discussed in this text. The process itself is seen as an essential element in developing problem-solving skills so that when students are qualified they can apply same method to patient care.

Clinical reasoning case studies that closely resemble actual patient encounters have also been advocated as powerful tools for teaching and evaluating clinical reasoning. Lee & Ryan-Wenger (1997) describe the clinical reasoning case study as a rigorous academic encounter for simulating the iterative clinical reasoning process occurring in an actual clinic in which the nurse is required to think aloud as the encounter unfolds. It explicates and substantiates the nurse's thought processes underlying each decision to collect objective and subjective data. Its unique characteristics include:

-discussion of the working diagnosis and certainty about the decision;

-selection of the single most important objective and subjective findings leading to diagnosis;

-listing chronologically diagnostic hypotheses that were generated throughout the patient encounter; and

-analysis of costs, diagnostic tests, medications and treatments (Lee & Ryan-Wenger, 1997).

The use of these case studies in the evaluation of clinical reasoning has been widely researched with empirical work indicating a variety of tools used to assess clinical judgement/decision-making process.

The commonly used measuring instruments included verbal protocol analysis; patient management problem simulation; clinical decision-making analysis; scales and the Triple Jump Exercise.

- Verbal protocol analysis:

This entails interpretive measure of verbalization by subjects whilst in the process of clinical reasoning. Fowler (1994) and Le Breck (1987) view this a valuable tool for discerning underlying cognitive processes in clinical reasoning. Subjects are either instructed to "think aloud" whilst they are solving a problem by narrating how they arrive at a diagnosis or problem solution or to retrospectively recall their thoughts after solving a problem. These verbalizations, together with whatever actions a person takes in solving a problem, are recorded and analysed phrase by phrase. Each phrase represents an assertion about the task or single act of task-specific behaviour (Kahney, 1986; Le Breck, 1987).

Though this measure has been used in nursing research it has drawbacks. Kahney (1986) argues that a good and valid verbal protocol is difficult to obtain since subjects may report something different from what they actually did in an attempt to justify themselves, leaving many of their thoughts used in problem solving unavailable and unspoken.

Nisbet & Wilson, cited by Kahney (1986), also argue that protocols do not reveal the actual cognitive processes as subjects do not have introspective access to all the higher mental processes involved in problem solving. For instance, some processes are automatic and unconscious and cannot be verbalised e.g. pattern recognition process which is automatic. The subject statements only permit us to infer that a particular mental process occurred.

- Patient Management Problem Simulation

Tanner (1983) describes patient management problem simulation as a situation where the examinees are presented with an initial description of a patient and are required to make judgements as to what type of data should be obtained and what actions should be implemented. After making all these selections from a variety of possibilities they are then given feedback about the consequences of their choices. Scoring is based on whether the selections made by the examinees tally with the items the panel of experts deem appropriate. Simulated cases may either be written or filmed. This measure, though widely used in nursing research has, like all simulation tests, been viewed as not measuring clinical judgement to the extent it would be found in actual clinical practice.

- Clinical decision making analysis scale

This entails the use of a numerical scale to assess clinical decision-making abilities in nursing through the use of nurses' verbal reports on how they engage in decision-making during their care-giving process. This method addresses perceptions of nurses about their own decision-making in clinical practice and does not examine the activity itself (Girot, 2000). For example, Jenkins' Clinical Decision Making in Nursing Scale (CDMNS) uses a Likert-type scale to measure respondents' answers to a 40-item questionnaire, divided into four distinct categories, assumed ideal for making clinical decisions. Items in the CDMNS are rated from 5 (always) to 1 (never), to reflect perceptions of behaviour while caring for clients and these ratings are summed up to make a total score of 40 - 200. A high score indicates more competent decision-making (Strickland & Waltz, 1988).

Critics of this measuring instrument base their argument on the fact that answers in response to the questionnaire indicate the respondents' views on their decision-making and may not necessarily represent their actual decision-making in clinical practice.

- Triple Jump Exercises

This measure of clinical reasoning is based on the hypothetico-deductive reasoning model. Callin & Ciliska (1983) describe the Triple jump exercise as an experiential exercise which allows students to observe and evaluate their problem-solving behaviour while simultaneously verifying their self assessments with another person. The Triple jump exercise has its origin from McMaster University, Canada and has been widely used in problem-based learning curricula. Its popular assessment format entails presentation of a student with an initial patient problem by two people, one tutor and the other a clinician. The student is then required to ask questions to obtain essential data that will enable him to understand fully the presented patient problem.

As the process continues, the student is required to state the rationale for the actions he/she thinks are deemed necessary, his thinking and the knowledge he might have relevant to the patient problem and to indicate the knowledge he feels he needs to understand the patient problem (Barrows, 1994). A specified time is set to allow the student to look for this information after which he is asked to review his problem formulation, based on the new knowledge he has obtained during self study and how he plans to manage the patient's problem .

Besides the Triple Jump exercise being a powerful tool in assessing students reasoning, Barrows (1994) asserts that exercise enables students to present their ideas in a logical and organised way. This is a measurement this study is advocating to use to determine differences in clinical reasoning of students of two different curricular approaches following basic nursing programme at a degree level. A detailed description of the Triple Jump exercise will be give in a subsequent chapter.

2.5 Approaches in Basic nursing programmes

For some time the traditional approach has been the sole approach used in nursing education programmes. With current reforms in higher education innovations in teaching and learning have been introduced. Problem based learning has been introduced as a result of these innovations but has been partially adapted in nursing education system worldwide. In South Africa few nursing education institutions have implemented this approach in their curriculae, for instance, University of Natal and University of Transkei have been using problem-based learning in their undergraduate nursing programmes.

2.5.1 Problem-based learning approach

This is an approach which has its origin and early proponents from medical education in McMaster University, Canada. Various definitions of problem-based learning centre around the notion that a problem situation is used as stimulus for learning.

This is explicit in WHO's definition, cited in Mellish, et al (1998) and Barrows & Tamblyn (1980), that problem-based learning is a process whereby a student learns by utilising a problem as a stimulus to discover the information needed to understand the problem and hasten the solution.

Boud & Feletti (1991) view PBL as a way of structuring the curriculum which involves confronting students with problems from practice to provide a stimulus for learning. Engel, cited by Boud & Feletti (1991) shares Barrows & Tamblyn's view of problem based learning as an approach to learning rather than a teaching technique. Engel describes it as a means of developing learning for capability rather than the sake of acquiring knowledge.

PBL has also been seen as the only approach that makes active use of students' existing knowledge. Its intent is to challenge the learner with patient problems she/he will be faced with in practice as a stimulus for learning and a focus for organising what has been learned or is to be learned (Barrows, 1994).

The following features of the teaching-learning process in PBL have been highlighted by Barrows (1994) and Boud & Felleti (1991):

-PBL takes into account how students learn i.e actively involving students in their learning, resulting in self-directedness and learning in the context in which knowledge is to be used.

-Learning issues are used as a dominant force during learning activities, guiding students during selection of literature for self directed learning.

-Emphasis is on learning processes of enquiry which proceed by asking what needs to be known to address and/or improve a particular situation i.e. students are taught how to pursue enquiry.

-Emphasis on integrated learning with subjects not presented separately but rather available for study as they relate to a problem.

-The problem is a central focus for learning basic sciences and clinical reasoning skills and knowledge in an integrated fashion. This integration is possible through utilization of problem simulation formats that present actual patient problems in the same manner they occur in practice and these formats permit student free enquiry process.

-The tutor acts mainly as a facilitator with contributions from both facilitator and student resulting in a shared learning process.

-High motivation and enthusiasm reward students.

From the above characteristics of the teaching-learning process of PBL, the following learning outcomes have been identified as the advantages of using this approach:

- Conception of knowledge, understanding and education in PBL have been seen to encourage open-minded, reflective, critical and active learning.
- Students have control of their own learning activities using a deep approach to learning, a skill conducive to lifelong learning in the health care profession.
- PBL facilitates acquisition of generic competencies valuable in health care practice, including effective clinical reasoning, the ability to be critical and think independently and the ability to self-evaluate.

- Additional transferable skills which include, communication and collaboration productively in groups or teams, are also developed (Barrows & Tamblyn, 1980; Boud & Felleti, 1991; Barrows, 1994; Davis & Harden, 1999 & Johnston & Tinning, 2001).

Despite these advantages the problem-based learning approach has, some drawbacks. These are identified as :

-Students may fail to develop an organised framework for their knowledge after extensive elaborations and accumulation of large quantities of information during their work with a problem situation. Bouhuijs et al (1993) revealed this as leading to diminished accuracy in their diagnostic reasoning.
-PBL inhibits good teachers from sharing enthusiasm for their topic with students and students' identification with good teachers.
-Teachers may not have the necessary skills to facilitate PBL. Andrews & Jones (1996) explain the few colleges which offer this approach as being due to lack of expertise and the fact that those involved are left to learn experientially or by trial and error.
-Students' depth of knowledge is not determined.(Bouhuijs et al, 1993; Andrews & Jones, 1996; Davis & Harden, 1999).

