

THE PERCEPTIONS OF NURSE TEACHERS, STUDENT NURSES AND
PRECEPTORS OF THE THEORY-PRACTICE GAP IN NURSING AND THE
EFFECT OF FACTORS SEEN TO INFLUENCE THE GAP ON KNOWLEDGE,
SKILL AND SATISFACTION IN STUDENT NURSES

JO CORLETT

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ABSTRACT

The theory-practice gap has been debated within the nursing profession for many years. This thesis describes a two-stage study exploring the theory-practice gap.

In stage one, a qualitative approach used techniques borrowed from grounded theory. Twenty-three group interviews were conducted to identify commonly-held perceptions of the theory-practice gap by nurse teachers, student nurses and preceptors. Open coding, comparative analysis and the collapsing of categories, resulted in eight themes emerging from the data. These were: definitions of theory and practice, the existence of a theory-practice gap, idealism versus realism, lack of time, sequencing, lack of communication between educational institutions and clinical areas, the link teacher role and views of how the theory-practice gap could be closed.

In the second, quantitative stage of the study, the theme of how interviewees in stage one thought the theory-practice gap could be reduced was translated into three factors. The three factors were: whether a preceptor or nurse teacher taught students theoretical elements relating to a medical and rehabilitation clinical speciality, whether the preceptor and nurse teacher collaborated on the content of what was to be taught to students and whether students went straight to, or delayed the medical and rehabilitation placement following theoretical input. A full factorial experimental design was used to study the influence of these three factors on theoretical knowledge, practical skill acquisition and student satisfaction. A sample of first year undergraduate student nurses from one institution of higher education ($n=19$) was studied, providing sufficient power to perform almost all tests undertaken ($>80\%$).

The second stage of the study showed that students taught by a preceptor increased their theoretical knowledge score more than those taught by a nurse teacher from a baseline score. Collaboration between the preceptors and nurse teachers on the content of what was to be taught to students had no effect on the increase in theoretical knowledge, although the power to detect a 15 percentage point difference for medical scores had a power of less than 70%. There were no differences in theoretical knowledge relating to a medical placement whether students went straight to or delayed this clinical experience, whilst those delaying rehabilitation placements, demonstrated an increase in theoretical knowledge of rehabilitation. The results of this study may help in suggesting strategies aimed at reducing the theory-practice gap.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This chapter forms a preliminary literature review of the phenomenon known within the nursing profession as the theory-practice gap. The theory-practice gap is an issue that has preoccupied the nursing profession for many years, generating a vast amount of literature within the nursing press. Publications from the nursing profession's governing body, the United Kingdom Central Council (U.K.C.C.) have indicated a concern over the years with the implications for the profession as a result of an inability to close this perceived theory-practice gap, despite various attempts at educational reform. The latest of these, *Fitness for Practice* (U.K.C.C. 1999) yet again calls for changes to be made within nursing in order to close the gap between the theory and practice of nursing, suggesting that the issue has still not been fully resolved. As Yvonne Moores, the Chief Nursing Officer at that time, stated in a letter to Trust Nurse Directors and Heads of Nurse Education:

"Discussion about the existence and nature of a theory-practice gap has been a matter of longstanding professional debate...There is a broad consensus about the need for renewed effort to tackle the issue."
(Department of Health 1999a)

One difficulty is that there is a lack of agreement with regard to this phenomenon. There has been much debate within the nursing press as to whether or not a theory-practice gap actually exists, precisely what it is, where it is, whether it is a beneficial phenomenon and whether or not attempts should be made to reduce or close the gap. The term theory-practice gap itself is poorly defined, with different individuals suggesting various definitions and interpretations. The aim of the following preliminary literature review is to clarify the term theory-practice gap and to present the main issues and debates in relation to this phenomenon.

1.1.1 Conduct of the literature review

This study was conducted in two stages. The first stage adopts a qualitative approach, utilising techniques borrowed from the grounded theory method, to investigate the theory-practice gap phenomenon. When a grounded theory methodology is used, the researcher interacts with the literature on an ongoing basis in order to develop and refine the theory that is emerging during the processes of data collection and analysis (Streubert & Carpenter 1999). Literature is used to substantiate the researcher's findings, suggest avenues for further exploration and to fill in any holes in the emerging theory (Strauss & Corbin 1998). It is an interactive process in which the researcher engages with the literature throughout the research process.

Some qualitative researchers would argue that performing a literature search prior to a grounded theory investigation is unnecessary and even detrimental to the proposed study (Streubert & Carpenter 1999). Conducting a literature review at this stage is seen to open the study to bias (Morse & Field 1996). These authors argue that the researcher should enter the research setting without prior knowledge of the area to be investigated as this may influence how and what data are gathered and the way in which they are analysed. However, it is accepted that a preliminary literature review is often necessary in order to provide context to the proposed study and to establish the need for such an investigation (Morse & Field 1996, Holloway 1997, Streubert & Carpenter 1999). This is achieved by reviewing the main studies pertaining to the proposed area of investigation, including classic studies and the most recent research conducted:

“...researchers trawl the relevant and related literature, summarise the main ideas from these studies as well as some of the problems and contradictions found, and show how they relate to the proposed project.” (Holloway 1997 p.99)

It was seen necessary to conduct a preliminary review of the literature within this study in order to clarify what is meant by the term theory-practice gap, to discuss the main issues involved in relation to this phenomenon and to establish the need for the proposed study.

The literature is thus used in two ways within a grounded theory study. Firstly, a preliminary literature review can serve to provide background on the topic to be investigated prior to the study. Secondly, the literature is used as an analytic tool during the conduct of the study, helping to substantiate and clarify the findings of an investigation (Strauss & Corbin 1998). The literature was used in both of these ways within this study.

The initial review of the literature discussed below orientates the reader to the theory-practice gap said to exist within nursing, by discussing a number of issues in relation to this alleged phenomenon. Definitions of the term are given, together with an overview of nursing research conducted in the United Kingdom (U.K.) during the last twenty-five years investigating various aspects of this phenomenon. This is followed by discussion of some of the perceived causes of the theory-practice gap and the main debates within current nursing literature are presented. Different strategies introduced by the nursing profession in attempts to close the theory-practice gap are also described. The discussion is then broadened out to consider the theory-practice gap in nursing within other countries and finally within other professions. The chapter concludes by outlining the aim, objectives and design of the study.

Whilst this preliminary review identifies the main topics and issues in relation to the theory-practice gap, it is not an exhaustive review of the literature. It has therefore been included within the introduction rather than as a separate literature review, as it serves to contextualise the study and emphasises the need for further investigation into the phenomenon known as the theory-practice gap. Many of the more recent research studies carried out, which bear a relation to the theory-practice gap, are reported in chapter two, where they are used to provide evidence to support the findings of the qualitative stage of the study and help the researcher to clarify and add to any themes emerging during the processes of data collection and analysis. It is thus used as an analytic tool as suggested by Strauss & Corbin (1998).

1.1.2 Strategies used to search the literature

The databases searched during the preliminary literature review were Medline, Cinahl, Cochrane and ASSIA. At the start of the study the key words 'theory' and 'practice' combined with 'gap' and 'integration' were sufficient to access literature in relation to the theory-practice gap within nursing as a starting point. In addition, review of U.K.C.C. and National Board publications and research studies provided not only information, but also access to other literature cited within them. Attendance at a conference also enabled access to one research study in advance of its publication. It was difficult initially to access information in relation to the theory-practice gap within other countries, until it was realised that this phenomenon is commonly referred to as 'unification' rather than theory-practice gap in countries such as the United States of America (U.S.A.) and Australia. The key word unification provided useful information, although no articles later than the mid-1980s could be found. It is not known why later articles were unavailable. Access to information on the theory-practice gap in professions, other than those relating to health, proved impossible to access. Whilst Schön (1987) suggests that differences between professional knowledge and practice exist in a number of professions, literature discussing this could not be accessed, other than one reference to the difficulties in teaching English language, even though a number of databases at the three local universities were searched. These included PsycINFO, Education Abstracts and Social Sciences Citation Index (SSCI). Whilst the theory-practice gap may be apparent in other professions, it does not appear to be well-documented.

In using the literature as an analytic tool during the stages of data collection and analysis, the term 'theory-practice gap' or 'unification' was combined with a keyword from the themes, for example 'reflection', 'idealism', 'sequencing', 'link teacher role'. If this did not provide appropriate information then just the keyword was used. Where a theme seemed to have a wider scope than nursing, other relevant databases were searched. For example, in relation to the transfer of learning, the available psychology databases were accessed. Accessing articles in this manner usually resulted in a number of other useful articles being located as citations. The focus of the literature review thus shifted and

changed throughout the data collection and analysis stage, depending on what particular aspect of the findings the researcher needed to clarify.

Literature searches were also conducted in relation to methodological procedures used within the study. For example, recent studies adopting a grounded theory approach were accessed. Also, articles using an objective item test design and multiple choice questionnaires were searched for, prior to the design of the quantitative stage of the study. In the case of objective item tests, a number of articles were located that used this type of measuring tool, but there was limited information on how to design such a test. In this case, a return to the textbooks was necessary and classic education texts were used. For example, Gronlund (1981) informed the design of the multiple-choice questions.

Overall, the conduct of the literature review was an ongoing process throughout the study. Initially the focus was very broad, but became narrower in order to investigate particular aspects and topics as they arose throughout the study.

1.2 PRELIMINARY LITERATURE REVIEW

1.2.1 Definitions of the theory-practice gap

The theory-practice gap has been the subject of debate within the nursing profession for many years and the term ‘theory-practice gap’ has appeared in numerous publications. It is a term in common usage within the nursing profession and yet it is often imprecisely defined and subject to differing, often individual interpretation (Khatib & Ford 1999). Khatib & Ford try to summarise some of the ways in which this gap has been classified:

“It is the difference between what nursing students get taught in school and what they see in the practice setting. It is the necessary tension between nursing theory and nursing practice so that the one can drive the other. It is the difference between what nurses know and what nurses do. It is the failure of nursing practice to utilise research findings. It is the difference between what nursing management visualise from directives and what actually happens when they are put into practice; and the list goes on.” (Khatib & Ford 1999 p.37)

The complex nature of the theory-practice gap is not fully understood. However, there is widespread agreement within current literature and classical studies investigating this phenomenon, that the theory-practice gap relates to the distancing of theoretical knowledge from the actual doing of practice (Jones 1997). As such, it is often defined as a discrepancy between what student nurses are taught in a classroom setting – the theoretical aspects of nursing – and what they experience while on placement to clinical areas – the practice of nursing (Alexander 1983, Miller 1989, Goode 1998).

Part of the difficulty in defining the theory-practice gap is due to the lack of consensus of opinion within the nursing profession of what constitutes nursing theory. McCaugherty (1992a) suggests that within nursing, theory is an everyday term encompassing all classroom and textbook knowledge. Thus, any topic taught within the classroom is referred to as theory, including practical procedures. These are said to have been learned in theory if they have been taught and practised within the classroom, but without direct contact with a patient (McCaugherty 1992a). This view of theory fits in with the commonly accepted view of theoretical knowledge being anything taught in the classroom (Rafferty 1992) and is supported by Craddock (1993) who, following a review of nursing literature, concluded that traditionally, theory has been a term used to describe classroom teaching. However, McCaugherty (1992a) goes on to say that the term theory can also be used more specifically to relate to the following: conceptual frameworks used to structure nursing (models of nursing); knowledge borrowed from other disciplines such as psychology and sociology (theories used in nursing) and finally, the results of nursing research which may or may not be used in practice (theories of nursing).

Dale (1994) suggests theory is knowledge that enables a nurse to understand what is happening within a situation, and therefore, to control reality. Knowledge is needed in order to practise, whether this is knowledge of nursing research, nursing models or borrowed from other disciplines and, for student nurses, this knowledge is initially developed within the classroom setting. The theory-practice gap thus centres on the fact that knowledge learned in the classroom is potentially different to that needed to practise within the clinical setting and the issue is why there is a difference between the two.

1.2.2 Research investigating the theory-practice gap phenomenon

A number of classic studies investigating the theory-practice gap have been conducted within the U.K. over the last twenty-five years. These have examined different aspects of the theory-practice gap and they all confirm the existence of a gap between the theory and practice of nursing.

1.2.2.1 Differences between textbook theory and clinical practice

Jones (1975) observed the nasogastric feeding of unconscious patients and discovered anomalies between policies for performing nasogastric feeds and the way these were actually carried out by nurses. In the pilot study of Jones' investigation, all nursing care given to a total of six unconscious patients was continuously observed and recorded in detail. A number of practices were observed which did not follow set procedures or protocols and were clearly not based on how these skills would have been taught to students and trained staff. For example, one patient with a tracheostomy was observed to have suction applied for eight minutes, although the recommended interval stated in policy documents was that suction should be applied for no more than ten seconds. Jones comments:

"...the nurse thought that, because the patient's breathing was becoming more laboured and the features more cyanotic, the procedure was not being performed correctly, and consequently, went about the procedure with renewed vigour." (Jones 1975 p.31)

It could be argued that this may have been an isolated occurrence and that no firm conclusions should be made from such a small sample. However, Jones found similar discrepancies between theory and practice when he conducted the main study in which the nasogastric feeding of thirty-nine unconscious patients was observed for between two and twelve days. These patients were distributed among twenty-eight wards within twelve hospitals. The preparation and administration of a total of 312 feeds were observed and a questionnaire was distributed to the nursing staff on each ward. Jones compared the practices he observed with 'good nursing practice' as described in standard textbooks and ward-procedure books, thus comparing practice with textbook theory. Forty-six percent

(143) of feeds were prepared by junior students and in many instances the actual procedure performed deviated from the process espoused in theory. For example, in 61% (191) of the procedures observed, samples of aspirate were not tested with litmus paper in order to ascertain the position of the nasogastric tube prior to a feed being given. Although Jones does not make a direct comparison between what had been taught and what was practised, anomalies between theory and practice are clearly highlighted. Jones' results however should be viewed with some caution.

There is no explicit discussion of validity and reliability within the study. For example, Jones says observation of the preparation and administration of feeds was performed by the researcher and one other field worker. In order to establish inter-rater reliability, the researcher and field worker continuously observed one unconscious patient for five days. Jones merely says that a 'reasonable' degree of agreement was achieved, but there is no further discussion of this. In addition, whilst a copy of the observation checklist is given in the appendices, there is no discussion of how the tool was developed, nor of attempts made to ensure its validity. In terms of sampling, Jones says that males under the age of nineteen and females under the age of forty-five were excluded from the study, but there is no explanation of why different exclusion criteria were applied to males and females. In the absence of such discussion it is hard to establish whether or not the sample of patients selected for observation is appropriate and whether the results are therefore valid. The degree to which the results of this study can be generalised to populations other than the sample studied, is therefore open to some question.

A more recent study suggests that a gap continues to exist between the theory and practice of nasogastric feeding. Schmieding & Waldman (1997) developed a sixty-two item questionnaire relating to nasogastric feeding as a result of consulting a variety of textbooks, journal articles, and hospital policy and procedure manuals. They state that this was administered to a random sample of 350 registered nurses working in medical/surgical units in eleven hospitals over a three-month period. The response rate was 43% (153). They conclude that published nursing research is not consistently used in practice and that, in some instances, practice appears based on ritual. They identify a theory-practice gap in relation to nasogastric feeding which needs to be addressed by further research. They also identify what they refer to as a 'theory-practice deficit' where

differences in practice exist because there is a lack of research to guide practice. However, in view of the low response rate of respondents within this study, the results have to be accepted with some caution and cannot be said to be indicative of any general trends at the time of the study.

In another classic study, Bendall (1975) discovered a difference between what student nurses said they would do, theoretically, in a given situation and what they were subsequently observed to do in practice, again highlighting discrepancies between theory and practice. She identified twenty-two nursing situations and compared what student nurses said they would do within each situation when asked in a written test, with what they were observed to do in reality. Two hundred and seventy student nurses in nineteen hospitals were observed and tested. Bendall applied tests of correlation in order to identify whether the observed behaviour of students matched their examination answers:

“...in only 27% of subjects could the written answer be a reasonable guide to practical performance: in 63% of subjects the answers would be no guide at all...” (Bendall 1975 p.55)

Bendall concludes that written examinations used to test students' theoretical knowledge cannot establish that this theoretical knowledge will actually be applied to practice; students do not necessarily do what they say they will do. As such, these tests are not a valid indication of clinical performance. She comments that the use of such examinations are a reflection of the idealised knowledge taught within the classroom and bear little relation to what happens in practice:

“The dichotomy between what is happening in the wards and what is prescribed in the syllabus, taught in the schools and questioned in the final examination persists.” (Bendall 1975 p.63)

However, the precise design of the various measuring tools used within this study is ambiguous. For example, Bendall refers to a 'verbal recall test' suggesting that students are asked to report verbally what they would do in particular situations. Students were actually required to write down what they would do when presented with a written clinical scenario. No detail as to what these scenarios were is given, although Bendall says they were based on previous pilot work and consisted of twenty-two different

nursing situations. The validity of the measuring tool to measure theoretical knowledge is therefore unclear. In terms of the clinical observation of students' practice, a great deal of attention is paid to ensuring that inter-rater reliability of the four individuals involved in observing students is achieved. The results obtained in terms of students' practice appear to be reliable, although the validity of what was actually observed cannot be established, as there is little discussion of how the observation tool was developed. Whilst Bendall comments that students' written answers bear little relation to what occurs in practice, there is no discussion of whether what occurs in practice or what was written down is more appropriate. Whilst a gap between theoretical answers and clinical practice is established, it is not known whether the gap is a result of inappropriate practice, or inaccurate theory.

Fretwell (1985) adopted an action research approach in order to improve the teaching and learning environment within ten wards spread across four hospitals. Student nurses and trained staff completed a questionnaire in which they rated the ward learning environment within which they were working. The results of these were analysed and disseminated to the charge nurses of the ten wards, who were then encouraged to initiate changes to improve the learning environment within their wards, involving ward-based staff in this process. Fretwell states that deficiencies in the teaching of theory was a common problem and that theory and practice were often not linked. However, no details are given with regard to what these deficiencies were, and no specific examples are given of theory and practice that were not linked. At the end of six months, a further questionnaire was administered to trained nurses to evaluate changes in staff relations, teaching, provision of learning opportunities and satisfaction with the action research project. The results of this study are far-ranging, emphasising the importance of the charge nurse in facilitating an environment conducive to learning and teaching. Fretwell comments that part of this role lies in ensuring that theory is taught within the clinical area and that it matches clinical practice.

1.2.2.2 Differences between taught theory and clinical practice

Hunt (1974) and Gott (1984) looked specifically at the differences between what is taught in the classroom setting and what students are subsequently observed doing in practice.

Hunt (1974) studied differences between the teaching and practice of surgical dressing procedures, in order to ascertain whether deviations occurred between formally taught sessions and techniques that were used in the clinical area. A total of twelve surgical wards were used for the study, four in each of three hospitals. Each hospital had its own introductory course for student nurses. Hunt observed the way in which the procedure for performing a surgical dressing was taught in each of the three introductory courses and compiled three observation checklists – one for each hospital. These checklists were then used to observe the way in which surgical dressings were performed in each hospital in the four surgical wards and to measure non-compliance with the classroom-taught method. A separate checklist needed to be compiled for each hospital, as the way in which surgical dressing procedures were taught varied from hospital to hospital. Hunt emphasises that the aim of the study was not to judge how effective or correct the procedure was that was taught. The aim was simply to identify differences between the way in which procedures had been taught in the classroom and the way in which they were subsequently carried out in practice.

Hunt's original intention had been to measure non-compliance with the taught dressing procedure with first year student nurses on their first clinical experience following the introductory course. Within the pilot study, Hunt discovered that the number of first year students that could be observed would be too small to perform statistical tests of significance. This was because, although surgical dressing procedures were taught in the introductory course, it was often only senior third year students and trained staff who performed these activities, which were seen to be a high status task. As a result, in the main study first, second and third year students and trained staff including staff nurses and ward sisters were observed on the twelve wards, a total of sixty-four participants.

Hunt concludes that deviations from the taught procedure do occur and that in a number of instances the degree of non-conformity represented suspected dangerous practices. In one hospital, trained nurses demonstrated higher levels of non-compliance in practice with taught procedures, although this did not include deviations that demonstrated unsafe practice. In another hospital the students demonstrated a higher level of non-compliance and this did include deviations demonstrating dangerous practice. In the third hospital, there was no difference in degree of non-compliance between students and trained staff.

Whilst the results with regard to differences in degree of non-compliance between student nurses and trained staff is inconclusive, Hunt states that overall differences do exist between the way in which surgical dressing procedures are taught within the classroom and the way in which they are carried out in practice.

Hunt recognises that the study has a number of limitations concerned with the sample used and comments that the general applicability of the study is limited. In addition, only the technical aspects of one skill, that of surgical dressing technique, are studied within the main study and again the results could not be generalised to other procedures. She notes that only having one observer collecting data meant that the amount of data that could realistically be gathered was also a limiting factor and that this observer may have been biased in the observations and recordings made. It could equally be argued that there were no issues in terms of inter-rater reliability, so that the reliability of the data collected was increased.

Overall, there is little discussion of the concepts of reliability or validity within the study and it is not made clear the degree to which these were established. For example, it may not have been valid to measure the practical performance of trained staff using the checklist developed for each hospital, because the way in which these individuals were taught in the classroom may have differed from the checklist. Hunt points out that there is variation in the way in which this procedure is taught from hospital to hospital and that trained staff moving from one area to another had to try and learn the 'correct' procedure for their current area of work. It only seems valid to observe what first year student nurses had been taught in the classroom and then to compare this with their subsequent practice. However, as Hunt points out, it is not often that first year nursing students are allowed to practise their dressing technique. One of the most pertinent issues Hunt does raise is that there seems little point in teaching surgical dressing procedures to student nurses in their introductory course, if they are not going to be able to practise this skill within the clinical setting for some time.

Gott (1984) investigated the relationship between nursing taught in a school of nursing and as practised on the ward. Her aim was to establish the effectiveness of nurse education in preparing student nurses for their role as nurses, specifically in relation to

practical and social skills training. Three different institutions were deliberately used for the study: a large teaching hospital, a small hospital and a medium-sized urban hospital, in the hope that similarities and differences between the hospitals could be identified. Several methods of data collection were used. These included analysis of the introductory course syllabi in order to identify where practical or social skills training were taught, followed by non-participant observation of the classroom teaching of these and of student nurses on their first clinical placement. Interviews with a sample of thirty-three student nurses, twenty-two teachers, thirty-three trained nurses and forty patients were also conducted. All of the teachers interviewed were observed teaching, and thirty-two of the student nurses were observed working in the clinical area. In an earlier article outlining the research Gott (1983) concludes:

“...it was found that nursing practice was almost exclusively taught in the classroom, and that nursing practice on the ward bore little relationship to the practices taught in the school.” (Gott 1983 p.109)

She goes on to give a specific example of this:

“Microbiology and theories of ‘cross infection’ had been taught by staff at all three nurse training schools, and yet these theories did not seem to have been understood and applied to the practice of nursing by students when dealing with patients’ toilet needs.” (Gott 1983 p.115)

Gott comments that basic nursing skills such as bedmaking, bedbathing and the measuring of vital signs were all practised differently to the way they had been taught. Within the interviews this was said to be because the school way was sometimes seen to be unnecessary, impractical or out of date. Students also expressed concern when they could not practise according to the way they had been taught within the classroom. Gott (1984) also suggests that part of the problem stems from the fragmentation in the teaching and sequencing of skills which does not facilitate the concept of total patient care. The teachers were also found to adopt traditional teacher-centred methods of teaching, which Gott states were largely ineffective in relation to student learning.

Gott says that two conflicting ideologies exist; the professional and bureaucratic. The professional stance is emphasised by the school of nursing, which seeks to develop

professional values and behaviour in students, whilst working in the clinical environment demands bureaucratic behaviour. This ideological conflict produces role conflict and stress for student nurses, which Gott says is not helped by nurse teachers because they do not overtly acknowledge that such conflict exists. Within Gott's study, the traditional view of the theory-practice gap as the difference between classroom and ward-based learning is very much in evidence, with nurse teachers seen to be the main culprits in perpetuating the gap as a result of their teaching methods and attitudes. Gott recommends that student-centred approaches focussing on problem-solving skills should be introduced, together with patient allocation, rather than task allocation in order to promote holistic patient care. In addition, she concludes there is a need for academic and service providers to work together:

"The ideological divide that has traditionally existed between teachers and service nurses will not be reduced until both groups of nurses recognise similar problems and goals and seek to achieve these together." (Gott 1984 p.105)

The results of Gott's study should be interpreted with some caution. Whilst there is some discussion of the development of the observation tools used to observe the classroom-based teaching sessions and the students' clinical practice, there is no discussion of the validity of their content. Gott identifies discrepancies between clinical skills taught to students in a classroom setting and how they are subsequently observed to perform these within the clinical area, but similar to Bendall's (1975) study, there is no way of knowing whether the theoretical teaching or the clinical performance was the more appropriate, merely that the two were different. In addition, only a small sample was included within the study, which was conducted in one geographical region. The results therefore cannot be generalised beyond this small sample. However, she makes a number of points which are still relevant nearly twenty years later, particularly in relation to the existence of conflicting ideologies between the education and service sectors and the need to eradicate these.

1.2.2.3 Differences between educational and clinical cultures

Melia (1987), similar to Gott (1984), also discovered that different cultures for practice and education exist and this has implications for student nurses. She used an ethnographic approach in order to investigate the occupational socialisation of nurses. Her study involved forty individual informal interviews with students at various stages of their training. Within these interviews students were encouraged to express spontaneously their ideas about nursing. Melia states that this methodology allowed the interviewer to understand the students' world from their perspective:

“...the students described their experiences of becoming nurses, and in a sense, could be said to be replaying events from their nursing world for the benefit of the researcher.” (Melia 1987 p.191)

Interviews were tape-recorded, transcribed and analysed using the constant comparative method utilised within grounded theory. Grounded theory is a qualitative research methodology, originally developed by Glaser & Strauss (1967), in which data are collected and analysed simultaneously, so that any theory emerging is said to be grounded in the data. Constant comparison of every item of data, with every other item of data facilitates this process (grounded theory is discussed further in sections 2.4.2.4 and 2.4.4). Melia says she used this approach because she wanted to ensure the theories that emerged were the students' and that these directed the study, rather than being influenced by the researcher who had her own knowledge and views of the phenomenon being studied. It is unclear how wide the selection of colleges of nursing used to provide volunteers for the study was, and thus the extent to which Melia's results could be said to apply to all student nurses. However, within qualitative studies, purposive sampling, in which the researcher handpicks the cases to be included in a study, is often actively engaged in, in order to access individuals who have rich data to contribute to a study (Polit & Hungler 1993). Certainly Melia's work is regarded as a seminal study contributing to what is known about how student nurses work and learn and how they become socialised into the role of the professional nurse.

Melia speaks very clearly of the segmentation of nursing and thus the student nurse's world into education and service. Each segment has its own version of nursing. Education

is seen as the idealised, professional version, in which the emphasis is on the production of competent, registered nurses, whilst service or practice is the pragmatic version in which the emphasis is on completing the workload. Each version of nursing is successful because it is compartmentalised. Education and service operate independently of each other, each having its own values and ways of functioning. However, this segmentation causes difficulties for students who are constantly moving from one sector to the other. Melia says that student nurses deal with this dichotomy by learning what behaviour is appropriate within each sector:

“These two versions of nursing are presented to the students in a way which suggests to them that there are competing and conflicting factions within nursing. The students’ response, to what is from their perspective a co-existence of two very different versions of nursing, is to negotiate their way through training by learning when and how to reproduce whichever version of nursing is required.”
(Melia 1987 p.162)

Within Gott’s (1984) and Melia’s (1987) studies, the repercussions of differences between theory and practice, or education and practice for student nurses is made very clear. Education and practice need to be integrated more closely together in order to ensure that student nurses experience high quality educational experiences and become safe, competent practitioners.

1.2.2.4 Attempts to close the theory-practice gap

Two classic U.K. studies have been conducted by Alexander (1983) and McCaugherty (1992b) in which specific attempts to close the theory-practice gap, using novel teaching and learning approaches, have been made.

Alexander (1983) conducted a study specifically aimed at investigating how the integration of the theory and practice of nursing could be facilitated. Alexander gives the traditional definition of theory as the subject matter of nursing that is taught in the classroom or college, whilst practice is nursing performed on the wards. She adopted a pre-test/post-test experimental design to establish whether a method of teaching which involved classroom teaching, supervised patient care and reflective tutorials, facilitated

the integration of theory and practice more than a traditional, purely classroom-based approach.

A specific component of the 1973 syllabus of training was selected to be the focus of the study. This related to the nursing care of gastro-intestinal disorders. This subject area was chosen because it was taught within the first six months of the training programmes in the colleges of nursing and midwifery included in the study. Five of the nineteen colleges in Scotland were used, with a total of 119 students being included within the sample. Students' knowledge of gastro-intestinal disorders was assessed at the pretest stage using a 100 item multiple-choice test. Students were then placed in pairs of matching scores and randomly assigned to either the experimental or control group. Both groups received the same classroom-taught sessions. The experimental group then went to medical and surgical wards with their teachers from the college to give total patient care to patients chosen because they had conditions similar to those studied in the classroom. They then returned to the classroom to engage in reflective discussions of these clinical sessions with the same college teachers. The control group received additional classroom-based teaching to match the time spent by the experimental group in the clinical area and tutorial sessions.

A number of data collection tools were utilised. A pre- and post-experimental questionnaire was administered to students, teachers and trained ward staff in order to ascertain attitudes of the participants towards classroom teaching, clinical experience and views of the theory-practice gap. A multiple-choice test was also administered to students in both the experimental and control groups in order to ascertain improvement in, and retention of, students' knowledge. Alexander states this test had previously been validated and that an identical test was used for all the colleges studied at each stage of the study. This test was administered pre-experimentally, post-experimentally at the end of the study and six months following completion of the study. All students, regardless of whether they had been assigned to the control or experimental group had improved their scores upon completion of the study. Retention of learning was also displayed to a similar degree by both groups six months following completion of the study.

Students also completed an essay upon completion of the study and six months post-study. Both groups of students achieved lower mean scores for the essays than for the multiple-choice tests, although as with the multiple-choice tests there were no significant differences in essay scores according to whether students were in the control or experimental group. There was loss of learning by both groups at the six-month stage.

Alexander concludes that both methods of instruction were effective in that a significant difference was found between each student's pre-test score and post-test and retention score. In terms of the knowledge displayed by students within the multiple-choice tests and essays, there was no difference between the control and experimental group. Alexander concludes that both approaches were useful in promoting student learning. Alexander's innovative approach to teaching and learning with the experimental group was seen to be a success in that the questionnaires administered, following completion of the study to the experimental group, were very positive towards the experimental methods used. Eighty-four per cent (42) of students in the experimental group felt they had learned more as a result of the experimental teaching methods used and the active experiential learning approach adopted. Students felt that the ward-based tutorials, working with patients who had conditions similar to those studied in the classroom, were a realistic way of learning. Part of this was due to the fact that students performed individualised patient care, rather than adopting the more usual task allocation approach to care, which was a common method of work organisation at the time of the study.

Alexander makes four main recommendations as a result of the study. Firstly, that nurse teachers should engage in teaching students within the clinical environment. Secondly, that more student-centred approaches to learning and teaching should be adopted. Thirdly, that there should only be one grade of nurse teacher. Lastly, that ward staff and student nurses should be taught how to teach. A number of Alexander's recommendations have since been realised. There is now only one grade of nurse teacher, with the demise of the clinical teacher during the 1980s and clinical staff are now prepared for their teaching role and are required to complete a programme of study in order to become preceptors. Also, the idea of student-centred approaches to learning have become popular with the introduction of reflection and problem-based learning. The debate with regard to the clinical role of nurse teachers however, continues.

Alexander's study is regarded as a classic within the theory-practice gap issue and the debate as to how theory and practice can be better integrated. However, Alexander herself warns of generalising the findings of the study, stating it is small-scale and conducted within a short time-span, although the fact that the study was replicated in four different colleges of nursing is seen to add validity to the findings. The main shortcoming of the study is that its success hinges on the positive view of the experimental teaching methods used by those involved in the study, but there is a lack of objective evidence to support the fact that these experimental approaches resulted in greater learning by the students. There were no significant differences in multiple-choice and essay scores between the experimental and control groups. In addition, it is difficult to see how Alexander can say that the study demonstrated ways in which the integration of theory and practice was achieved in view of the fact that there was no evaluation of practice. It is also difficult to see how integration of theory and practice can be said to have been improved if only theory was measured via the use of pen and paper exercises.

McCaugherty (1992b) used an action research approach to develop an experimental teaching model with first year student nurses, which he implemented on a surgical unit. Small groups of three or four students received tutorial sessions several times a week, each tutorial lasting approximately one hour. Each session focused upon the nursing care of one patient whom the students selected for discussion and reflection:

"...the main focus of the tutorial was to use the students' experience as a springboard for integrating theory and practice."
(McCaugherty 1992b p.38)

The researcher's role was to supply a knowledge of surgery and surgical nursing and to help the students apply this to their experiences using reflective techniques. Following the tutorials, spot checks were carried out on students in which the researcher questioned students about the care they had given to two patients. The purpose of these spot checks was to determine students' understanding and ability to provide a rationale for the care they had given to the patient. These sessions, which each lasted approximately fifteen minutes, were audio-taped and transcribed. Spot checks were conducted on all first year students passing through the surgical ward over a nine to ten month period, although McCaugherty does not indicate how many students comprised this sample. A similar

number of students acted as a control group on a different surgical ward. These students did not take part in the tutorial sessions, but completed the spot checks. McCaugherty states that the students who were exposed to the experimental tutorial sessions demonstrated a greater depth of understanding of the nursing care they gave to their patients, whilst the control group were less able to demonstrate an integration of theory and practice. McCaugherty concludes that the use of small group, ward-based tutorials proved useful within the study as a means of facilitating the integration of theory and practice.