2.5.2 Traditional approach

This is sometimes referred to as the conventional curricular approach. In this approach, the curriculum is content-focused, with emphasis upon teaching facts, concepts and their relationship to a particular subject domain.

The classroom is a setting used for theoretical instruction, which is mainly dispensed through lectures, and this instruction is followed by clinical practice placement of students for correlation of theory with practice. A block system is used to assign students for a period of 1 to 2 months in classroom teaching and then they are allocated to clinical settings for practica. The course delivery in this approach is mainly teacher centred.

2.5.2.1 Key characteristics of the traditional approach

These entail the distinct features that distinguish the approach from the others. These features include those pertaining to the teaching-learning process and the teacher-students role

- Teacher - learner role:

This approach puts emphasis on a teacher-centred learning process with the teacher being solely responsible for what students have to learn. Decisions as to what information and skills students have to learn, how these are to be learnt, and the sequence and pace of learning, all are vested in the teacher (Boud & Felleti, 1991). This approach encourages passivity on the part of learners. Students do not learn to dig information out for themselves but rather regurgitate what has been taught on demand by the teacher (Boud & Felleti, 1991)

- Teaching - learning process

Information learnt during this process is in isolated subjects and is discipline-based with concepts learned within hierarchies of that particular discipline.

Learning is for the sake of acquiring knowledge through rote memorisation. Teaching strategy that is best and easiest in this approach is lecture format (Boud & Felleti, 1991).

From the above characteristics of the traditional approach, Barrows & Tamblyn (1980) single out the followig as shortcomings or weaknesses:

-The traditional approach lacks attention to issues of subject relevance, as content coverage is the main emphasis.
-There is little emphasis on team effort and team work, as students memorise on their own to ensure success in learning.
-Little attention is given to developing skills of enquiry in students as only memorisation of facts is emphasised and
-There is inadequate portrayal of the context of major issues and problems because of content-based learning instead of context-based learning.

From the above highlights of strengths and weaknesses in the two approaches, it is evident that the two approaches are based on different views about the teaching-learning process. Boud & Felleti (1991) suggest these differences pertain to different views held on the notion of expertise and the value of knowledge by the PBL and the traditional approaches.

The PBL approach values knowledge as used in context rather than justifying the structure of a particular discipline and sees expertise as the ability to make sound judgements as to what is problematic about the situation. The traditional approach sees expertise in terms of content (Boud & Felleti, 1991).

From the above theoretical review it can be concluded that PBL is viewed as aiming at developing clinical reasoning abilities in students, but empirical evidence of conclusion is sought.

The differences in the impact these two approaches (PBL and traditional) have in enhancing development of clinical reasoning abilities in basic nursing students is what this study seeks to investigate.

2.5.3 Other approaches

Other approaches that are not commonly found in nursing education include the case-based method.

Though the case-based method has been a well known method in other fields like business, law and medical education, not much has been written about this as a curriculum development approach in nursing education (Christensen, 1987, cited by Uys). A few nursing institutions are considering its use as an appropriate methodology for teaching especially in clinical sciences. The case-based approach utilises case studies as its teaching strategy. Students are presented with a case study to stimulate their ideas through a complex problem analysis of the actual or hypothetical case which provides a means of applying theoretical principles to practice (Dailey, 1992). Uys (1999) asserts that a case-based curriculum can be linked or seen as similar to a Problem-based curriculum. To distinguish between the two curriculum approaches, the differences between the two are clarified using the following concepts:

- Focus of learning:- The case-based curriculum focuses on balancing content and process while PBL is strongly based on the learning process.

- Information given: Complete case information is given to students before a class session in the case-based method, whereas PBL gives limited information and students are left to explore additional information for themselves.

- Confronting the case: In PBL this is done in a group where students analyse the presenting problem together with subsequent data collection and study done individually, whereas in the case-based method, students undertake individual study of the case first before it is discussed in class by the group (Uys, 1999).

2.6 Empirical Review

This review focused on research works done on clinical reasoning process and other related studies. As clinical reasoning in this study has been used to includes such concepts as clinical decision making, clinical judgement and problem solving, all nursing research studies using these terms were surveyed.

Search for ways of enhancing clinical problem-solving ability has been a consistent feature in medical and nursing literature. Clinical decision-making, clinical judgement, problem solving, clinical reasoning, diagnostic reasoning have been studied in relation to critical thinking and level of educational preparation by various nursing researchers. These studies have been unable to show consistently significant relationships existing between these concepts. (Pardue, 1987; Brooks & Shepherd, 1990; Kintgen-Andrews, 1991; May, Edel, Butell, Doughty & Langford 1999; O'Neil, 1999).

Many of these studies for instance reported that high levels of critical thinking abilities are related to level of educational preparation. for instance, studies comparing diploma, associate degree and baccalaureate nursing students in their critical thinking and clinical decision-making skills revealed that baccalaureate nursing students performed better in Watson & Glaser Critical Thinking Appraisal measuring critical thinking, as compared to those of diploma and associate degree (Pardue, 1987; Brooks & Shepherd, 1990; Kintgen-Andrews, 1991).

But no identifiable relationships existed between critical thinking and clinical decision making. This is made explicit by Brooks & Shepherd in the conclusions to their study when they say:

> it does not appear that the higher level of inherent critical thinking ability transfers to the more specific decision-making skills in nursing (1990:396).

Some studies also refute the hypothesis that level of educational preparation corelates with decision making. Brooks & Shepherd (1990) and Pardue (1987) in their studies using subjects of different level of educational preparations i.e master's prepared, baccalaureate, diploma and associate degree nurses, found no statistically significant differences among the groups in decision making abilities.

Girot's (2000) study of whether graduates are good critical thinkers or decision makers, found a highly significant difference in clinical decision making between those exposed to the academic process and those who were experienced non-academics suggesting therefore that those exposed to academia are more effective decision-makers than non-graduates in practice. Scoloveno's study, cited by May et al (1999) also found problem solving abilities correlated with the levels of educational preparation as he found baccalaureate students differed from diploma and associate degree students to a statistical significance.

Roberts (1999) comparing care-planning skills in senior students of integrated degree, diploma and registration courses as general nurses, also revealed the existence of some significant difference among different educational levels in certain aspects of the Stages Model of problem solving. Integrated degree students were found to obtain higher median scores than the others in problem identification, whilst registration course students performed better than their counterparts in the diploma course.

The registration course students' better performances are attributed to the fact that the focus of learning in the registration courses is within a clinical setting, and thus registration course students have potentially more opportunity to develop and refine their care-planning skills.

Studies which seek to identify variables associated with decision-making have also been abundantly found in nursing literature. These studies include studies that focused on understanding cognitive processes involved in decision making and those that identify demographic variables associated with decision making (Jenks, 1993; Lauri et al, 2000).

Jenks (1993) focused on gaining practice-based understanding of clinical decision-making, describing patterns of personal knowledge that include knowing patients, peers and physicians and the quality of these interpersonal relationships as influencing factors in nurses' clinical decision-making. Haffer & Raingruber (1998) studied students' perceptions of how their clinical reasoning skills developed using narrative approach. This study revealed that confidence emerged as a significant aspect of the students' experience. This study concluded that minimising threats to confidence and employing ways of building confidence by empowering students with questioning skills and challenging perceptions of the status quo and offering support, were constructive moves towards promoting of sound clinical reasoning and critical thinking.

Lauri et al (2000) in their exploratory study of clinical decision-making used by nurses working in different nursing settings in five countries, identified two cognitive approaches that were commonly used, as analytic and intuitive cognitive processes.

Professional education and experience, field of practice, type of knowledge and country of residence of practitioner were also cited as significantly asociated with decision-making. Decision-making has been suggested to vary from country to country and in different nursing situations.

With these mixed findings on studies pertaining to the relationship of levels of educational preparation and clinical decision-making, and influences of a variety of factors including approaches in the clinical decision making used by nurses, the nursing education system has been challenged to institute reforms in its education and training programmes.

Some programmes and approaches have to be transformed and replaced by others, for instance the 4 year Comprehensive basic nursing course replaces the 3 year hospital-based diploma and the introduction of problem based learning. The problem-based learning approach has as one of its outcome objectives that of developing students' clinical reasoning abilities. This approach has been a new concept in South african nursing education, hence limited research work on the concept is found. Few studies focused on exploring the perceptions nurse educators have about the implementation and success of this approach within the country's nursing education system (Mhlauli, 1999; Khumalo & Gwele, 2000).

Most empirical work on problem-based learning has been found in medical education since problem-based learning as an educational strategy was first introduced in medical education by McMaster University, Canada. These studies comparing traditional and PBL focused on the differences these two have in developing problem solving abilities, imparting knowledge, enhancing motivation and promoting self-directed learning of medical students (Bouhuijs et al, 1993; Barrows, 1994 and Deretchin, Hamilton, & Contant, 1999).

In a study comparing the effects of conventional (traditional) and problem-based medical curricula by Patel & Norman, in Bouhuijs et al (1993), two distinct modes of reasoning used by the medical students of these curriculae were identified. PBL students used a backward reasoning with a tendency to formulate extensive elaborations which indicated their use of hypothetico-deductive reasoning taught in PBL, whilst students from conventional curricula, though no systematic method of reasoning had been taught, displayed a forward reasoning with a tendency to refrain from extensive elaboration.

Expected developmental changes of both PBL and traditional students from beginning to end of their training revealed that PBL students had less accuracy of explanations during their reasoning process at all levels, making more erroneous statements than traditional students. Berkson, in Bouhuijs et al (1993) produced findings on the problem solving abilities of these two groups of students revealing no significant difference shown by these students in their use of various components of hypothetico-deductive reasoning. Though the hypothetico-deductive reasoning is a mostly emphasized reasoning method in PBL, proficiency in the components of this method did not evolve with progression from begining to the end of PBL curriculum. Studies on the aspect of differences in learning behaviours between students from the PBL and the traditional approach, revealed that PBL students were rated highly motivated and self-directed using deep approaches in learning as compared with students from traditional approaches (Bouhuijs et al, 1993; Deretchin et al, 1999).

Mtshali's (1999) comparative study of ethical decision-making skills used students from the 4-year Comprehensive Basic Nursing course of the traditional approach and B. Cur students following the problem-based learning approach.

The findings of this study revealed that 4-year diploma students performed better in application of ethics in nursing than B.Cur students. Studies in nursing discipline that specifically compare the two approaches on their effect in the development of clinical reasoning have not been found. As clinical reasoning skills are demanded in our contemporary and dynamic nursing practice and are one of the terminal objectives of Comprehensive basic nursing programmes as laid down by the South African Nursing Council (1985), it remains a concern therefore that approaches used within the basic nursing programmes be evaluated for their effect in enhancing development of this highly sought skill of nursing practice.

2.7 Conclusion

Literature study undertaken has revealed no empirical studies in nursing education that seek to explore the effects of the two approaches in developing clinical reasoning abilities of nursing students following Comprehensive basic nursing programmes. Related studies compared the concept of critical thinking with other clinical nursing competencies. The absence of such empirical studies in this area of nursing education at the time of transformation in the profession indicates the urgent need to pursue the present study.

CHAPTER 3

3. RESEARCH METHODOLOGY

3.1 Introduction

In order to explore whether the two approaches (PBL and traditional) used in both Comprehensive Basic Nursing Programmes had an effect on the development of the clinical reasoning abilities of basic nursing students, the students' clinical reasoning skills were assessed using the Triple Jump Exercise. The research questions for which answers were sought were as follows:

-How do clinical reasoning abilities of basic nursing students following programmes with different approaches compare with each other?

-Is there progression in the development of clinical reasoning skills from the beginning to the end of the students' training programmes offered in these two varying approaches?

3.2 Approach Used

In this particular study a quantitative approach was used. The quantitative approach has been viewed as most suitable for studies that seek to describe, examine the cause/effect relationship and determine causality among variables (Burns & Grove, 1987). The quantitative approach has relevance to this particular study which aimed at determining the effect of two approaches used in teaching-learning processes of Comprehensive Basic Nursing Programmes in enhancing the development of clinical reasoning abilities in two groups of student nurses.

The researcher also aimed to describe any progression in the development of clinical reasoning skills of students of both approaches from the beginning to the end of their training programme.

3.3 Research Design

The research design is an overall plan for obtaining answers to the research questions and testing the research hypothesis. Burns & Grove (1987) describe research design as a blueprint for the conduct of a study that maximizes control over factors that could interfere with the desired outcomes of the study and would also spell out strategies that the researcher chose to develop accurate, objective and meaningful information.

This particular study has utilized a comparative descriptive survey. Comparative descriptive surveys are deemed suitable to examine and describe differences in variables in two or more groups and to ensure that large amounts of data are collected. They make use of descriptive and inferential statistical analyses. Descriptive surveys are also useful in providing answers in a descriptive form, describing relationship between variables as they naturally occur which is also an aim of this study. The clinical reasoning abilities of the two groups of student nurses in Comprehensive Basic Nursing Programmes (CBNP) was described in relation to the approaches used in their teaching - learning processes.

Brink & Wood (1988) assert that comparative studies seek not to manipulate but study variables that already exist. Two approaches used in CBNP by two institutions for basic nursing training and education were in place already therefore no variables needed to be manipulated for this study

As one of the objectives of this study was to determine progression levels of clinical reasoning abilities from entry to completion of nursing training, cross-sectional data was used to examine groups of subjects in various stages of their training programmes. Following the two groups through their entire four-year training programme by means of a longitudinal study would be impossible for the researcher's study time frame. Burns & Grove (1987) assume that stages are part of a process that will progress across time, therefore selecting subject at various points in the process should provide important information about the totality of the process.

3.4 Population

Burns & Grove (1987) describe population as the entire set of individuals or elements who meet the sampling criteria of the study. Two types of population exist i.e target and accessible population.

3.4.1 Target Population

Polit & Hungler (1991) define the target population as the aggregate of cases about which the researcher would like to make generalizations. The target population represents a larger group of individuals in whom the investigator is interested. The target population of this study was therefore all students of nursing following Comprehensive Basic Nursing Programmes (CBNP) at degree level, using either PBL or traditional approaches in two Universities with schools of nursing in South Africa.

3.4.2 Accessible Population

The accessible population is an aggregate of cases that conform to the designated criteria and are accessible to the researcher as a pool of subject for the study and from which a sample is drawn (Polit & Hungler, 1991, p254). In this study the accessible population comprised 1st, 2nd and 4th year nursing students of a basic nursing degree (B.Cur) from a PBL approach and those from a traditional approach at the two institutions chosen as the research sites.
1st year level students were included in the study population so as to obtain baseline information of nursing student at the beginning of each nursing programme, whilst 2nd and 4th year were included as they met the eligibility criteria which are a minimum period of clinical exposure in medical and surgical units of ±1 year. 3rd year levels were not included as it was felt that a difference of a year between levels would not give much observable picture of the students' progression in clinical reasoning skills. The progression was to be observed from the 2nd to the 4th year level.

3.5 Sample and Sampling Technique

Sampling refers to the process of selecting a portion of the population that has the characteristics essential to be included in a study which will represent the entire population. A sample therefore is a subset of the unit that composes the population (Polit & Hungler, 1991). Though a sample size of 100 subjects was proposed for the study only 87 participants were available to form this study sample. The three levels of training selected for inclusion in the sample were represented as 10% of 1st years, 45% of 2nd years and 45% 4th years. Eligibility criteria of these levels entailed the following:-
The representation of 1st year students in the study was deliberately minimal as their inclusion was solely to provide baseline information.

2nd and 4th year levels were selected as they had the minimal period of ± 1 year clinical exposure that is believed to have offered them learning opportunities in clinical reasoning in clinical settings and thus would make them eligible for participation in this study.

The quota sampling technique used was a characteristic sampling method which is described by Brink (1996) as a non-probability sampling method, the equivalent of stratified sampling, whose purpose is to draw a sample that has the same proportion or characteristics as the whole population and relies on convenience choice. Quota sampling entails initial determination of strata of the group to be studied and thereafter determines the number of subjects to be in each stratum. This study's strata were determined from the students' levels of training, and three groups of different levels from each curricular approach, were selected. Thereafter, the quota (number of participants) in each stratum was determined as comprising of 10% of the study sample as 1st years, 45% 2nd years and 45% 4th years with individuals selected through convenience sampling (See table 3.1 below).

Though the quota sampling technique is similar to convenience sampling which Burns & Grove (1987) describe as the selection of elements of the study that are readily available at the researcher's disposal, it goes beyond this by further ensuring the inclusion of representatives from certain elements in the population. Thus quota sampling enables the researcher to obtain the desired balance of elements to be included in the study and also allows control of the number of sample subjects with desired characteristics (Brink & Wood, 1988).

Table 3.1: Representation of the two approaches in the study sample size

	INSTITUTION A (TDL)	INSTITUTION B (PBL)
LEVEL 1	n = 9	n = 11
LEVEL 2	n = 14	n = 14
LEVEL 4	n = 19	n = 20
TOTAL	42	45

3.6 Research Setting

Two universities with schools of nursing were used as settings for this study. Both institutions offer Comprehensive Basic Nursing Programmes (CBNP) in their undergraduate programmes at a degree level, using two different curricular approaches i.e. traditional and problem-based learning approaches. These institutions have been referred to as Institution A and B throughout the study text. Institution A is the institution using traditional approach and B uses the PBL approach.