McCaugherty's results can only be seen as tentative and cannot be generalised for a number of reasons. He does not explain how the degree of integration between theory and practice was actually measured. In addition, it is unclear what the sample size was and the study was conducted in only one locality with students from one institution. It could also be argued that the researcher's enthusiasm and commitment to this type of teaching session determined the success of this study. Other teachers may have less success with this approach. Further, more extensive research is needed in order to establish the reliability of McCaugherty's findings.

All of these classic studies identify some type of dichotomy between the way in which nursing work is carried out within the practice setting and the way in which it is espoused in theory within protocols, textbooks or the classroom. Since these studies were conducted, many changes have taken place within the health-care arena. The introduction of the concept of clinical governance in 1997 (Department of Health 1997) is having a major impact on the health profession as a whole, whilst the introduction of post-registration education and practice – PREP as it became known (U.K.C.C. 1990) has affected the nursing profession in particular. Initiatives such as these make explicit the need to provide high quality services to the public, for individual health personnel to be accountable for the care each gives and to provide a high standard of individualised, evidence-based care. The context within which health is provided is changing and there is an even greater need to ensure that practitioners have the knowledge and skills necessary to be professionally accountable. The theory-practice gap needs revisiting in order to assess whether the changing context of care has altered the gap in any way. Possibly, recent initiatives have served to help reduce the theory-practice gap. This seems unlikely

in view of the renewed interest in the gap demonstrated in documents such as the *Fitness for Practice* document (U.K.C.C. 1999). This calls for a radical review of the way in which nurse education is provided, to ensure newly qualified nurses have the skills and competence necessary to function as newly qualified staff nurses. The need to reduce the theory-practice gap as one means of achieving this is discussed within the document.

There seems to be little doubt that a theory-practice gap does exist within nursing and that this particularly affects student nurses. Having established that there is a theory-practice gap, we now need to consider what causes it.

1.2.3 Causes of the theory-practice gap

1.2.3.1 Different ways of knowing

It has been suggested that the theory-practice gap exists because theory and practice are based on different types of knowledge which can never completely come together (McCaugherty 1991). The study of epistemology and differences in the way in which knowledge is acquired has preoccupied philosophers for centuries. Aristotle differentiated between scientific knowledge as that which is derived from first principles, and practical wisdom as that gained from experience (Jarvis 1999). Thus the view that theory, or scientific knowledge is different to practice, or practical wisdom is not a new concept.

Burnard (1987) refers to theoretical or 'know that' knowledge gained from books; and practical or 'know how' knowledge gained from direct experience or involvement in a situation. He suggests that both are necessary to engage in the practice of nursing. Heron (1981) says that there are three types of knowledge: propositional – learned from books; practical – learning by doing; and experiential – learning by being involved in situations and reflecting upon them. Polanyi (1958) uses the terms explicit and tacit in relation to knowledge. Explicit knowledge can be transmitted in words and symbols. Tacit knowledge results from practical experience and this is more than words or symbols can represent. Later authors have suggested that expert nurses possess tacit or expert knowledge developed from their experience and that this tacit knowledge forms the artistry of nursing (Benner 1984, Meerabeau 1992). One of the problems with this type of

tacit knowledge is that it is individual and difficult to share with others (Meerabeau 1992).

Benner (1984) says that the 'know-how' practical knowledge possessed by expert nurses is largely untapped and that adequate description of this type of knowledge is needed to develop and extend nursing theory. Benner conducted a series of interviews with pairs of newly qualified nurses and their experienced preceptors (Benner 1984). The interviews were conducted separately in order to discover whether there were any distinguishing characteristics in the way in which the preceptor and preceptee described the same clinical incident. She used a phenomenological approach in order to uncover such differences. Phenomenology is a qualitative research methodology which seeks to uncover the lived experiences of individuals, trying to understand the meaning of these for the individual involved. As a result of the research, Benner identifies five stages of progression of expertise that newly qualified nurses progress through from novice to expert. She also emphasises the central role of caring within nursing, stating that ways of expert caring, or 'know how' caring develop as a result of experience.

Whilst all of these authors use different terminology, there is general agreement that nursing involves different types of knowledge. 'Know that' knowledge gained from research, books, articles etc. and 'know how' knowledge which involves practical skill and experience. 'Know how' knowledge is more than simple manual dexterity and often cannot be put into words, symbols or thoughts (McCaugherty 1992a). As Benner (1984) says:

"Theory offers what can be made explicit and formalised, but clinical practice is always more complex and presents many more realities than can be captured by theory alone." (Benner 1984 p.36)

Carper (1978) identifies four patterns or ways of knowing that are used within nursing. She labels these as: empirical knowing; aesthetic knowing; personal knowing; and ethical knowing.

Empirical knowing is the science of nursing and is founded upon the generation of systematically organised theories and laws that describe, explain and predict phenomena

of concern to nursing. This is very similar to Heron's propositional and Burnard's 'know that' type of knowledge. Carper (1978) suggests empirical knowledge is the pattern of knowing that has gained ascendancy over other forms of knowledge within nursing:

"One is almost led to believe that the only valid and reliable knowledge is that which is empirical, factual, objectively descriptive and generalizable. There seems to be a self-conscious reluctance to extend the term knowledge to include those aspects of knowing in nursing that are not the result of empirical investigation."
(Carper 1978 p.16)

Aesthetic knowing, or the art of nursing has been likened to 'know how' knowledge which comes as a result of practical skill and experience (Behi & Nolan 1995). It is not merely practical skill, as this could simply be a matter of technical ability. It also involves the nurse being able to be aware of and interpret a situation and to use his/her experience in order to decide what actions are going to be of most help to the patient. Carper (1978) says that an important component of aesthetic knowing is empathy and experience:

"The nurse will thereby have available a larger repertoire of choices in designing and providing nursing care that is effective and satisfying." (Carper 1978 p.18)

The aesthetic pattern of knowing recognises the importance of the unique and particular within situations. It is also a subjective pattern of knowing, similar to Polanyi's (1958) tacit knowledge. Carper (1978) views aesthetic knowing as the highest pattern of knowing used within nursing, because it organises the other ways of knowing in order to form the artistry of practice (Carr 1996).

Personal knowing concerns the conscious use of the self within the nurse-client relationship. This is often referred to as 'therapeutic use of self':

"The nurse in the therapeutic use of self rejects approaching the patient-client as an object and strives instead to actualize an authentic personal relationship between two persons."
(Carper 1978 p.19)

Personal knowing involves knowing and encountering oneself and the process of self-awareness (Carr 1996). Carper (1978) says this form of knowing is the most problematic to master and to teach to others.

Ethical knowing centres on issues of obligation and what ought to be done. It requires a knowledge of the various philosophical schools of thought with regard to what is right and good and frameworks that can be used to try and arrive at reasoned and rational decisions where moral choices need to be made.

Carper says that each pattern of knowing is important within nursing in order to develop a comprehensive knowledge of nursing practice and that nursing has a long history of utilising all these forms of knowing to inform and guide practice. Carper views them as being interdependent and interrelated to each other. Other authors however, suggest that particular forms of knowledge have taken precedence over others.

For example, Rafferty *et al* (1996) say that what constitutes nursing knowledge is socially and historically constructed and Jones (1997), and others (Miller 1989, Chinn & Kramer 1995, Rolfe 1996) argue that since the inception of modern nursing by Florence Nightingale, a patriarchal stance has been adopted, with nursing subordinate to medicine and the medical model. The medical model is derived from the school of logical empiricism, sometimes referred to as the positivist paradigm, and methods of scientific investigation which focus upon the description, explanation and finding of relationships between phenomena under study (Jones 1997). This logical empiricist approach equates to Carper's empirical knowing. Until recently, empirical knowledge has been regarded as the most credible way of knowing and creating knowledge, enjoying an ascendancy over other forms of knowledge (Carper 1978, Charmaz 2000). As Marks-Maran & Rose (1997) comment:

“That nursing has its early 20th century history rooted in the medical model is a direct result of the rise of positivism, and the scientific paradigm in the 1930s. The value placed on scientific knowledge as the important knowledge underpinning nursing has led to nursing's emphasis on research-based practice in the 1970s and 1980s, hard facts and objectivity...” (Marks-Maran & Rose 1997 p. 115)

Jones (1997) argues that this patriarchal stance and adoption of the logical empiricist model by nursing following the inception of modern nursing by Nightingale, was inevitable due to women's subordination to men:

“For the rest of the nineteenth century and into the twentieth, one main theoretical model – logical empiricism – the medical model, derived from logical empiricism, in turn encompassed societal beliefs from a time when women were subordinate to men. Such a patriarchal view is still evident in the health profession today. With logical empiricists valuing the results of scientific enquiry more than the process of the science, the nursing theories developed were aimed at describing, explaining and predicting phenomena as well as showing relationships between them.” (Jones 1997 p.127)

Chinn & Kramer (1995) suggest that the medical profession exploited nurses to further their own ends:

*“Nurses’ positive desire to help people in need, coupled with a relative lack of educational preparation and social or political power, led to an extended period in history when nursing was practiced primarily under the control and direction of medicine”
(Chinn & Kramer 1995 p.33)*

Chinn & Kramer (1995) suggest that nurses had little option but to adopt the medical model and logical empiricism. However, they go on to suggest that much of the knowledge that actually evolved within nursing was based on tradition and wisdom acquired through years of experience and perpetuated by the apprenticeship style of nurse training. They also suggest that it was only as a result of World Wars I and II that women gained greater freedom and autonomy and the chance to enter higher education. They argue that these educational opportunities resulted in a shift away from emphasis upon technical competence to a more scientific stance.

Other authors suggest that nursing's early quest for professional status focused upon the need to create a body of knowledge unique to nursing (Miller 1989). Contemporary sociology authors writing in the field of professionalisation and professionalism, argue that in order to be viewed as a profession, an occupational group must demonstrate that it has a unique body of knowledge (Johnson 1972, Friedson 1986). Knowledge created through scientific methods based on the model of logical empiricism was seen to be the

best way in which to strengthen nursing's claim to be a profession because this type of knowledge was highly valued by society. Meanwhile, 'know how', technical and experiential knowledge were seen to detract from nursing's claim to professional status (Johnson & Ratner 1997, Goode 1998):

"Nurses' quest for professional legitimacy intensified through the mid-1900s, and nursing academicians, in an attempt to portray nursing as a legitimate discipline, rightly placed within institutions of higher learning, began to minimize the importance of the technical and experiential aspects of nursing. By the mid-1960s, many nursing theorists supported the view that learned professions and technical work are incompatible." (Johnson & Ratner 1997 p.6)

Johnson & Ratner say that knowledge development within nursing centred upon empirical investigation and the development of nursing theories and models to expand the science of nursing. 'Know that' empirical knowledge became the most credible form of knowing, whilst 'know how' knowledge became devalued (Carper 1978, Miller 1989, Johnson & Ratner 1997).

More recently, it has been argued that this empirical 'know that' approach to nursing is not an accurate reflection of what actually happens in practice, where nurses interact and care for clients (Carr 1996, Rolfe 1996):

"Whereas in the hard sciences, the use of the scientific method ensures that the gap between theory and reality is kept to a minimum, in nursing this theory-practice gap is showing no signs of diminishing, since the scientific, hypothetico-deductive model of research can tell us nothing about individual patients and their therapeutic encounters with individual nurses." (Rolfe 1996 p.25)

There is a growing recognition that the 'know how', artistry of nursing knowledge is a closer approximation to the realities of clinical practice (Meerabeau 1992). Thus, there is a discrepancy between what Meerabeau refers to as espoused theory, based on scientific 'know that' knowledge and theory in use, based on 'know how' knowledge (Meerabeau 1992). As such it is argued that one of the causes of the theory-practice gap is the fact that theory and practice are based on different ways of knowing and different knowledge forms.

Since the 1980s there has been a shift away from the empirical stance within nursing to more humanistic approaches of knowledge development. These focus upon the unique lived experiences of individuals and concepts of holism. Jones (1997) believes that the practice of nursing is a process of nurturing and human interaction within a social context and that these humanistic approaches are therefore more appropriate to the generation of knowledge within nursing. Within this approach, Carper's aesthetic, personal and ethical patterns of knowing become more valued. The difficulty lies however, in the fact that the knowledge upon which nursing is presently based is still largely derived from the empiricist model of knowledge. It is argued that the theory and practice of nursing can never completely come together because they are based upon different types of knowledge. 'Know that', scientific knowledge cannot be brought together with 'know how' practical experience of nursing, there is a mismatch between the two, with reality being more complex than textbook theory:

"However good a textbook or lecture, neither can ever capture a fully accurate picture of the real world... They are generalised and, in some ways, an inadequate view of reality." (McCaugherty 1992a p.32).

Rolfe (1998) goes further to suggest that this dichotomy between theory and practice is perpetuated by nurse theorists who continue to engage in what he refers to as academic research, still based on the empirical model. Such research has little to do with the realities of practice which in agreement with Jones (1997), Rolfe says are more concerned with humanistic approaches to nursing and caring. The technical rational approach according to Rolfe produces research and theories of what happens to the average patient in the average situation. This may be appropriate at a macro, societal level, but is unsuitable for application on a micro level of what will probably happen in a given situation. Rolfe argues that this is no use to nurses who work on a one-to-one basis with patients and need to know what will work for this particular patient in this particular situation. The laws of probability upon which the empiricist model is based are of little value to nurse practitioners of today, who need to find solutions to the unique problems facing him/her:

"...whereas statistical research is adequate for generating theory, we run into difficulties when we come to apply that theory to practice settings with individual patients...no matter how much the statistical

model of research is refined, it will never provide findings of use in individual and unique situations.” (Rolfe 1998 p.674)

In an earlier work, Rolfe (1996) proposes a new paradigm of nursing to close the theory-practice gap which he refers to as hypothetico-abductivism. Within this model it is the clinically based nurse who engages in reflective practice, developing theories based on his/her practice and testing these out in order to find solutions to the everyday problems facing them. In this way theory and practice inform each other and praxis occurs:

“...the relationship between theory and practice is not a deterministic or causal one, but a mutually enhancing one. Theory and practice are locked in an inseparable whole, such that reflective practice produces informal theory, which in turn modifies and develops practice.” (Rolfe 1996 p.30)

Whilst this may seem an attractive means of abolishing the theory-practice gap, Rolfe has been criticised for inconsistencies within his model relating to the way in which theory is judged and legitimised. Rafferty *et al* (1996) suggest that informal theory cannot have the same credibility as traditional formal theory because it is not subjected to the same rigorous processes by which such formal theory is generated. However, the argument of basing theory in practice as a means of closing the theory-practice gap is persuasive and Rolfe is not the only author to argue that this is a way forward for the nursing profession. Jarvis (1999) also suggests that the high status accorded to theory needs to be questioned. Whilst objective scientific knowledge espoused by nurse teachers and taught to student nurses is important, it has to be translated and developed by practice. In a similar argument to Rolfe, Jarvis suggests that practice-based research, with clinical nurses engaging in forms of action research to develop and utilise their own personal theories of practice, is the way nursing should move in the future. Practice should be at the heart of education:

“...the future of practice education entails placing practice rather than theory at the heart of teaching, and recognising that the theory we present in initial preparation is merely information for the practitioners so that they can experiment with it in practice.” (Jarvis 1999 p.273)

In a more recent article Jarvis (2000) suggests that a new breed of practitioner-researchers is emerging in response to the fast pace of change that occurs within practice and the need to find solutions rapidly to everyday unique problems in the workplace.

In conclusion, there appears to be substantial support for the argument that the theory-practice gap in nursing exists because theory and practice are based on two different knowledge forms and ways of knowing. Traditionally, nursing has supported the empirical approach to knowledge development as a result of the sociological norms that predominated at the time of the inception of modern nursing and also as a result of its pursuit of professional recognition. However, there is growing support for nursing to be based upon other forms of knowledge, which are seen to be a more accurate reflection of clinical practice and therefore a more appropriate framework for nursing.

1.2.3.2 The organisation of nurse education

The way in which nurse education has traditionally been organised and delivered is also seen to contribute to the theory-practice gap (Ferguson & Jinks 1994). Florence Nightingale set up the first training school for nurses in 1860, emphasising the need for both education and service. The apprenticeship style of nurse education, in which student nurses learned primarily via ward-based service, predominated until the 1940s, when concerns that students received more theoretical input, resulted in the block system of nurse training being introduced (Ferguson & Jinks 1994). This consisted of practical experience being interspersed with periods of theoretical teaching which took place within the school of nursing. Ferguson & Jinks (1994) comment that service needs determined where students were located for clinical experience, so that often what they were taught in the classroom, bore little relation to their clinical experiences.

The Briggs Report (H.M.S.O 1972) appeared in 1972 resulting in the implementation of modular schemes of nurse education in which each module of training involved both theoretical teaching and associated practical experience (Alexander 1983). Since then, nurse education has been divided into blocks of study time spent within a college of nursing or institution of higher education, interspersed with periods of practical experience in a variety of related clinical settings. Nurse teachers based within an

educational institution, whether this was a college of nursing or institution of higher education, provided classroom teaching, or theoretical input, whilst teaching within clinical areas, the practice of nursing, was the domain of clinical staff and clinical teachers. As a result of further reform within nurse education which culminated in 1992 with the implementation of Project 2000 (U.K.C.C. 1986), the responsibility for the clinical teaching of student nurses now lies primarily with clinical staff who act as preceptors and mentors for students whilst they are on clinical placement. Nurse education has become divided between periods of theoretical input, taught by nurse teachers based within an institution of education, interspersed with periods of clinical experience under the control of clinical staff.

The balance between theoretical input and practice has changed since the introduction of the modular scheme of nursing. Initially, the balance was one-sixth formal instruction about nursing and related subjects with the remaining five-sixths being practical experience (Alexander 1983). With the introduction of Project 2000 there is now an equal balance of 50% theory, 50% practice (U.K.C.C. 1986). However, the division of nurse preparation between the education and service sectors remains. This split of the theory and practice of nurse education into formal, academic, classroom teaching and clinical experience is seen by some authors to perpetuate the gap between the different types of knowledge used within nursing (Meerabeau 1992, Carr 1996).

Rolfe (1996) suggests that nurse education is divided between the academic setting which is a proponent of empirical, 'know that' knowledge and the service sector which supports the 'know how' of knowledge. The empirical approach underpins the way in which student nurses are taught within the academic, classroom setting and it has been argued that academic nurse education maintains the theory-practice gap by focusing and valuing empirical knowledge over other forms of knowledge (Rolfe 1996). As Schön (1987) says, 'know that' knowledge takes precedence over 'know how' knowledge within education. Thus, there is a fundamental discrepancy between what is formally taught to student nurses – the theory of nursing, based on empirical scientific knowledge, and students' practical experiences of nursing during clinical placement – based on humanistic approaches to care. It has been suggested that the recent move of all pre-registration nurse education into the higher education sector, with its traditional emphasis

on the acquisition of theoretical knowledge and academic idealism may result in an even greater gap between theory and practice (Goode 1998). This view does not take account of developments within nurse education to interweave theoretical and practical learning through initiatives such as reflection (section 1.2.5.5), problem-based learning (section 1.2.7.1), preceptorship (section 1.2.5.4) and through posts which combine both educational and service commitments (sections 1.2.5.1 – 1.2.5.3).

Cook (1991) suggests that the picture is not as simple as merely being a difference in educational and service ideologies and that the hidden curriculum needs to be taken into account. He suggests that the theoretical knowledge espoused by the educational institution is based on the premise of benefiting the patient, whereas nursing practices are often based on the need to protect the nurse from the emotional stress of caring for the sick:

“Hence, the nursing theory which underpins the nursing practices aimed at improving patient care can be in direct conflict to the psychological theory which underpins the actual nursing practices which are aimed at the defence of the nurse from excessive and unbearable emotion and anxiety, necessary for self-preservation.”
(Cook 1991 p.1467)

He suggests that in order to understand more fully the theory-practice gap, there needs to be research into the theories that underpin current clinical practices and the way in which such theories are transmitted through the hidden curriculum.

1.2.3.3 Differing value systems

Some authors state that the focus on different forms of knowledge within academic and practice settings also results in different cultures, values and pressures being presented to students (Ferguson & Jinks 1994, Khatib & Ford 1999). This is similar to Gott’s (1984) professional and bureaucratic ideologies espoused by the school of nursing and clinical area respectively and which she said results in role stress for students. It also relates to Melia’s (1987) work in which nursing was seen to be segmented into professional education and pragmatic service. Thus the theory-practice gap is more pervasive and

complex than simply the result of different forms of knowledge being transmitted to students.

Rafferty *et al* (1996) refer to this as 'tribal prejudice'. They go on to suggest that the theory-practice gap is an unavoidable but positive phenomenon that can be used to introduce students to the debates surrounding what constitutes nursing knowledge. The important issue is to prepare students for the differences between what they learn in the classroom and see in the clinical area, rather than simply ignoring the fact that such differences exist. This is consistent with the view which Gott proposed over ten years earlier (Gott 1984). Cook (1991) also supports this view, suggesting that conflicts between classroom teaching and the realities of practice are inevitable and that students should be prepared for dealing with these discrepancies.

May *et al* (1997) conducted a study commissioned by the National Board for Nursing, Midwifery and Health Visiting for Scotland (N.B.S.), evaluating the implementation of Project 2000 in Scotland. This study focuses on the processes of teaching and learning within these programmes of nursing and midwifery education and their relationship to specific educational outcomes for individual students. The methodology adopted within the study was that of illuminative evaluation using a case study approach, focusing on six of the twelve Colleges of Nursing and Midwifery offering programmes of nursing and midwifery education in Scotland. Four methods of data collection were used: semi-structured interviews, non-participant observation of classroom teaching and learning, document analysis and Likert-type scales. A large sample of participants were involved in the study which included 204 nurse and midwife tutors, 494 nurse and midwifery students and 195 nurse and midwifery mentors (McIntosh *et al* 1997). The findings of this study are wide-ranging and recommendations are made for future practice and further study. Whilst the theory-practice gap is not specifically investigated within May *et al's* (1997) study, a number of the findings can be related to the theory-practice gap issue. In relation to theory and the relevance of this to practice, they comment on discrepancies between theoretical and practical knowledge, stating these should be exploited for their educational potential, supporting the view forwarded by Cook (1991) and Rafferty *et al* (1996).

The previous discussion highlights that the theory-practice gap is regarded by some authors as a potentially beneficial phenomenon. It is seen as a useful learning experience for students, providing them with opportunities to develop problem-solving skills in terms of how to bridge the gap and apply theory to practice (McMahon 1994). However, there is also a wealth of literature suggesting that there is a need to integrate, more closely, the theory and practice of nursing, thereby closing, or at least reducing, the theory-practice gap.

1.2.4 The integration of theory and practice

Whilst there seems to be a general consensus of opinion within the nursing literature that theory and practice should be integrated and the theory-practice gap closed, it is less obvious as to what exactly is meant by this, or how it should be achieved. Langford *et al* (1987) suggest that:

“...integration is an index of connectedness, the extent to which parts of a whole are coordinated toward the accomplishment of a common purpose.” (Langford et al 1987 p. 362)

Alexander (1983) also states that integration is the putting together of all the relevant parts in order to make a meaningful whole. For Alexander, the whole organisation of the nurse education process, design of the curriculum, teaching methods used and links between education and service sectors are all necessary for integration to occur, but whether or not integration actually takes place is up to the individual learner.

McCaugherty (1992b) suggests there are two aspects to integration. Firstly there is the notion of putting theory into practice. This occurs at the bedside when students are observed and instructed in the performance of practical skills, such as monitoring vital signs – learning by experience. Secondly there is the bringing of theory and practice together by the use of experiential techniques in order to stimulate the students to engage in reflection - learning from experience. As he says in another article, integration of theory and practice is a thinking and doing process (McCaugherty 1992a). For Rolfe (1996, 1997, 1998) as already discussed, integration is achieved by theory being developed, tested and applied to practice and an essential component of this process is the

adoption of reflective techniques. The common theme is that theory and practice need to inform each other, rather than developing in isolation, but how can this be achieved?

1.2.5 Achieving integration

Rafferty *et al* (1996) suggest that there have been three approaches adopted in attempting to integrate nursing theory and practice. These are reconstruction, reorganisation and reconstitution.

Reconstruction refers to attempts historically, to alter the way in which nurse training has been resourced and the creation of student status for student nurses. Rafferty *et al* state that this was first considered by the Ministry of Health as long ago as 1919, but because of the financial implications and the reluctance by the service sector to lose control over students, it was not finally achieved until the introduction of Project 2000. The philosophy underpinning student status for nursing students is that it values the educational experiences of nurse training and prevents students from being used merely as pairs of hands to ensure the completion of the ward workload.

Reorganisation refers to the various attempts to organise the nursing curriculum into block and modular modes of delivery in attempts to integrate more closely the theory and practice of nursing as previously discussed. However, in view of the persistence of a perceived theory-practice gap the efficacy of such attempts at reorganisation is questionable (Rafferty *et al* 1996).

The third way in which a closer approximation of theory and practice has been attempted is by the reconstitution of various teaching roles which cross the traditional education service boundaries. A number of teaching and service roles have been created such as the clinical teacher, joint appointee, lecturer-practitioner and preceptor roles. These roles are discussed more fully in the next section.

1.2.5.1 The clinical teacher

The clinical teacher role (originally the clinical instructor) dates from the 1950s in an early attempt to help students integrate the theory and practice of nursing. Post holders had responsibility to supervise and teach students on clinical practice, with teaching being based within the clinical area. A number of studies conducted in the 1970s and early 1980s identified problems with the clinical teacher post, including a lack of clearly defined job responsibilities, role conflict due to the demands of having dual roles of nurse and teacher and lack of status within either field (Lathlean 1994). As a result, courses offering clinical teacher training were withdrawn in 1985 (Fairbrother & Ford 1998) and with the introduction of Project 2000 and one level of nurse teacher, the role became obsolete.

1.2.5.2 The joint appointment

Joint appointments were advocated as a way forward in reports that appeared in the 1970s (Lathlean 1994). Joint appointment posts have taken various forms, but in general terms there is joint responsibility to both a service and educational setting, usually a 50:50 split. Joint appointees are experienced nurses, often in a senior managerial position who carry a clinical workload which forms their service responsibility. They also teach students and other members of staff, both within the clinical area and within the educational establishment. This tended to result in unrealistic expectations in terms of the size of the role to be maintained with individuals often carrying what amounted to two full-time jobs (Vaughan 1989). Fairbrother & Ford (1998) comment that this approach requires a superhuman effort to sustain. Day *et al* (1998) quoting a number of research articles evaluating the joint appointment role, also comment that their success largely depends upon the enthusiasm and motivation of the individual appointed.

1.2.5.3 The lecturer-practitioner

Lecturer-practitioner roles are similar to joint appointments in that the role involves a commitment to both service and education (Lathlean 1994). Fairbrother & Ford (1998) suggest the role originated in Oxford in the 1980s, where lecturer-practitioner posts were

set up as part of a planning strategy between the local health authority and an institution of higher education. However, the number of lecturer-practitioners in post has since increased across the U.K., but there is little in the way of standard definition of what the post entails. This is because individuals are developing the post to suit their own skills and experiences and the role needs to be sufficiently flexible to meet local education and service needs (Jones 1996). In broad terms, the lecturer is expected to undertake formal classroom teaching within an institution of higher education, together with having responsibility for a clinical workload and clinical teaching. This should ensure that the lecturer-practitioner has up-to-date clinical knowledge, competence and credibility which can be applied to a theoretical setting.

Woodrow (1994) said the lecturer-practitioner was a fairly new concept, which was poorly defined and evolving along a variety of lines to suit local needs. The term itself is misleading, implying a lecturer in practice. Several years later, there is still no commonly agreed definition of the role. It primarily seems to be a role occupied by individuals within senior clinical posts, carrying a clinical workload, who also have a remit of teaching responsibilities, usually clinically-based, to both students and clinical staff (Day *et al* 1998). Day *et al* state that whilst existing numbers of lecturer-practitioners are small, there has been a noticeable increase in their numbers within the mid-1990s. However, they remain an elite group, with only 42% of trusts within England having lecturer-practitioner posts (Hollingsworth 1997).

Shepherd *et al* (1999) state that there has been little in the way of empirical evaluation of the lecturer-practitioner role and report their case study of a small group of community lecturer-practitioners or 'community facilitators' as they call themselves. Sheperd *et al* (1999) conducted a qualitative investigation, utilising a case study approach to conduct a series of semi-structured interviews with community facilitators. The report highlights many positive aspects of the community facilitator role for the individuals involved. This included the ability to facilitate the integration of theory and practice, which was enhanced by their perceived credibility in the eyes of students, both within the education and practice arenas and the advantage of being able to cross traditional boundaries of education and practice. One perceived benefit of the community facilitator role was that the teachers and facilitators involved gained a greater insight into each other's worlds and

seemed to overcome some of the traditional boundaries between education and practice. The authors recognise the limitations of the study in terms of the small number of participants involved and the need for further evaluative research. However, they suggest that the lecturer-practitioner role may be a means of enabling skilled nurses to remain close to clinical care, whilst also advancing their career by developing an educational role. Watson & Harris (1999) also suggest that lecturer-practitioner type posts may be one means of ensuring that students are adequately supported within clinical placements.

The use of roles such as joint appointees and lecturer-practitioner posts have not only been used within the U.K. as a means of trying to ensure the integration of theory and practice; they have also been adopted within other countries as discussed below in section 1.2.6.

1.2.5.4 Preceptorship

Preceptorship has been cited as a means of closing the theory-practice gap in nursing by a number of authors (e.g. Armitage & Burnard 1991, Yassin 1994, Spouse 1996, Kaviani & Stillwell 2000, Chow & Suen 2001, Pigott 2001). The concept of preceptorship was founded in the U.S.A. in the late 1960s and early 1970s in response to growing concern over the disillusionment experienced by graduate nurses when they entered the clinical arena for the first time as newly qualified nurses (King & Cohen 1997). Kramer (1974) in her classic book, discusses the reality shock experienced by newly qualified graduate nurses as they try and make the transition from the ideal theoretical values attained during their training, to the often less-than-ideal reality of clinical practice. Kramer suggested the reason so many newly qualified nurses were leaving the nursing profession, was because they could not cope with this reality shock. Preceptorship was introduced as a means of helping these new practitioners make the transition into the world of work and is a model now used internationally as a means of supporting newly qualified nurses (King & Cohen 1997).

Brennan & Williams (1993) suggest the problem of transition into the qualified practitioner role became more prominent within the U.K. among newly qualified Project 2000 graduates:

*“...who, while having a strong knowledge base, can experience problems in translating theoretical concepts into practice.”
(Brennan & Williams 1993 p.34)*

Within the U.K. the preceptorship model was adopted by the U.K.C.C. as part of a formal framework designed to support learning by newly qualified practitioners (U.K.C.C. 1993). As Morton-Cooper & Palmer (2000) say:

*“This required employers to prepare and establish preceptorships across the workplace with the stated intent of helping newly qualified practitioners to consolidate existing skills and theoretical knowledge and to develop their practice and interpersonal skills within a supportive and constructive learning environment.”
(Morton-Cooper & Palmer 2000 p.93)*

Within this framework, each newly qualified member of staff should be preceptored for a certain period of time, usually four months, by an experienced colleague who has received specific preparation to act as a preceptor (Morton-Cooper & Palmer 2000).

The importance of supporting pre-registration student nurses has also been recognised. Project 2000 (P2000) emphasised the need to support student nurses both within the academic and practice setting (U.K.C.C. 1986). More recently, the *Fitness for Practice* document (U.K.C.C. 1999) has again reiterated the need to ensure students are appropriately supported within practice placements.

One of the problems with the introduction of a system of support for students within the clinical environment at pre-registration level, has been the ambiguity over definitions of the term and what the role and responsibilities of a support person should be. There has been disagreement over whether the term preceptorship or mentorship should be used to describe the support given by experienced practitioners within a clinical area to student nurses (Coates & Gormley 1997, Morton-Cooper & Palmer 2000). In some geographical areas the term mentor is used, although it is argued that this term denotes a different relationship to that of preceptorship which focuses on the educational needs of students. Mentorship is also concerned with aspects of teaching and learning, but the aim within a mentoring relationship is to develop a closer, more personal, relationship over a long

period of time (Kaviani & Stillwell 2000). Preceptorship is the title used within this investigation as this is the term used within the clinical areas studied. Kaviani & Stillwell (2000) define preceptorship as follows:

“...preceptorship involves access to an experienced and competent role model, and a means of building a supportive one-to-one teaching and learning relationship. This relationship tends to be short term, aimed at assisting the newly qualified practitioner or nursing student adjust to the nursing role.” (Kaviani & Stillwell 2000 p.219)

The purpose of preceptorship is to orientate new workers to the clinical environment and to develop a supportive teaching and learning relationship, particularly with regard to ward routines. The preceptor also acts as a role model and helps to socialise the new worker into the work environment (Kaviani & Stillwell 2000, Pigott 2001). The advantages of preceptorship are cited as being a reduction in the reality shock and role conflict experienced by students and newly qualified staff on entering the clinical area for the first time (Brennan & Williams 1993, Kaviani & Stillwell 2000). Brennan & Williams (1993) and O’Mara (1997) point out that preceptors benefit from the enhanced job satisfaction that results from the challenge and responsibility of being a preceptor. O’Mara (1997) also suggests that academic institutions and preceptors can benefit from the possibilities of developing collaborative research.