3.7 Data Collection Procedure

After written permissions from the Heads of the two institutions were sought. (See Annexure A) the researcher visited the institutions personally to meet research subjects of the different selected levels that were in the proposed sample. This visit a week prior to data collection was an effort to explain to the study participants personally all relevant and needed information about the study, namely the purpose and objectives of the study, the data collection instrument and the procedure and ethical considerations applicable in this study.

A written letter requesting consent to participate in the study was given to all students who were willing to participate (See Annexure B). Dates for the actual data collection were also discussed and arranged with the participants. Three days were allocated for data collection in each institution. Quiet venues, in one of the small tutorial rooms of the universities were arranged for use during data collection.

The Triple Jump Exercise was used as a data collection instrument. This instrument is commonly used by some institutions with problem-based learning curriculum to evaluate and grade the clinical reasoning abilities of students. The tool was obtained from the School of Nursing, University of Natal – Durban and permission to use it in this study was negotiated with the head of the School of Nursing as it is being used by School of Nursing in the evaluation of their basic nursing students. To elicit the demographic characteristics of the subjects a questionnaire was completed by each subject before each interview session (See Annexure C)

In preparation for using the data collection instrument, the researcher had three days' orientation arranged with the School of Nursing, University of Natal, on how the tool is used and also to participate as an observer during the University's end of the year evaluation of nursing students utilising the Triple Jump Exercise.

Two research assistants were used in this study, both of whom have experiences in the use of Triple Jump Exercise. One research assistant, who is a preceptor in one of the clinical areas locally used for student placement, participated in the interview sessions in order to ensure measures of equivalence and also prevent researcher bias whilst the other assistant was used as a moderator of the clinical reasoning scores during score assigning in the evaluation form.

3.8 Data Collection Instrument

The Triple Jump Exercise was used as a measure of clinical reasoning in this study. This is a structured test consisting of nine phases of problem-solving process. Callin & Ciliska (1983) describe it as a three-stage exercise hence its name Triple Jump, which involves:

- Problem definition
- Information search and study
- Problem synthesis, formulation, intervention and self-evaluation (Callin & Ciliska, 1983).

The Triple Jump exercise comprises nine phases of problem-solving. Students are presented with a clinical scenario or problem situation to analyse and during the process these phases are assessed. Two forms of this exercise namely an evaluator's (tutor) notes and an evaluation form are used during evaluation. The evaluator's notes, which contain open-ended questions to be used by the evaluator as an interview guide, ensure that all subjects are exposed to similar questions. A space to record each subject's response to the question posed is provided and these are written verbatim (See Annexure F). The evaluation form contains a number of items to be evaluated on a numerical scale of ratings from 1 to 5. Each item of evaluation has two criteria that are used for assessing and rating the subjects' performance on the clinical reasoning process and thereafter a numerical value is assigned. The numerical scores are added up and the total score calculated (See Annexure G).

3.8.1 Pilot testing of the instrument

Before administration of the Triple Jump exercise as a data collecting instrument in the actual research, it was first subjected to a trial run during a pilot study.

Six participants, 2 from each level of study, i.e 1st, 2nd and 4th years were evaluated with the instrument. These participants were selected from a non-participating institution and were not part of the population under study.

From this pilot study it was found that some aspects of the instrument were not relevant and related to the hypothetico-deductive reasoning model used for this study. Through consultation with experts in the use of this instrument, one of whom was the supervisor of this study, it was decided that the tool be adapted to this model. Only 4 phases of the instrument thought to be most applicable to this study were selected. These phases were assessed by the first nine items in the evaluation form (See annexure G). The time used for the interviews was determined to last 25-30 minutes. The phases used were:

- Phase 1 : Problem definition

This is the initial phase, wherein the subjects, after being presented with basic information about the clinical situation, are required to identify nursing issues or hypotheses about possible patient problems. The identification of nursing issues correlates with the first two stages of hypothetico-deductive reasoning model namely, hypothesis generation and formation of an initial concept. An item on issue identification in the evaluation form assesses this phase (See item 2 of the evaluation form).

- Phase 2 : Data collection

The subjects are given time to ask questions related to the problem situation and the researcher responds by providing the needed information from the patient's record. This is the inquiry process of the reasoning model.
The items in the evaluation form that address this phase include those for question generation and data gathering (See item 1, 3, 4, 5 & 6 of the tool).

- Phase 3 : Problem formulation

After data collection, subjects are required to summarise the major patient problems and nursing issues that are identified from the presenting situation with supportive data or findings described or identified from collected information. Inferences have to be drawn and this phase correlates with the data analysis and synthesis stage of the reasoning model of this study. Items 7 and 8 pertaining to current knowledge used in analysis and interim problem formulation, are used in this phase.

- Phase 4 : Interventions

From the problem/s formulated subjects are required to identify interventions to be implemented in order to solve the problem and this phase correlates with the last stage in the reasoning model of treatment decision or intervention. Item 9 on the initial nursing intervention assesses this phase.

3.8.2 Administering the data collection instrument

The tool was administered through individual interviews with the two different groups of students from the different curricular approaches at their respective institutions (i.e Institution A for traditional approach and Institution B for PBL). Before the start of each interview session, each subject was oriented on how the interview process would develop, to inform and allay anxiety (See Annexure E). A clinical scenario was used for analysis by all participants to evaluate their problem solving skills. (See Annexure D).

Analysis of this scenario lasted for 30 minutes and, guided by the researcher, each subject was evaluated in all 4 phases of the instrument. Using questions in the evaluator's notes as interview guide, responses from the subjects were elicited.

Subjects were to think aloud when analysing the scenario, whilst the researchers took notes of the responses verbatim. Audiotape recording was also done to complement the researcher's notes and to ensure that every response was recorded fully.

For ethical reasons no names were used. Codes indicating the student's curricular approach and the level of training were used i.e PBL01, 02 & 04 for the three levels in the PBL approach and TDL01, 02 & 04 for the Traditional approach students. These codes were used throughout data collection phase in the researcher's notes and in the evaluation form of the tool so as to ascertain that all data was clearly identified.

3.9 Data Analysis

According to De Vos (1998) data analysis is the breaking down of data into constituent parts to obtain answers to research questions and to test the research hypothesis. It entails categorization, ordering, manipulating and summarization of data with the purpose of reducing it to an intelligible and interpretable form so that the relations of research problems can be studied, tested and conclusion drawn (De Vos, 1998).

With the help of two research assistants, the rating and moderation of the subjects' responses were done jointly, making use of the evaluator's notes and the audiotaped information, and this ensured objectivity in the ratings.

Narratives of the subjects were rated on the 5 item rating scale on the Triple Jump evaluation form with 1-2 rated as the lowest performance, 3 as borderline and acceptable performance and 4-5 the highest scores and excellent. Individual scores on the evaluation tool were added up to to obtain a total score. With the use of a computer software package (SAS) and the assistance of a statistician numerical data of subjects scores in the evaluation form were analysed.

The analysis had two sections:

-Descriptive analysis to provide summaries of data in tables and graph form with short textual comment to draw out the main points.

-Inferential analysis to provide statistical analysis depicting differences between group scores, using parametric statistical measures..

3.10 Aspects of reliability and validity

3.10.1 Reliability

Reliability refers to the degree of consistency or accuracy with which an instrument measures an attribute (Polit & Hungler, 1991). For an instrument to be reliable, it should show the characteristics of dependability, consistency, accuracy and comparability.

Brink & Wood (1988) highlight three methods to test reliability:
tests for stability; test for equivalence and test for internal consistency.
Though the data collecting instrument of this study cannot be guaranteed in all the above measures, an effort to ensure inter-rater reliability was made by using two researchers to rate the subjects independently during interviews independently at the same time and their ratings compared for inter-rater reliability.
Moderation of the subjects' scores was also a team effort assessed by the researcher and the two research assistants. Callin & Ciliska (1983), who were the first to use Triple Jump exercise with second year medical students reported a highly positive inter-rater correlation between the two evaluators they used ($p = 0.91$ & 0.77)

For a measure of internal consistency, which is the extent to which the instrument' subparts are measuring the characteristics under study, the instrument in this study has a certain degree of internal consistency, for the set of items in it measures all critical attributes of the problem-solving process, namely problem definition, data collection, problem formulation and initiation of nursing intervention (Callin & Ciliska, 1983).

3.10.2 Aspects of validity

Validity refers to the degree to which the instrument measures what it is supposed to be measuring (Polit & Hungler, 1991).

- **Content Validity:**

Evidence of content validity examines the extent to which all major element relevant to the construct being measured are included (Polit & Hungler, 1991). The Triple Jump exercise has a self-evident measure of the adequate coverage of all the elements of concept -clinical reasoning this study seeks to investigate. The phases of the instrument used in this study were adapted to the conceptual model of the study, and literature review on the topic and consultation with experts in the use of this Triple Jump exercise was also a measure of estimating content validity.

3.11 Ethical Consideration

Ethical considerations demand that the researcher takes into account that subjects' rights in the setting are protected (Polit & Hungler, 1991).
In this study three aspects of ethical consideration were considered:

- **Permission:**

Permission to conduct the study has been sought from the Heads of the two institutions used in the study. (See Annexure A)

- **Consent to participate:**

Groups of projected subjects were visited in their institutions before data collection to request their participation in the study and to provide them with essential information regarding the whole study process, thus enabling them to make an informed consent. During the actual data gathering period each subject was given a written letter requesting consent to participate in the study, in which detailed information about the study process was explained (See Annexure B). Subjects were informed that giving consent was not binding them, as they were free to withdraw at any time before or during the study, without prejudice.

- **Confidentiality and anonymity:**

In the researcher's notes and evaluation form used during data collection, no names were written on the scripts. Pre-determined codes were used to identify the information with the subject from each group (e.g. PBL02-1 for the first student tested in her 2nd year of problem-based learning and TDL02-1 as the first student of the traditional approach in her second year).
Subjects were assured, that findings would be reported in such a way that the information gathered was grouped, to conceal any personal characteristics and thus subjects would remain anonymous.

3.12 Conclusion

In this chapter an overall plan for obtaining answers to the research questions was described. The focus of the researcher was to describe the research design, population sample and sampling technique used. The instrument, data collection procedure and how data was analysed, was also detailed. Measures to ensure reliability and validity and ethical considerations were also discussed.

CHAPTER 4

4. DATA ANALYSIS AND FINDINGS

4.1 Introduction

To obtain answers to the research questions of this study, quantitative data collected through Triple Jump Exercise had to be analysed. The research questions to be answered were:-

- How do the clinical reasoning abilities of basic nursing students following programmes of different approaches compare with each other?

- Is there progression in the development of clinical reasoning skills from the beginning to the end of students' training programmes offered in two varying approaches?

Raw data of the scores of the two groups of subjects from the Triple Jump evaluation form were given codes and value labels to ease computer analysis using the SAS computer programme, and these codes were used and referred to when reporting findings. SAS is a statistical computer software package used in analyses of quantitative data. Descriptive and inferential statistical tests were also run. The descriptive tests enabled the researcher to reduce, summarise and describe the quantitative data of subjects' performance in the Triple Jump Exercise. The inferential tests provided a means to draw conclusions about the population, given the data obtained from the sample.

These tests were done so as to give answers to the objectives of this study by:

-giving a composite picture of participants abilities in clinical reasoning;
-identifying differences in clinical reasoning abilities of subjects according to their level of training irrespective of the approach used, and the extent of variations amongst different training levels of the same or different programme approaches;
-and describing differential effect of the two approaches in the development of clinical reasoning skills of three levels of training of the two curricular approaches.

Cross referencing of the clinical reasoning scores with the phases of clinical reasoning as postulated in the study's hypothetico-deductive reasoning model, was also done.

4.2 Sample realization and description

4.2.1 Size of the final sample

A total of 87 subjects constituted the final sample used in the study against 100 subjects which was the initial number proposed for this study. This sample was selected from a population of nursing students of the two universities in the Eastern Cape Province using two different curricular approaches i.e Problem based learning and the traditional approach. Using a quota sampling technique which incorporated convenience sampling, students were selected during their attendance in tutorials or lectures on their different study days. These students were in their 1st, 2nd or 4th year levels of training, from both curricular approaches.

The study participants from the two institutions approaches were represented as follows:

-From a total number of 24 fourth years in the traditional approach, 19 students participated;

-out of the total of 28, 14 second years; and

-out of the total of 56, 9 first years participated in the study.

From the problem-based learning approach representation was as follows:

-out of 32 fourth year students, 20 participated;

-out of 22second years , 14 participated;

-and out of 50 first year students, 11 participated.

A total of 45 participants from the three levels of problem-based learning and 42 from the traditional learning approach were used, making a final sample size of 87 subjects.

4.2.2 Sample description

The demographic profile of the participants in the study revealed that this study sample was made up predominantly of females (n = 79%) with males forming only 21% of the study sample. The age distribution of the sample ranged from 18 – 21 in the youngest age group. to 35+ in the oldest age group and a distribution of

21-25 forming 50% of the study sample. Previous training was also a factor elicited in the demographic data. Few subjects in all the levels had previous training either as enrolled nursing assistants or enrolled nurses before joining the Comprehensive Basic Nursing Programmes. One 4th year student in the traditional approach was an enrolled nurse and one other an enrolled nursing assistant. Three in problem-based learning approach were nursing assistants, one at 1st year and two at 2nd year levels.

4.3 Measures of clinical reasoning abilities of the two groups from two different approaches

The following results from statistical tests run on the scores on clinical reasoning abilities of various levels of the two groups, comprised of the following:-

-Total mean scores of all the groups in clinical reasoning;

-Performances in clinical reasoning by group participants in the 3 levels of study;

-Variations in clinical reasoning scores by similar levels of study in the two groups

-Variability according to the different approaches.

4.3.1 Total mean scores of the clinical reasoning abilities of all groups

Mean scores of clinical reasoning by students of both programme approaches, i.e traditional (TDL) and Problem-based learning approaches (PBL), revealed slight differences in scores when the three levels of each were compared. Marked differences were shown in the mean scores of the higher and lower levels of study, with 1st and 2nd year levels of the two groups lower than their senior levels. TDL04 & PBL04 mean scores of 29,3 (SD=7,1) and 30,05 (SD=6,3) respectively were the highest scores in clinical reasoning. See Table 4.1 below.

Table 4.1 Total mean scores of clinical reasoning abilities of all groups

Approach & Level of study	Valid No. of subjects	Mean	Min	Max.	Std. Dev.
TDL01	9	19,9	18	22	1,5
TDL02	14	22,5	16	30	4,2
TDL04	19	29,3	20	42	7,1
PBL01	11	21,7	18	27	2,9
PBL02	14	24,7	20	37	4,7
PBL04	20	30,05	21	41	6,3

Total No. of subjects: n = 87

4.3.2 Differences of mean scores of same group by levels of study

Differences amongst the 3 levels of training within the same groups were identified. In the traditional (TDL) approach, 2nd year performances were lower than in the 4th year with a mean difference of 6.8. The same pattern was observed in the problem-based (PBL) groups, with a mean difference of 5.3 between the 2nd & 4th years. When the same levels of the two groups were compared, slight differences among the two were identified. Between the 2nd year levels of the TDL & PBL students there was a mean difference of 2.2, while mean difference at 4th year levels was 1.2. (See Figure 4.1 below.) From these findings it is also evident that as levels of study increase, a marked increase in the scores of clinical reasoning have been observed.

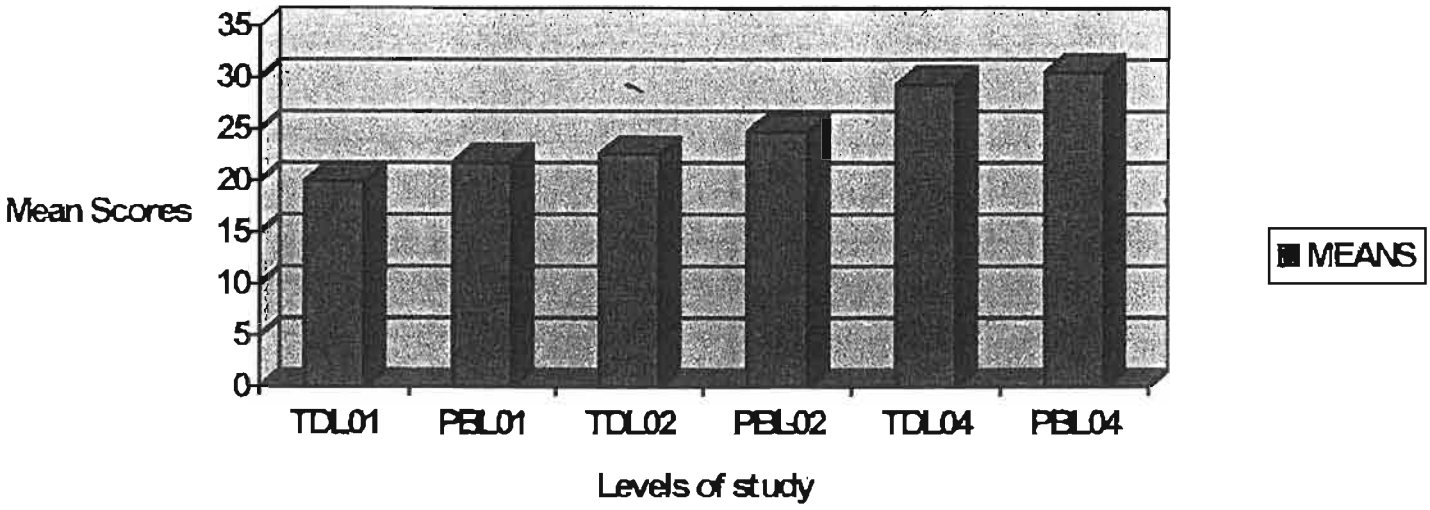

Figure 4.1 Comparison of mean scores by levels of study

4.3.3 Mean scores of group performances in various phases of Triple Jump Exercise

Interpretation of performances of the two groups on the 4 phases of the instrument was made possible by splitting the total scores of clinical reasoning according to the 9 evaluation items in the evaluation form. Performance in each evaluation item by all levels of study is depicted in Table 4.2 overleaf by mean scores of each levels and standard deviations..