Myrick & Yonge (2001) say the role of the preceptor is:

“...to bridge the gap between the reality of the workplace and the idealism of an academic environment without compromising professional ideals.” (Myrick & Yonge 2001 p.463)

They say preceptors play a pivotal role in influencing the learning environment within the clinical area and that the impact of the learning environment, or learning climate, on students is well documented:

“Most experts concur that the most effective climate in the promotion of learning and critical thinking is the one that reflects support, is devoid of threat, fosters openness, inquiry and trust, and avoids competitive performance judgements.” (Myrick & Yonge 2001 p.461)

In this Canadian study, Myrick & Yonge adopted a grounded theory methodology in order to investigate how preceptors foster the development of critical thinking skills in student nurses and how the learning climate influences this development. Six preceptees and six preceptors were interviewed and observed in tertiary care settings. The preceptees were fourth year baccalaureate nursing students. Myrick & Yonge discovered that two factors were important in the development of critical thinking skills during the preceptorship experience. Firstly, the preceptor's ability to work with, value and support the student was pivotal in creating a learning climate in which the student was encouraged to develop problem solving and critical thinking skills. Secondly, other members of staff present within the clinical environment also contributed to the creation of a positive learning climate. An important factor was the preceptor's relationship with the nursing staff and other health professionals, such as doctors, physiotherapists and managers, which Myrick & Yonge say often has a direct effect upon the student. They conclude that the need for clinical staff to accept and value students within the clinical setting is crucial to establishing a positive learning climate, enabling students to develop critical thinking skills and to link classroom learning with their clinical experiences:

“It is in the practice setting that students begin to operationalize the theories that have been in the forefront of their classroom experiences. Although they may have been taught new and alternative ways of interpreting and analysing nursing situations in the familiarity of the classroom and laboratory setting, it is in the unfamiliarity and sometimes overwhelming milieu of the practice setting, or real world of nursing, that they acquire the ability to apply that way of thinking to the patient situations...If staff are not accepting, this can become a formidable and not infrequently insurmountable challenge.”
(Myrick & Yonge 2001 p.465)

The results of this qualitative study should be viewed with some caution in terms of their applicability to other groups of students. Only a small number of preceptees and preceptors were interviewed and only fourth year nursing students comprised the preceptee sample. Different perceptions and interpretations may have been gained if students from other years had been studied. In addition, it is difficult to assess how applicable the results of this Canadian study are to the U.K. Canada has different systems of nurse education and health care organisation, which may have influenced the views of those studied. However, other authors support Myrick & Yonge's findings. For example,

Manley (1997) also emphasises the importance of the learning environment and the influence the preceptor can bring to bear upon this:

“If the preceptor creates a supportive, non-threatening environment that is open to enquiry and free from pejorative judgements of performance, the environment will enhance learning.”
(Manley 1997 p.34)

Spouse (2001) highlights the importance of effective preceptor support in helping students adapt to the clinical setting and to learn. Spouse (2001) conducted a naturalistic, longitudinal study designed to investigate how pre-registration nursing students acquire professional knowledge within the clinical setting. One U.K. educational institution was used to conduct the study following a convenience sample of eight, first year undergraduate nursing students through twelve clinical placements. Spouse used both ethnographic and phenomenological methodologies in order to conduct the study, stating that this multi-method approach facilitated the collection of data sufficiently flexible to be sensitive to students' experiences and to allow the verification of data by comparison of different perspectives and sources of information. Data collection methods included focused interviews, non-participant observation, critical incident analysis and illuminative artwork. Methods of constant comparative analysis and inductive approaches were used to code data and to develop a case study of each student.

The results of Spouse's (2001) study indicated that the most important factor influencing the development of professional knowledge within the clinical setting was the social interaction that took place between the student and his/her preceptor. The preceptor played a crucial role in terms of sponsoring and befriending the student, creating a climate in which effective social interaction and subsequently, effective learning could take place. The preceptor's ability to communicate with the student, describing the care they were providing to patients and why, helped students relate theoretical knowledge to nursing practice. The creation of a nurturing relationship also fostered the student's ability to ask questions and explain his/her experiences, allowing the preceptor to gauge the student's level of knowledge, identify the student's learning needs and to provide appropriate experiences. Spouse (2001) refers to this as scaffolding activities that help the students to integrate theory and practice:

“Through these scaffolding activities students learn how to recognize the saliency of previously studied material (epistemic) and to see its relationship to every day practice thus learning how to integrate theory and practice.” (Spouse 2001 p.519)

The extent to which the results of Spouse’s study can be generalised to other situations and other groups of students is open to question as only one institution and a small number of students were studied. However, there seems to be a growing body of evidence to suggest that preceptors can play an important part in the development of learning by students, due to the preceptor’s ability to influence the student’s clinical learning environment (Myrick & Yonge 2001). Both Spouse (2001) and Myrick & Yonge (2001) suggest the preceptor can help the student to integrate classroom learning with what they experience within the clinical area, bridging theory to practice.

Other authors suggest there is a lack of empirical evidence to support the benefits of preceptorship generally (Marriott 1991, Coates & Gormley 1997, Kaviani & Stillwell 2000, Morton-Cooper & Palmer 2000). Allen & Simpson (2000) argue that in particular, there is a lack of empirical evidence to support the belief that preceptorship helps reduce the theory-practice gap.

Allen & Simpson (2000) report the results of a grounded theory study conducted in two stages. The first stage investigated the education and training needs of community mental health nurses (C.M.H.Ns) and their perceptions of their role as preceptors. Purposive and snowballing sampling methods were used to conduct a series of semi-structured interviews and focus groups with C.M.H.Ns, hospital-based mental health nurses and other mental health workers (including social workers, occupational therapists, support workers, psychiatrists and a general practitioner representative), managers, nursing lecturers and P2000 mental health nurse students. A total of 209 participants took part in the individual and group interviews. The second stage followed a similar methodology to explore preceptorship in more detail with a total of 275 managers, lecturers, preceptors, P2000 nursing students, community and social work practice teachers being interviewed. A large sample was included within the study which covered a wide range of education and service staff, but the study was conducted in only one geographical location and generalisations from this may well be inappropriate.

One of the key findings of Allen & Simpson's study was that preceptor preparation and support arrangements did not meet the needs of preceptors, who felt the preceptor role was undervalued and not acknowledged. In particular, preceptors felt inadequate in their ability to assess students and support those who were failing. In relation to the role of the preceptor in helping students link theory and practice, Allen & Simpson comment:

"Preceptors stated that, prior to the students' arrival in the clinical placement, they had little knowledge of what 'theory' had been imparted to them...Without knowledge of the course content it was difficult for them to marry any theory, acquired by the student, with practice opportunities in the placement."
(Allen & Simpson 2000 p.510)

It would seem that the effect of preceptorship on the theory-practice gap perhaps requires further investigation. In general terms, there seems to be agreement that for preceptorship models to be successful there needs to be formal preparation for the preceptorship role and an effective partnership between education and service sectors (U.K.C.C. 1999, Kaviani & Stillwell 2000, Pigott 2000). Guidelines recently published by the U.K.C.C. (U.K.C.C. 2000) advising the standards of preparation for mentors, identifies the need for effective communication and working relationships and the facilitation of learning. The importance of assessment, role modelling, the creation of an effective learning environment, improving practice and development of a knowledge base that fosters the dissemination of research findings within practice are also highlighted. The document also identifies the need for demonstration of strategies that will assist with the integration of learning from the practice and educational setting (U.K.C.C. 2000).

A number of recent research studies have investigated various aspects of the clinical support which student nurses receive whilst on clinical placement; how students gain knowledge whilst in the clinical area and their experiences of preceptorship (e.g. White *et al* 1994, Cahill 1996, Phillips *et al* 1996, Spouse 1996, Coates & Gornley 1997). The findings of these studies are wide-ranging and contain aspects relating to the preceptorship role. In particular, the difficulties inherent in maintaining an effective preceptor role due to issues such as time constraints, workload and shift patterns are highlighted. These studies are reported in more detail in chapter two (section 2.5), where they are used to support the findings of the qualitative stage of the researcher's study.

1.2.5.5 The use of reflective techniques

Schön (1987), an eminent writer in the field of education, discusses the way in which professional knowledge develops and the way in which professionals are prepared for practice. He suggests that all professions, such as medicine, law, teaching, civil engineering and business studies, experience difficulties when it comes to relating professional knowledge learned in the educational institution to the practice situation. In a similar vein to other authors, he says that educational institutions are based on the technical rational approach which has devalued the artistry of practice. Similar to Rolfe (1996) and Goode (1998), Schön says the realities of practice are far more complex than what is learned theoretically and that professionals need to descend from the high ground of the positivist paradigm to what he refers to as the messy and swampy lowlands of real-life practice (Schön 1987).

Schön suggests that much of this real-life practice is based upon 'knowing-in-action' which he defines as spontaneous skilful performance which cannot be verbalised. This is the same as what Polanyi (1958) referred to as tacit knowledge. However, by the use of reflection, this knowing-in-action can be made explicit, verbalised and therefore learned from, in order to become 'knowledge-in-action'. This process of reflection can take one of two forms. 'Reflection-on-action' is a process whereby the individual thinks back to a situation in order to learn from it. 'Reflection-in-action' occurs when the individual thinks about a situation as he is experiencing it and this reshapes the way in which the situation is dealt with by reshaping what is being done, whilst it is being done. This reflection is a conscious process, which is often stimulated in situations where there is an unexpected response or surprise. This, in effect, focuses attention upon the situation. The individual then begins to think about why this is happening, how it can be explained and on the spot experimentation is undertaken in order to try and deal with the situation effectively:

"We think up and try out new actions intended to explore the newly observed phenomena, test our tentative understandings of them, or affirm the moves we have invented to change things for the better."
(Schön 1987 p.28)

Schön says that students within the different professions can learn these reflective techniques by being exposed to a practicum in which they can learn within a safe environment that is an approximation of reality. He also says that the way in which students learn within practice is by being coached by experienced practitioners who can share their knowledge in action with students, promoting reflective activity.

Kolb (1984) developed a model of experiential learning within which the process of reflection is a central component. Similar to Schön, Kolb says the link between thinking and doing is reflection and that:

“learning is the process whereby knowledge is created through the transformation of experience” (Kolb 1984 p.41).

Kolb’s model consists of a four-stage cycle consisting of four learning modes. He identifies these four stages as: ‘concrete experience’, ‘reflective observation’, ‘abstract conceptualisation’ and ‘active experimentation’. For learning to occur, all of these stages have to be completed. Kolb states that merely having an experience is insufficient for learning to occur, it has to be transformed in some way. The learner engages in some type of situation, or concrete experience, upon which they reflect. This results in insight and transformation of that experience into knowledge and is the process of abstract conceptualisation. Active experimentation occurs when the individual tests out the knowledge he has gained as a result of this reflective process in a practice situation. Kolb makes the point that this learning process is cyclical, with active experimentation resulting in concrete experience and therefore beginning the cycle again. This is the same as Schön’s (1987) on-the-spot experimentation.

Kolb’s model has been criticised by Jarvis (1987) as being oversimplified. Jarvis states that Kolb does not consider the affect that progressing through the cycle has on the learner. It does not consider the process of the learner or:

“...how that learning experience affect(s) the next time that the individual encounters a similar situation?” (Jarvis 1987 p.18)

This does not seem a valid point, as it is implicit within Kolb's cycle that through the process of reflection and conceptualisation, the individual arrives at new strategies of action. It is a continually evolving cycle which affects the individual, but it would be impossible to predict how this would occur. Each case is unique, depending on the individual involved, his particular experiences and ways of reflecting and conceptualising. In general, Kolb's experiential model has gained acceptance within the field of nursing and is cited by various authors, (e.g. Burnard 1990; McCaugherty 1992a; Rolfe 1996)

The concept of reflection has become a popular theory of learning within nursing (Marks-Maran & Rose 1997), where it is seen to provide a new rationale to underpin practice and to try and integrate this to theoretical learning processes (Quinn 1995). The work of Benner (1984) previously discussed in section 1.2.3.1, did much to promote the concept of reflection, by emphasising the importance of actively learning from experience in order to become an expert practitioner. The use of reflection was also used by McCaugherty (1992b) in his action research study discussed in section 1.2.2.4, to help students relate their practical experiences within a surgical placement to theoretical principles underpinning surgical practice. The work of Rolfe (1996), also previously discussed in section 1.2.3.1, hinges on the notion of reflection-in-action and reflection-on-action by the practising nurse in order to develop theories to overcome practice-based problems with individual patients.

Burnard & Chapman (1990) say there are a number of ways in which reflection can help nurses to learn and give a list of twenty-three activities in which reflective ability can be useful. Examples they give include: reflecting on past clinical experiences; exploring feelings in small groups; receiving positive and negative feedback from colleagues; using problem-solving strategies; consciously changing roles and practising new interpersonal skills.

In a more recent study commissioned by the N.B.S., Watson & Harris (1999) investigated the support of students in practice placements in Scotland. They found that helping students to reflect on their practice was a valued means of supporting students within the clinical setting, helping them to learn from practice and to link practice to theory. Within

the study a sequential mixed method design utilising focus groups and a postal questionnaire was used. Watson & Harris say this allowed for triangulation of the methodologies used and also of the groups involved in the study. The study was conducted in five stages. Firstly, a survey of all academic institutions offering nurse and midwifery training throughout Scotland was made, to identify arrangements made to support students on placement and the preparation of preceptors to undertake their educational role. This was followed by preliminary focus group interviews with a total of forty nine students, forty preceptors and twenty-three lecturers from academic institutions. This was a purposive sample selected from all branches and all courses, from academic institutions throughout Scotland. The purpose of the focus groups was to collect qualitative data on the views and experiences of those who support student nurses whilst they are on clinical placement and from the students experiencing such support.

From these initial focus groups, postal surveys were developed and conducted, again with students, preceptors and lecturers. This consisted of a stratified, random sample of students and mentors from five institutions. The sample was stratified in order to ensure that the full range of preceptorship courses offered by academic institutions in Scotland were included with representation of all courses and branches offered by institutions. Questionnaires were sent to lecturers who had been identified as having a remit in practice placements. In total 1,000 questionnaires were sent out with an overall response rate for all three groups of 60% (600). Further focus groups were then conducted with twenty-seven preceptors and twelve lecturers, to explore issues arising from the postal survey. Finally, a postal survey of a total population of Executive Nurses and Midwives and Chief Executives within Scotland was conducted with regard to manpower planning in relation to preceptorship needs. A response rate of 84% (56) was achieved.

It can be seen that this is a large-scale study in which sampling methods have been carefully constructed. The findings can be said to be representative of the recent situation in relation to the support of students in practice placements in Scotland. As a result of their investigation, Watson & Harris make a number of recommendations, which will be discussed in chapter two of this study, in order to support the findings made within the qualitative stage of the study. As already discussed, Watson & Harris note the importance of the use of reflection in practice in order for students to relate theory to practice.

Linkage of theory to practice and the development of critical thinking skills, was facilitated by mentors and lecturers using case studies of actual patients, tutorials and reflection sessions. Thus, reflective techniques can be seen to play an integral part in the integration of theory and practice, helping to bridge theory to practice.

1.2.6 The theory-practice gap in other countries

The theory-practice gap in nursing is not only an issue of concern within the U.K. Similar concerns are reported in nursing literature from other countries, notably the United States of America (U.S.A.), Australia and New Zealand.

1.2.6.1 U.S.A.

The U.S.A. has had similar experiences to Britain in terms of the separation of theory and practice. Degree programmes for nurses began to develop in the U.S.A. during the 1950s and quickly became the main means of preparing professional nurses (Marriner 1983). Marriner comments that these programmes were firmly located within educational institutions and taught by faculty staff. Hospitals were only used for clinical experience and as a result, the separation of education and service was complete by the late 1950s. Within the literature from the U.S.A., reference is made of the need to integrate the education and service sectors of nursing, rather than specifically the need to bridge the gap between theory and practice. However the concept in terms of a perceived need to align more closely education as espoused by the educational institution, with what actually happens in the practice setting, is similar.

Various models have been adopted by educational institutions in America in order to try and achieve integration of education and service. These are referred to collectively as unification models:

“The introduction of the unification model into nursing involves the implementation of a complex set of organisational changes between service and education.” (Yarcheski & Mahon 1985 p.120).

The philosophy of unification states that professionalism in nursing is the ability to unite practice, education and research (McKenna & Roberts 1999) and the main aim of unification is to improve the quality of nursing care given to patients (Fry 1982). Unification models have developed along two main prototypes, according to the way in which the administration of the educational establishment and hospital is managed. In the first prototype, there are separate, independent administration systems, budgets and governing bodies for the school of nursing and the hospital. In the second prototype, the school of nursing and the hospital are under one administration, budget and governing body (Yarcheski & Mahon 1985).

Dorothy Smith is cited as being the pioneer in developing the model of unification in which education and service maintain independent structures in the early 1960s at Case Western Reserve University, Cleveland, Ohio (Marriner 1983). Unification, or integration, is achieved within this model by faculty staff holding joint appointments in which they contract service and educational responsibilities. They teach within the educational institution and within the clinical area, acting as role models for students. Students learn from faculty staff who provide:

“...clinical, scholarly and administrative leadership in the teaching hospital to create an environment for students to learn professional nursing practice by example.” (Smith 1993 p.147)

Marriner (1983) comments that the Case Western Reserve unification model has reduced the number of negative learning experiences encountered by students, although no research evidence is offered to support this statement.

The unification model in which education and service is united under one administration was initially developed by Luther Christman at the Rush University, Chicago, Illinois. This model uses practitioner-teachers in order to integrate theory and practice. Appropriately qualified nurses within the practice setting take responsibility for the teaching and support of students within a particular area of clinical expertise. This teaching role can be flexibly interpreted in order to meet the particular needs of the organisation. It may involve supporting students whilst within the practitioner-teacher's clinical area, developing a particular research interest, and/or lecturing within the

classroom in their area of clinical expertise. The main advantage of this approach is that the practitioner-teacher is teaching about his/her own patients and that:

“...the scientific theory a teacher expounds in the classroom is clearly translated into the empirical science he/she applies in the clinical setting.” (Christman 1979 p.9)

Within the Rush model, practitioner-teachers not only support students within the clinical environment, but also promote collaboration between managers, clinicians, educators and researchers, so that educational and clinical goals are integrated and achieved (Cochran *et al* 1989). Marriner (1983) says that the Rush unification model has improved the quality of teaching. Fisli (1994), in discussing the Rush model of unification, says that it influenced the development of subsequent models of unification across the United States during the 1980s and that various models of unification have developed, similar to the Rush model. The common theme is the use of nurse teachers to teach within the university and within the clinical area in order to foster an environment whereby students develop professional practice by example (Smith 1993). Other research suggests that unification models have not been widely adopted within the U.S.A. (Awrey 1990) and that excessive workload and burnout are problematic (Yarcheski & Mahon 1985).

The development of joint-appointees and practitioner-teachers within models of unification in the U.S.A. reflect similar developments in the U.K. as previously discussed. Within America the use of joint-appointees and practitioner-teachers appears to be implemented wholesale by universities and hospitals, which opt for unification. This requires large-scale organisational change and re-negotiation of roles in relation to clinical and educational responsibilities. In the U.K. it is only within Oxford that the practitioner-teacher or practitioner-lecturer role has been adopted on such a wide scale. A number of American articles dating from the late 1970s through to the early 1990s were found, reflecting interest in models of unification as a means of integrating service and education sectors at that time. No articles later than 1994 could be located, perhaps suggesting that interest in this approach has since waned. The lack of recent literature makes it difficult to establish what the current position is in relation to the adoption of

unification models in the U.S.A. and whether these have resulted in a reduction of the theory-practice gap.

1.2.6.2 New Zealand

In New Zealand, nurse training was transferred from the hospitals to the polytechnics in the early 1970s and this transfer is seen to have caused a theory-practice gap within nursing in New Zealand:

“The traditional tendency for educational institutions and clinical areas to act in isolation results in nurse educators becoming removed from the realities of clinical life and the changes that constantly occur within this context.” (McKenna & Roberts 1999 p. 14).

Models of unification similar to those used in the U.S.A. have been adopted by a number of institutions in New Zealand, with the introduction of joint appointments in which individuals have both educational and service commitments. McKenna & Roberts (1999) state that these can take several forms. One individual may have two roles within a single institution, for example, an area of clinical practice in which clinical teaching of students is also undertaken. Alternatively, two individuals may share two jobs, for example a nurse teacher who completes a number of clinical shifts per week, whilst his/her clinical counterpart undertakes classroom teaching (McKenna & Roberts 1999).

1.2.6.3 Australia

An Australian study conducted by Emden & Young (1987) investigated the views of trained Australian nurses into the theory-practice gap, focusing on whether or not it was seen to be an inevitable phenomenon. The majority of nurses disagreed that the gap was inevitable and supported the view that the gap can be minimised if theory develops as a result of practice. In this study the gap was seen to be both necessary and desirable in that the disunity between the two promotes positive change. Although this research is now somewhat dated, a similar view is expressed in the British literature by authors such as Cook (1991) and Rafferty *et al* (1996) as previously discussed.

Speedy (1989) comments that the theory-practice gap had not received a great deal of attention in Australia into the 1980s, even though there had been a movement of nurse education into the tertiary sector, which is often seen to increase the gap even further. Speedy (1989) states that the theory-practice debate relates to the relationship between nursing theory and nursing practice and offers three perspectives of this. Firstly, theory can be seen to guide practice. In this view theory is used to select a framework upon which to base practice. Such theory is generated as a result of research. An example of this is the use of models of nursing to guide practice. Secondly, practice can be seen as a source of theory. Here theory is seen to arise as a result of reflecting on practice and experiential learning. This view is similar to that of Benner (1984) who believed that theory was embedded in practice. Thirdly, theory and practice inform each other. Theory is applied to practice and its ability to represent reality is tested and challenged. Where it is found to be inaccurate, theory is restructured and again applied to practice. Speedy (1989) suggests that the adoption of a model of critical theory by practising nurses which operationalises this third view may be a way forward in reducing the theory-practice gap. The role of the nurse educator in this process is to help nurses see the relevance of theory and to help them reflect on their practice in order to promote the development of practice-based theory.

Duke (1996) discusses the widespread use of casual or sessional clinical teachers to teach Australian nursing students whilst on clinical placement, due to a lack of nurse teachers. She conducted a small-scale qualitative study of eighteen nurses employed on a casual basis to support and assess nursing students on practice. The results of the study indicate that low self-esteem, role conflict and lack of confidence in decision-making processes relating to evaluation of students were commonplace amongst the group. She suggests that the findings have implications in terms of the credibility and integrity of programmes of nurse education, suggesting that the theory-practice gap is widened by the use of such sessional clinical teachers.

Cox *et al* (1994) state that three models have been used in Australia in order to interweave education and service. The lecturer or tutor/clinician role, in which academic staff are expected to engage in clinical work for 20% of their time. The clinical /lecturer role, where full time expert clinicians are seconded to teach in the academic institution

for 20-60% of their time and the joint appointment where two nurses are employed, each to spend 50% of their time in practice and 50% of their time in the academic setting. The experiences of individuals in roles which combine both clinical and academic responsibilities in Australia appear to reflect those in the U.K. and U.S.A., with advantages cited as being increased job satisfaction, facilitation of learning for the student and benefits to the patient in the care received. Disadvantages are the lack of role clarity, role conflict, lack of time to manage what often amounts to two full-time jobs and the need for motivation and commitment to make a success of the role (Crane 1989, Cox *et al* 1994, Hanna & Peart 1994).

The theory-practice gap then is not a phenomenon restricted to the nursing profession in the U.K. Other countries are also aware of the problems created by having such a gap and have adopted various models in attempts to close it. It is interesting to note the similarities in the strategies adopted by different countries in order to try and achieve a closer integration of theory and practice, particularly in relation to roles that combine both practice and education responsibilities. However, is it a phenomenon peculiar to nursing, or do other professions experience similar difficulties?

1.2.7 The theory-practice gap in other professions

Whilst the theory-practice gap is of concern within the nursing profession, other professions close to nursing do not appear to experience difficulties on a similar scale. Khatib & Ford (1999) state that the expression 'theory-practice gap' does not seem to be a term that is used outside of nursing, although other professions are occupied with how to make theoretical learning relevant to practice. Schön (1987) suggests that law and medicine in particular, experience problems of translating textbook knowledge into practice.

1.2.7.1 Medicine

McCaugherty (1992b) comments that within medicine, theory and practice are brought together as a result of medical students being taught clinical skills by junior doctors – putting theory into practice. Also, the consultant ward round, in which the consultant

stimulates discussion of patient management by junior doctors and medical students, has an important coaching function, stimulating students to learn from their experiences and to relate theory to practice. Humphreys *et al* (2000) suggest that in relation to the medical profession, the apparent lack of attention to the theory-practice divide is the result of the educational system of medical training. Within medicine, academics tend to have a dual role, working within clinical practice whilst also having an active educational role that is acknowledged by the presence of a clinical academic career structure. There is not the separation of education and service to the same extent as within nursing. It is interesting to note that the development of a clinical academic structure is also advocated as a means of supporting students in practice placements within nursing in the future (Watson & Harris 1999).

It has been suggested that problem-based learning (P.B.L.), can be used to reduce the theory-practice gap (Frost 1996). Problem-based learning was originally introduced into programmes of medical education in North America as a result of dissatisfaction with traditional methods of teaching medical students:

“Medical education, with its intensive pattern of basic science lectures followed by an equally exhausting clinical teaching programme, was rapidly becoming an ineffective and inhumane way to prepare students, given the explosion in medical information and new technology, and the rapidly changing demands of future practice.”
(Boud & Feletti 1997 p.2)

The medical school at McMaster University Canada introduced the first P.B.L. courses in the 1960s and it has since spread world-wide through North and South America, Europe, Africa, the Middle East, Asia, Australia and the South Pacific (Schwartz *et al* 2001). Problem-based learning is used as a means of training professionals within many fields including the health sciences, social work, engineering, architecture, business, law, economics, management, mathematics, education, introductory university science and agriculture (Schwartz *et al* 2001). Morales-Mann & Kaitell (2001) define P.B.L. as follows:

“Problem-based learning (P.B.L.) is a method of group learning that uses true-to-life problems as a stimulus for students to learn problem-

solving skills and acquire knowledge about the basic and clinical sciences.” (Morales-Mann & Kaitell 2001 p.13)

Frost (1996) says that P.B.L.:

“...challenges adult learners to learn for themselves. Information, concepts and skills are learnt in relation to a problem which acts as a stimulus for learning. The student develops problem solving skills and is able to recall, adapt and use this knowledge to deal with a variety of related situations. The student understands the relevance of subject material learnt and becomes motivated to seek further knowledge.” (Frost 1996 p.1049)

Small groups of students are presented with a realistic practice situation, which acts as a trigger for the students to discuss the situation and what the problem is that they need to resolve. This discussion helps students to link the problem with their previous experience and what they already know, in addition to allowing them to identify any gaps in their knowledge, which they need to address in order to solve the problem. Students thus identify their own learning needs. New knowledge and understanding is sought out by the students, shared at the next meeting and applied to the original problem. A plan of action is formulated by the group and presented to peers (Frost 1996).

There are three approaches to P.B.L. In an integrated P.B.L. curriculum, all learning content is taught using P.B.L., focused around health care scenarios. In a transitional curriculum, traditional approaches to teaching and learning are used during the early stages of the programme, with a gradual increase in small-group work and student-centred approaches as the students progress through the curriculum. Problem-based learning can also be introduced into just one or two courses of study within a curriculum (Saarinen-Rahiika & Binkley 1998).

The proponents of P.B.L. argue that it is a student-centred approach to teaching and learning which has many advantages over more traditional, didactic, teacher-centred approaches of medical education (Morales-Mann & Kaitell 2001). These include a greater degree of critical thinking; equal, or sometimes better performance on clinical examinations; greater engagement in learning and higher levels of satisfaction by both students and tutors (Saarinen-Rahiika & Binkley 1998, Celia & Gordon 2001, Morales-

Mann & Kaitell 2001). Frost (1996) says that P.B.L. promotes team-work, an important consideration when health professionals are usually required to work as part of a multi-disciplinary team. Saarinen-Rahiika & Binkley (1998) say that P.B.L. promotes self-directed learning skills, demonstrated by high usage of resource materials and time spent studying. Problem-based learning is also seen as a way in which education can be linked to professional practice, achieving a closer integration of theory and practice (Frost 1996, Boud & Feletti 1997). Frost says this is achieved by students problem-solving real-life type situations and being encouraged to reflect on their prior experience and knowledge in order to do this.

A number of disadvantages of P.B.L. have also been cited. Heliker (1994) comments that the requirements of a P.B.L.-based curriculum are very demanding for both students and teachers. This is because students and teachers, who have often been used to didactic teaching methods and passive learning, need to develop a different mind-set in which learning is a student-centred, active process. This can be difficult for students:

“...the requirement to become active learners, critical thinkers, and problem-solvers offers quite a challenge.” (Heliker 1994 p.46)

Saarinen-Rahiika & Binkley (1998) state that at McMaster University, where P.B.L. was first introduced, high levels of student stress have been noted during the early stages of the P.B.L. programme. This is due to the uncertainty regarding the depth of study required, time constraints, group conflicts and the difficulty of identifying and searching for appropriate resource material.

Teachers may feel threatened by the loss of power and authority engendered by a move from teacher-centred to student-centred learning methods used within a P.B.L. approach to education (Saarinen-Rahiika & Binkley 1998, Celia & Gordon 2001):

“Faculty members must become facilitators of learning, rather than givers of information.” (Saarinen-Rahiika & Binkley 1998 p.202)

Saarinen-Rahiika & Binkley go on to comment that this shift needs a great deal of preparation and support if teachers are to develop a facilitative role. The teacher needs to

be able to act as a facilitator of the learning process and to have some knowledge of the areas to be studied. Frost (1996) comments that too much expertise on the part of the teacher can impede student learning, as the teacher tends to control the learning process. Saarinen-Rahiika & Binkley (1998) also suggest that teachers with content expertise tend to dominate group discussions, which may adversely affect the students' responsibility for learning. Frost (1996) says there can sometimes be a discrepancy in the learning goals that students identify and those planned by the teacher. In particular, medical students tend to emphasise biological problems, to the detriment of psychological and social issues. However, P.B.L. is based on the premise that learning is student centred and the teacher must therefore allow the students to lead the process. This can be frustrating for the teacher and also cause anxiety if the teacher feels important learning goals are not being met (Frost 1996).

In general, P.B.L. is a time-consuming and intensive approach to education, requiring more student contact than traditional didactic methods. The need for students to be divided into small groups, each led by a facilitator, means that several teachers are needed for large classes of students. In the initial phases, students may need more support as they develop problem-solving skills, Frost (1996) says that once these have been mastered, less guidance is needed and student contact reduces. Baker (2000) comments that more learning resources are also needed to support P.B.L.

The level of content knowledge gained by students within a P.B.L. curriculum has caused concern. Lower levels of content-specific knowledge have been recorded for students on P.B.L. courses, compared with students on traditional programmes (Saarinen-Rahiika & Binkley 1998). This can be problematic in disciplines that require demonstration of specific content knowledge in order to qualify as practitioners:

“Many of the professions are constrained by assessment procedures laid down by national licensing bodies which test for recall of memory rather than the application of problem solving skills in the process of decision making.” (Frost 1996 p.1051)

Saarinen-Rahiika & Binkley (1998) say that P.B.L. students are at a disadvantage when their performance is assessed using traditional assessment methods and both Frost (1996)

and Saarinen-Rahiika & Binkley (1998) say that new methods of assessment need to be developed that measure appropriately students' problem solving skills.

Whilst originating as a teaching and learning method within medical training, P.B.L. is becoming popular within programmes of nurse education (Frost 1996, Morales-Mann & Kaitell 2001). Here, it is seen as a way of developing skills of critical analysis, problem-solving, reflection and motivation to engage in further learning (Heliker 1994). In relation to nurse education, a number of authors have seen P.B.L. as a way in which theory and practice can be combined (Creedy *et al* 1992, Heliker 1994, Frost 1996). Frost (1996) says this is because P.B.L. deals with real-life situations, facilitating reflection upon prior knowledge and experience and the identification of gaps in their knowledge and experience by the students, which need to be addressed. It is unclear exactly how this is achieved and to date there is a lack of conclusive research regarding the impact of P.B.L. in general terms and upon the theory-practice gap in particular (Schwartz *et al* 2001).

1.2.7.2 Physiotherapy & Occupational Therapy

Roskell *et al* (1998) say that within physiotherapy, the theory-practice gap has not attracted attention to the same degree as within the nursing profession. They suggest that it is perhaps timely for the physiotherapy profession to examine the relationship between theory and practice, learning from the nursing profession's experiences. They say that such an examination is necessary for the discipline of physiotherapy to become better informed and more aware of the issues surrounding the successful integration of theory and practice and what constitutes physiotherapy knowledge. Salvatori (1999) proposes that an occupational therapy curriculum, focusing upon student-centred and problem-based learning is beneficial to the transfer of learning to clinical practice and the long-term retention of knowledge. Whilst not focusing on the theory-practice gap as such, this article suggests how the integration of theoretical knowledge and practice-based learning can be optimised and makes suggestions similar to those within the nursing literature reviewed.