From Table 4.2, levels of study within and between groups displayed no conspicuous variability by mean scores in the various evaluation items of the instrument. A mean difference of 0.2 was found in these performance scores and this according to the researcher, was not sufficiently significant to establish the existence of differences in performances. Again higher levels of study reveal better performances than the lower levels in all the items of the instrument.

Table 4.2 Composite picture of all group performances by mean scores on the 4 phases of the Triple Jump Exercise

	APPROACHES	Traditional approach (TDL)						Problem based learning (PBL)					
4 Phases of		Tdl01		Tdl02		Tdl04		Pbl01		Pbl02		Pbl04	
Instrument	Evaluation items	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
1.Problem definition	Issue identification	2.4	0.5	2.6	0.7	3.1	0.8	2.7	0.8	2.9	1.3	3.7	0.5
2.Data gathering	Question generation	2.3	0.5	2.6	0.5	3.2	1.0	2.4	0.5	2.9	0.9	3.2	0.7
"	Systematic data collection	2.2	0.4	2.5	0.5	3.2	1.2	2.4	0.5	2.4	0.7	3.3	0.7
"	Gathered data used as cues in data gathering	2.3	0.5	2.6	0.6	3.3	1.1	2.7	0.5	3.1	0.9	3.4	0.9
"	Knowledge guiding data collection	2.2	0.4	2.4	0.9	3.1	1.2	1.9	0.5	2.6	1.0	3.4	1.0
"	Amount of data collected (80%)	2.0	0	2.2	0.4	3.0	0.9	2.0	0.5	2.4	0.7	2.8	1.1
3. Problem formulation	Current knowledge in data analysis	2.2	0.4	2.4	0.6	3.2	1.1	2.4	0.8	2.8	0.9	3.2	1.0
"	Accuracy in problem formulation	2.1	0.3	2.4	0.6	3.5	0.8	2.4	0.8	2.9	0.7	3.4	0.9
4. Nursing intervention	Initial nursing interventions	2.4	0.5	2.9	0.8	3.8	0.9	2.8	0.8	3.1	0.5	3.7	0.7

All the levels performed poorly in the aspect of collecting at least 80% of the required data to initiate nursing intervention for the presented problem situation. Mean scores of fourth years were also lower in this aspect compared with other aspects (PBL04= 2.8 & TDL04 =3.0).

To substantiate all the above descriptive analyses and determine the effect of the two independent variables, i.e. programme approaches and level of study on the dependent variable that is, clinical reasoning scores, two factor analyses of variance and interaction tests were done, using total mean scores of the groups. The question to be answered was whether differences in the scores on clinical reasoning were due to the approaches used by the groups or the levels of study of the groups or the combination of the approach used and level of study.

Results revealed that neither approaches used nor their interactions with the levels of study had significant effect on the subjects' clinical reasoning scores (p=0,2120 and 0,8237 respectively). The levels of study were the factors that had significant effect on the scores at p=0.0001 The table below displays these results.

Table 4.3 Two factor ANOVA results on differences in total mean scores by levels of study and curricular approaches.

	DF	SS	Mean Square	F-Value	p
levels of study	2	1199.1608	599.5804	21.16	0.0001
approaches used	1	44.8464	44.8464	1.58	0.2120
Level of study & approach	2	11.0196	5.5098	0.19	0.8237

A post-ANOVA test using Tukey's method was done to establish and substantiate the ANOVA results, by identifying where the significant differences amongst levels of study. The results confirmed that significant differences among the lower levels and higher levels of study at p-0.05 were observed. Between 4th year levels and 2nd year levels with lower confidence limits of 2.9 and upper confidence limits =9.2, differences were observed (6.075 mean difference). Between 4th year levels and 1st year levels with lower confidence limits =5.272 and upper confidence limits =12.264, there was a mean difference of 8.768. Between 2nd year levels and first year levels no significant difference was marked.

4.4 Interpretation of Results

Total scores of the two groups on clinical reasoning abilities provided a composite picture of group performances in the clinical reasoning process as measured by the 4 phases of the Triple Jump Exercise. Variations according to levels of study on both groups were identified, with senior levels showing better performances than lower levels, as shown by the high mean scores of the 4 years in Table 4.1.

From these results it can be deduced that as students mature or progress throughout their training from first to final year level of study, their clinical reasoning abilities improve. Benner, cited in Maynard (1994), contends that this is because nurses gain skills and knowledge primarily through stages based on experience. The 4th year levels thus have greater clinical experience than the lower level groups and this greater experience has been an influencing factor on their performances.

Though first years were included in the study solely to provide baseline information, their below average performances (<50%) nevertheless indicated that a certain degree of clinical reasoning can be found even in beginning students, to form a foundation upon which further competencies can be developed. Sedlak (1997) supports this finding in her study of critical thinking and clinical reasoning in the beginning Baccalaureate nursing students during their clinical nursing course, as that beginning nurses do indeed think critically and thus require supportive environment for growth in these skills. The low first year level performances could be ascribed to the students' limited amount of nursing knowledge and clinical experiences, which also supports the contention of Kataoka & Saylor (1994) that clinical experience is an important component in competence development.

In this study the context was clinical reasoning abilities. Comparing the two groups on their total mean scores of clinical reasoning by programme approaches, a slight difference was evident between 2nd year TDL and those of PBL with mean difference of 2.2. But these findings were not supported by ANOVA results which refuted the conclusion that approaches have effect on the clinical reasoning scores. Within the senior levels of the two groups, no significant difference could be marked by total mean scores (mean difference = 0.7).

The results of group performances on the 9 evaluation items of the instrument that evaluated the 4 phases of clinical reasoning showed no conspicuous differences by approaches. The PBL approach group had been expected to show better performances in some aspects, because the model of clinical reasoning, the hypothetico-deductive reasoning model, used in this study as the conceptual model and upon which the instrument was based, is the mechanism popularly used to teach and develop students' reasoning processes in PBL programmes.

Slight differences were seen in the performances at 2nd year level between the two groups (See Table 4.3=Items 4; 7 & 8), but more surprisingly, the 4th years of both groups performed almost equally in almost all evaluation items of the tool The findings in this study support those of Berkson, cited in Bouhuijs (1993). Berkson evaluated the clinical reasoning of two groups of medical students using the two approaches, by using the hypothetico-deductive model, and revealed no differences between the two in employing different components of this model. Differences in the evaluation items of the tool were significant only amongst the levels of study that is, senior levels performed better than the junior levels.

Again this difference can be attributed to the fact that senior level groups had more clinical learning experiences than the juniors and, as Maynard (1996) also asserts, significant changes in nursing practice occur after a period of professional nursing experience, enabling the experiential component of competence development to come to the fore.

In conclusion, these findings indicate that occurrence of variations in clinical reasoning abilities from the lower levels to higher levels of study amongst these two groups, demonstrate evidence of progression in skill development from the beginning of programmes up to the final year levels and that the two different approaches (TDL & PBL) have no significant effect on the clinical reasoning abilities of the two groups of students.

CHAPTER 5

SUMMARY, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS.

5.1 Introduction

This chapter provides a summary of the study findings from the analysed data, with reference to existing similar or related empirical findings prevalent in medical and nursing literature. Based on the findings and the researcher's interpretation of the results, recommendation, implications and limitations of the study have been outlined.

5.2 Summary of the study

This comparative, cross-sectional descriptive survey was done to examine and determine the effect of curricular approaches on the development of the clinical reasoning abilities of basic nursing students following Comprehensive Basic Nursing Programmes at a degree level. These curricular approaches were traditional and problem-based learning. Questions to be answered by this inquiry were:-

-How do the clinical reasoning abilities of basic nursing students following the CBNP but using different approaches, compare with each other?

-Is there progression in the development of clinical reasoning skills from the beginning to the end of the basic nursing education and training programmes offered in two different approaches?

A literature survey was done to identify a conceptual model that would form the basis of the study, and other empirical work done on the variables under study was consulted. The hypothetico-deductive model of clinical reasoning was the model of choice and based on this choice, the data collection instrument used in this study had to be adapted. The Triple Jump exercise was the tool used. Only its first 4 phases which related well to the phases of the model chosen were used. (See paragraph 3.8.1 in the previous chapter). A sample size of 87 subjects was used with the tool to evaluate clinical reasoning abilities. Subjects' verbalizations during clinical reasoning process were quantified as clinical reasoning scores and with the help of an expert statistician these scores were then analysed, using an SAS computer programme. The findings from the descriptive and parametric statistical tests done can be summarised basing the summary on the following hypothesized questions of this study:

5.2.1 Is clinical reasoning ability of PBL students better developed than those from the traditional approach?

Though much has been written about PBL as an approach aiming at fostering and improving clinical reasoning in students, a need for empirical evidence to support this contention has been a concern. This study was undertaken to examine and explore whether PBL approach enhances clinical reasoning skills better than the traditional approach in nursing education and training programmes. As meta-analysis and systematic reviews of studies on the assessment of whether the theoretical benefits of PBL are demonstrable have been undertaken by various researchers with focus on medical education, this study focused on nursing programmes although its findings were related to these medical review findings (Albanese & Mitchel, 1993; Berkson, 1993 and Vernon & Blake, 1993, cited in Huey, 2001).

Descriptive results of the two groups of different approaches revealed that only slight differences shown by mean scores in clinical reasoning exist between the traditional and the PBL groups, but the significance of these differences was not demonstrated statistically by the results of the two factor ANOVA (See Table 4.4). Significant differences highlighted were only seen among levels of study and were not due to the approach used or to interactions of the approach and the levels of study.

That the different approaches did not show a significant effect, indicates that neither PBL nor traditional approach influenced the clinical reasoning abilities of nursing students. Findings similar to these on clinical reasoning abilities were also revealed by Berkson (1993) and Moore et al (1990) cited by Albanese & Mitchell (1993). Berkson found no significant difference between PBL and traditional medical students in employing different components of the hypothetico-deductive model of reasoning, the same model which was also used in this study. Moore et al (1990), cited by Albanese & Mitchell (1993), when examining the effect of PBL on reasoning processes, compared PBL and traditional medical students. He used battery tests but also reported no differences on any measure.

Various researchers have identified that errors and inaccuracies in making a decision about a diagnosis and inclusion of irrelevant information in case-analysis are weaknesses in clinical reasoning strategies of PBL as compared to the traditional approach (Berkson, 1993; Patel et al, 1993 & Claessen & Boshuizen 1985 cited by Albanese & Mitchell 1993; Andrews & Jones 1996). The lack of outstanding clinical reasoning performances therefore by PBL students could therefore be attributed to this effect.

In spite the fact that this evaluation of clinical reasoning was based on the hypothetico-deductive model which is the mechanism mostly used in the teaching-learning process of PBL curriculum, no significant effect of PBL on students performance was revealed by the findings of this study. The study by Patel et al (1993) in Albanese & Mitchell (1993) on reasoning patterns of two groups of students following the PBL and the traditional approach, revealed that the traditional approach students use forward reasoning strategies. Forward reasoning is described by Gilhooy (1990), cited by Albanese & Mitchell (1993), as a maxim used by experts whilst backward reasoning is used by novices. Based on this assumption, traditional students would then be expected to outperform PBL students but this was not shown by the results of this study

The findings of this study contradicts findings of Hmelo's study (1998) cited by Huey (2001) comparing medical students from PBL and traditional curriculae on measures of knowledge and reasoning. In Hmelo's study the PBL students using hypothesis driven reasoning strategies, performed better than traditional students in generating explanations that were more accurate, coherent and comprehensive (these being important variables to expert problem solving performances). Surprisingly in the findings of this study, the same reasoning abilities expected of PBL students was not revealed.

The findings of this study therefore lay ground to argue Barrows (1985) assertion that knowledge structured by PBL format could be easily remembered and retrieved when needed in clinical practice than those structured into mental organisations and around taxonomies and hierarchies in the traditional format.

5.2.2 Is there progression in the development of clinical reasoning from entry to end of training programmes of different curricular approaches?

Both descriptive and parametric statistical results provided answers to the above question. Statistically significant differences between levels of study were evident at $p = 0.0001$ and greater difference was marked between the 2nd year level and the 4th year level. This therefore shows that progression in the development of clinical reasoning does occur irrespective of the approach used. But Patel et al (1993) in Bouhuijs et al (1993) in their study of patterns of reasoning used by both approaches refute this assertion and state that distinct progression over years of study is only seen in the traditional approach using forward reasoning pattern which is more marked at senior levels. Findings of Patel et al study, also showed that in the PBL approach beginning level students showed markedly developed reasoning pattern which does not change with levels of training. This, they explained as being due to the fact that hypothetico-deductive reasoning is explicitly taught at the beginning levels and thereafter reinforced throughout the curriculum (Patel et al, 1993 in Bouhuijs et al 1993). This fact was not revealed and supported in the findings of this study, as all senior levels even those from PBL approach showed marked progression in clinical reasoning abilities better than their juniors.

Clinical experience could among other factors accounted for the findings of this study. The 4th year levels which have more clinical exposure than the 2nd year levels showed better clinical reasoning performances. Maynard (1996) also asserts that changes in nursing practice occur in stages after a period of professional nursing experience and thus experience is a key factor in the development of competence.

5.3 Implications of the study findings

Though the researcher wishes to express that the findings of this study be treated with caution when generalisations are made, the findings of this study showed clearly that same levels of clinical reasoning abilities exist in both the PBL and the traditional approach nursing students exist and that neither PBL nor the traditional approach is to be seen as more effective than the other.

The similar performances of the two groups on the Triple jump exercise with no significant difference according to the different approaches, has left a question remaining: "what other factors besides curricular approaches do impact on the development of clinical reasoning skills in comprehensive basic nursing programmes?

Clinical reasoning remains the crux of expert nursing practice and one of the most demanded skills for nurses to be able to deal with the increasing complexities of nursing practice today. There is therefore a dire need for further research to address other complexities in the teaching and development of the clinical reasoning skills.

The findings leave much to be debated about the effects of other factors in theory-practice correlation on the development of clinical reasoning. A constant challenge therefore is on nurse educators to play a role in changing educational environment by identifying methods by which theory and practice can be integrated. The impact of clinical learning environment and student accompaniment on the development of clinical reasoning skills needs to be looked at.

Landers (200) asserts that theory-practice gap remains a concern in nursing education and blames the conscious effort on the part of nurse theorist to clarify and define rules which are abstractions of situations in the clinical domain.

She asserts that theoretical and clinical learning should be given equal status by the nurse educator, who is referred to as lecturer-practitioner, having a lecturing and a clinical responsibility to provide a synthesis of clinical and theoretical learning (Landers, 2000).

5.4 Recommendations

Based on the findings of the study and the researcher's interpretation of the results of the inquiry, the following recommendations are made:-

5.3.1 Nursing education

On the basis of the findings of this study, that both PBL and traditional approaches have a similar effect on the clinical reasoning process, one can conclude that neither of these approaches may be viewed as more effective than the other. Factors that may be contributory to the lack of differences in the clinical reasoning performances of the two approaches, need to be viewed critically by nurse educators. These factors include the amount of clinical practice exposure and student accompaniment. PBL has been advocated by its pioneers as an innovative approach aiming at facilitating development of clinical reasoning skills. The findings of this study therefore, challenge nurse educators using PBL to investigate why the end results of PBL approach are not demonstrable.

From this study and other related empirical findings it appears that both traditional and PBL approaches have associated strengths and weaknesses (Patel et al, 1993, Berkson, 1993, Andrews & Jones, 1996 and Huey, 2001). Therefore a balanced approach is recommended, an example of which is a case-based approach. Deretchin et al (1999) also support this, stating that using PBL alongside other approaches, in a mixed curricular format resulted in learners using deeper approaches to learning which is lacking in the PBL-only approach and they show preferences for active forms of learning and the use of a variety of learning resources.

The case-based approach, which utilises case studies as its teaching strategy, is defined by Dailey (1992) as a teaching and learning strategy that stimulates ideas through complex problem-analysis of actual or hypothetical situations and provides a means of applying theoretical principles to practice. This case-based method is recommended as an effort to balance the limitations of both PBL and the traditional approaches and nurture clinical reasoning skills with its characteristic features as:

-Being content-based, as the learning is controlled by content objectives;
-Teacher-guided, as the teacher prepares the learning objectives of case studies based on the content required to be learnt;
-Student-oriented and controlled by the student, as he/she takes active participation in the learning required by the case study (Dailey, 1992).

This is a method also recommended by Uys (1999) as more useful than PBL in situations where learning resource are not accessible to students since it offers and identifies learning resources for them.

The researcher in this study also recommends that increasing involvement of nurse educators in the clinical area is imperative as a way to ameliorate the problems of theory-practice gap which affect skill development and acquisition in nursing students. Burnard & Chapman cited by Landers (2000), emphasize that nurse teachers must be competent in clinical as well as academic skills and must provide a synthesis of clinical and theoretical learning. Landers (2000) describes the nurse educator as a lecturer-practitioner, with 'both lecturing and clinical responsibility, who ensures that equal status is given to theoretical and clinical learning.