1.2.7.3 Teaching - English Literature

There also seems to be a degree of awareness of a gap between theory and practice in professions not related to health. Guy & Small (1993) state there is a crisis within English studies and the study of English literature in higher education because of the uneasy relationship between theory and practice. They suggest that the teaching of English studies is problematic because there are multiple theories which underpin the practice of literary criticism, but which students cannot connect to that practice. Guy and Small suggest that if this disunity between theory and practice cannot be resolved there may not be any English departments in the future and that literary criticism as an academic activity could disappear. Eagleton (1990) a well-known theorist of literary criticism, takes a more positive view, suggesting that theory develops on a grand scale when it is needed, usually when old values are being questioned and are no longer acceptable:

“Theory on a dramatic scale happens when it is both possible and necessary for it to do so – when the traditional rationales which have silently underpinned our daily practices stand in danger of being discredited, and need either to be revised or discarded.”
(Eagleton 1990 p. 26)

Eagleton says the development of theory results in self-consciousness and a reflection upon our practices so that new theories can emerge and practice can change and suggests that this is a useful process within literary studies. Until new theories which adequately explain reality emerge, there is a period of unrest and tension, but within literary studies, Eagleton regards the gap between theories and practices as a positive concept.

1.2.8 Conclusion

It could be argued that the preceding discussion has been somewhat biased as it has been assumed that a theory-practice gap exists within nursing. This assumption is justified since the evidence overwhelmingly indicates a theory-practice gap does exist within nursing. This evidence comes from classic research studies, which have been reviewed in some depth. In addition, publications from the profession's governing body, the U.K.C.C. have indicated a concern over the years with the implications for the profession as a result of an inability to close the gap, despite various attempts at educational reform. The latest of these, *Fitness for Practice* (U.K.C.C. 1999) suggests the issue has still not been fully resolved. Further, the nursing profession seems to have a continuing preoccupation with this problem, demonstrated by the vast amount of literature published in the nursing press. There seems to be little doubt that a theory-practice gap does exist, what is open to debate is what exactly the gap is and what, if anything, should be done to close it. This chapter has attempted to review the main debates and issues involved in order to clarify the need for the proposed study.

Whilst there are various definitions of the theory-practice gap, there is general agreement that it concerns differences between textbook, classroom-taught theoretical aspects of nursing and what actually occurs within the realities of clinical practice. It has been suggested that possibly the current preoccupation with the theory-practice gap by the nursing profession is a result of the fact that nursing has spent a great deal of time and effort in recent years in developing a theoretical framework to underpin its claim to professional status. This framework, as previously discussed, has been largely based upon the empiricist, scientific model, which does not sit easily with clinical practice. It has also been shown that nursing has been influenced historically by current societal beliefs and norms in terms of the type of knowledge developed to underpin nursing practice. Perhaps the theory-practice gap is the result of the perceived need to develop new theories which more adequately explain clinical practice as Rolfe (1996; 1998) and Jarvis (1999) suggest. Also, it is a necessary and beneficial phenomenon stimulating change and development as McMahon (1994) and Rafferty *et al* (1996) believe. Figure 1.1 on page 63 attempts to identify the main issues covered within this preliminary literature review within a conceptual framework.

The theory-practice gap is not a phenomenon peculiar to nursing within Britain, but has concerned nursing professionals in other countries and indeed may be cause for concern in professions other than nursing. Various attempts have been made to close the theory-practice gap within nursing in the U.K. Examples of these include the reorganisation of the delivery of nursing programmes of education and the introduction of a variety of posts which combine educational and service responsibilities, whilst research has concentrated on the use of novel teaching approaches in order to bridge the two. More radical approaches suggest that nursing needs to re-define its theoretical framework and for theory to be firmly embedded in practice. Yet despite attempts to close the gap and the proliferation of research reports and articles within the nursing press, the theory-practice gap remains an issue of concern.

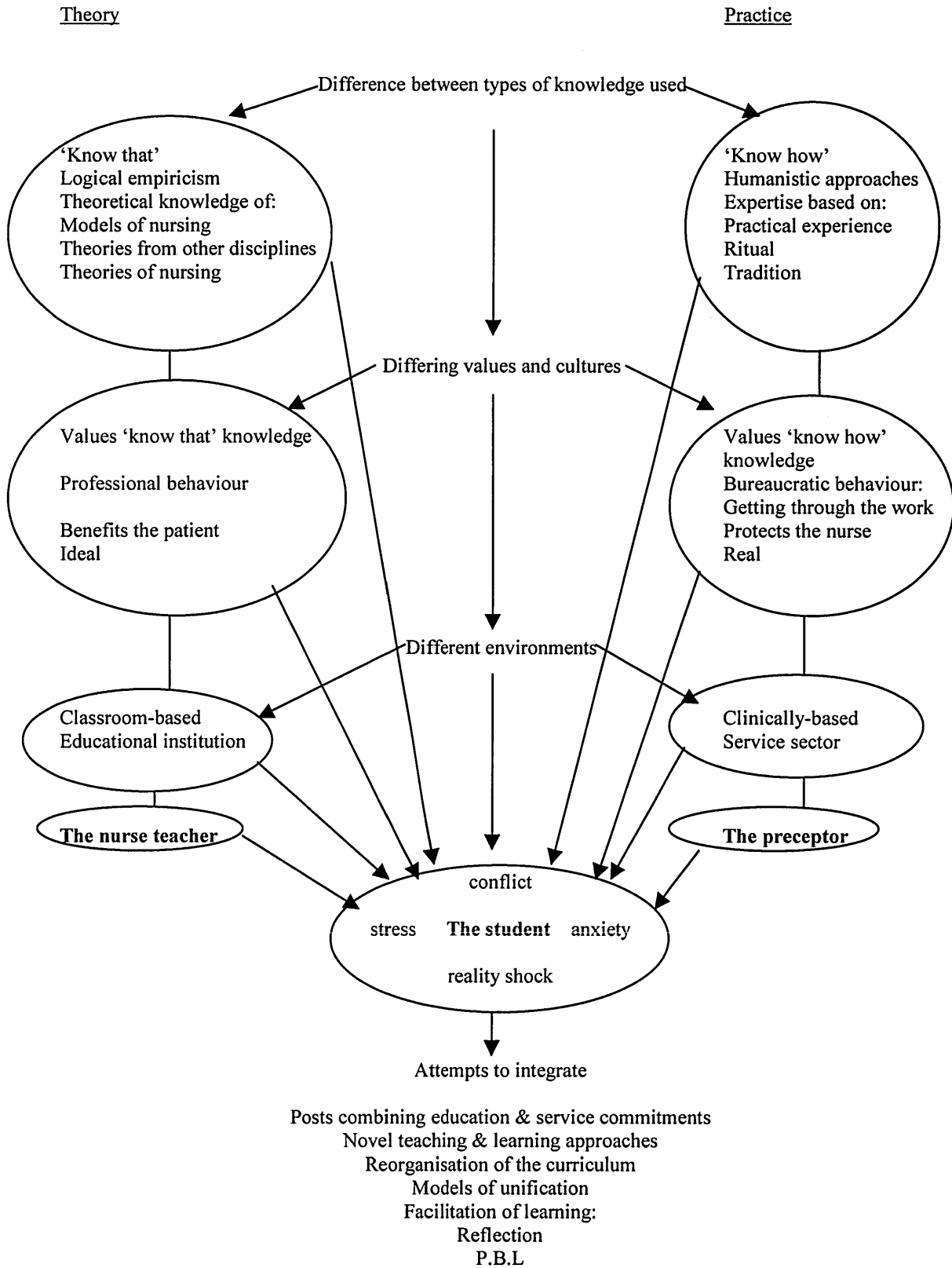
There is a need to develop effective methods of integrating the theory and practice of nursing and finally closing the theory-practice gap. This involves discovery of what actually causes the theory-practice gap in the first place, followed by the elimination of such causes. Much has been written about factors that may contribute to the theory-practice gap, but such causes remain elusive and have not been firmly established. There is very little empirical research to date, which determines whether factors, commonly believed to contribute to the gap, affect knowledge and skill development in student nurses. This study seeks to address this by investigating commonly-held beliefs in relation to the theory-practice gap and its causes and to provide evidence as to whether any factors identified affect theoretical knowledge and practical skill development in student nurses. This is achieved by a study consisting of two stages.

The first stage adopts a qualitative approach to explore the perceptions of nurse teachers, student nurses and preceptors of the theory-practice gap and to identify factors seen to contribute to its existence. Whilst it could be argued that other groups such as ward managers, budget holders and charge nurses also experience the gap, it is the teachers, students and preceptors who are most closely involved, having to deal with it on a daily basis and having to develop strategies to overcome it. Hence these groups were the focus for the initial stage of the study.

The second stage of the study adopts a quantitative approach to measure the effect of any factors identified within the first stage, on theoretical knowledge and practical skill acquisition in student nurses. In addition, a satisfaction survey of student nurses will ascertain whether levels of satisfaction differ, according to the way in which these factors are manipulated. It is hoped that this information will prove useful to both education and service sectors in devising strategies which maximise knowledge and skill development in student nurses and subsequently may help to eliminate the theory-practice gap within nursing.

It could be argued that demonstration of theoretical knowledge and practical skill does not necessarily indicate closure of the theory-practice gap and certainly this complex phenomenon cannot be reduced to such simple terms. However, both appropriate theoretical knowledge and practical skill are necessary to engage in the art and science of nursing. If the effect that particular factors have on knowledge and skill development in students can be established, then this information can be used to develop means by which factors adversely affecting knowledge and skill can be minimised, whilst those enhancing knowledge and skill can be maximised. This may go some way to closing the theory-practice gap.

What is the theory-practice gap?



1.3 AIM OF STUDY

To explore nurse teachers', student nurses' and preceptors' perceptions of the theory-practice gap within nursing and to identify commonly-held beliefs with regard to factors seen to contribute to its existence. To investigate whether any of the factors identified affect theoretical knowledge, practical skill acquisition and satisfaction in student nurses and to use such information to develop strategies which maximise knowledge and skill acquisition.

1.4 OBJECTIVES OF STUDY

- To identify commonly-held perceptions of the theory-practice gap held by three groups involved in experiencing this phenomenon: nurse teachers, student nurses and preceptors.
- To identify factors perceived by these three groups to influence the theory-practice gap.
- To manipulate those factors identified in order to establish their effect on the acquisition of theoretical knowledge and practical skill in student nurses.
- To establish any differences in students' reported satisfaction with teaching and clinical placement according to the way in which these factors are manipulated.
- To establish 'best practice' to promote theoretical knowledge and practical skill development in student nurses.
- To use such information to develop strategies which maximise knowledge and skill development in student nurses.

1.5 DESIGN OF STUDY

The study is designed in two stages:

Stage 1 – Qualitative Stage

Within this stage a qualitative approach utilising group interviews is adopted, in order to establish commonly-held perceptions of nurse teachers, student nurses and preceptors of the theory-practice gap. Factors seen to cause or influence the theory-practice gap are identified.

Stage 2 – Quantitative Stage

Having identified factors perceived to influence the theory-practice gap, an experimental design is used. The factors identified are manipulated in order to assess whether or not they affect the development of relevant theoretical knowledge and practical skill demonstrated by student nurses. A satisfaction survey is also conducted to ascertain whether any differences in levels of satisfaction occur according to how factors are controlled. This information is then used to suggest strategies that promote the development of appropriate knowledge and skill in student nurses.

CHAPTER TWO
STAGE 1 - QUALITATIVE PHASE
INVESTIGATION OF PERCEPTIONS OF THE THEORY-PRACTICE GAP

2.1 INTRODUCTION

This chapter discusses the first stage of the study in which a qualitative methodology, using methods borrowed from grounded theory, was adopted in order to discover the perceptions held by nurse teachers, student nurses and preceptors of the theory-practice gap. Firstly, the aim and objectives of this initial stage are stated. This is followed by discussion of methodological issues, including the research design, data collection and analysis, sampling, ethical issues, reliability and validity. Finally, the results of the data analysis are given, together with discussion of the results obtained. In the tradition of grounded theory, these results are discussed in relation to other published research which either supports or refutes the findings of this study and thus adds to the theory emerging (Streubert and Carpenter 1999).

2.2 AIM OF QUALITATIVE STAGE OF STUDY

To investigate the perceptions of nurse teachers, student nurses and preceptors of the theory-practice gap within nursing and to identify commonly-held beliefs with regard to factors seen to influence the gap, which can be subjected to empirical testing in stage two of the study.

2.3 OBJECTIVES OF QUALITATIVE STAGE OF STUDY

- To establish how each of the groups identified perceives the theory-practice gap.
- To identify similarities and differences in the groups' perceptions.
- To identify ways in which the groups perceive a narrowing of the theory-practice gap could be achieved.

- To identify factors commonly perceived as affecting the theory-practice gap which can be empirically tested using an experimental design and statistical methods of data analysis in stage two of the study.

2.4 METHODOLOGY

2.4.1 Research Design

Historically, the quantitative research paradigm has been regarded as a powerful means of conducting research in the quest to create knowledge and understanding, with quantitative research enjoying an ascendancy over other research approaches (Charmaz 2000). The precise and highly controlled objective methods used within quantitative research have been regarded as the optimum way in which to establish truths about phenomena under investigation (Charmaz 2000). However, in recent years quantitative researchers have been challenged to define and explain phenomena which are difficult to measure and quantify (Streubert & Carpenter 1999). In particular, within the field of social science it was felt that quantitative methods were unable to explain adequately human phenomena, such as human values, culture and relationships (Streubert & Carpenter 1999). As a result of the dissatisfaction with quantitative methods, qualitative research methodologies began to develop. For example, one of the earliest qualitative methodologies to develop was Glaser & Strauss's (1967) pioneering work on grounded theory (Charmaz 2000). Over the years there has been much debate with regard to whether quantitative or qualitative research methods are best at uncovering the truth. More recently, there has been a shift towards the recognition that both approaches are valuable means of conducting research and that the two approaches can inform and complement each other and may even be combined within a study:

“...dogmatic positions often are taken in favor of either qualitative or quantitative research...However, there are intermediary positions. Combining methods may be done for supplementary, complementary, informational, developmental, and other reasons.”
(Strauss & Corbin 1998 p.28)

The difference between qualitative and quantitative approaches to research centres on the idea that there are two ways of being in and interpreting the world. Firstly, there is the real world, which actually exists physically and can be quantified, measured and reduced to theories and laws. Within this quantitative, positivist paradigm it is believed the best way to conduct research is to control and manipulate events using quantitative research methods in order to discover such relationships and laws in a deductive manner (Nolan & Behi 1995). Inductivists, however, argue that this 'actual' world is irrelevant: what is of importance is how this real world is perceived and interpreted by individuals. Within qualitative methodologies, the emphasis is on understanding human behaviour by studying phenomena in their natural settings and attempting to make sense of them:

“Qualitative researchers stress the socially constructed nature of reality ...They seek answers to questions that stress how social experience is created and given meaning. In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes.”
(Denzin & Lincoln 2000 p.8).

LoBiondo-Wood & Haber (1998) say that within inductive approaches the researcher seeks to explore all dimensions of human experience in order to discover the meanings individuals ascribe to their experiences. They describe qualitative research as the collecting together of bits of information and piecing them together, building a mosaic of the human experience being studied:

“As with a mosaic, when one steps away from the work the whole picture emerges.” (LoBiondo-Wood & Haber 1998 p.218).

This contrasts with quantitative approaches where the researcher begins with the whole picture and seeks to explore pieces of it by testing one relationship with another (LoBiondo-Wood & Haber 1998).

Morse & Field (1996) say that qualitative designs can be used to describe phenomena from the perspective of those individuals involved in experiencing them. Qualitative researchers aim at illustrating how humans live and cope with their daily lives, providing insight and understanding of how the individuals studied make sense of their reality. In achieving this aim, the researcher does not impose any constraints or controls upon the

phenomena studied, but attempts to explore all aspects of the problem under investigation:

“When using qualitative approaches, reality is explored from an emic perspective, understanding life from the perspective of the participants in the setting under study; and everyday life is examined in an uncontrolled, naturalistic setting.” (Morse & Field 1996 p.18).

Within the first stage of this study, the primary aim was to gain insight into how individuals perceive and interpret the theory-practice gap within nursing. The researcher was interested in discovering the human perspective of those who encounter the theory-practice gap; what their experiences of this phenomenon are; if they perceive a theory-practice gap to exist and how they deal with such a gap on a day-to-day basis. In achieving this aim, it was seen to be important to adopt the emic perspective advocated by Morse & Field (1996), with the starting point being participants’ experiences, attitudes and beliefs, allowing these to direct the study, rather than having preconceived ideas which could influence and bias the investigation. For these reasons a qualitative approach was seen to be the most appropriate to take. As Denzin & Lincoln (2000) state:

“Qualitative research involves the studied use and collection of a variety of empirical materials – that describe routine and problematic moments and meanings in individuals lives.”
(Denzin & Lincoln 2000 p.3)

The aim of this stage of the study was to explore the routine and problematic moments experienced by individuals in relation to a gap between the theory and practice of nursing.

Qualitative designs are used to construct theories, whilst quantitative designs normally test theory (Morse & Field 1996). Qualitative researchers may have general questions about which they wish to gather data, for example, what terminally ill cancer patients’ experiences of chronic fatigue syndrome are, but they make no assumptions as to what they expect to find. The purpose of qualitative research is to develop theory, often in areas where little is known about a phenomenon, or to gain new insights into areas that may have changed over time, or the researcher suspects original findings may be biased in some way (Morse & Field 1996). Although qualitative research is capable of producing theory independently in its own right (Charmaz 2000), a qualitative study may

also be used to produce tentative theory which is then tested using quantitative methods (Morse & Field 1996). Qualitative methodologies are often used in this way to formulate and build theory in areas where knowledge is limited (Nolan & Behi 1995). The aim of this initial stage of the study was to discover individuals' perceptions of the theory-practice gap and the factors seen to influence the gap, so that these can be subjected to empirical testing within the second stage of the study. A qualitative exploratory approach was again seen to be the most appropriate method to employ within the first stage in order to achieve this. The aim was to construct an understanding of how the gap is perceived within stage one and to test these perceptions within stage two.

In summary, a qualitative design was adopted for stage one of the research because the researcher wanted to investigate a human experience from the perspective of those involved in experiencing a particular phenomenon – the theory-practice gap within nursing. The researcher did not want to enter the research study with any preconceived ideas as to what might be found, but wanted to describe what the participants' perceptions of this phenomenon were. The aim was to construct a framework of whether or not such a gap was perceived to exist, if so, what was seen to contribute to its existence and perceptions of how the gap might be reduced. It was hoped that if particular factors, seen to contribute to the gap, could be identified, these could then be subjected to empirical testing within stage two of the research.

2.4.2 Qualitative Methodologies

Qualitative research has the common purpose of constructing theory from an emic perspective and collectively is seen to be an inductive means of creating knowledge and understanding. Distinct qualitative methodologies have arisen within the different disciplines of social science, as a result of their diverse epistemological underpinnings (Morse & Field 1996). New approaches to qualitative research are also developing as the qualitative research paradigm continues to grow and evolve (Denzin & Lincoln 2000). A wide variety of qualitative methods of inquiry are thus available to prospective qualitative researchers.

Phenomenology, ethnography, grounded theory and historical research are strategies of qualitative inquiry commonly cited in research textbooks (Field & Morse 1996, Creswell

1998, Denzin & Lincoln 2000, Streubert and Carpenter 1999). It should be noted that these four strategies do not comprise an exhaustive list, other methods also being available. These four approaches are described here briefly, as they were all thought potentially to be appropriate methods that could be used within the proposed study. This is followed by a rationale for the choice of approach that was finally adopted within the study.

2.4.2.1 Phenomenology

Phenomenology is both a philosophy and a research method which originated in the early 20th century as a means of investigating consciousness as it is perceived by the individual (Parahoo 1997). There are different interpretations of phenomenology according to the way in which various philosophers have developed their particular ideas and beliefs, but as Streubert & Carpenter (1999) say:

*“Phenomenology as a research method is a rigorous, critical, systematic investigation of phenomena.”
(Streubert & Carpenter 1999 p.48)*

It attempts to understand the consciousness, or lived experiences of individuals, by describing the essence of behaviour. The aim of phenomenology is to describe accurately the phenomenon being studied, thereby increasing understanding of what it is and what it means to individuals:

“Phenomenology is, therefore, the study of phenomena and the appearance of things, and the discovery of their essence is the ultimate purpose of such research.” (Morse & Field 1996 p.20)

Morse & Field suggest the question the researcher needs to ask is “What is it like to have a certain experience?” For example, what is it like to be a patient terminally ill with cancer, coping with chronic pain? Streubert & Carpenter (1999) say that only those who actually experience a phenomenon can communicate what it is like to others and it is the researcher’s responsibility to try and portray these ‘lived experiences’ as accurately as possible to others:

“The goal of phenomenology is to describe accurately the experience of the phenomenon under study and not to generate theories or models, nor to develop general explanation.”
(Morse & Field 1996 p.20)

The focus of phenomenological studies is to give detailed, in-depth descriptions of the lived experiences of individuals in order to illustrate to others what these are and to aid understanding of them, rather than attempting to explain them.

2.4.2.2 Ethnography

Creswell (1998) says that ethnography is a means of investigating groups and their culture:

“An ethnography is a description and interpretation of a cultural or social group or system. The researcher examines the group’s observable and learned patterns of behaviour, customs, and ways of life.” (Creswell 1998 p.58)

It is not simply the study of people and their culture. Morse & Field (1996) say that ethnographers learn from people and that ideally ethnography should move beyond a simple description of a culture, to an explanation of culturally patterned behaviour. Streubert & Carpenter (1999) suggest that what makes ethnography unique within qualitative methodologies, is this focus on culture and attempt to discover cultural meanings within groups of people:

“Ethnography is the only research method whose sole purpose is to understand the lifeways of individuals connected through group membership” (Streubert & Carpenter 1999 p. 149)

Ethnographic studies involve fieldwork and require prolonged contact with the group being studied, with the researcher becoming immersed in their day-to-day lives (Creswell 1998). This is referred to as cultural immersion (Streubert & Carpenter 1999).

Ethnography has become a popular method within health research as it can uncover the health beliefs and practices of a culture, facilitating understanding of health and illness behaviour (Morse & Field 1996). For example, the culture of families who have a

chronically ill child, or coping with a family member who has the human immunodeficiency virus (Streubert & Carpenter 1999).

2.4.2.3 Historical research

Historical research focuses on an understanding of the past via the collection, organisation and interpretation of historical artifacts such as letters, diaries and writings by historians, in addition to official records such as parish and town hall records. Eyewitnesses to the recent past can also be used within this approach (Holloway 1997). Historical research can be both qualitative and quantitative. When a qualitative approach is taken, the researcher focuses on the perceptions of those studied, their view of the past, rather than on the researcher's interpretation of these:

“It is the participants’ interpretations of history and its effects, however, that are central to the analysis, rather than the researcher’s inference of the effects of earlier events.”
(Morse & Field 1996 p. 27)

Streubert & Carpenter (1999) suggest that historical research can be used to inform the present:

“The purpose of such a study is not to predict but, rather, to understand the past in order to explain present or future relationships. From historical documents, historiographers derive insight from past lived experiences that they can adapt to generate new ideas.”
(Streubert & Carpenter 1999 p.198)

For example, a study investigating the experiences of being a nurse in a mental health institution in the early twentieth century, could not only highlight what it was like to work as a nurse in such a situation, but also explain how present day mental health nursing has been influenced and shaped by its past.

2.4.2.4 Grounded theory

Grounded theory was originally developed by Glaser & Strauss (1967) in response to the view of that time that only quantitative studies could provide a systematic and scientific

approach to investigation within the social sciences. Grounded theory was therefore, at the forefront of the qualitative revolution (Charmaz 2000):

“Essentially, grounded theory methods consist of systematic inductive guidelines for collecting and analyzing data to build middle-range theoretical frameworks that explain the collected data.”
(Charmaz 2000 p. 509)

When using a grounded theory approach, the researcher does not start with a theory or hypothesis that is to be tested, instead the theory emerges during the processes of data collection and analysis. Thus any theory emerging is firmly rooted or grounded in the data and what is being studied, rather than as a result of any preconceived ideas held by the researcher. In discussing grounded theory as a methodology, Strauss & Corbin (1998) say:

“A researcher does not begin a project with a preconceived theory in mind...Rather, the researcher begins with an area of study and allows the theory to emerge from the data.”
(Strauss & Corbin 1998 p.12)

The theoretical framework underpinning grounded theory is symbolic interactionism in which human behaviour is seen to develop as a result of interaction and negotiation with others (Morse & Field 1996). As such, it is a useful method to employ where the researcher is seeking to understand social processes and the way in which humans interact with each other (LoBiondo-Wood & Haber 1998). As Morse & Field (1996) say:

“...individuals are active participants in creating meaning in a situation.” (Morse & Field 1996 p.22)

The aim of grounded theory is to discover and explain the meaning of human interaction and social processes.

2.4.3 Rationale for qualitative methodology adopted

Each of the four methods of qualitative inquiry outlined above could have been adopted in the first stage of this study. Phenomenology was considered a possible approach, as this methodology involves discovering the lived experiences of individuals and what they

mean to those individuals. However, the aim within this stage of the study was not only to discover and describe what it is like to live with the theory-practice gap on a day-to-day basis or to have participants tell their story. The interviewees were to be asked, not only to relate their experiences of the theory-practice gap, but also to offer insight into why these happened. Why they thought the theory-practice gap occurred and how it could be reduced. The aim was to access viewpoints, perceptions and perspectives, rather than just a narrative of experiences and what it is like to live with the theory-practice gap. More is required than a description of lived experiences. A degree of critical appraisal and interpretation on the part of the interviewees was also needed. Also, the study did not require the discovery of essences, but more simply the discovery of commonly-held beliefs and perceptions, therefore the depth of detailed description inherent to phenomenological studies was not required.

An ethnographic approach could have been utilised instead, with the researcher perhaps becoming a part of an area of clinical practice, participating in the theory-practice gap first-hand and observing others experiencing and dealing with the gap. However, because of the need for total cultural immersion required when adopting an ethnographic approach (Charmaz 2000), this would have been a time consuming and intensive methodology to use. Realistically it would only have been possible to study the theory-practice gap within one particular situation, whether this was clinically based, or conducted within an educational institution. The researcher wanted to collect data from as diverse a sample as possible in order to gain data on all perceptions of the theory-practice gap, whether these were positive, negative or neutral. As with the phenomenological approach, an ethnographic investigation would have been more focused and more intensive than was required at this stage of the study.

A historical approach was not seen to be appropriate as the researcher was not especially interested in how the theory-practice gap has been perceived or dealt with in the past, or how this has informed the current situation (although this in itself may have been an interesting perspective to develop). The focus of the proposed study was to be on the present and perceptions of the theory-practice gap in the here and now. In addition, historical evidence of a theory-practice gap in terms of records and artifacts could have been difficult to access, if indeed they exist.

The theoretical framework and methods underpinning the grounded theory approach to qualitative research appeared to approximate most closely with the aims and focus of the first stage of the research study. A grounded theory framework was chosen because the focus of this stage of the study was an investigation of the perceptions of individuals who experience and deal with the theory-practice gap said to exist in nursing. The researcher wanted to ensure that any data collected in relation to this was purely from the individuals studied, rather than being preconceived and possibly biased by the researcher. The researcher wanted to gain a picture of the reality of the theory-practice gap from the point of view of those studied, rather than allowing a personal view of that reality to influence the study. The aim was to allow concepts relating to the theory-practice gap and how it is perceived to emerge from the participants. The methods used to collect and analyse data in a grounded theory approach ensure that any concepts or theories that emerge are firmly located in the data and in the reality of those studied:

“Theory derived from data is more likely to resemble the “reality” than is theory derived by putting together a series of concepts based on experience or solely through speculation (how one thinks things ought to work). Grounded theories, because they are drawn from data, are likely to offer insight, enhance understanding, and provide a meaningful guide to action.” (Strauss & Corbin 1998 p.12)

Charmaz (2000) says that grounded theory provides qualitative researchers with a systematic and rigorous approach to developing theory derived from data, because it consists of a series of explicit procedural steps to follow during the processes of data collection and analysis:

“The strengths of grounded theory methods lie in (a) strategies that guide the researcher step by step through an analytic process, (b) the self-correcting nature of the data collection process, (c) the methods’ inherent bent toward theory and the simultaneous turning away from acontextual description, and (d) the emphasis on comparative methods.” (Charmaz 2000 p.522)

Because the processes of data collection and analysis focus on allowing theory to emerge from the data, it is more likely that any theory developed will be an accurate reflection and interpretation of those studied. The need to focus on the way in which individuals interpreted the theory-practice gap was seen to be a critical element within the proposed study.

Work reviewed within chapter one suggests that the theory-practice gap may result, in part, because of the way in which student nurses are socialised into the role of the professional nurse. Gott (1984), Melia (1987), Ferguson & Jinks (1994), Rolfe (1996), and Khatib & Ford (1999) all suggest the theory-practice gap exists because two conflicting ideologies of education and practice exist within nursing which students experience and have to try and reconcile as they become socialised into the nursing role. Other authors have suggested that innovative teaching and learning strategies can be used to achieve a reconciliation between theory and practice (Alexander 1983, Schön 1987, McCaugherty 1992b). One way of viewing the theory-practice gap therefore is to see it as part of a social process, which students experience as they become socialised into the role of the professional nurse. Within grounded theory, social processes are explored using symbolic interactionism.

Symbolic interactionism seeks to uncover social processes by studying the way in which humans give meanings to objects and to other humans as a result of their interaction with them (Morse & Field 1996, Schwandt 1997, LoBiondo-Wood & Haber 1998). The researcher was interested in studying the theory-practice gap as part of the way in which students are socialised into nursing and in discovering the meaning different groups of individuals ascribe to the theory-practice gap as a result of their experience and interaction with this phenomenon. As such, a grounded theory approach again appeared to be an appropriate framework to adopt.

In summary, a qualitative approach based on the grounded theory methodology was chosen because the theory-practice gap can be viewed as part of a social process. Individuals interact with the theory-practice gap and as a result of this interaction they interpret and give meaning to this phenomenon. The researcher was interested in discovering the way in which individuals interpret and perceive the theory-practice gap as a result of their contact and interaction with it. In addition, methods of data collection and analysis adopted in a grounded theory approach ensure that any concepts or theories that emerge are purely rooted in the reality of those studied and are not influenced by prior knowledge on the part of the researcher. Ensuring that perceptions of the theory-practice gap belonged solely to those participating in the study was seen to be an important element of the study. The researcher wanted to ensure that any perceptions

tested in the second, quantitative, stage of the study were those of the participants, rather than as a result of any preconceptions held by the researcher.

Whilst the theoretical framework underpinning grounded theory was appropriate to the proposed investigation, the aim of this initial stage was not to discover and develop a middle-range theory, as such, of the theory-practice gap (Charmaz 2000). It was sufficient at this stage simply to be able to identify the main concepts and themes in relation to how the theory-practice gap is perceived, how individuals interact with it, what causes it and how it could be reduced, with the emphasis on the participants' interpretation of the phenomenon. Rather than engaging in a full-scale grounded theory study therefore, grounded theory methods were used as they were needed. Thus techniques of data collection and analysis have been borrowed from the grounded theory methodology, rather than a pure grounded theory study being conducted. Strauss & Corbin (1998) who have co-authored several books developing and refining grounded theory since Glaser and Strauss's (1967) original book say:

"...we realize that theory building is not the goal of every research project, nor should it be...Knowledge and understandings take many forms. We know that readers will treat the material in this book as items on a smorgsabord table from which they can choose, reject, and ignore according to their own "tastes" – and rightly so. Some will use our techniques to generate theory, others for the purpose of doing very useful description or conceptual ordering."

(Strauss & Corbin 1998 p.8)

Strauss and Corbin, who are regarded as seminal authors in the field of grounded theory research, say it is acceptable to use those parts of their grounded theory technique that appear to be useful. They say however, that there is no need to adhere rigidly to all the methods and procedures they discuss or to use all of them in one study. They go further and advocate the mixing of qualitative and quantitative procedures within a study, if this will help the researcher achieve his/her aims:

"...our advice to readers...is to think in terms of the interplay between qualitative and quantitative methods...data collection and analysis can be done in both modes, and in various combinations, during all phases of the research process."

(Strauss & Corbin 1998 p.31)

They urge readers to use “*any or every method at his or her disposal.*” (p.33). It therefore seems acceptable to conduct a qualitative study in which methods have been borrowed from grounded theory and in which quantitative methods have also been utilised, as proposed within this study. A discussion of grounded theory methods follows, together with explanation of the grounded theory procedures incorporated into the study. Where grounded theory techniques were not utilised, reasons for this are given.

2.4.4 Grounded theory methodology

Since Glaser & Strauss’ original work in the 1960s, the two authors have independently continued to develop and refine their own version of grounded theory (Charmaz 2000). The techniques used within this study are based on the methods developed by Strauss & Corbin (1998), who, as previously discussed, have co-authored several books refining their methodology and are regarded as seminal writers in the field of grounded theory.

2.4.4.1 Data analysis in grounded theory

In grounded theory studies, data collection and data analysis are closely linked (Morse & Field 1996, Strauss & Corbin 1998). Data are analysed as they are gathered, with the results of the analysis guiding subsequent sampling and data collection. Following the initial collection of data, the first stage of data analysis is to open code the data. During open coding, each piece of data is examined and labelled with a code that describes and summarizes the data. For example, an interview transcript may be examined word by word, line by line, or sentence by sentence, in order to identify the main idea or concept it contains and this concept is given a code. The aim at this stage of the analysis is to identify as many codes as possible and a piece of data may have more than one code attached to it (Morse & Field 1996). The codes are written into a wide margin on the right hand side of the transcript (Morse & Field 1996).

A process of constant comparison, or comparative analysis is also conducted, during which each piece of data is compared with every other piece of data, so that data found to be conceptually similar can be grouped together under the same code. As the comparative analysis proceeds, data and codes are grouped together into more abstract concepts, referred to as categories:

“...during open coding, data are broken down into discrete parts, closely examined, and compared for similarities and differences. Events, happenings, objects, and actions/interactions that are found to be conceptually similar in nature or related in meaning are grouped under more abstract concepts termed ‘categories’”.
(Strauss & Corbin 1998 p.102).

The processes of open coding and comparative analysis allow the data to be broken down into a series of labelled concepts. Grouping these concepts into categories reduces the amount of data with which the researcher has to work, making it more manageable. The data begin to have structure and the researcher can then commence developing the properties and dimensions of each category (Strauss & Corbin 1998). The properties of a category refer to the characteristics or attributes of that category, whereas the dimensions refer to the range a category has (Strauss & Corbin 1998). Strauss & Corbin give an example to illustrate these processes:

“...if a person observes 10 objects in the sky and labels them as “birds”, then observes 5 different objects and defines them as “planes”, and then observes 7 more objects and calls them “kites”, sooner or later, he or she might ask what these objects share in common and come up with the concept of “flight.”
(Strauss & Corbin 1998 p. 113)

Once a concept or category has been identified it is possible to begin to define its properties and dimensions. Continuing the flight example:

“What we want to do now is define what we mean by “flight” – why, when, how long, how far, how fast and how high. We want to give a category specificity through definition of its particular characteristics. We also are interested in how these properties vary along their dimensional ranges. For example, birds fly lower, slower, and for shorter lengths of time than do many planes.”
(Strauss & Corbin 1998 p.116).

Naming the properties and dimensions of a category allows the researcher to see the variations within a category, allowing it to be distinguished from other categories and making it more precise. It increases the knowledge the researcher has about each category (Strauss & Corbin 1998).

The next stage of data analysis is referred to as axial coding. Axial coding involves the systematic identification and development of the subcategories within a category and the way in which categories link to each other according to their properties and dimensions. During this process, patterns and relationships which explain the categories and the way in which they relate to each other begin to emerge (Strauss & Corbin 1998). Strauss and Corbin suggest that during open coding data are broken down, or fractured. Subsequently, during axial coding it is reassembled in new ways to provide more precise and complete explanations of phenomena:

In axial coding, our goal is to systematically develop and relate categories. This step of analysis is important because we are building theory” (Strauss & Corbin 1998 p.142).

The next stage in the analytic process is selective coding, which is the process of integrating and refining the categories. At this stage of analysis a theory begins to form (Strauss & Corbin 1998). The aim of selective coding is to identify the central or core category which unites and explains all the other categories and any variation that occurs within each of these (Strauss & Corbin 1998). Identifying the core category should allow the basic social process to emerge. As discussed previously, the identification of social processes which underpin and explain behaviour is the ultimate aim of full grounded theory studies.

It can be seen that there are a number of stages to data analysis when using a grounded theory methodology. These have been presented as a series of steps. Strauss & Corbin (1998) point out that in reality, the researcher moves back and forth between the various stages as new data are collected and new concepts emerge. The ultimate aim of analysis is to code and categorise data in order for a theory to emerge which explains all of the data collected. A number of other strategies are also characteristic of a grounded theory study. These are the use of specific sampling methods, memo writing, drawing diagrams and selective sampling of the literature (Strauss & Corbin 1998, Streubert & Carpenter 1999).

2.4.4.2 Sampling methods in grounded theory

As discussed previously, the aim of a grounded theory study is to allow a theory to develop as a result of data collection and analysis, with the two processes occurring concurrently. As such, the sample of who will be included within the study is not usually pre-determined, but develops as the study progresses (Morse & Field 1996, Strauss & Corbin 1998, Streubert & Carpenter 1999). The researcher conducts an analysis of data collected initially and decides where he/she is most likely to gather subsequent data that helps to substantiate his/her early findings. Sampling progresses in order to further explore codes and categories which are not fully developed, helping the theory to become more rich and dense. This is referred to as theoretical sampling which Strauss & Corbin (1998) define as:

“Data gathering driven by concepts derived from the evolving theory and based on the concept of “making comparisons”, whose purpose is to go to places, people, or events that will maximize opportunities to discover variations among concepts and to densify categories in terms of their properties and dimensions.”
(Strauss & Corbin 1998 p.201)

Theoretical sampling allows the researcher to compare previously collected data with new data, identifying any significant variations. This facilitates the verification of similarities and differences between categories (Strauss & Corbin 1998). Theoretical sampling thus allows the researcher to fill in any gaps or holes in the developing theory (Charmaz 2000). Theoretical sampling continues until all the categories are well-developed and defined and data collection is not yielding any new information. At this stage category or data saturation is said to have been achieved (Morse & Field 1996, Charmaz 2000).

Theoretical sampling, which is characteristic of the grounded theory methodology, facilitates the development of theory firmly grounded in the reality of those studied. However, as Strauss & Corbin (1998) point out, one of the difficulties lies in deciding the sample from which data will initially be collected, as this will subsequently direct the study and the way in which theoretical sampling progresses. They suggest that as the researcher is interested in generating as many open codes as possible at the start of a

study, the researcher should gather data from as wide a sample as possible and should engage in what Strauss & Corbin refer to as open sampling :

“Because the aim of open coding is to discover, name and categorize phenomena according to their properties and dimensions, it follows that the aim of data gathering at this time is to keep the collection process open to all possibilities.” (Strauss & Corbin 1998 p.206).

Both open and theoretical sampling allow the researcher to develop theoretical sensitivity which Morse & Field (1996) define as:

“...the ability of the researcher to recognize what is important in the data and to give it meaning.” (Morse & Field 1996 p.133)

Strauss & Corbin (1998) comment that sensitivity develops throughout a project, enabling the researcher to know what concepts to look for and where they might be found.

2.4.4.3 Use of memos in grounded theory

Memo writing refers to the record kept by the researcher of the ways in which data have been analysed. Memos record the researcher's thoughts about possible concepts and categories, the way in which data may link and areas for further investigation. In effect, they provide a written record of the thought processes in which the researcher has engaged during the research process. They are a useful means for the researcher to check earlier directions of thought and to provide a record for other researchers to follow when conducting similar studies. Memos also provide an audit trail of the decisions the researcher has made (Strauss & Corbin 1998, Streubert & Carpenter 1999).

2.4.4.4 Use of diagrams in grounded theory

Strauss & Corbin (1998) suggest that the use of diagrams and matrices, particularly at the stage of axial coding, are a useful means of identifying the subcategories of a category. By using diagrams, the researcher can more easily visualise possible relationships and linkages between concepts. They can also be used to establish the properties and dimensions of categories and can highlight potential areas for theoretical

sampling (Strauss & Corbin 1998, Streubert & Carpenter 1999). Strauss & Corbin (1998) suggest the use of a conditional matrix which is described as a series of concentric circles mapping the range of conditions and consequences of a category. The use of such matrices can sharpen researchers' explanations and predictions (Charmaz 2000).

2.4.4.5 Literature reviews in grounded theory

As discussed within the introduction to chapter one (section 1.1), an initial literature review can be conducted prior to a qualitative investigation in order to provide background information and to highlight possible broad areas for study, as was the case with this study. However, it is unnecessary to review all of the literature. Indeed this is seen to be detrimental as it can influence and bias the proposed study (Strauss & Corbin 1998). Within a grounded theory study the review of literature is an ongoing process that accompanies data collection and analysis. Strauss & Corbin (1998) refer to the use of literature as an analytic tool which is used for several purposes:

“...the literature can provide a rich source of events to stimulate thinking about properties and for asking conceptual questions. It can furnish initial ideas to be used for theoretical sampling.”
(Strauss & Corbin 1998 p.47)

In general terms it is used to compare the researcher's findings with other literature. This can help sensitise the researcher to concepts found within current literature which also seem to be emerging from the researcher's own study, or conversely to identify where the researcher's concepts differ from those within the literature. Reviewing the literature can help the researcher to think about data and what they mean. Reviewing the literature can also provide insight into possible productive areas for theoretical sampling. At a later stage, the literature can be used to confirm the researcher's findings and to suggest where current literature is inaccurate or incomplete (Strauss & Corbin 1998).

2.4.4.6 Example of educational research utilising grounded theory methods

One of the best known grounded theory studies within the field of educational research, is Burnard's (1990) doctoral thesis which explores nurse tutors' and student nurses' perceptions of experiential learning. He used a semi-structured interview format to

interview a convenience sample of twelve students and twelve nurse tutors. Two methods of data analysis were utilised. Firstly, a simple content analysis was performed, followed by a detailed qualitative analysis in the style of grounded theory. The analysis demonstrated that students viewed experiential learning methods in a positive light and felt that such an approach to teaching and learning facilitated the connection of theory to practice. Burnard addresses issues of validity and reliability within this qualitative stage by having a colleague, not involved in the study, reading the interview transcripts, identifying categories that seemed to be emerging from the data and comparing these with his own. Burnard comments that the categories generated were very similar. Another check was to ask an interviewee to discuss and verify the categories that were developed as a result of their particular interview. This strategy is often recommended within research methodologies adopting a qualitative approach, (Streubert & Carpenter 1999). Burnard says that this proved to be problematic due to the time lapse that occurred between the interview and subsequent discussion and the pressure felt by the interviewee to agree with the researcher. Limiting the sample to a total of twenty-four interviewees may have prevented category saturation being achieved and could have affected the validity of the findings. However, Burnard used this first stage simply to develop a tentative theory which he then tested empirically in the second stage of the study.

In the second part of his research, Burnard developed a questionnaire, based on the findings of the interviews, which was distributed to a total sample of nurse educators in Wales (n=184) and a 10% stratified sample of general and psychiatric nurse students, also in Wales (n=325). The aim was to compare the interviewees' perceptions with those of a larger sample. Thus Burnard utilised a qualitative approach to generate a tentative theory which was then tested using empirical methods, similar to the intention within the researcher's study.

2.4.5 Design of study utilising techniques borrowed from the grounded theory methodology

Having outlined methods advocated by Strauss & Corbin (1998) in the conduct of a grounded theory study, the following sections discuss methods of data collection, analysis and sampling which were adopted or borrowed from the grounded theory tradition within this study. The use of open coding, comparative analysis of data and

codes and the collapsing of codes into larger categories, were the levels of data analysis employed. These techniques were sufficient to identify the main themes present within the data, which could then be subjected to empirical testing within the next stage of the study. Axial coding and selective coding were not employed as the aim was not to generate a theory of the theory-practice gap as such, nor to discover a basic social process which underpins this phenomenon. These higher levels of analysis were therefore not required within the study.

A departure from the grounded theory methodology was the way in which sampling was conducted. Random sampling was used rather than the theoretical sampling technique advocated by Strauss & Corbin (1998). This was because, at this stage of the study, the aim was to access as wide a range of perceptions as possible. Sampling methods and the rationale for these are discussed in more detail in section 2.4.5.3 below.

The technique of memoing was employed to provide a record of the analytic process, memos being written in the left hand margin of transcripts. Finally, a continuous review of the literature was conducted throughout the data collection and analysis period in order to explore and substantiate themes that began to emerge from the data.

2.4.5.1 Data collection

A number of data collection methods can be used when conducting grounded theory studies including observation, interviews and the scrutiny of records and documents (Holloway & Wheeler 1996). Within the researcher's study a series of group interviews were conducted, with each group being composed of either three teachers, student nurses or preceptors. Small groups of people were used rather than individual interviews, because it was felt that such groups would generate discussion from within the group and would require less input from the researcher than a one-to-one interview. This would ensure that any data emerging were purely the interviewees' perceptions, rather than being directed and therefore possibly biased by the researcher. In addition, it was felt that the ability to discuss this phenomenon with peers in a small group format would facilitate a greater depth of discussion among the participants, than with just the researcher. It would also help to uncover shared perceptions of the groups, an important aspect of this stage of the research study. The decision to interview three participants all belonging to

the same peer group, rather than mixing groups of teachers, student nurses and preceptors together, was made because it was felt that in such a mixed group students might be less assertive in giving their opinions and views. Also, teachers and preceptors might be less willing to voice any concerns in front of students.

A topic guide was developed which listed seven key areas the researcher thought would prompt discussion relevant to the investigation. These areas had been identified as a result of a preliminary literature review of the topic, which is discussed within chapter one. The areas were as follows:

- Can you explain what you think is meant by “theory” within nursing?
- Can you explain what you think is meant by “practice” within nursing?
- Do you think there is a gap between theory and practice?
- Can you describe situations where you have experienced this theory-practice gap?
- Why do you think this gap occurs?
- Do you think this gap should be reduced?
- How might this be achieved?

It was felt that some structure was needed because of the number of interviews that were to be conducted and to ensure continuity from interview to interview. Within this loose structure, interviews were as open as possible, allowing participants to take the lead and explore any issues that arose. In effect, these group interviews were very similar to using a focus group approach. Focus groups are also used to explore shared perceptions of groups of people having similar experiences, however focus groups tend to be larger and less structured than group interviews (Holloway & Wheeler 1996).

Three pilot interviews were conducted initially, one for each of the three groups involved. All three pilot interviews yielded a great deal of information and modifications to this

loose structure were seen to be unnecessary. These pilot interviews were valuable in developing interviewing and communication skills, in addition to becoming familiar with the recording equipment being used. It is important when conducting interviews, to ensure interviewees are put at ease and that the environment in which they are to be interviewed is comfortable. Helping interviewees to feel relaxed can help to facilitate the communication process and thus maximise the depth and quality of the data obtained (Barker 1991).

Within both the pilot and main study, efforts were made to ensure the interviews were conducted in quiet and private surroundings by using rooms away from busy areas, disconnecting telephones and putting 'do not disturb' signs on doors. Teacher and student interviews were conducted in small classrooms in both of the institutions used for the study, according to which institution the interviewees belonged. Preceptor interviews were conducted in either the staff room or charge nurse's office on the ward being sampled. Whilst the teacher and student interviews took place without any difficulty, the preceptor interviews proved more problematic because it was difficult to find times when all three of the preceptors to be interviewed were on duty. Lunchtime was most suitable as preceptors, on both the early and late shifts, were on the ward and in a number of instances preceptors gave up their lunch break, or came in early to be interviewed, which was appreciated by the researcher. Preceptors were sometimes called away at the start of the interview which caused delay. In one instance, an interview had to be re-scheduled because preceptors were required elsewhere to deal with an emergency situation. Nevertheless all preceptor interviews were completed.

Before the start of each interview the researcher made sure the room was comfortable in terms of lighting and temperature, placed chairs into an informal grouping and set up the recording equipment as unobtrusively as possible. At the start of each interview the researcher introduced herself and the interviewees to each other, (although in most cases they were already known to one another), briefly discussed the aim of the research and asked if participants objected to the interview being audio-taped. They were also assured of the confidentiality of the interview and their right to withdraw at any stage if they chose to do so. Whilst some participants were a little embarrassed by the thought of being recorded, none objected and quickly forgot about the tape recorder once the interview was underway. The procedures for putting interviewees at ease seemed to work well, in

that they were willing to discuss the theory-practice gap with little prompting. In many cases the discussion was very animated and on occasion even heated. Whilst this elicited a great deal of valuable data, it was more difficult to transcribe the interviews when all three participants were speaking at the same time. With experience this became less of a problem as at the start of each interview, the researcher asked the participants to speak one at a time and reminded them of this if necessary once the interview was underway.

2.4.5.2 Data Analysis

Interviews within the study lasted between twenty and forty-five minutes. The interviews were audio-taped and transcribed verbatim. Interviews were transcribed as soon as possible following their completion. Initially the researcher performed all of the transcription, but it became evident that this was a very time-consuming activity and funding became available to pay an audio-typist to help with the transcription of later interviews. Those transcribed by the audio-typist were checked for accuracy by the researcher in order to ascertain they were a faithful transcription of the conversation that took place.

Following transcription each interview was subjected to open coding. A wide margin was left at the right hand side of the transcript in order to record the open codes. Each interview was examined sentence by sentence and as many codes as possible were listed to describe each piece of data. A comparative analysis was then conducted during which each code was compared against every other code generated within the interview and where codes appeared to be very similar they were placed together in the same category with a new code to identify it. Also, the codes and categories generated within an interview were compared against the codes and categories of all other interviews that had been transcribed. Any themes that seemed to be emerging from these processes of data analysis were explored in subsequent interviews helping to substantiate and clarify the themes that were emerging. In effect, this helped to develop theoretical sensitivity.

In this first stage of the study, the aim was to discover any shared perceptions and views of the theory-practice gap, rather than to develop a theory attempting to explain these, or to uncover a social process explaining the phenomenon studied. At this stage of the study it was sufficient to identify perceptions of the theory-practice gap the interviewees had in common, what was seen to cause this phenomenon and views of how it could be reduced.

These could then be subjected to empirical testing in stage two of the study. Axial and selective coding methods, which are higher levels of analysis normally used to establish a theory from the data, were therefore not employed. Open coding, comparative analysis and the condensing of codes and categories were adequate levels of analysis to employ in order to identify the main themes within the data. These themes began to emerge very clearly and strongly within the first few interviews conducted. Subsequent interviews were used to substantiate these themes and to ensure that category saturation was achieved.

Memos were written into the left hand margin of each transcript as thoughts occurred to the researcher. These related to ideas as to how data could be linked and developed and reminders to check other transcripts for similar ideas. Concepts to be further elaborated upon within subsequent interviews and areas of literature to search were also included as memos. Literature searches were conducted as themes began to emerge from the data, for example, literature relating to the lack of time perceived by preceptors to teach students, the role of the link teacher, the sequencing of theory and practice. These were used to clarify the researcher's findings. In most cases the literature supported the findings of the researcher. Where findings were different they encouraged the researcher to view data from a different perspective and to consider alternative explanations of the data.

2.4.5.3 Sampling

Inductive researchers would argue that randomising samples within qualitative studies is inappropriate. Rather, participants are often chosen precisely because they have a particular interest, involvement, experience, or expertise with the topic under investigation and therefore have a great deal of rich data to contribute. Sampling is thus purposive (Streubert & Carpenter 1999). However, within this study, early discussions with teachers and students, who expressed an interest in the topic, indicated very negative views of the theory-practice gap. For example, students felt that the gap prevented learning from taking place and that what was learned within the classroom setting, often could not be applied to practice. It was felt that a purposive sample of such individuals could result in a biased view of the phenomenon under study and would not be an accurate representation of perceptions of the theory-practice gap in general.

Within the grounded theory methodology a specific type of sampling, referred to as theoretical sampling is normally used. As previously discussed, theoretical sampling is characteristic of the grounded theory methodology in the effort to ensure that theory is rooted or grounded in the reality of those studied. In theoretical sampling, sampling methods are driven by data analysis (Strauss & Corbin 1998). As concepts and categories begin to emerge from the data, the researcher samples from individuals or situations which the data analysis indicate may be potential sources of further data. Theoretical sampling is used at the stages of axial and selective coding in order to construct the properties, dimensions and variations among categories and the relationships between them. Theoretical sampling serves to densify and add completeness to the emerging theory (Strauss & Corbin 1998).

As Strauss & Corbin discuss, it can be difficult, in the early stages of a grounded theory study, to decide who the initial sample will be. The researcher has no analysis to inform this decision. This is an important issue, as the initial sample can influence the direction the study takes. Strauss & Corbin (1998) say that the aim at the beginning of a grounded theory study is to generate as many codes as possible through the process of open coding. Gathering data from as wide a sample as possible can facilitate this process. They refer to this as open sampling:

“Sampling is open to those persons, places, and situations that will provide the greatest opportunity for discovery...one could choose every third person who came through the door or could systematically proceed down a list of names, times, or places”
(Strauss & Corbin 1998 p.206)

During open sampling as broad a range as possible, of individuals or situations who may be able to contribute data to a study, is accessed.

Within this study it was decided that nurse teachers, student nurses and preceptors would be the most appropriate individuals to interview in order to investigate perceptions of the theory-practice gap within nursing. These groups of individuals are most likely to experience and have to deal with the theory-practice gap first hand. The literature reviewed in chapter one suggested that the theory-practice gap exists in part because of the different ideologies and values held by service and education sectors. The researcher wanted to discover whether perceptions held by preceptors (the service sector) differed

from those held by nurse teachers (the education sector) and also what student nurses' perceptions were, as this student group has to move between the two sectors. The difficulty lay in how to sample from this large pool of individuals. As discussed, early conversations with nurse teachers and student nurses expressing an interest in the subject, had been very negative and it was felt that simply using these individuals could result in a negative and biased interpretation of the theory-practice gap. A means of producing an open sample that potentially would include individuals with positive, negative and neutral views of the theory-practice gap needed to be developed.

Although not usual within grounded theory studies, it was decided to use a random sample of nurse teachers, student nurses and preceptors which had been stratified and proportionally allocated, in order to include as broad a range of individuals from the three groups as possible. The use of a random sample is usually associated with quantitative methods of inquiry and traditionally is not part of the grounded theory methodology. However, in their most recent book, Strauss & Corbin (1998), pivotal authors in the grounded theory method, advocate the mixing of quantitative and qualitative techniques at all stages of the research process if this will facilitate the generation of high quality research:

“Unless unduly constrained, routinized, or ideologically blinded, useful research can be accomplished with various combinations of both qualitative and quantitative procedures. This is so for each and every phase of the research, whether researchers are collecting data, formulating hypotheses, seeking to verify them, or giving illustrations when writing publications.” (Strauss & Corbin 1998 p.31)

A proportionally allocated, stratified random sample of student nurses and nurse teachers was selected from the two institutions of higher education which provide programmes of pre-registration education locally within the geographical area studied. Institution A provides undergraduate education, institution B provides diploma level education.

This sample consisted of:

- Six groups of nurse teachers from the two institutions of higher education:
 - Two groups of nurse teachers teaching undergraduate student nurses at institution A.

- Four groups of nurse teachers teaching diploma students at institution B.

- Nine groups of students:
 - Three groups of undergraduate nursing students at institution A.
(one from each year of the course)
 - Six groups of diploma nursing students at institution B.
(two from each year of the course)

In addition, eight groups of preceptors were interviewed from the following clinical specialties within the two Trusts having students from institutions A and B allocated to them:

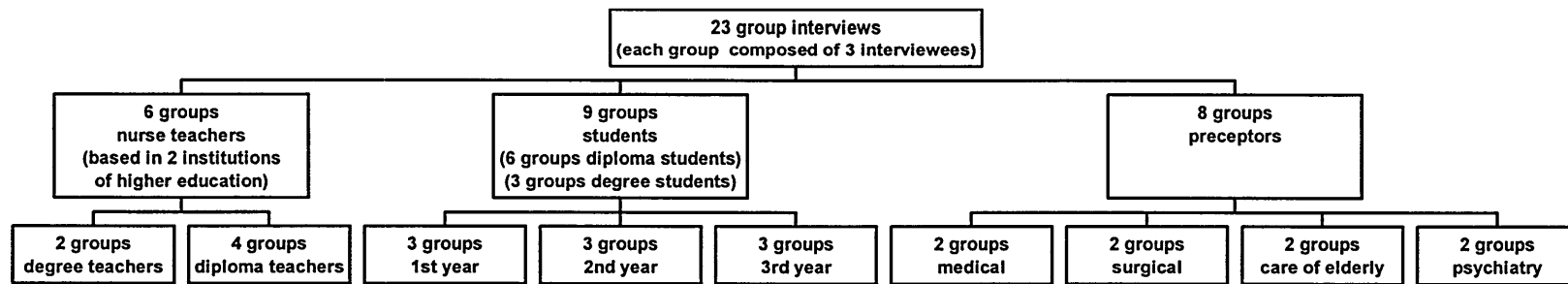
- Two groups from medical
- Two groups from surgical
- Two groups from psychiatry
- Two groups from care of the elderly

These clinical areas were chosen as all pre-registration nursing students will be allocated to them at some stage of their training. A total of twenty-three interviews were performed, with sixty-nine participants being interviewed. Figure 2.1 demonstrates the stratified random sampling of groups.

Once the proportions of the sample had been calculated, complete lists of nurse students and nurse teachers at both institutions were provided by the Heads of School. Nurse teachers were selected by picking names out of a hat until a sufficient sample had been gained. The lists of student nurses were divided into years according to institution and again the required sample was randomly chosen from these.

Figure 2.1

Proportional, stratified random sample of groups of interviewees



The preceptor sample was generated by producing four lists: one each for surgical, medical, psychiatry and care of the elderly. Each list identified all of the wards and units in that specialty within the geographical area used in the study. This geographical area consisted of all those areas used for clinical placements by both institutions. From each list two wards were chosen at random. The Directors of Nursing responsible for the wards chosen were asked to provide lists of staff working as preceptors within these wards. Again, names were picked at random from the lists of preceptors provided and these individuals were contacted.

Contact with all the prospective interviewees was initially by letter, outlining the research and enclosing a consent form for them to fill in and return, if they were willing to be interviewed. Copies of these can be found in Appendix 1. When individuals indicated they did not wish to participate in the study, further random sampling was conducted until the pre-specified proportional allocations were achieved.

2.4.6 Ethical Issues

At the time this stage of the research was undertaken, the policy adopted by the two local Trusts that would be involved in the study, was that research not involving patient contact was not required to proceed through the Trusts' ethics committee. The approval of an ethics committee was not therefore required. Research requiring the participation of staff employed by the Trusts, could proceed providing permission was gained by the appropriate manager. Directors of Nursing, responsible for the ward areas where preceptors could potentially be included within the random sample, were contacted in writing, asking permission for the study to proceed and to approach preceptors. Permission was also gained from the Heads of School of the two educational institutions to conduct the study and to approach nurse teachers and students once they had been randomly selected. Copies of these letters can also be found in Appendix 1.

Every participant randomly chosen to take part in the study was initially contacted by letter. This outlined the purpose of the research and what would be required if the individual agreed to participate. Participants were also assured of the confidentiality of the interviews within the confines of each group. No participant was identified within the recordings or transcripts. Participants were assured, that whilst they might personally recognise some comments as being made by themselves in future publications, that none

of these would be attributed to any particular individual, educational institution or clinical area. Prospective interviewees were asked to sign and return an enclosed consent sheet if they agreed to being interviewed. This information was reiterated before the start of each interview. Interviewees were also told that participation in the study was voluntary and they were free to withdraw from the study at any stage if they so wished. Permission to audio-tape the interview was also sought prior to commencement of the interview.

2.4.7 Reliability and Validity

Reliability and validity are terms associated with the evaluation of quantitative research. It has been argued that the methods used to do this are inappropriate to apply to qualitative studies (Lincoln & Guba 1985, Holloway & Wheeler 1996, Streubert & Carpenter 1999). Instead, the term 'trustworthiness' is often used to describe methods used to establish the rigour of qualitative research. Schwandt (1997) refers to trustworthiness as the quality or goodness of a qualitative study. Qualitative research is said to be trustworthy when it accurately represents the experience of those studied (Streubert & Carpenter 1999).

Four terms are used to describe activities used to establish the trustworthiness of a qualitative study: credibility, dependability, confirmability and transferability (Lincoln & Guba & 1985, Schwandt 1997).

2.4.7.1 Credibility

Credibility refers to activities that help ensure credible findings are produced. Credibility within a qualitative study parallels internal validity within the quantitative paradigm (Miles & Huberman 1994, Schwandt 1997). In attempting to establish the credibility of a study, Miles & Huberman (1994) suggest the following questions should be asked:

“Do the findings of the study make sense? Are they credible to the people we study and to our readers? Do we have an authentic portrait of what we were looking at?”
(Miles & Huberman 1994 p. 278).

Schwandt (1997) says that credibility refers to the fit between participants' perceptions and the researcher's reconstruction and representation of these. Credibility can be

enhanced by prolonged engagement with the individuals being studied and by returning to participants in order to check that they agree with the findings of the research (Lincoln & Guba 1985, Miles & Huberman 1994, Streubert & Carpenter 1999).

Whilst returning to verify findings with participants is advocated by some authors, this technique has been criticised by others (Burnard 1990, Silverman 1993). It is argued that participants may not be able to recall accurately what was said or observed, or may feel pressurised to agree with the researcher. Prolonged engagement was not feasible within the researcher's study. In addition, the results of analyses were not returned to participants for verification because following the arguments of Burnard (1990) and Silverman (1993) this was not seen to be of any value. In view of the large numbers of participants interviewed, this would have been a time-consuming activity with questionable benefits.

2.4.7.2 Dependability

Dependability within qualitative studies parallels reliability within quantitative approaches to research and focuses on whether or not the processes used by the researcher during the course of an investigation are appropriate and logical (Miles & Huberman 1994, Schwandt 1997). Miles & Huberman (1994) refer to this as a form of quality control. In assessing the dependability of a study the reader needs to ask whether the research questions are clear and congruent with the study design; has collection of data across a full range of appropriate settings, times and respondents been demonstrated and have coding checks been made (Miles & Huberman 1994). Coding checks are a type of inter-rater reliability test in which the codes, categories and themes discovered by the researcher during data analysis are compared with those discovered by another researcher analysing the same data (Silverman 1993).

Within this study the sampling methods used, in addition to trying to maximise the transferability of the study to other settings (see section 2.4.7.4), also attempted to establish the dependability of the study's results by ensuring that as wide a range of individuals as possible was sampled. Coding checks were made by a sample of the transcripts being independently subjected to coding by the researcher and another nurse researcher, experienced in the use of qualitative methodologies. The codes and categories

identified by the researcher and other nurse researcher were then compared for similarities and differences. Transcripts of the first five interviews conducted were used for this purpose. Two of these interviews had been with nurse teachers, one at each institution. Two had been with second year students, one at each institution. The fifth interview subjected to comparison was an interview with preceptors on a surgical ward. A high degree of agreement was achieved. Silverman (1993) suggests that comparison of analyses by different researchers is one of the most useful ways of establishing the trustworthiness of a qualitative study.

2.4.7.3 Confirmability

Schwandt (1997) says that confirmability is:

“...concerned with establishing the fact that the data and interpretations of an enquiry were not merely figments of the inquirer’s imagination.” (Schwandt 1997 p.164)

Miles & Huberman (1994) explain that a study should be as neutral and free of bias as possible in terms of establishing its confirmability. The study should be objective, with the findings reflecting the views and perceptions of those studied, rather than the researcher. As with dependability, there needs to be explicit and detailed discussion of the way in which a study progressed, the methods and procedures used during data collection and analysis and the way in which conclusions were arrived at. These should be sufficiently detailed to form an audit trail that can be followed by others in order for them to assess the objectivity, or otherwise, of the study.

Within this study, the discussion above in sections 2.4.1. to 2.4.5 explains the rationale for the choice of research design, methods of data collection, data analysis and sampling and forms an audit trail of the methods and procedures used within the study for others to judge its objectivity. The minimal contribution to the discussion during the group interviews by the researcher ensured that the perceptions gained were those of the interviewees, not the researcher. The checking of codes and categories with another researcher ensured that any themes seen to be emerging from the data were not influenced by the researcher. These strategies served to minimise the introduction of bias by the researcher into the study and helped ensure that it was the interviewees’

perceptions and interpretation of the theory-practice gap that were gained, not the researcher's.

2.4.7.4 Transferability

Miles & Huberman (1994) and Schwandt (1997) say that transferability parallels external validity within quantitative studies and refers to the extent to which the findings of a study have meaning for others in similar situations. This is a similar concept to that of generalisation within quantitative studies and is the extent to which findings can be said to be true in other situations. As with quantitative research, transferability depends, to some degree, on the sample studied (Miles & Huberman 1994, Holloway & Wheeler 1996). Qualitative studies tend to be in-depth in nature, requiring lengthy analysis. As a result, samples are usually small, purposive and generalisability is often not feasible (Carr 1994). Indeed, some authors argue that each study and its results are unique and that any generalisation beyond the study is inappropriate (Streubert & Carpenter 1999).

Within the researcher's study, generalisation of the findings was seen to be important for a number of reasons as discussed in the section on sampling above (2.4.5.3). In summary these were because the number of interviews to be conducted was limited and it could not be assumed that category saturation was achieved. Also, the researcher wanted to ensure that as wide a range of perceptions and views were obtained as possible and a purposive sample could have resulted in biased opinions only being gained. Using a random sample of participants that had been stratified with proportional allocation, established the representativeness of the sample studied. The use of student nurses and nurse teachers from two institutions offering different types of pre-registration preparation contributed to this. In addition, allowing the possibility of participants who may have positive, negative or neutral perceptions to be included in the study reduced the possible introduction of bias. All of these sampling procedures were employed to try and ensure the transferability of the study's findings to similar populations experiencing the theory-practice gap.

Having discussed the design of the qualitative stage of the study and providing a rationale for the techniques used, the next section discusses the results of the data analysis.

2.5 RESULTS AND DISCUSSION

Eight themes, which were frequently cited by nurse teachers, student nurses and preceptors, emerged from the data. These centered on commonly-held perceptions and influencing factors of the theory-practice gap as follows:

- Defining nursing theory and practice
- The existence of a theory-practice gap
- Idealism versus realism
- Lack of time
- Sequencing of theory and practice
- Lack of communication between clinical areas and educational institutions
- The link teacher role
- Strategies to close the gap

In the tradition of qualitative methodologies, these themes are discussed in relation to other work, either supporting or refuting the findings of this qualitative investigation. This process also helps to establish the trustworthiness of the study's findings (Streubert & Carpenter 1999). A number of research articles and projects commissioned by the four National Boards for Nursing, Midwifery and Health Visiting within the U.K. have been published within the last four years. These are in relation to practice placements, support of students in practice and emerging roles of nurse teachers and clinical preceptors within the context of the educational reform currently being experienced within nursing. Whilst these do not specifically investigate the theory-practice gap, findings within these reports support those of this study, as do the results of a number of other research articles and are therefore discussed in some depth. Two such studies, one by May *et al* (1997), the other

by Watson & Harris (1999) have already been examined within chapter one in sections 1.2.3.3 and 1.2.5.5 respectively.