More reflective learning in clinical teaching and learning is also recommended to enhance development of critical thinking, clinical reasoning and growth in self-awareness, self actualization and new knowledge development.
Reflective journalising using various media is one strategy students and educators will find stimulating and rewarding. Reflective journalism provides an opportunity for students to relate to aspects of their clinical experiences in a critical and creative way which most profoundly speak to them at the moment, and tapping into central concerns that create the greatest potential for growth (Baker, 1996).

5.3.2 Nursing research

As this study only used settings that were accessible to the researcher in terms of geographic area, time and cost, it is recommended that this study be replicated with randomly selected schools of nursing and study subjects to enable generalisations to the greater population. The use of triangulation in data collection technique is also recommended so that results, for instance, of subjects' verbalizations could be complemented with behavioural observations in actual clinical practice.

More research work into factors that impact on the development of clinical reasoning is therefore essential. Research is also needed on effective strategies for teaching and measuring clinical reasoning.

Tracking of clinical reasoning skills after graduation in nurse graduates from the two approaches during their first 6 to 12 months of practice would also help evaluate development of clinical reasoning.

5.5 Limitations of the study

The sampling technique used in this study,which is non-probability technique, limit the representativeness of the study sample. This therefore weakens the degree of generalisation about the findings of this study.

The two research settings used in this study were within the same provincial area. The two institutions might then share the same educational problems e.g limited resources that would impose a negative impact on student learning and thus affect the results of this study. Studies of this nature undertaken in other settings different from these might have revealed different findings. This factor could limit generalisations about the findings of this study into greater population.

5.6 Conclusion

Most empirical evidence, supports the findings of this study though a few report contradictory findings. The same level of performance in clinical reasoning of students who followed the two approaches denotes that no approach should be seen as superior to the other in relation to the concept of clinical reasoning.

A search for ways and means to facilitate development of clinical reasoning skill remains a challenge to nurse educators. The findings of this study suggest that, though theoretically the expectation of the PBL curriculum is its ability to develop clinical reasoning skills, no demonstrable empirical evidence support this expectation. More work is therefore essential to identify effective instructional methods, and measures to evaluate clinical reasoning.

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ANNEXURE A

Permission letters

N.B. This is a sample of permission letter received from the two institutions. This letter has been adapted by the researcher to ensure anonymity and confidentiality of the participated institutions.

Dear Madam

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH STUDY

Your letter dated 25th May 2001 refers.

Permission is hereby granted to conduct research study in the department.

Yours faithfully

.....

HEAD OF DEPARTMENT

ANNEXURE B

Letter requesting consent to participate

University of Transkei
Private Bag X1
UMTATA

Sir Madam

REQUEST FOR CONSENT TO PARTICIPATE IN A RESEARCH STUDY

I am a registered M. Cur student with the University of Natal - Durban on a part-time basis. To fulfill the requirements for the degree, a research study to explore **"the effects of two curricular approaches, that is Problem-based learning and Traditional approaches, on the development of clinical reasoning abilities of nursing students following Comprehensive basic nursing programmes at degree level,** has to be undertaken.

You are humbly requested to participate in this study which aims at describing the influence these two approaches have on the development of clinical reasoning skills. A consent form is provided for you to sign. This is not binding on your side as you still reserve the right to withdraw at any stage of the research process without prejudice.

No names will be used against any information you provided as this will not be evaluating you per se but the approaches used in Comprehensive basic nursing programmes. The information will be kept as confidential as possible and any taped information will be erased and destroyed after transcription. Access to be information will be shared with only people involved, that is my supervisor, co-supervisor and/or external examiner.

There are no material incentives for participation in the study but it is hoped that the information gathered will be of benefit to both nursing education and nursing practice.

Thanking you in anticipation.

Yours truly

FANISWA H. MFIDI

ANNEXURE C

Demographic data questionnaire

DERMOGRAPHIC DATA

NB: MARK WITH "X" NEXT TO THE APPROPRIATE RESPONSE

GENDER:

Male	
Female	

AGE:

18 - 21	
21 - 25	
25 - 30	
30 - 35	
35 & OVER	

MARITAL STATUS:

Single	
Married	

APPROACH USED:

Problem-based learning	
Traditional approach	

LEVEL OF TRAINING:

1st year	
2nd year	
3rd year	
4th year	

PREVIOUS TRAINING:

Enrolled nurse	
Enrolled nursing assistant	
Health educator	
None of the above	
Other (Specify)	

ANNEXURE D

Clinical scenario

CLINICAL SCENARIO:

IT IS 20HOO, MRS ZAZA HAS BEEN BROUGHT IN THE CASUALTY DEPARTMENT OF YOUR PROVINCIAL HOSPITAL; COMPLAINING OF SEVERE PAINS, LOOKS PALE, COLD AND CLAMMY WITH SPLINTED FOREARM.

ANNEXURE E

Triple Jump Exercise – Instruction to the student

TRIPLE JUMP EXERCISE

STUDENT INSTRUCTIONS

1. PHASE 1 TO 4 OF TRIPLE JUMP EXERCISE (30 MINUTES)

- Read the problem card in front of you with a written clinical scenario which you will be expected to analyse. Be calm and relax. Then you will be interviewed to see how you go about problem-solving in this situation. We would like you to think aloud, so that we can hear how you think.

- Remember that you will be analysing this situation for about thirty minutes or half an hours (30mins).

- You have to identify issues/questions which you think are relevant in this situation.

- On request, the researcher will supply you with information from the patient's record. This could be the patient's history and physical findings.

- You will then have to summarise and formulate the nursing problems.

- Thereafter, describe the initial nursing intervention you will implement and state the rationale behind each intervention.

ANNEXURE F

Triple Jump Exercise – Evaluator/Tutor's Notes

TRIPLE JUMP EXERCISE

TUTOR'S NOTES

STUDENT :.....

TUTOR:.....

STEP 1: PROBLEM DEFINITION

A. Read aloud the presenting situation on the problem card and give it to the student.

What important nursing issue/s can be derived from the presenting situation?

Issues / Hypotheses

B.

Now lets proceed with the problem. What question would you like to ask in order to the understand problem better. Ask the questions and I will give the information. Explain the knowledge which directs your questioning.

Please make notes about: the question the students ask

interpretation of data

current knowledge

C.

You have much more information about the situation now. So, before we continue let's stop again and summarise the major problems and issues related to this situation. What findings support that? What are your reasons for identifying these problems?

Please make notes about **interim problem formulation and rationale**

D.

Now that you have identified your initial problem list, what are your initial nursing action or interventions and their rationale. What would you do first in this situation and why?

Please make notes about **initial nursing interventions with rationale**

ANNEXURE G

Triple Jump Exercise - Evaluation form

TRIPLE JUMP EXERCISE

EVALUATION FORM

STUDENT:.....

TUTOR:.....

For each of the evaluation items, please read both statements I and II and then check the most appropriate box on the rating scale below.

1. QUESTION GENERATION

Evaluation to be based on the student's initial summary of the most likely nursing issues and the related explanation(s) when possible, given the information included in the presenting situation.

STATEMENT I

Major gaps in question generated.

STATEMENT II

Accurate and appropriate initial questions generated include psychological, physical and social concepts.

Esentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

2. ISSUES IDENTIFICATION

STATEMENT I

Unable to relevant issues situation.

STATEMENT II

Identifies relevant issues in the situation

Esentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

3. DATA GATHERING

STATEMENT I

Unsystematic data collection. Questions do not direct data collection.

STATEMENT II

Systematic data collection. Uses questions to direct data collection.

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

4. STATEMENT I

Does not proceed from the client's presenting problem. Does not use gathered data as cues for further data collection.

STATEMENT II

Proceed from the client's presenting problem and the priority issues. Uses gathered data as cues for further data collection.

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

5. STATEMENT I

Does not state knowledge which guides data collection

STATEMENT II

Able to state knowledge which guides data collection.

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

6. STATEMENT I

Major gaps in data collection.

STATEMENT II

Collects 80% of data including essential information to begin nursing care.

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

7. KNOWLEDGE (CURRENT)

STATEMENT I

Unable to think through unfamiliar concepts

STATEMENT II

Able to inter-relate concepts and explain underlying mechanisms when analyzing data. Able to think through unfamiliar concepts.

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

8. INTERIM PROBLEM FORMULATION

STATEMENT I

Inaccurate and imprecise statement of patient problem(s)

STATEMENT II

Accurate and precise outline of patient problems

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

9. INITIAL NURSING INTERVENTIONS

STATEMENT I	STATEMENT II
Unable to describe the most important initial nursing actions	Able to describe the most important initial nursing actions.
Unable to provide rationale	Able to provide rationale

Essentially like I	More like I than II	Between I and II	More like II than I	Essentially like II

TOTAL SCORE : ___ ___