2.6 THEMES

2.6.1 Defining nursing theory and practice

Findings of this study

All interviewees had some difficulty in defining nursing theory, and were unable to define this without also referring to nursing practice. This is perhaps a reflection that nursing has always been regarded as a practice-based profession (Acton *et al* 1992). Initially, interviewees said that nursing theory was to do with theories and models of nursing, but would then broaden this out by saying that theory also included subjects such as natural and social sciences, ethics and professional issues. Theory was also regarded as the knowledge required to perform practical, psychomotor skills, whether this was the theory and principles underlying the way in which a skill should be performed, or the actual stages of skill performance. Thus the whole range of subjects and disciplines taught within programmes of nurse education were all seen to be aspects of theory. Primarily, theory was seen to be concerned with principles and the knowledge needed to understand the ‘why’ of practice and to be able to practise safely. As one student said:

*“It’s the reason behind why you’re doing things when you’re on a ward.”
(2nd year student interview. Interview No. 3)*

A teacher tried to explain this more fully:

“...if you look at what nurses need to know about giving injections, then it’s actually quite complex, because they have to have a knowledge of anatomy, they have to have a knowledge of drug administration, the policies that need to be obeyed. And as they get more senior, more information of the different kinds of drugs, their actions and their adverse reactions. That’s the theory that allows them to practise. (Teacher interview. Interview No. 1)

Concern was expressed by nurse teachers that many of these subjects were not really nursing theory as such, but were borrowed from other disciplines:

"I think we maybe always have had to draw from so many diverse disciplines, and it's difficult to identify exactly what nursing is, because it seems to be an amalgam of it all. It's psychology, sociology, biology...I don't think you could stand out in isolation and say this is ours."

(Teacher interview. Interview No. 4)

Other interviewees saw the strength of nursing lying in its holistic approach, unique in the way it amalgamates and applies theory from other disciplines to form nursing. It was also interesting to note that students, in the early stages of their programme, regarded much of the teaching in each of these disciplines irrelevant to being able to nurse patients. First and second year students were more concerned with acquiring practical nursing skills which would enable them to survive in the clinical area:

"So we did a lot of sociology and psychology which was interesting, but it didn't really help us out as far as nursing goes, because you couldn't really put anything like sociology or psychology into practice, especially on your first placement – it's hard enough just to cope with the day to day activities of the ward."

(1st year student interview. Interview No. 11)

However, third year students could begin to understand how all of these disparate parts came together within the sphere of nursing practice:

"Well, looking back, now I see how you need to know about the sociology and that, and you kind of put it all together, but at the time I didn't, I just wanted to look as though I knew what I was doing and not do anything wrong."

(3rd year student interview. Interview No. 15)

A nurse teacher summed it up as follows:

"I mean they pooh pooh some of the stuff that we teach them, yet they say maybe three years later, well I do see the relevance of it now, but I wondered why you were teaching us this rubbish at the time, you know." *(Teacher interview. Interview No. 4)*

Interviewees found the concept of practice easier to explain. There was general agreement that practice was “hands on” contact and caring for patients. It requires interaction and communication with patients and the need to be involved:

*“Doing it. Actually working with and doing with patients.”
(1st year student interview. Interview No. 9)*

Literature in support of study

The comments made by the interviewees within this study are similar to those suggested by McCaugherty (1992a) as discussed in section 1.2.2.4, in that there appears to be several ways in which the term theory can be applied. McCaugherty suggested there are four ways of applying the term within nursing. These are: textbook knowledge, the results of nursing research, conceptual frameworks used to underpin practice and as theories that are borrowed from other disciplines. The participants interviewed within this qualitative stage of the researcher’s study also offered all of these definitions. The view of respondents was that all of these were legitimate interpretations of nursing theory and that all of these facets of theory were needed in order to practise nursing, although students failed to see the relevance of borrowed theories from the social sciences, until they were in the final stages of their training.

A study by Hislop *et al* (1996) investigating student nurses’ views of theory and practice within a Project 2000 nursing programme, reports a similar finding in terms of the relevance students see in course content. Hislop *et al* interviewed a random sample of nineteen students at one Scottish College of Nursing. The purpose was to try and identify how students relate theory to practice, particularly how they relate the content of what they are taught in the college to what they subsequently encounter within the clinical environment. The precise methodology adopted within this study is not clear, it is simply stated that a qualitative approach was used. In addition, no details of the process of data analysis are given, other than that this was straightforward. Issues of validity and reliability are not discussed within the article and whilst the sample size is acceptable within the field of qualitative study, the fact that the study was only conducted within one college must raise questions as to the reliability of its findings. This said, the issue of relevance is a theme that occurs in both Hislop *et al*’s and the researcher’s own study. In Hislop *et al*’s study, a number of students stated they could not see the relevance of the

first part of their course, but in retrospect could see its significance. This reflects the finding within the researcher's study, in that it was not until they were in their third year, that students could begin to put the various parts of nursing theory together and to understand how all of these were integrated to inform nursing practice.

In the May *et al* (1997) study discussed in section 1.2.3.3, in relation to theory and the relevance of this to practice, the comment is made that:

“The vast majority of students were able to integrate elements of their learning and practice before they completed the programme...”
(May *et al* 1997 p.215)

This suggests that students do see the relevance of their learning and are able to utilise this within their practice, although it is not clear from the study at what stage this is likely to occur, simply that it occurs before the end of training.

In relation to the definitions of practice given by the respondents within the researcher's study, the notion of practice being direct patient contact and involvement with patients is a common theme running through the work of many nurse theorists such as Stevens Barnum (1994) and Benner & Wrubel (1989). Inherent within the work of these authors is the need for effective interaction and communication. The concept of involvement has been examined in detail by Benner & Wrubel (1989) who say that involvement is central to the art of caring in nursing. They used a phenomenological approach to study the concept of caring within nursing, presenting a series of paradigm cases to support their discussion. Their work is regarded as a seminal piece in the development of nursing knowledge. It seems to be universally accepted within nursing literature, that nursing practice involves direct contact with patients, or 'hands on' activity, similar to the views expressed by interviewees within the researcher's study and that this contact requires interaction and involvement with patients.

2.6.2 The theory-practice gap

Findings of this study

Having been asked to define the terms theory and practice, interviewees were asked whether they thought there was a gap between the two. Without exception, the answer to this was 'yes'. There were two views apparent as to the perceived causes of this theory-practice gap. In the first, the gap was seen to result simply because classroom teaching differed from clinical practice. A student nurse gave an example of this:

"...this teacher said they used swimming caps for something in oncology, but when I went to oncology, they said oh they haven't been used for years right, and we have been taught all about them."
(2nd year student interview. Interview No. 16)

Interviewees varied in their perceptions of how wide this gap was seen to be. Students felt the gap was huge, with what they experienced within the clinical area often bearing little relation to what they had been taught in the classroom. Teachers however, felt the gap was narrower, with there being only a few discrepancies between the classroom and clinical situation. Preceptors were less definite in terms of how large they felt the gap was, but made comments that students did not seem to have the knowledge needed to underpin practice and often did not understand why they were doing certain things, or performing particular skills.

In the second view, the theory-practice gap was seen to result not because classroom teaching and clinical experience differed, but because students were unable to apply what they had been taught within the classroom to a clinical situation. Teachers and preceptors cited basic nursing skills and communication skills as examples of this. The problem therefore was not always seen to be a lack of knowledge, but students had difficulty in appropriately applying their acquired knowledge to clinical situations. In relation to communication skills, both preceptors and teachers said they knew students had been taught communication skills in theory, but when they observed students interacting with patients, they did not apply what they had been taught:

"Another one I find is a huge gap is communication. Because they've got all the theory, but you watch them, and they put not one bit of it

into practice sometimes. They don't even look at their own attitude, their own stance or anything when they're delivering information...and they come over in what could be instead of an assertive mode an aggressive mode... And you watch them do this with patients, and yet they'll comment that you've got to do this and that – they've got all the theory, but you've watched them and its divorced completely.”

(Teacher interview. Interview No. 7)

Different views were also expressed according to whether this theory-practice gap was a positive or negative occurrence. The nurse teachers interviewed, felt that the gap could be seen as a beneficial phenomenon, in that it promoted problem-based learning and reflective skills in terms of trying to find ways in which to bridge the theory-practice gap. Students however, tended to view the differences as frustrating. They gave more credence to what they saw and learned in the clinical area. When what had been taught by a nurse teacher in the classroom differed from the experience in the clinical area, the students assumed it was the nurse teacher who had taught inaccurately or inappropriately. In such cases, the nurse teacher was seen to be out of date with what was happening within clinical practice and therefore of questionable credibility. Students also felt that sometimes what was taught to them in the classroom could not be applied to the clinical area, even before they got there and tried it out for themselves:

“Yeah, the teacher was talking about imagining the pain as a river which was being washed away. And I thought yeah, right, if I tell that guy with acute appendicitis to imagine his pain as a river flowing away he's going to clock me one! You just knew it wasn't going to work out there.” (3rd year student interview. Interview No. 21)

Here again, the teacher's credibility was questioned.

Literature in support of findings

A number of classical studies (Hunt 1974; Bendall 1975; Jones 1975; Alexander 1983; Gott 1984; Fretwell 1985; Melia 1987; McCaugherty 1992b) all support the notion of a theory-practice gap. These have been discussed in some detail within section 1.2. The suggestion that a theory-practice gap exists is also supported by the continuing interest within the nursing press in relation to this phenomenon and the call to find ways in which to overcome it (Department of Health 1999a; U.K.C.C. 1999).

Within the researcher's study, it was interesting that, where a gap was perceived to exist between theory and practice, examples cited focused particularly on practical-orientated skills, such as the basic skills of nursing and communication. In the May *et al* (1997) study, comment is made with regard to the limited exposure of students on clinical placements to theoretical concepts such as holistic, research-based care, health promotion and therapeutic practice. Within the May *et al* study, broad umbrella concepts were focused upon in terms of where a gap is perceived, rather than specific clinical skills.

Hislop *et al* (1996), discuss the theory-practice gap in terms of the 'decontextualization' of theory. They argue that because theory is a set of principles or rules abstracted from reality, it loses its contextual meaning, making it difficult for students to recognise when it is appropriate to apply the theory to practice. This article has also been outlined previously in section 2.6.1. Referring to Bransford *et al* (1989), Hislop *et al* (1996) state:

"...theory may end up as inert knowledge, which is not accessed during practice even though it is technically 'accessible', simply because novices are unable to recognize when it is appropriate to use it." (Hislop et al 1996 p.172)

This supports the comments made by teachers and preceptors within the researcher's study, that students did not seem able to apply theoretical knowledge to practice situations.

Spouse (1996) conducted a longitudinal study investigating the professional development of student nurses. A phenomenological approach was used to describe the lived experience of becoming a nurse. Informal, unstructured interviews were the main method of data collection. These focused on students' experiences whilst on clinical placement. Additional data were obtained from students' written assignments and critical incident reports. Eight students participated in the study, with a total of eighty-six interviews being conducted during the students' training. Spouse recognises that the small sample inhibits generalisations of the study, however she says that from that five key aspects of the student-preceptor relationship emerged from the data. These were befriending, planning, collaborating, coaching and sense-making. She says that formalised, de-contextualised knowledge from lectures and books is important, but students struggle to

make the connections between this and the informalised knowledge they see clinical practitioners applying in practice; knowledge which has been generated largely as a result of their experiences within practice. She suggests that clinical preceptors play an important role in helping students to transfer this formal learning to practice, by supporting students to make the connections between formalised or decontextualised knowledge to the practice situation at hand. This is similar to Schön's (1987) idea discussed in section 1.2.5.5, of the need for knowing-in-action to be made explicit as knowledge-in-action, so that it becomes available to student nurses, who can subsequently learn from it.

Authors such as Hislop *et al* (1996) and Spouse (1996) seem to be alluding to the differences in the types of knowledge used within nursing as previously discussed within section 1.2.3.1. Here it was argued that the theory-practice gap results, due to the fact that theoretical or classroom teaching is based on scientific or formal 'know that' knowledge, whereas practice is based on 'know how' knowledge gained as a result of experience. The difficulty for students, is in transferring the 'know that' knowledge to practice and in making it relevant and applicable to the clinical setting. In an earlier article, Wong (1979) also refers to the difficulties students have in transferring learning from the classroom to the clinical area. She suggests that students need to believe that what is learned within the classroom is pertinent to other situations and is therefore valuable. Students need to see the relevance and credibility of what is taught to them in a classroom setting and that this will be useful to them in a practice environment.

There have been a number of theories developed to assist understanding the way transfer of learning takes place. In broad educational terms, transfer of learning refers to the way in which what a person learns in one situation influences his/her learning and performance in other situations (Bigge & Shermis 1992). As Bigge & Shermis state, this concept underpins the whole notion of schooling. It is hoped that what is learned in school will be of use to students in future learning and life situations. Within nursing, the concept of transfer of learning, refers to the way in which students learn within one situation, and then transfer this learning to other situations. This might be transferring classroom learning to the clinical area, transferring learning from one clinical situation to another, or using clinical experiences to inform what is taught in the classroom.

Psychologists have developed a number of theories of the transfer of learning and these largely depend upon the theory of learning that is advocated. How learning is perceived to take place will determine how it is seen to be transferred to new situations. Such learning theories include natural unfoldment, mental discipline, apperception, classical conditioning, operant conditioning, reinforcement and linear and cognitive-field interaction (Bigge & Shermis 1992). Child (1986) gives an overview of a number of the psychological theories relating to the transfer of learning, identifying four factors which will influence a positive transfer of learning from one situation to another. These are similarity of what is already known to the new situation; the thoroughness of what is known; an awareness of the possibility of transferring learning from the known situation to the new one; and readiness to learn. Thus students need to have an awareness, or have it drawn to their attention, that what has been learned in situation A, can be applied to situation B (Jinks 1991). Within nursing, experiential, reflective techniques can be used by nurse teachers and preceptors, to facilitate this transfer of learning.

The use of reflection as a means to close the theory-practice gap is a common theme within the work of many authors. The importance of promoting reflective practice as a means of linking theory and practice was recognised within the Project 2000 documents issued by the U.K.C.C. on nurse education (U.K.C.C. 1986). The use of reflective techniques as a means to integrate theory and practice has been discussed at length within section 1.2.5.5. Here the continuing importance of reflection as a means to transfer learning and link theory with practice was discussed in light of Watson & Harris' (1999) study, investigating the support of students in clinical practice.

Comments made by interviewees within the researcher's study, suggest that this reflecting and linking is not taking place on any regular or structured basis amongst those studied. This is not to suggest that such reflection is not occurring elsewhere. May *et al* (1997) state that where there were regular, reflective opportunities for students, and where these were student-led, they were significant to students' learning, adding further credence to the findings of Watson & Harris (1999).

As previously discussed in section 1.2.3.3, a number of authors regard the theory-practice gap as a beneficial phenomenon, as it encourages students to question everything, rather than simply accept what they are told. It is seen as a useful learning experience for

students as it provides them with opportunities to develop problem-solving skills in terms of how to bridge the gap and apply theory to practice (McMahon 1994). May *et al* (1997) also comment that discrepancies between theoretical and practical knowledge should be exploited in a positive way for their educative potential. Cook (1991) supports this view, suggesting that conflicts between classroom teaching and the realities of practice are inevitable and that students should be prepared for dealing with these discrepancies. Rafferty *et al* (1996) take this even further by suggesting that the tension between theory and practice is healthy in order for change to occur and for learning to take place:

“Rather than decrying the theory/practice gap it might be more productive to consider it as a natural and positive sign that learning is taking place. Indeed it may well be that the disjunction between theory and practice is necessary for learning to take place at all; lose the tension and the impetus to learn is lost.”
(Rafferty *et al* 1996 p.689)

This positive view of the theory-practice gap was endorsed by the teachers who were interviewed within the researcher’s study. They regarded the theory-practice gap as useful in developing problem-solving skills in order to devise ways in which differences between theory and practice could be overcome.

2.6.3 Idealism versus realism

Findings of this study

One theme to emerge very early within the interviews was the perception that there are two versions of nursing. One version was seen to be an ‘idealistic’ view of nursing. Student nurses and preceptors interviewed felt nurse teachers taught an idealised version of nursing, which often did not fit in with the reality of practice encountered within a clinical setting. This idealised version of nursing was primarily taught within the classroom setting and related to the way in which principles underpinning practice were conveyed to students. This idealised way of teaching principles of clinical procedure was also seen to be taught within the clinical area, when nurse teachers came into the ward setting to teach students clinical skills and engage in direct patient care giving with the student.

Students and preceptors found this ideal way of performing clinical skills was often unrealistic within the ward situation, in that such ideal methods were time consuming and regarded as unnecessary. A good example of this, given by a number of students, was in relation to bedbathing. Students would be taught the correct, ideal way of performing this procedure within the classroom and might be expected to practise this ideal bedbath with a nurse teacher and patient whilst on clinical practice. Students questioned how important it really was, whether the arm nearest or furthest away from themselves was washed first, when precisely the water should be changed, or disposable wash-cloths discarded.

Nurse teachers were also aware that there was a discrepancy between the ideal version that they taught and what was realistic within the ward environment and there was heated debate as to whether the teaching of this idealised version of nursing was appropriate. The nurse teachers were themselves divided on the topic. Some felt they needed to teach ideal procedures of nursing, so that students clearly understood the principles involved. Students would then know when they could digress from this, without compromising patient care, in order to practise within the confines of reality:

“We need to teach them the ideal way of doing things, so they know how to bend the rules safely.”
(Teacher interview. Interview No.7)

However, it was unclear how students would know this; whether then students would decide when the bending of rules was permissible, or whether this would be taught by the teacher. In general, teachers felt that this idealistic approach should continue to be taught within the classroom, even although clinical situations are not usually idealistic. A number of teachers were concerned that continued emphasis on teaching idealised versions of traditional nursing skills, resulted in students not being equipped with the skills they really need in order to cope effectively within clinical areas:

“...we’re sending these students out and we’re doing things like, now this is how you bath a patient, this is how you take your patient’s blood pressure, you know, this is how you put a patient on a commode...they need to know these skills, but compared to what else is out there, these are very minor skills. And we’re not teaching them enough technical skills, we’re teaching them what I feel are the old standby nursing skills... and I feel that part of the problem is that we don’t prepare them for the skills they need to

become part of the team out there, that there's so much going on that they have to keep saying well I can't do that."
Teacher interview. Interview No. 4)

These teachers and the students interviewed felt that classroom teaching needed to change in order to equip students with the technical skills they needed in order to function effectively within clinical practice, rather than continuing to focus on how to do the perfect bedbath.

Literature in support of findings

Literature which looks specifically at the idealism versus realism issue within nurse education is anecdotal and limited (Harrison 1993; Booth 1995). Although a nurse teacher interviewed as part of a large scale study funded by the English National Board for Nursing, Midwifery and Health Visiting (E.N.B.), supports the view that an idealised version of nursing should be taught to students, so that students know when it is appropriate and safe to digress from this:

"...quite often the clinical experts have developed their own safe methods...but it's only with the proper initial grounding in basic techniques that you can deviate." (Carlisle et al 1997, p.391)

This study investigated the clinical role of nurse teachers within a Project 2000 framework, using multiple data collection methods, including a modified Delphi survey, case study and telephone interviews. A random sample of nurse teachers was selected using the U.K.C.C. database. Other groups involved in the study, such as clinical nurses, health service managers, teacher education and link lecturers were purposively sampled from all institutions offering teacher preparation and Project 2000 courses in England in 1990-1991. It unclear how the samples were generated within the study, or what the numbers of participants taking part in each stage of the study were, as such it is difficult to establish the validity and reliability of the study's findings.

Wong (1979) in discussing the problems nursing students encounter in transferring classroom learning to the clinical environment, suggests they view this as a conflict between right and wrong. Students are taught the 'right' or ideal way of performing clinical skills within the classroom setting, but ultimately see the real way things are done

within clinical practice, which consequently, they regard as 'wrong'. This finding is different to the views expressed by the students interviewed within the researcher's study, where the nurse teacher was more likely to be regarded as wrong and of questionable credibility. According to Wong, the conflict between what the student perceives as right and wrong creates frustration and inflexibility in the student's ability to perform clinically. Wong emphasises the need to help students value and transfer principles in a flexible approach to clinical practice.

Spouse (1998) discusses the application of sociocultural theory to explain the way in which:

"...students abandon their formalized knowledge in order to deal with the messiness of the situation in hand." (Spouse 1998 p.260).

This article is based on an earlier study conducted by Spouse (1996) which has been reported previously in section 2.6.2. Spouse (1998) says that students need to find ways of dealing effectively with the realities of clinical practice facing them and that this may require deviation from the ideal. Spouse suggests the clinical preceptor is pivotal in helping the student connect the ideal with the real, by merging formal, ideal knowledge with the reality or 'messiness' of practice. As Cook (1991) and May *et al* (1997) state, students need to develop skills in the ability to connect the ideal with the real in a positive way. As already discussed, reflection is seen to be an important tool that can be utilised by nurse teachers and clinical preceptors in helping students achieve this.

2.6.4 Lack of time

Findings of this study

Preceptors are now primarily responsible for students' learning within the clinical area and the preceptors interviewed within this study were very committed to teaching students. Although they stated that patient care had to be their top priority, students came high on the list, as one preceptor stated:

"If you don't teach the students properly, then they are the ones who are teaching your patients and looking after your patients, if they're learning not to practise properly, then it's going to reflect on patients." (Preceptor interview. Interview No. 14)

Preceptors have an important role to play in helping students integrate theory and practice. All those interviewed felt there was a lack of time to facilitate this integration. Whilst preceptors and students expressed this view most strongly, their concerns were echoed to a lesser degree by the nurse teachers.

There were several dimensions to the way in which lack of time was seen to contribute to the theory-practice gap. Placements were too short for students to have adequate time to engage in learning, as students need time to orientate themselves to new clinical areas. They would just be beginning to feel sufficiently comfortable and confident to practise and extend their skills and knowledge, when they would have to move on:

"We need longer placements on the wards. Now it's two weeks here, three weeks there, you just don't have the time to get settled in, before you're on the move again."
(2nd year student interview. Interview No.3)

Preceptors also spoke of the difficulty in trying to build up an effective teaching-learning relationship with students in such a limited time period:

"They are just not learning the skills, they don't have enough time to develop a relationship with their preceptor.... how do you build up a relationship in two weeks? You have probably seen them about five times or something...you're not developing this wonderful relationship or whatever you are supposed to do."
(Preceptor interview. Interview No.18)

Without exception, students and preceptors felt that the period of time allocated to each placement was too short and that this was a barrier to learning. Nurse teachers also expressed concern over this problem, although it was questioned whether students would actually learn more if they had longer placements and what the optimum length of placement should be. When students and preceptors were asked how long they felt placements should be: between four and six weeks was the most common answer:

"I think that the first week or two is spent getting yourself to a level with student, you get to know that person reasonably well and know what they can or cannot do. I think that a month or the next two weeks after that could be used hopefully in learning the things that they need to learn while they're here." (Preceptor interview. Interview 18)

In addition to short placements, the preceptors' workload was often seen to compound the problem. Clinical areas tend to be extremely busy and patient care has to be the preceptors' first priority. As a result, preceptors who were interviewed said they often did not have the time to be able to teach students and found this frustrating. They expressed feelings of guilt at not being able to give students sufficient time, due to other responsibilities:

"...sometimes you are so busy,... A few weeks ago we had six new students and the two of us were working each with three new students. I really enjoyed working with the new students but you just feel that how much can you give them? You've got to give your patients as much as well, you've got other people wanting your attention too. I just feel so divided all the time."
(Preceptor interview. Interview No. 19)

In addition, whilst the majority of preceptors who were interviewed stated they only officially preceptored one student at a time; this was not an accurate reflection of the situation. Shift patterns were problematic, in that interviewees said it was often difficult to put students and their preceptors on the same shifts. Preceptors and students reported it was not uncommon for there to be only one or two trained members of staff on a shift, with several students to preceptor - a finding highlighted in the quote above.

Literature in support of findings

The issues surrounding the time available for trained staff to act as preceptors is well-documented within nursing literature. Because there is a great deal of research evidence to support this theme, this section has been further subdivided into areas which examine various aspects of this phenomenon.

2.6.4.1 Need for protected time

Coates & Gormley (1997) adopted a case study approach to investigate the views of preceptorship in one college of nursing following the introduction of Project 2000. They state that qualitative and quantitative approaches were combined within the study, using interviews and questionnaires to discover opinions about preceptorship held by nursing students, ward managers, senior ward managers and nurse teachers. This article only reports the findings of the first quantitative stage of the study, in which a questionnaire

was distributed to a total of 150 preceptors to gain their views of their clinical teaching role. The authors state that full psychometric testing of the questionnaire was not undertaken, identifying this as a limitation of the study. The fact that only a small convenience sample was used may also have introduced bias into the study, plus the fact that only sixty-two of the preceptors returned the questionnaires, representing a response rate of only 41%. However, Coates & Gormley make a number of interesting findings which are supported by the work of other authors such as Watson & Harris (1999).

Acting as a role model was seen to be the most important aspect of the preceptor's role within Coates & Gormley's study. The preceptors were asked to identify factors which hindered them from being good preceptors. A lack of time was the most frequent response, followed by workloads and off duty. The difficulties experienced in ensuring that preceptors' and students' duty rotas coincide was also highlighted. Staff shortages and being in charge of the ward were also listed. When staff were asked what additional resources (if any) they felt were necessary to work as preceptors, the most frequent response was the need for 'protected time' to be allocated for students and preceptors to be able to work together. A finding which has since been reiterated in the work of Watson & Harris (1999) who recommend that service providers should allow dedicated time for preceptors to engage in their support role with students.

Yonge *et al* (1995) also cite problems of time management within the preceptorship role, whilst MacCormick (1995) says:

"Today's rapidly changing healthcare service makes it less likely that qualified nurses now have adequate time to accept extra responsibilities for teaching...With fewer resources and pressures from all sides to do more with less, adding greater responsibility for the teaching, supervision and assessing of students seems unrealistic." (MacCormick 1995 p.39.)

The problems surrounding the availability of time, or rather the lack of it, to engage in teaching and supporting roles do not seem to have resolved themselves. Aston *et al* (2000) note that there continues to be little time for preceptors to supervise and teach students due to competing demands on their time and increasing workloads. The unrealistic workload experienced by preceptors and the effect this has on the time available to teach students is a theme reiterated in a number of other studies.

2.6.4.2 Workload

Forrest *et al* (1996) conducted a qualitative study in order to investigate the present and ideal role of the nurse teacher in the clinical setting. In the first stage of the study, semi-structured interviews with twelve nurse teachers and twelve charge nurses were carried out, whilst stage two involved focus group discussion interviews with thirteen staff nurses and thirty student nurses. The main finding of the study was a lack of clarity with regard to the clinical role of nurse lecturers. They also discovered that understaffing and an increasingly demanding workload resulted in trained staff experiencing difficulty in providing adequate supervision of students. It is difficult to establish the credibility of this study, as there is no discussion of issues of validity and reliability, and the explanation of the analytical processes adopted, is vague. However, the findings appear to support those of the researcher's study, in that preceptors feel that competing demands are made upon their time, therefore they cannot engage in the degree of teaching and supervision they would wish.

May *et al* (1997) also report that increasing service demands and the need to provide patient care, conflict with preceptors' ability to support students' learning. They also discuss the 'trading off' engaged in by students in providing labour in the short-term, in order to gain acceptance and learning experience in the long-term. The aims and methodologies of this study have already been discussed in section 1.2.3.3.

2.6.4.3 Shift patterns

Shift patterns have been problematic for a number of years. Laurent (1988) reported:

"...often with ward sisters battling to cover wards with the right skills mix, students can find themselves on opposite shifts from their mentors." (Laurent 1998 p.30)

The situation did not appear to improve a great deal in the years following publication of this article, as a qualitative investigation into sixteen third year student nurses' experiences of preceptorship conducted by Cahill (1996) demonstrated:

"A major source of dissatisfaction amongst the students was the lack of contact with their mentors; working opposite shifts was a

commonly mentioned occurrence, with only occasional and perceived accidental coincidence of shifts.” (Cahill 1996 p.795)

Even more recently, shift patterns continue to be problematic and regarded as a barrier to students' learning, with Watson & Harris (1999) recommending that not less than 50% of the preceptor's and student's on-duty time should coincide.

2.6.4.4 Length of clinical placement

Richards (1993) and White *et al* (1994) both report on the problems of short placements. The White *et al* study was commissioned by the E.N.B., to investigate the relationship between teaching, support, supervision and role modelling in clinical areas within Project 2000 courses.

This was a large-scale study, conducted on six sites, employing several methods of data collection. These included semi-structured interviews with students, clinical staff and nurse teachers, and case studies within each of the six centres. Watson & Harris (1999) comment that the focus of the White *et al* study is somewhat narrow with children's and learning disability nursing, midwifery and specialist practice courses being excluded from the study. However, the findings of the White *et al* study are wide-ranging, and in relation to the theory-practice gap, difficulties in linking theory to practice were seen to be exacerbated by the short duration of placements. This finding was reiterated in the later study by May *et al* (1997), although May *et al* state that the nature and purpose of the placement influenced whether or not a placement was seen to be long enough or not. In the early stages of a course, where students were simply observing, two to four weeks was seen to be sufficiently long enough for this. Eight to ten weeks were optimal where students were engaging in the development of skills and where practice was to be assessed. May *et al* also comment that where students undertook a series of short placements, this was associated with:

*“...high levels of student stress and superficial learning.”
(May et al 1997 p.266).*

However, there were benefits to short placements in that they resulted in communication and assertiveness skills developing rapidly.

In the study carried out by Hislop *et al* (1996), discussed in section 2.6.1, students stated they felt that only on extended placements had they the time to be sufficiently involved in practical work to be able to link theory and practice. Unfortunately, the authors do not state how long an extended placement could be. Jowett *et al* (1994), discovered that students would prefer ten week placements. This is somewhat longer than the four to six week period seen to be the optimal length of clinical placement by the students and preceptors interviewed within the researcher's study. Watson & Harris (1999) have recently suggested that five weeks is a significant length of time for learning to occur and that placements should be no shorter than this. As already discussed, May *et al* (1997) suggest that the nature of the placement should be an important determinant of its length.

Recent reports into nurse education provision have also recognised the detrimental effects of short placements (Department of Health 1999a; U.K.C.C. 1999) and have advocated the implementation of longer placements within nursing curricula.

2.6.4.5 Relationship building

Phillips *et al* (1996) conducted a study, commissioned by the Department of Health, investigating the effect of the introduction of preceptors into pre-registration nurse education across Wales. Interviews and questionnaires were used to investigate the views of preceptors, students and lecturers of the preceptorship role. Within this study, the difficulty of building effective teaching-learning relationships with students in such limited periods of time as a result of short placements is emphasised:

“...the short duration of placements was felt to restrict the potential for development of a long-term, supportive relationship, characteristic of mentorship between the student and the clinically based practitioner-teacher.” (Phillips et al 1996 p.1085)

This finding is similar to the view expressed by preceptors interviewed within the researcher's study, in which preceptors referred to the inability to build effective relationships within such short time constraints.

As can be seen from the preceding discussion, there is a great deal of research support for the findings of the researcher's study. Issues relating to the shortness of clinical

placements, shift patterns, workload and the general lack of time for preceptors to engage in teaching and learning processes are common themes within a number of other studies.

2.6.5 Sequencing

Findings of this study

The nurse teachers and students interviewed by the researcher within the study saw the sequencing of theory and practice as problematic. Students said that sometimes they were not taught the theory relevant to a particular placement, prior to their allocation in that area. Examples of where clinical experience preceded theoretical input included theoretical aspects relevant to a surgical placement, such as care of the pre- and post-operative patient, aseptic technique and wound care; and the theory underpinning a placement in maternity:

“It never made sense to go to a surgical placement first, if we hadn’t done anything behind surgical procedures. And especially, we went to a surgical specialty, we all went to gynae, whereas we should have gone to a general surgical ward, if anything at all.”
(3rd year student interview. Interview No. 15)

Students felt very strongly that a lack of taught theory relevant to a clinical area compromised their ability to care for patients:

“You might not be doing the best thing for the patient if you don’t know why...You might be getting them to lie flat, when they should be sitting up, like respiratory patients. You don’t know why you’re doing things...that could be dangerous for the patient.”
(3rd year student interview. Interview No.17)

On the other hand, the theory may have been taught some time previously before students went to the relevant clinical placement, in which case the students felt they had forgotten a large part of the theory they had been taught in the classroom:

“...it’s the timing of it being taught, because sometimes it’s going to be so long before we’re in, say a surgical ward or whatever, whereas you know you’ve maybe only got a few weeks between mental health and actually starting the mental health placement but if you’ve got surgical lectures or medical things, then the gap is

longer, so you're maybe more likely to forget some of what you've learned."

(2nd year student interview. Interview No.3)

Nurse teachers, were also concerned about the effect of poor sequencing on student learning, but were unsure what could be done to remedy the situation:

"I think you can narrow the gap... and I think we were probably slightly nearer to narrowing it with the old modular scheme, in that they had their theory immediately followed by the relevant practice. And they didn't have to hold things in their head too long. Whereas now... some kind of surgical care, now these students may not go to a surgical ward for you know, three, four months, sometimes."

(Teacher interview. Interview No.8)

Part of the difficulty stems from the large numbers of students requiring clinical placements in a limited number of areas which are restricted to the number of students they can take at any one time. This is especially problematic in specialist areas such as maternity and paediatrics, where there are only a small number of areas available. Preceptors seemed less aware of the problem with sequencing, although some referred to it in the context of their experiences as students.

Findings in support of study

In support of this study, an investigation carried out by Bendall (1976), demonstrated that having theoretical instruction juxtaposed to clinical experience improved students' examination performance. Twenty years later, Davies *et al* (1996) confirmed the effect sequencing has on student learning. Students and teachers within the study reported difficulties in linking the theoretical content of the course to clinical experience, when theoretical input followed practical experience. This article reports selected aspects of the White *et al* (1994) study, commissioned by the E.N.B. reported in section 2.6.4.4.

Students interviewed in Hislop *et al's* (1996) study, also felt that theory and practice needed to be better phased:

"A dominant theme in their comments is that learning only took place when theory and practice were closely related in time - they

talked persistently about the need to phase theory and practice more satisfactorily.” (Hislop et al 1996 p. 176).

Wong (1979) also emphasises the need for the appropriate sequencing of theory and practice in order to promote the transfer of learning and suggests that theory needs to be learned before it is applied to practice. Ferguson & Jinks (1994) say that the introduction in the 1970s of modular schemes of nurse education, which organised courses into modules of theoretical teaching and related clinical practice, were an attempt to integrate theory and practice. Project 2000 courses have also attempted to maintain the close time link between theoretical input and related clinical practice. However, the theory-practice gap remains, although authors such as Jinks (1991), Ferguson & Jinks (1994), Rafferty *et al* (1996) and May & Veitch (1998) all reiterate the need to sequence theory and practice appropriately.

Veitch *et al* (1997) reporting on the same N.B.S. commissioned study as May *et al* (1997), discussed in section 1.2.3.3, comment that the re-organisations of health care which have occurred over recent years, have resulted in the re-designation and closure of ward areas. This has resulted, not only in an increased workload for clinical staff, but also a reduction in placements available for students. Veitch *et al* (1997) say that finding placement areas in child, mental health, mental handicap, care of the elderly and maternity are particularly problematic, a view endorsed by those interviewed within the researcher’s study. Where clinical placements are in short supply, it is extremely difficult to ensure that all students receive appropriate clinical experience, following theoretical input.

2.6.6 Lack of communication between clinical areas and educational institutions

Findings of this study

A theme which emerged very strongly was the perceived lack of communication, relationship building and information exchange between the educational institutions and clinical areas. All the groups commented upon this, but had different interpretations as to how they viewed this problem and its causes.

Preceptors felt they had very little information about particular courses students were undertaking, the stage of training students had reached and what students had been taught in college:

“...there’s nothing specific and I think that’s always the case there’s always been a lack of communication, and that’s maybe our fault as well you know, the responsibility is left up to the individual ward on how much they want to teach the student.”

(Preceptor interview. Interview No. 5)

An issue of particular concern, was the clinical assessment books preceptors were expected to complete for each student. Different assessment books were used for the undergraduate and diploma nursing students, as they undertake different courses in separate institutions. Both types of assessment books appeared problematic. The books were seen to be confusing and difficult to fill in, preceptors said they often had to rely on students to tell them how to complete them, although this was becoming easier with experience:

“They’re a nightmare (the assessment booklets) if you don’t have the guidelines to help you through it, even the students can’t always interpret what they’re being asked.”

(Preceptor interview. Interview No. 19)

Staff who had recently completed their own training, felt they had a better idea of courses and assessments, but still did not feel particularly confident, because course structures had changed. Staff who had been qualified some time, felt out of their depth in terms of understanding the new nurse education programmes. The differences between undergraduate and diploma students’ needs were particularly hard to grasp.

Preceptors stated they had learned about courses primarily from their contact with students. They also felt unsure as to what could be expected of students in terms of the knowledge and more importantly for them, the clinical skills students possessed. Their starting point had to be the student, in terms of finding out what he/she knew, his/her stage of training and learning needs:

“You’ve got to ask them (the students), what they know, and it’s difficult to know exactly what they’ve been taught. You have got to be

able to have a certain trust in that student and use your own common sense a lot of the time, especially if you (the preceptor) haven't gone through the degree course or foundation course."
(Preceptor interview. Interview No. 19)

Preceptors had little knowledge of the theory students had received prior to their placements and could not discuss this in any depth. All they could say was that students' knowledge either appeared to be satisfactory, or more commonly, was very limited or non-existent. This did not appear to be a particular problem for preceptors as they said their starting point was always the student, identifying what the student did or did not know and developing a learning plan or contract based upon this.

Interviews with students support those of the preceptors, with students commenting that clinical staff in most cases seemed to have little information about the course they were undertaking, or what theory they had been taught previously. It was also not uncommon for the lack of communication to result in clinical areas being unaware of when students were to be placed with them, with students turning up unexpectedly to begin a placement. This was stressful for students and frustrating for staff. However, one interview with students from a group in their branch programme, which was composed of only a small number of students, indicated a high level of satisfaction with the organisation of their course, the integration of theory and practice and the liaison between clinical areas and the institution.

Conversely, the teachers who were interviewed had little knowledge of what students learned whilst on placement, but tended to make assumptions about this. Feedback from clinical areas was primarily in the form of students' assessments of clinical performance and by discussion with students, although this did not seem to take place on any structured basis. Part of this lack of communication was seen, in part, to stem from the removal of the clinical teacher from clinical areas. In the past, this role acted as a means of liaison between a clinical area and the educational institution, as well as a way of integrating classroom and clinical teaching. Now this role has been replaced with that of the clinical link teacher, preceptors and students felt this liaison had been lost in many cases. The students were the ones who tried to keep channels of communication open between the educational institution and clinical area and regarded themselves as the 'piggy in the middle' when communication broke down.

Literature in support of study

A number of published studies have highlighted the lack of communication that occurs between clinical areas and educational institutions. Alexander's classic study found that a third of qualified staff felt there was no communication between themselves and nurse tutors from Colleges of Nursing (Alexander 1983). In a study commissioned by the E.N.B, Balogh & Beattie (1991) described the characteristics of a high standard school of nursing. They state:

"Consonance of theory with practice was regarded as essential, which means that tuition should be planned to inform and enhance clinical learning experiences. Close links with service colleagues and in-service education were seen as essential in achieving this."
(Balogh & Beattie 1991 p.47).

Crotty (1993) supports this, saying that liaison between educationalists and clinical staff is important in providing information and support to clinical staff, whilst Forrest *et al* (1996) emphasise the need for joint working relationships between educational institutions and practice areas. Darbyshire (1991) concluded:

"...nurse education is dialogue between teachers, students and practitioners." (Darbyshire 1991 p.57)

Yonge *et al* (1995) used a combination of qualitative and quantitative data to investigate the perceived rewards by preceptors of the preceptor role. Within their survey 22.9% (68) of 297 preceptors said they felt they had not received sufficient support in their preceptorship role. They cited a lack of interaction with nurse educators, together with problems of time management, to be the main causes of this perceived lack of support. Whether a preceptor perceived support as being adequate or not, depended on the nurse teacher providing guidance, teaching, orientation and being available to support preceptors.

May *et al* (1997) state that information sharing and liaising between nurse educators and preceptors is crucial, particularly in relation to the development of new courses and the roles and processes associated with these. Watson & Harris (1999) recommend that education and service providers should strengthen activities which promote

communication. One of the key themes within the *Fitness for Practice* document (U.K.C.C. 1999) is the need for service and education providers to work in partnership and collaboration to break down traditional barriers between education and practice and to assume joint responsibility in ensuring that students are adequately supported to acquire the skills necessary at the point of registration. This requires joint working and communication at all levels, from strategic to operational, between the service and education sectors. The results of this study suggest that such communication and collaboration may not be commonplace.

2.6.7 The link teacher role

Findings of this study

With the introduction of Project 2000, it was proposed that nurse teachers should have contact with a clinical area in order to maintain their clinical skills and credibility. It was also seen as a way in which communication and collaboration between clinical areas and educational institutions and the integration of theory and practice could be promoted. This became known as link teaching.

Within this study, the majority of preceptors and students regarded the link teacher role almost as a joke. When asked when they had last seen a link teacher a common response was “what’s one of those?” In one area it was seen to work extremely well, with regular contact with the link teacher. Elsewhere, preceptors and students said they rarely saw a link teacher, with only one or two interviewees saying they were occasionally visited:

*“I mean there was no-one came out....on our first ward we were shown round, we were left on our ward and that was it. Nobody came to see us again. I thought first placement, I’m out here, I don’t have a clue, will somebody come and see me?
(1st year student interview. Interview No. 9)*

*“...some of our class are feeling as if they’ve been abandoned because nobody has been to see them....Like I’ve been out for six weeks now, and nobody has been out to see me. What am I doing wrong? Am I supposed to phone and say hi I’m out on medical, do you want to come and see me, just to see if I’m doing things right?”
(1st year student interview. Interview No. 9)*

The students, who had been visited by a link teacher felt that this was useful in terms of discussing problems, concerns and their progress. However, negative views were expressed of teachers engaging in teaching practical skills via patient care. Teachers would come and work with a student, spending a great deal of time providing care for one patient and teaching the student. Both students and clinical staff saw this as totally unrealistic, inappropriate and frustrating. As one student explained:

“I was on surgical and we had one patient who I was to look after with my teacher. We spent hours doing everything for him, full bedbath, mouthcare, wound dressing - the lot. If I'd been that patient, I would have been hitting us!”

(2nd year student interview. Interview No. 2)

The preceptors who were interviewed, generally did not regard teachers as clinically credible, but did not see this as a particularly important issue. They felt themselves best equipped to teach clinical skills, as they had current practical experience, thus ‘hands on’ teaching by the teacher was seen as inappropriate and unnecessary. They wanted teachers to provide information about the course students were on, the stages of training and problems with particular students. They also felt they needed support from link teachers to carry out their preceptorship role:

“Unless you've got somebody you know you can actually go to and say look I can't trust this student, they're not doing whatever. I just feel that can only be a link person, who comes in....and. sees how well the students were doing, and speaks to the students as well. Because they may be having a hard time. I mean the students may not enjoy the ward because they're not getting all their preceptor's

attention and they need to be able to talk to somebody about that.”

(Preceptor interview. Interview No.5)

Teachers spoke of the lack of clarity of their clinical role. The issue as to whether teachers should perform ‘hands on’ skills with students, or act as advisors and facilitators was hotly debated in some interviews, supporting the ongoing debate within the nursing press. They also spoke of the difficulty in maintaining a link role due to pressures of workload, and feelings of inadequacy and de-skilling when they did venture into the clinical area:

“I don’t do practical. I tried it once or twice, but felt so inadequate so de-skilled and to tell you the truth so threatened from a professional point of view, that I thought no.”
(Teacher interview. Interview No. 7)

Teachers appeared to be in a no-win situation. In general, students and preceptors did not regard teachers as clinically credible, but they were unwilling for teachers to be involved in teaching practical skills and patient care which would enable them to develop this. They were regarded as a liability by clinical staff:

“What you’d be doing is giving us more workload if you’re bringing teachers out to work on the wards. I mean, that’s fine, but who is going to then support the teachers working on the wards? You would have to work with somebody you’d have to have a preceptor of some sort because you couldn’t just come onto the ward. So who then is going to take on that role when you’re on the wards?”
(Preceptor interview. Interview No.6)

The views expressed by the majority of teachers, students and preceptors was, that link teachers should not engage in direct patient care with students, but should develop a facilitative role, supporting students and preceptors in their learning and teaching roles.

Literature in support of study

A wealth of nursing literature exists debating the link teacher role. Two opposing views are apparent. Some authors argue that link teachers should be involved in ‘hands on’ teaching of practical skills and patient care, whilst others suggest the role should be supportive and facilitative in nature. Webster (1990) suggested there was a need for teachers to regain practical skills and be involved in the teaching of students within clinical areas in order to be seen as clinically credible and to keep abreast of current practice. This view was reinforced by documents published at that time in relation to the future of nursing. *A Strategy For Nursing* (Department of Health 1989) stated the need for nurse teachers to be clinically credible in the area of practice they teach. *The Future of Professional Practice* (U.K.C.C.1994) underlined this, stating educators must be clinically credible and knowledgeable about current practice. Most recently the *Fitness for Practice* document yet again cites the need for nurse teachers to maintain clinical credibility (U.K.C.C. 1999). A number of authors argue this is unrealistic, in view of the extra academic and administrative roles teachers have had to take on board as a result of

Project 2000 and the move of nurse education into the higher education sector, (Luker *et al* 1995; Carlisle *et al* 1997). It is too much to expect teachers to be experts both in the classroom and clinical area:

“It may be that too much is being asked of one professional group to meet targets for achievement both in the academic domain with teaching and research priorities, and in the clinical area where advances in treatment pose challenges even for those practitioners in full-time practice.” (Carlisle et al 1997 p.387)

The Carlisle *et al* study which has previously been discussed in section 2.6.3, reports a similar finding in that there were seen to be a number of barriers preventing teachers from engaging in a ‘hands on’ role:

“Teachers who did attempt to incorporate care delivery within their link area met a great deal of resistance, not only from education managers but also from their nurse teacher colleagues and the ward staff. They believed that their peers felt threatened by their attempts to remain clinically credible, and the ward staff felt they had come to ‘spy’ on them. Service managers were also less than welcoming at attempts by nurse teachers to practice.” (Carlisle et al 1997 p.389)

Day *et al* (1998) in a study commissioned by the E.N.B. explored the role of the teacher/lecturer in practice. A three-phase study was undertaken. In the first phase, a national survey of educational and service managers was conducted, in order to collect data about lecturers in practice. In the second phase, a case study design was used to collect data from lecturers, practitioners and students in five institutions and in the third and final phase further information was collected from Heads of School. The sampling techniques for each phase of this study are complex, but a representative sample appears to have been selected for inclusion within the study in order to give an accurate representation of the role of the lecturer in practice in England. In addition, both the strengths and weaknesses of the study are discussed in some detail and attempts have been made to maximise the validity and reliability of the study’s findings. As with other studies funded by the four National Boards, the findings of this study are both wide-ranging and complex, examining in depth the different ways in which practice roles have developed for nurse lecturers and how these are viewed by students, clinical staff and the lecturers themselves. In relation to lecturers in practice, Day *et al*, in agreement with

other authors, state that lecturers are often not welcomed within the clinical arena as they are regarded as inspectors.

Infante (1986) and Osborne (1991), propose that teachers should have a more facilitative and supportive role of both students and clinical staff, whilst other authors have argued that using teachers to teach practical skills is an unnecessary doubling up of staff and resources, (Acton *et al* 1992).

Forrest *et al's* (1996) work, supports the notion of inconsistencies in the amount of link teacher support received by students:

“...trained and student nurses said that the service was ‘patchy’ and ‘inconsistent’ and, to some extent, depended on the ‘luck of the draw’. For example, some students reported receiving only one visit from a nurse teacher during their whole 3-year programme, whilst others reported weekly contact in some areas and none in others.”
(Forrest *et al* 1996 p.1259).

Lee (1996), following a review of the literature debating the link teacher role, suggests that teachers perceive themselves to be lacking in clinical credibility, a view similar to the finding of the researcher's study. In the Forrest *et al* (1996) study, it is suggested that students have different views to teachers in terms of what constitutes clinical credibility. For students in Forrest *et al's* study, credibility was determined by their perception of the teacher's attitude, ability to relate to students and share past experiences, rather than on their actual clinical teaching. Students felt they could judge a teacher's clinical credibility on the basis of classroom contact. Forrest *et al* list a number of studies suggesting that interpersonal effectiveness is the most important characteristic rated by students. The link teacher appears to play an important role in promoting collaborative relationships. This seems to be of more importance to both preceptors and students than ability to teach clinical skills.

Humphreys *et al* (2000) in another article debating the clinical role of nurse teachers, suggest that clinical credibility may not involve a 'hands on' or direct care giving role by nurse teachers. Rather, nurse teachers' expertise in practice is in teaching and facilitating. They say that what is important, is for the nurse teacher to be up to date with current research and practice issues, this is what gives them credibility.

2.6.8 Views of how the theory-practice gap could be closed

Findings of this study

All interviewees within the study were asked for suggestions as to how the theory-practice gap could be lessened. Four main ideas became apparent as the interviews progressed, each of these is discussed below.

2.6.8.1 Theoretical elements to be taught by preceptors

Within one of the early interviews, conducted with a group of students, it was suggested that preceptors could be invited into the college to teach students the theory relevant to their clinical area. This idea was explored more fully in subsequent interviews, with interviewees being asked their views on this. Students thought it was an excellent idea. Preceptors, in general also agreed it was a good idea:

“...I think it would be a great idea. It would be very beneficial for students when it came to exam time to say they have actually had somebody come in to do theory on an area where they have actually worked you know? Yeah definitely, relating it to a ward area.”
(Preceptor interview. Interview No. 5)

However, they felt it would need to be somebody who had an aptitude for this type of teaching. Their main concern was the time that would be involved, on top of other commitments:

“...if you're saying come in and teach for us in the college, who will cover for us here?...You would also have to be very careful, not everyone can put things over very well... You would have to identify people that can teach and want to teach.”
(Preceptor interview. Interview No. 12)

Those teachers interviewed, felt it would be appropriate and expressed the opinion that they personally would be happy with this, but thought some of their colleagues might feel threatened by what could be regarded as a take-over of their role:

“How often do we stand teaching a subject, alright, that we've maybe never nursed ourselves. We've learned it from a textbook, we've taken a lecture from a textbook. Why don't we go out and

say to the likes of (clinical staff) look, we're doing acute renal failure, would you please come inyou give them the outcomes that students need to achieve. He can do that. Why don't we do that?...I do believe that one of the greatest things that stops us is the fact that we are so territorial...we're so threatened by anybody who's not a qualified teacher."
(Teacher interview. Interview No. 8)

In addition, it was felt that the theoretical aspects taught by preceptors would need to be closely related to the work of their clinical area and would need to concentrate on the particular knowledge and skills required within this. It was felt by preceptors and teachers, that it would be inappropriate for preceptors to be teaching topics such as theories and models of nursing and research skills.

2.6.8.2 Improved collaboration and communication

All groups emphasized the need for improved communication, information sharing and collaboration. When asked how this might be achieved, it was suggested link teachers could make regular, pre-arranged visits to a clinical area, so that preceptors knew when a teacher would be available to discuss problems, or see students, if this was felt necessary. It could also be used as a time for information sharing between the link teacher, representing the institution and clinical staff. Preceptors felt very strongly that they needed more information about course structures and students' needs at specific stages of their training. This was seen to be a facilitative role, with teachers only engaging in teaching practical skills if there was felt to be a need to do so by preceptors or students. The teachers who were interviewed, expressed concern with regard to the time needed on a regular basis to achieve this, nevertheless they felt there was a need to develop facilitative roles of this nature.

2.6.8.3 Improved sequencing of theory and practice

Better sequencing of theory and practice was an important issue for students, who felt that if they were taught the relevant theory prior to a clinical placement, then they would be more able to integrate that theory with practice. However, students said this theory would have to be up-to date and a reflection of what they would actually see whilst out on practice.

2.6.8.4 Longer clinical placements

Both preceptors and students felt that longer placements would facilitate a better integration of theory and practice. Preceptors thought they would have more opportunities to spend time with students, teaching them and providing support. Students agreed with this and felt it would give them more time to become settled into an area, develop relationships and be able to ask questions.

Literature in support of findings

There is a great deal of literature discussing various roles which have been introduced over the last forty years in attempts to achieve a better integration of theory and practice. These usually combine both teaching and clinical responsibilities, such as clinical teachers, joint appointments and lecturer-practitioner posts, all of which have had varying degrees of success and failure and are discussed in detail in sections 1.2.5.1 - 1.2.5.3. As also discussed within section 1.2.6, the notion of posts involving education and service responsibilities is not unique to the U.K., it is a policy that has also been adopted in countries such as the U.S.A., Australia and New Zealand.

Watson & Harris (1999) report that the Council of Deans and Heads of U.K. Faculties of Nursing, Midwifery and Health Visiting, recommend that a clinical career structure should be established and propose that Clinical Dean and Director of Clinical Practice posts should be developed in order to ensure that students are supported appropriately in practice, (Council of Deans and Heads of U.K. Faculties of Nursing, Midwifery and Health Visiting 1998). Watson & Harris suggest that there is scope to have lecturer-practitioner, practitioner-lecturer and practitioner-researcher posts within this framework. However, the emphasis within Watson & Harris' study seems to be on the practice arena. Within the researcher's study, the idea of preceptors teaching theory relating to their area of clinical practice, focused upon the academic institution setting, and the bringing of preceptors' experience of clinical practice into the classroom.

A recent N.B.S publication (N.B.S. 2000) reports an initiative at the Robert Gordon University, Aberdeen and local Trusts in Grampian. The University provides funding at the present time for five Trust staff to be seconded to the University for 25% of their time

as Practice Educators. The post holders are responsible for facilitating learning both within the University, or service setting, and are given the opportunity to gain a teaching qualification. This initiative is in support of post-registration and continuing professional development programmes, rather than pre-registration nursing, but it seems to be a similar idea to the views expressed within the researcher's study, in relation to clinical staff entering the academic setting in order to teach.

2.7 CONCLUSION

A number of themes emerged as a result of analysing the interviews, with commonly-held perceptions occurring across all groups of teachers, student nurses and preceptors. In particular, there was general agreement and strongly held views as to the causes of the theory-practice gap and what could be done to alleviate this. The themes discussed above are summarised in table 2.1 below.

Table 2.1
Summary of themes

THEME	MAIN POINTS
Definitions of theory	Principles and knowledge needed to understand the “why” of practice.
Definitions of practice	“Hands-on” involvement, interaction and communication with patients.
Existence of a theory-practice gap	Unanimously yes.
Idealism versus realism	Should students be taught the idealistic way of doing things so that they can then deviate from this safely, or should they be taught realistic skills to enable them to cope with the realities of working in clinical areas?
Lack of time to integrate theory and practice	This is due to the short duration of placements, problems of coinciding students’ and preceptors’ shifts, workload commitments of preceptors and limited time to teach students.
Sequencing of theory and practice	Students may not receive theory relevant to a clinical area prior to their placement there. Alternatively this may have been taught some time previously in which case students have difficulty remembering it.
Lack of communication between clinical areas and educational institutions	Preceptors do not know the stage of training students have reached, the skills they have, or the theory they have been taught. They lack information about course structures and assessment methods. Teachers lack feedback on what exactly students have learned within clinical areas.
Link teacher role	The link teacher role is non-existent in many clinical areas. The link teacher is perceived as a way in which communication and support of students and preceptors could be facilitated.
Ways to close the gap	<p>Longer placements.</p> <p>Better sequencing of theory and practice, students should receive appropriate theory immediately before a clinical placement.</p> <p>Improved collaboration and communication between clinical areas and educational institutions.</p> <p>Preceptors to teach within the college, the theory relevant to their clinical area.</p>

2.8 DISCUSSION

This first, qualitative stage of the study was unique in its approach of investigating the perceptions of three of the main groups involved in experiencing the theory-practice gap phenomenon within nursing. Whilst other studies have also incorporated the views of students, preceptors and nurse teachers within their research methodology, none of these studies have focused specifically on perceptions of the theory-practice gap. Recent studies that have concentrated on the theory-practice gap, have only elicited the views of one or other of these groups. For example, Hislop *et al* (1996) only examine students' views of theory and practice.

A number of the themes emerged clearly within the early stages of data analysis. The difficulty interviewees had in defining nursing theory, reflects the ongoing debate as to what is and is not nursing theory. There was agreement that it should be concerned with the principles and knowledge required to understand practice and that a number of different disciplines needed to be amalgamated in order to inform this practice. Practice was viewed as the hands-on nursing care of patients and required interaction and involvement with patients.

In the earlier stages of their course, students often could not see the relevance of some of the theoretical input to their education, particularly in disciplines such as the social sciences, ethics and professional issues. Students in the first year and to a lesser extent the second year, were more concerned with acquiring practical nursing skills which would enable them to survive in the clinical area. More senior students said they could begin to see how all the disparate parts came together and needed to be considered within nursing practice.

It could be argued that the theory-practice gap is simply a function of time, something students have to live with, until they have sufficient knowledge and experience to fit all the parts together. One of the central tenets underpinning Knowles (1960) theory of andragogy, is the need for students to see the relevance of what they are taught to the here and now. If students do not see the relevance of what they are taught, they are unable to learn and to apply that knowledge. Knowles' theory is often used as a framework to

underpin nursing curricula as it focuses on student-centred learning, a concept that is becoming increasingly popular within the field of nurse education.

There is perhaps a need to review the way in which the nursing curriculum is designed, so that those aspects seen as irrelevant by junior students come later within a programme of nurse education. Alternatively, there is a need to help students see the relevance of these subjects, to interrelate them for the student. It was suggested that students sometimes do possess the theory they require to practice, but are not always able to apply it in the clinical situation. Theory is inert and inaccessible as suggested by Hislop *et al* (1996). The development of experiential learning, problem-based learning and reflective skills is seen as a way to overcome this, but students need help to develop this ability. This is perhaps where the facilitative role of the link teacher could be used, with the student identifying clinical situations which the teacher can help the student to reflect on, relate to theoretical aspects of nursing and thus use as a learning tool. This would be of particular benefit to junior students in the earlier stages of their programme, who have difficulty pulling all the different areas of theory together to apply to practice. Preceptors must also have an important role to play in this integration and reflection. They are experts within their own clinical field, but they can only help the students reflect on their experiences within the clinical area and to relate theory to this, if they know what theory the students have actually been taught, or if they teach that theory themselves. The need for closer working relationships and information sharing between clinical areas and educational institutions is the means of helping to realise this. In addition, the theory students have been taught needs to be relevant to a clinical area to enable them to apply it. Preceptors teaching the theory relevant to their own clinical area prior to students placement there, may be a way of achieving this.

The theory taught by preceptors, needs to be directly related to the work of the preceptor's clinical area and the particular knowledge and skills required to practise there. This has resource implications in terms of time and finance, in addition to a reorganisation of teaching roles and responsibilities. It would be useful, therefore, to establish how effective this strategy would be at increasing students' knowledge and skill acquisition.

The issue of idealistic or realistic teaching generated a great deal of debate. Nurse teachers generally felt students needed to be taught the ideal way of nursing, so they would then know how they could digress safely from this. Students, however, found this frustrating and felt it diminished the teacher's credibility. Perhaps there is a need to make explicit to students that what is taught is idealistic, but that the principles can be applied to practice realistically and safely. Experiential learning, problem-based learning and reflection are techniques that can again be used in order to help students bridge the gap between the ideal of theory and the reality of practice. Alternatively, perhaps there needs to be less focus on the dichotomy between the ideal and the real and more concern with what is actually best practice according to research-based evidence.

Better sequencing of theory and practice placements was seen to be important in narrowing the theory-practice gap. It was suggested that students need to be taught the theory relevant to a clinical area, prior to their placement there. Time was another factor that was seen to have a major impact on students' learning. As discussed, there are several dimensions to this, including the effect of shift patterns and preceptors' workload. The length of clinical placements was also seen to be important. It has been suggested that longer placements would result in more learning on the part of the student and thus better integration of theory and practice, although it could be argued that they will simply have more time to pick up bad habits and compound bad practice by having more time to be socialised into the culture of the clinical area (Hislop *et al* 1996).

A number of striking similarities were found between the themes apparent with the researcher's investigations and articles appearing concurrently within the nursing press. The theory-practice gap seems to be a particular concern within the U.K. at the present time. A number of studies have been commissioned by the National Boards for Nursing Midwifery and Health Visiting, (e.g. May *et al* 1997; Day *et al* 1998; Watson & Harris 1999). These were commissioned to investigate areas such as the support of students within clinical areas, the changing role of the nurse teacher and to evaluate the implementation of Project 2000, rather than focusing specifically on the theory-practice gap. However, many of the issues highlighted are the same as those uncovered within the researcher's study, including the length of clinical placement, the lack of communication between educational institutions and clinical areas and the role of the link teacher. Further support is provided by recent reports and white papers which have recently appeared:

Working Together (Department of Health 1998), *Making a Difference* (Department of Health 1999b) and the U.K.C.C. response to this, *Fitness for Practice* (U.K.C.C. 1999), which proposes a radical review of nurse education provision.

A number of factors thought to influence the theory-practice gap within nurse education have been identified in this study and are supported by a review of current nursing literature. However, much of this published work, as with the researcher's own study, is based upon the opinions and views of individuals involved in the theory-practice gap. Whilst it can be said that such opinion is important and informed, there is a lack of actual evidence to prove that those factors commonly perceived to affect the theory-practice gap, in fact so do. This lack of evidence is partly due to the fact that it is very difficult to develop measuring tools which establish whether or not theory and practice are integrated and to demonstrate that theory and practice inform each other. Whilst studies such as those conducted by Alexander (1983) and McCaugherty (1992a) have used novel approaches to attempt a closer integration of theory and practice, the methods used to measure whether or not this was achieved, are questionable in terms of measuring degree of integration of theory and practice.

Within the researcher's study, interviewees were asked to identify ways in which the theory-practice gap could be reduced. Interviewees' responses to this question formed theme eight within the analysis – ways to close the gap. Within this theme, four main views were identified as follows:

- Preceptors teaching the theory relevant to their clinical area within the educational institution
- Improving collaboration and communication between clinical areas and educational institutions
- Improving the sequencing of theory and practice, with students receiving appropriate theory immediately before a clinical placement
- Longer clinical placements

Within the second, quantitative stage of the study, these four views are translated into four factors that can be subjected to empirical testing using a factorial experimental design. The aim is to investigate whether these four factors influence theoretical knowledge and practical skill acquisition in student nurses. The effect of these factors on levels of satisfaction expressed by students is also investigated.

As discussed, there are difficulties involved in clearly establishing that theory and practice are integrated. However, the effect of these four factors on theoretical knowledge, practical skill acquisition and satisfaction can be measured. It is hoped that the results of this second stage can be used to develop strategies which minimise the effect of adverse factors and maximise those seen to be beneficial to knowledge and skill acquisition in student nurses. It has been argued previously, that if factors which maximise knowledge and skill development can be identified, then strategies can be developed which enhance knowledge and skill development and subsequently this may go some way to closing the theory-practice gap.

CHAPTER THREE
STAGE 2 – QUANTITATIVE PHASE
**INVESTIGATION OF FACTORS PERCEIVED TO AFFECT THE THEORY-
PRACTICE GAP**

3.1 INTRODUCTION

This chapter reviews the quantitative phase of the study. Firstly, views expressed by those interviewed within the qualitative stage of the study in relation to how the theory-practice gap might be closed are reiterated and secondly, the process by which these were translated into four factors is described. The aim and objectives of the quantitative stage are then stated. This is followed by discussion of the design of the second stage, the measuring tools developed and the theoretical framework underpinning these. The population studied is identified, issues of validity and reliability and ethical considerations are also discussed. Methods of data analysis are explained and finally the conduct of the study is outlined.

Theme eight within the qualitative stage of the study identified interviewees' ideas as to how the theory-practice gap could be reduced. Four main views were forwarded as follows:

- Preceptors teaching the theory relevant to their clinical area within the educational institution
- Improving collaboration and communication between clinical areas and educational institutions
- Improving the sequencing of theory and practice, with students receiving appropriate theory immediately before a clinical placement
- Longer clinical placements

These views needed to be translated into four factors, which could be incorporated into a factorial experimental design to discover whether they affect theoretical knowledge, practical skill and satisfaction in student nurses. The four factors chosen for further investigation were selected because they were perceived by all the groups interviewed in the first qualitative stage of the study to have a significant impact on the theory-practice gap and were identified as ways in which the gap could be closed.

Preceptors coming into the academic institution and teaching theoretical elements relating to their clinical area of practice was a theme supported by all the groups interviewed. Views expressed by those participating in stage one of the study were that preceptors teaching theoretical elements relating to their area of work would be beneficial, with students in particular thinking that this was an excellent idea. However, there were concerns that the preceptors should have an aptitude for teaching and would need to be knowledgeable about their clinical speciality. Within stage two, the intention is to investigate whether there are any differences in the theoretical knowledge, practical skill and satisfaction demonstrated by students according to whether they have been taught theoretical elements relating to particular clinical specialities by a preceptor from that clinical area, or by a nurse teacher.

The need for improved communication and collaboration at all levels between educational institutions and clinical areas was a theme continually stressed within the interviews. In particular, preceptors felt they needed more information about the courses students were undertaking, the stage of training students had reached, what students could be expected to do whilst in the clinical area and how they were to be assessed. They also stated a need to know what the students had been taught before they came into the clinical area and what theoretical teaching they had received. Students also felt that preceptors needed to know these things, rather than the student having to explain what course they were on, their stage of training and the kind of clinical experience they needed. Students also felt there needed to be continuity between what they were taught in the classroom setting and what they experienced on clinical placement. Nurse teachers felt they needed information with regard to what skills students were able to practise, the experiences they encountered and how students had linked their classroom teaching to what they experienced whilst on clinical placement. There was also a need for improved

collaboration and communication in terms of nurse teachers supporting preceptors in their role as preceptors.

The perceived need for improved collaboration and communication is complex, encompassing a range of issues. For the purposes of this quantitative stage of the study, this issue needed to be translated into a factor that could be incorporated into a factorial experimental design. The factor needed to be under the control of the researcher and amenable to manipulation by the researcher. It is therefore proposed to look at the effect of collaboration in terms of comparing whether or not collaboration between a nurse teacher and preceptor on the content of what is to be taught to students in a classroom setting – in theory – affects their subsequent knowledge, skill and satisfaction levels. This links to the perceived need for continuity between what is taught in a classroom setting and what students experience on clinical placement. It is recognised that this only examines one particular aspect of the collaboration issue. It would also be of interest to examine other aspects highlighted by interviewees, for example, the effect of improving communication to clinical areas with regard to the type and stage of training students are undergoing. However, if the impact on knowledge and skill of collaboration between nurse teachers and preceptors, on taught content to students, can be assessed, this could provide useful information on which to build strategies promoting knowledge and skill acquisition.

The need to sequence theory and practice was also seen by interviewees to be important. A delay between theoretical input and subsequent related practice was regarded as detrimental. In particular, students felt they had forgotten much of the theoretical input if there was a delay in the time of going to the associated practice. Views expressed within the qualitative stage of the study suggested that students should have theoretical input immediately followed by relevant clinical experience. Students also expressed the view that to go to a clinical placement without any previous theoretical input was nonsensical. It is proposed to examine the effect on knowledge, skill and satisfaction of students receiving theoretical input and then either going straight to or delaying the related clinical experience. It was not possible to examine the effect of a complete lack of sequencing within the design of the study as all students would have received some theoretical input

prior to clinical placement. It would be interesting to investigate the effect of a complete lack of sequencing on knowledge, skill and satisfaction in another study.

The length of placement was also seen to be important, with students, preceptors and nurse teachers expressing the view that longer placements were necessary for students to be able to integrate theory and practice and to develop knowledge and skills. Preceptors thought they would be able to spend more time supporting and teaching students, whilst students felt they would have more time to become accustomed to the clinical environment and engage in learning. It is proposed to investigate whether longer placements result in greater knowledge skill and satisfaction by comparing a two-week with a four-week placement.

3.2 AIM OF QUANTITATIVE STAGE OF STUDY

To measure the effect of four factors previously identified by interviewees, on student nurses' acquisition of theoretical knowledge, practical skill and reported levels of satisfaction and to use this information to identify strategies which maximise the development of these.

3.3 OBJECTIVES OF QUANTITATIVE STAGE OF STUDY

- To establish the effect of four factors, previously identified in the qualitative stage of this study, on theoretical knowledge and practical skill acquisition in first year undergraduate student nurses.
- To establish whether the way in which these four factors are varied has any effect on reported levels of satisfaction with theoretical teaching and clinical placement by the first year student nurses.
- To use the information gained from the above to develop strategies which promote theoretical knowledge and practical skill.

3.4 METHODOLOGY

3.4.1 Design of study

The aim of this stage of the study was to provide empirical evidence of the effect of four previously identified factors on theoretical knowledge, practical skill and satisfaction in student nurses. For the purposes of this study, theoretical knowledge is assumed to equate with 'know that' knowledge, whilst practical skill is assumed to equate with 'know how' knowledge. Different ways of knowing within nursing have previously been discussed in section 1.2.3.1. The aim of the investigation here, is to identify whether any of the four factors identified as ways in which the theory-practice gap may be closed, influence students' acquisition of 'know that' and 'know how' knowledge. It was argued in section 1.2.3.1 that 'know how' knowledge is actually more complex than simply being able physically to perform practical skills as it is more than mere manual dexterity. The ability to apply previous experience and judgement to a situation is also a part of practical skill. However, first year student nurses who comprise the sample for this study will not have had the opportunity to develop such expertise, as the experiment begins with their first clinical placement. Therefore for the purposes of this study, 'know how' knowledge, in terms of students' ability to perform manually specific practical skills only, is examined.

In order to achieve this, an experiment was conducted. Experiments are a means of studying specific phenomena by manipulating what happens to them under controlled conditions and discovering the way in which they behave and relate to each other. They are a means of determining cause-and-effect relationships, because the researcher can control and vary an independent variable, administer an experimental treatment and observe its effect on a dependent variable (Polit *et al* 2001). An independent variable is a variable that is thought to cause or influence the dependent variable. In experimental research the independent variable is the variable that is manipulated by the researcher in order to determine its effect on the dependent variable (Polit *et al* 2001). Experimental research is regarded as an extremely powerful quantitative method of conducting research because of this ability to control rigorously variables (Carter 1991). True experimental designs should be able to demonstrate manipulation of the independent variable being

studied, control over the experimental situation (usually by the use of a control group in addition to the experimental group) and randomisation of subjects to different groups within the study (Polit *et al* 2001).

Various experimental designs can be employed. Post-test-only designs involve random allocation of subjects to two groups and the collection of data following some type of intervention. Pre- and post-test designs are similar, except that data are collected prior to, as well as following an intervention. Pre- and post-test designs are most commonly used in randomised controlled clinical trials (Polit *et al* 2001). Crossover designs involve subjecting the same subjects to more than one treatment (Polit *et al* 2001).

Factorial experimental designs allow a researcher to manipulate more than one variable at the same time. This type of design is useful where a researcher, not only wishes to study the effect of one independent variable (referred to as the main effect), but also wishes to investigate the way in which two or more variables interact with each other (referred to as the interaction effects) (Polit *et al* 2001). In a factorial design, independent variables are referred to as factors. A factorial design was the most appropriate design to utilise within this study, as the researcher wanted to study the effect of four different factors and the way in which these interact with each other. The aim was to try and establish which combination of the four factors best promoted the development of knowledge, skill and satisfaction. A factorial design, which would allow the researcher to study the interaction effects between the four factors, was therefore a relevant method to adopt.

All of the factors previously identified are amenable to experimental testing. The researcher can manipulate them in order to assess their effect on theoretical knowledge, practical skill and satisfaction of a group of undergraduate nurses. In summary, the dependent variables within the experiment were theoretical knowledge, practical skill and satisfaction. The independent variables, or factors, were who taught the students, whether collaboration took place on the content of what was taught to students, the sequencing of theory and practice and the length of clinical placement.

In a factorial design, each factor has two or more levels. Within this study the factors and levels were as follows:

- **X1 Teacher** – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher
- **X2 Collaboration** – students are taught theoretical elements relating to a clinical speciality upon which the preceptor and nurse teacher have or have not collaborated
- **X3 Sequencing of theory and practice** – students go straight to the relevant clinical speciality following theoretical input, or after a delay
- **X4 Length of clinical placement** – students complete a two- or four-week placement.

It was only realistic to study one year of students for a number of reasons. Firstly, a large number of practical skill assessments had to be completed for each student within a very short time span. Secondly, only undergraduate student nurses from the researcher's own institution (identified as institution A in chapter two) could be recruited to the study, as it would have been impossible to control the organisation of placements and teaching sessions within other institutions. It is recognised that the use of only one cohort of students within one institution of higher education is a limitation of the study and that the results obtained may not be typical of other institutions or other groups of nurse students.

First year undergraduate student nurses were chosen for the study because it is argued that the theory-practice gap is widest for these inexperienced novices who are undertaking clinical placement for the first time. Comments from the qualitative stage of the study indicate that the theoretical input from disciplines such as sociology, psychology and the natural sciences are regarded as less relevant by first year student nurses than acquisition of the knowledge needed to be able to perform practical nursing skills. First year students appear less adept than more senior students in being able to integrate knowledge from a variety of theoretical sources and to apply this to the clinical situation. Comments from third year student nurses within the qualitative stage of the researcher's study highlight their ability to recognise the relevance of theoretical input taught during the third year to nursing practice. In addition, they could appreciate the relevance of topics taught during earlier years of the course, although at the time, they

were unable to see the significance of these. Similar comments are made by students within the Hislop *et al* (1996) study.

The first year undergraduate student nurses who were studied have limited knowledge and skill at the start of clinical placement and what is of interest within this study, is to see how this develops according to how the factors identified above are manipulated. Also, this cohort of students formed the largest student group according to year of the course at institution A, maximising the sample studied.

Within this framework the design of the study was determined by the clinical placements that students are required to complete in accordance with the undergraduate BSc in Nursing course document offered by institution A. This in turn is based on professional requirements to be met before students can register as qualified nurses. In their first year, students complete placements in the community, nursing homes, nurseries, rehabilitation and medical wards. Realistically, only the hospital-based placements in rehabilitation and medical could be used within the study in order to assess practical skills. This is because community placements, nursing homes and nurseries are spread throughout the whole geographical region used in the study and it would have been impossible to complete the practical skill assessments in the short time available. In addition, the students do not engage in nursing skills within the nurseries and usually only act as observers whilst in the community. The longest placement undertaken by students in the hospital-based placements is four weeks, the shortest two weeks.

Who taught the students, whether collaboration took place on the content of teaching sessions and the sequencing of placements could be controlled within the proposed study, but controlling the length of placement proved problematic. The intention had been to compare knowledge, skill acquisition and satisfaction with a two week and four week placement using hospital-based medical and rehabilitation clinical placements. However, the length of placement could not be varied independently. The two week placement was always a rehabilitation placement, the four week placement a medical experience. Differences in knowledge, skill and satisfaction could not therefore be assumed to be due to differences in length of placement, they could have been as a result of the different clinical specialities involved.

Due to the aliasing of clinical speciality and length of placement, a three rather than four factor experimental design had to be developed. Each of the three factors has two levels. This is defined as a 2x2x2 or a 2³ experimental design. This is a shorthand notation referring to an experiment with three factors, each of which has two levels. Such a design has eight different treatment combinations.

- **X1 Teacher** – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher
- **X2 Collaboration** – students are taught theoretical elements relating to a clinical speciality upon which the preceptor and nurse teacher have or have not collaborated
- **X3 Sequencing of theory and practice** – students go straight to the relevant clinical speciality following theoretical input, or after a delay

As discussed, two clinical specialities were used for the study: these were a two week rehabilitation and a four week medical placement. The study was designed so that the students were randomly allocated to one of eight groups. All groups received two teaching sessions, one relating to theoretical elements underpinning a medical placement, the other relating to a rehabilitation placement. This teaching was in addition to the usual curriculum content taught to first year undergraduate student nurses. Depending on how the groups were varied, the students were either taught by a preceptor or a nurse teacher who had, or had not collaborated on the content of the teaching session. This allowed for the effect of who taught the students and whether they had collaborated on theoretical knowledge, practical skill and satisfaction to be established.

Following the teaching sessions, students went straight to a two week rehabilitation or four week medical placement. They then completed a range of first year clinical placements including nursing homes, nurseries and community. These lasted a total of eleven weeks. They then completed their final placement. If their first placement had been medical, this final placement would be rehabilitation. If the first placement had been rehabilitation, the last placement would be medical. In this way students either went straight to, or delayed their two week rehabilitation and four week medical placements

and the effect of this sequencing on theoretical knowledge and practical skill acquisition could be established.

It was not possible to assess the effect of a two week versus a four week placement on theoretical knowledge and satisfaction due to the aliasing of length of placement with clinical speciality. It was possible to compare practical skill at two and four weeks on the medical placement.

Analysis of variance (ANOVA) was used to determine which, if any, of the above factors were significant in terms of their effect on theoretical knowledge, practical skill development and satisfaction. ANOVA is a statistical test which ascertains whether the mean score is the same or different for each level of the factors studied. It thus tests whether differences observed between and within groups are significant or not (Moore & McCabe 1998). ANOVA is equivalent to the t test when comparing the means of levels for one factor. The advantage of ANOVA, is that it can also compare the means of levels for more than one factor at the same time. This is not possible when a t test is employed. ANOVA thus allows the interaction effects to be studied and the identification of which combination of factors produces the optimum results (Moore & McCabe 1998).

The ability to study three factors and the way in which they interact was an important element within this study, as the researcher wanted to try and establish which combination of factors produced the best theoretical knowledge and practical skill scores and the highest levels of satisfaction. The results of the qualitative stage of this study suggested that the optimal combination of factors would be: being taught theoretical elements relating to a clinical speciality by a preceptor, who has collaborated on the content of the teaching session with a nurse teacher and then going straight to that clinical speciality. It is suspected that student satisfaction will also be greatest with this combination of factors.

It could be argued that acquisition of theoretical knowledge and practical skill is not necessarily indicative of the integration of theoretical knowledge with practical skill and it is recognised that the theory-practice gap cannot be reduced to such simple terms. However, it is argued here, that both relevant theoretical knowledge and practical skill

are needed to engage in the practice of nursing. If the effect of the length and sequencing of clinical placements, who teaches the students and whether collaboration takes place, on knowledge and skill development can be established, strategies can be developed which maximise the development of these and this will hopefully go some way to closing the theory-practice gap. One important issue is that the theoretical knowledge and practical skills to be measured are seen as relevant and appropriate by both clinicians and educationalists.

3.4.2 Measuring tools

Three measuring tools needed to be constructed in order to determine students' knowledge, skill acquisition and satisfaction levels under a series of controlled conditions. Students' theoretical knowledge was measured using an objective test composed of multiple-choice and short answer questions. Students' practical skill was assessed using an observation schedule based on a first year clinical assessment tool. Levels of satisfaction were measured using a tool comprising a series of Likert scales.

3.4.3 Theoretical framework underpinning tools to measure theoretical knowledge and practical skill

Two approaches to nurse education are commonly cited: the process-based system and the product-based system (Oliver & Endersby 1994). In the product-based system, the outcome of the educational experience is emphasised, in terms of producing individuals with appropriate skills, knowledge and attitudes. Proponents of the process-based system, argue that it is the educational process, rather than the outcome that is important. It focuses on the educational experience and the development of critical and reflective thinking skills (Stenhouse 1975). At present, nursing curricula tend to incorporate elements of both models, as it is recognised that qualified nurses must be sufficiently knowledgeable and skilled to practise competently, but also need to develop life-long learning and reflective thinking skills. For the purposes of this study, the product-based system of education and assessment has been adopted, because it is the outcome of the teaching/learning process in terms of knowledge and practical skill demonstration that is of interest. In addition, the first year undergraduate student nurses who were studied have

not had the opportunity to put their clinical placements into context, nor to engage in experiential, reflective activities based upon clinical experience. The product-based system lends itself very well to this type of measurement.

The product-based system normally incorporates a behavioural objectives model of curriculum design. The behavioural objectives model has influenced education throughout the western world during the last fifty years, and has been particularly prevalent within nurse education as a means of assessing students (Quinn 1995). The foundation of this approach to curriculum design is usually attributed to Tyler (1949):

“...the major phenomena with which we are concerned are the changes produced in individuals as a result of educational experiences.” (Tyler 1949 p.11)

The focus within this approach is on students' achievement of particular, pre-defined objectives, which Tyler said should be stated in terms of changes in students' behaviour, as a change in behaviour indicates that learning has taken place and this can be measured and assessed. A behavioural objective then, is a statement of the behaviour a student is expected to engage in as a result of learning. Behavioural objectives should be written in terms of observable and therefore measurable changes in students' behaviour:

“Unless the learner's behaviour is observable it is impossible to assess whether or not an objective has been achieved.” (Quinn, 1995 p.274)

The product-based system is a product model as it specifies exactly what behaviours are to result from a learning experience, (Oliver & Endersby, 1994). Each objective has a verb indicating the action or behaviour to be engaged in by the student, which can be used as a standard against which to measure whether the student has achieved the behavioural objective or not. One of the most important considerations when formulating behavioural objectives is to ensure they are appropriate to the student's level of learning and Bloom (1956) developed a taxonomy of educational objectives in order to help teachers achieve this. This taxonomy is divided into three domains:

- **Cognitive** – related to knowledge and intellectual ability

- **Psychomotor** – related to motor and practical skills
- **Affective** – related to attitudes and values

The domains used to assess students' learning within this study are the cognitive and psychomotor domains. The cognitive domain was used to measure theoretical knowledge, and the psychomotor domain to measure practical skill. Each of these domains is further subdivided into categories or levels of functioning which are hierarchical, with those behaviours listed at lower levels of functioning being required in order to function at a higher level. Within the cognitive domain the levels range from knowledge – the ability to recall specific facts or terminology, to evaluation – the ability to make judgements about the value of material (Quinn, 1995). The psychomotor domain ranges from perception – the ability to perceive cues to guide action, to origination – the ability to engage in new patterns of psychomotor action to suit particular situations (Quinn, 1995).

The levels which first year undergraduate student nurses would be expected to demonstrate are the basic, lower-order categories. In the cognitive domain they would be expected to demonstrate knowledge by being able to list, identify, define, describe, label, name and state items. They would also be expected to demonstrate a degree of comprehension by being able to explain and give examples of things. In the psychomotor domain the expected levels are perception, set and guided response. Here the students are able to recognise the need to engage in a psychomotor skill and are able to do so having received instruction. They should be able to use these psychomotor skills to perform aspects of basic nursing care of patients. A review of various learning outcomes stated on module descriptors for undergraduate first year student nurses on the BSc in Nursing course at Institution A confirms that these levels are appropriate. Understanding, recognition, definition and exploration of concepts and awareness are all listed as appropriate levels of functioning for first year nursing students. Copies of these modules and associated learning outcomes can be found in Appendix 2.

Critics of the behavioural objectives model say that not all learning can be reduced to a display of appropriate behaviour; that it is difficult to set behavioural objectives for

higher-order outcomes in the cognitive and psychomotor domain and almost impossible to set any within the affective domain. Identifying pre-determined outcomes to learning can also limit the scope of learning, which tends to be teacher rather than student directed (Oliver & Endersby, 1994, Quinn, 1995). For the purposes of this study, only lower-order outcomes are required in the cognitive and psychomotor domain. The affective domain was not included, as assessment within this domain is not relevant here, and there are ethical implications of studying the acquisition of values and attitudes. In addition, assessment tends to be more difficult and usually more subjective. An important aspect of the study design is the need to assess students objectively, to allow direct comparison among students. This is not to suggest that students' development within the affective domain is less important, rather it is more difficult to measure objectively. The product-based behavioural objectives model of education and assessment thus provides an appropriate theoretical framework underpinning the design of tools to measure theoretical knowledge and practical skill acquisition in first year nursing students for the following reasons:

- Learning is stated in terms of behavioural objectives, which are easy to observe and therefore measure.
- The participants within this study are first year student nurses, who would only be expected to be achieving the lower levels of behavioural objective, which are easy to assess.
- The behavioural objectives model has been shown to be particularly useful in identifying psychomotor objectives and skills training, an important component of this study.
- Assessment of students' knowledge and skill acquisition is objective, rather than subjective; an important consideration in terms of the validity and reliability of a quantitative study.
- A behavioural objectives approach allows comparisons to be made among and within groups of students, again an important consideration within this study where any significant differences between and within groups are to be established. (Oliver & Endersby 1994, Quinn 1995)

Having identified the theoretical framework underpinning the design of the tools to measure theoretical knowledge and practical skill, and the domains and levels of objectives to be tested, the tools to measure these could be constructed.

The measuring tool used to assess students' theoretical knowledge acquisition was an objective item test composed of multiple-choice and short answer items, administered to the students as a quiz. The tool used to measure practical skill acquisition was an observation schedule, based on a current clinical assessment tool in use. This required the researcher to observe students performing specific clinical skills listed within the observation schedule. Students were required to complete the same quiz and be observed performing practical skills at various set intervals throughout the study. The design of the quiz and observation schedule are described below.

3.4.4 Tool to measure theoretical knowledge – objective item test

In order to test the objective levels of knowledge and comprehension within the cognitive domain, specific subject areas and topics about which students would be expected to know, within each of the clinical specialities used within the study, needed to be identified. Relevant areas of theoretical knowledge relating to rehabilitation and medical specialities for first year student nurses needed to be established before they could be incorporated into some type of measuring tool.

The content of the objective test was developed as a result of a series of discussions with charge nurses and lecturing staff. The charge nurses of two medical and rehabilitation wards were asked to identify areas of nursing, relevant to their clinical area, about which they would expect first year undergraduate nursing students to be knowledgeable. These charge nurses were chosen because they routinely had first year undergraduate nursing students allocated to their clinical speciality. In addition, they acted or had previously acted as preceptors, and could therefore be expected to have an insight into the needs of first year undergraduate nursing students. Two members of academic teaching staff within institution A, involved in teaching medical and rehabilitation topics to first year nursing students were also asked to identify areas about which they would expect these students to be knowledgeable. None of the charge nurses nor academic teaching staff had

been involved in the first stage of the study. The areas of knowledge subsequently identified as a result of discussion with these individuals, were those areas of knowledge deemed to be relevant by both clinicians and educationalists; an important consideration in a study attempting to examine the theory-practice gap.

A list of topics was drawn up as a result of these discussions. A number of topics appeared on the lists for both rehabilitation and medical. This is to be expected, as students are developing a general, basic knowledge of nursing applicable to any area of nursing within their first year as student nurses, regardless of speciality. For example, a knowledge of the nursing process, models of nursing or pressure area care, are common to both medical and rehabilitation placements. Other areas were more specific to either rehabilitation or medical areas. For example, a knowledge of the effects of a stroke and nursing interventions to overcome these, such as conditioning exercises and reality orientation were more commonly seen in rehabilitation areas, whilst a knowledge of naso-gastric feeding was seen to be more relevant in a medical area. A list of topic areas was drawn up as a result of the discussions with teaching and clinical staff. The complete list was discussed again with the two charge nurses and two members of teaching staff and topics agreed upon as being important by everyone were retained, whilst other areas perhaps only identified by one person were disregarded. In general, there was a high level of agreement between the charge nurses and teaching staff as to the knowledge needs of the students within the initial list of topic areas, with only minor amendments being subsequently needed.

The final stage of the design of the cognitive measuring tool was to decide the format this would take. In other words, how would the attainment of theoretical knowledge, identified by both clinicians and educationalists as being relevant, be measured?

There are many different methods available in order to ascertain students' achievement of cognitive behavioural objectives. These include formative and summative approaches, ranging from the use of essays, examinations, tests, projects – pen and paper type exercises, to seminars, presentations, tutorials, group work – requiring communication and interaction of some type, through to various experiential and reflective techniques. Most of these are open to some degree of subjectivity on the part of the assessor. One of

the few methods of assessment to be purely objective are objective test items. They can be easily constructed to measure knowledge and comprehension by asking students to list, define, describe, identify and state items and are an appropriate means of assessing the lower order of cognitive functioning required within this study.

3.4.4.1 Objective test items

Bloom *et al* (1971) discuss methods of knowledge testing using what they term 'knowledge items'. There are two classes of knowledge items: supply and choice. With the supply type, students are required to supply the answer from their memory by completing a list, giving a definition or supplying a short answer. A choice item is one in which the student has to select the correct answer from a selection of possible alternatives presented to them. Both types are often referred to as objective test items, as they allow the measurement of behavioural objectives (Kubiszyn & Borich, 1984). They are also referred to as objective tests, because they are marked objectively and are not open to the subjective opinion of the marker (Waltz *et al* 1991). There is only one correct answer, which has been clearly identified beforehand, thus there is perfect marker reliability (Quinn, 1995). Quinn also says that content validity is very high, as large numbers of items can be included, ensuring that a syllabus can be widely sampled. Gronlund (1981) has the following to say about objective item testing:

"..it can measure a variety of the more complex outcomes in the knowledge, understanding and application areas. This flexibility, plus the higher quality of the items usually attained with the multiple-choice form, has led to its extensive use in achievement testing." (Gronlund 1981 p.178)

Choice items can be formulated as true/false questions, matching items or multiple-choice questions. Multiple-choice questions are a useful means of testing the lower levels of cognitive objectives, namely knowledge and comprehension. Gronlund (1981), argues they can also measure higher level objectives by asking students to apply information in new situations and engage in problem solving. DeYoung (1990) agrees this is possible, but requires practice. It is well established that multiple-choice questions are an appropriate means of assessing the lower levels of cognitive function, which is the requirement within this study. Therefore the main method of assessing students'

theoretical knowledge is by the use of an objective item test composed of multiple-choice questions. A section of short answer items is also included.

Short answer items are a useful form of supply item, requiring the student to supply a sentence or two as a response to a question or statement. They are open to some degree of subjectivity on the part of the marker because they require some interpretation and evaluation. If carefully formulated they are an effective means of assessing students' ability to give a correct answer without being prompted by a list of alternatives as with the multiple-choice format. They can therefore help establish the student who really knows the answer, rather than those who are making a lucky guess. Together multiple-choice and short answer items are a powerful method of assessing lower order cognitive objectives (Gronlund, 1981).

3.4.4.2 Multiple-choice questions

There are two parts to a multiple-choice question. The actual question is referred to as the stem. This stem can be formulated as a question, or as an incomplete statement. The list of alternative solutions to the question are called the options. These may be formulated as words, numbers, symbols or phrases. The correct solution is called the answer, whilst incorrect solutions are termed distractors (DeYoung 1990). The distractors are intended to distract students who are unsure of the correct answer – hence their name. Well-designed distractors should discriminate between students who know the correct answer and those who are merely guessing. Because there are a number of distractors available to the student, the opportunity to guess the right answer is reduced and reliability is therefore enhanced (Gronlund 1981). Gronlund says this can be made even more subtle by including an answer which is very plausible and misleads the students into thinking it is the correct answer; this also distinguishes between students who really do know the correct answer, and those who are simply guessing.

Writing good multiple-choice items requires skill and can be a time-consuming process. The stem needs to be clearly worded, so that its meaning is unambiguous and it is essential for the stem to contain all the information students require in order to answer the

question correctly. However, they should not be so long that students get lost. Negatively stated items should be avoided in most cases, as they tend to confuse students.

DeYoung (1990) suggests that three to five options per item is acceptable and that there is no need to stick rigidly to the same number for every item. This can lead to the writing of poor quality options simply to make up the required number. The more plausible distractors that can be stated, the better, as the larger the number of options available to the student, the more discriminating the item is likely to be (Ebel 1979). It is sometimes difficult to think of sufficiently plausible, but incorrect distractors. Gronlund (1981) says this can be particularly problematic at earlier levels where students have limited knowledge of topics. This could be the case with first year nursing students who are newly introduced to many of the concepts and terminology commonly used within nursing. It can also be argued that by the end of their first year of studies, students should have a basic knowledge of the terminology used such as hypertension, hypotension and pyrexia.

Options need to be written in such a way that clues are not given to the student as to the correct answer. They should all be grammatically consistent with the stem, fairly short and approximately the same length. They should be placed in a logical order, if there is one, such as increasing or decreasing size. DeYoung (1990) also advocates the avoidance of what she terms 'specific determiners':

"People who become test wise know that words like all, always and never in the options probably indicate false statements, whereas the words usually, sometimes, often, seldom, and generally are often found in true statements." (De Young 1990 p.58)

Another clue that can inadvertently be given to students, is by placing the correct answer in the same position each time. If options are labelled a to d, there tends to be a preference on the part of the item writer to place the correct answer in positions b and c. Correct answers should be placed in approximately equal numbers throughout the positions. Finally, all of the distractors should be plausible and realistic.

Multiple-choice items therefore require careful construction, but can be used to test various levels of learning. Ebel (1979) suggests that multiple-choice items are a highly valued method of assessment:

“They are adaptable to the measurement of most important educational outcomes: of knowledge, understanding, and judgement; of ability to solve problems, to recommend appropriate action, to make predictions...The form of the multiple-choice item, with the stem asking or implying a direct question, provides a realistic, naturally appropriate setting for testing student achievement.” (Ebel 1979 p135)

Gronlund (1981) offers a comprehensive list of dos and don'ts when constructing multiple-choice items:

- The item stem should be meaningful by itself and should present a definite problem.
- The item stem should include as much of the item as possible and should be free of irrelevant material.
- Use a negatively stated item stem only when significant learning outcomes require it.
- All of the distractors should be grammatically consistent with the stem of the item.
- An item should contain only one correct or clearly best answer
- Items used to measure understanding should contain some novelty but beware of too much novelty.
- All distractors should be plausible.
- Verbal associations between the stem and the correct answer should be avoided.
- The relative length of the distractors should not provide a clue to the answer.
- The correct answer should appear in each of the alternative positions approximately an equal number of times, but in random order.
- Use special alternatives such as “none of the above” or “all of the above” sparingly.
- Do not use multiple-choice items where other item types are more appropriate.
- Break any of these rules when you have a good reason for making an exception.

“Although these rules provide valuable guidelines for constructing multiple-choice items, you may encounter instances where making an exception to the rule improves the item.” (Gronlund 1981 p.198)

3.4.4.3 Short answer items

Short answer items require the student to supply the correct information from memory, without being prompted by a number of possible alternatives as in the multiple-choice format. Ebel (1979) says short answer items test recall, rather than recognition and are a more valid test of knowledge and understanding than multiple-choice questions. Ebel also states that short answer items are a useful means of testing for factual knowledge, a low level of cognitive functioning that is being investigated within this study.

According to Kubiszyn & Borich (1984) the most important consideration in composing short answer items is to ensure they are as specific as possible, to avoid the possibility of there being a variety of correct answers. They add that, where feasible, items should only require a single-word answer, or a brief, definite statement.

The preceding discussion has built a rationale for using an objective item test, composed of multiple-choice and short answer questions to test theoretical knowledge. In summary the main points are:

- The research study involves testing and re-testing students at various intervals in order to assess the effect particular conditions have on their cognitive functioning. In order to achieve this, a means of assessing students was needed which would allow for direct comparisons to be made. The assessment method needed to be wholly objective and not susceptible to subjective interpretation. Assessment methods such as essays, projects, seminar presentations and examination tests, commonly employed within education to assess cognitive functioning tend to have some element of subjectivity within them. Objective tests, are completely objective – hence their name. There is only one pre-determined correct, or best answer and the student either answer correctly or incorrectly. This ensures that the reliability of objective tests is high and allows for comparisons to be made under different conditions. The students' scores on the objective test are the dependent variables which differ according to the independent variables being manipulated.
- Well-constructed objective tests require time and skill, but once this has been achieved they are easy to mark and analyse statistically. This was an important

consideration in establishing the feasibility of this study as an optimum total of 128 tests would require scoring and analysing.

- The objective test could be completed by students within a short time – approximately thirty to forty minutes. Again an important consideration in terms of feasibility of the study and students’ willingness to participate. Students would have been less willing to complete several essays, examinations or presentations.
- Objective tests are suitable for testing lower levels of cognitive functioning, although it has also been argued that if skilfully constructed they can also test students’ abilities at higher cognitive levels. For the purposes of this study, first year undergraduate student nurses would only be expected to function at levels one and two, particularly in new subject areas which they have studied as student nurses. Thus objective tests are a suitable means of assessing cognitive development.

3.4.4.4 Construction of objective item test

The objective test was designed using Longman Logotron Pinpoint software. As previously discussed, the content of this was based on the topic areas identified during discussion with teachers and preceptors. A copy of the test filled in with the correct answers and possible maximum score for each question can be found in Appendix 3. The total score possible was 150.

The test was constructed in two sections. Section A consisted of a series of multiple-choice questions, section B of short answer questions. This gave the student the opportunity to choose the correct answer in section A, and to supply the correct answer in section B. Each section was divided into general questions, medical questions and questions relating to rehabilitation as shown in Table 3.1 below:

Table 3.1

Sections of quiz with maximum scores for each section and overall

Section	Question Number	Maximum Score
A Multiple-Choice:		
General	1-11	22
Medical	12-25	28
Rehabilitation	26-33	16
B Short Answer:		
General	34-40	36
Medical	41-46	21
Rehabilitation	47-53	27
		Total Score 150

Section A comprises the multiple-choice section of questions on general, medical and rehabilitation knowledge, with students being required to identify a correct item of knowledge. The item stems are concise, whilst also supplying the student with the relevant information needed to be able to identify the correct answer. Negatively-worded item stems have not been used. Each question has three distractors in addition to the correct answer. All of the distractors are plausible, requiring the student to be very sure of the answer, as the distractors are similar. For example question 23 in the quiz:

Q23. Which one of the following blood pressure recordings would indicate that a patient is hypotensive?

- a. 140/90
- b. 90/140
- c. 90/60
- d. 60/90

Quinn (1995) says that a wide range of topics can be tested using multiple-choice questions and that this ensures the tool is a valid means of testing knowledge, providing

of course that the questions themselves are appropriate areas to be tested. Areas for testing have previously been identified by both service and educational staff as being important and relevant. The content of the tool should therefore be valid.

Section B of the quiz is composed of short answer items. The majority of these questions require the student to list very specific items, such as the twelve activities of Roper, Logan and Tierney's Activities of Living Model (Roper *et al* 1990), the four stages of the nursing process or the types of linen bag used for particular types of dirty linen. These are very specific, with little room for subjective interpretation. The student either does or does not know the correct answer. These are completely objective.

Some items are more flexible in that they require the student to supply a definition, as in the questions asking the student to define primary and team nursing. With these questions, the answer sheet in Appendix 3 identifies key words for which the student will be awarded points if they appear within his/her answer. Other items require the student to list two or three things, when there are actually more than two or three possible correct answers. For example, students are asked to identify two actions that can be implemented if a patient has an elevated temperature. The possibilities are: to remove clothing or bedclothing, open a window, use a fan, tepid sponge the patient and administer anti-pyrexial drugs such as paracetamol. Two points are awarded to any two of these which the student lists. This type of item, as well as those requiring a definition, are useful in establishing students' understanding, but it has to be said they are susceptible to a degree of subjectivity on the part of the marker. This can be minimised by the marker maintaining consistency throughout the marking process. If one student is awarded a certain number of points for the way in which he/she has answered a question, all other students answering in the same or similar fashion also receive the same number of points.

A draft of the test was given to members of teaching staff and to two preceptors for their comments as to the content and design of the test. None of these individuals had been involved in the initial discussion, of what should be included in the quiz. The draft formed an initial pre-test for the instrument. All of those who pre-tested the instrument agreed that the areas of knowledge to be tested were appropriate. The instrument was also

submitted to the three members of the research supervisory team for comment. As a result of this, modifications to the wording of questions was made and to the layout of the test. One question, pertaining to the need to turn patients on a regular basis to prevent pressure sore development, was removed as it was suggested that this was less relevant with the routine use of pressure relieving devices.

The test could not be piloted on a group of first year students, as they would all be involved in the main study. However, a group of four third year students agreed to take the test for piloting purposes. This established that it would take at least twenty to twenty-five minutes to complete (it is expected that first year students will take longer to complete as their knowledge levels are lower). A few further modifications were made to questions which the third year students felt required clarification. The discussion and collaboration which occurred throughout the development of the tool, in addition to its preliminary testing, served to maximise the validity of the tool. It is valid in that the areas of knowledge being tested are seen to be relevant by groups of academic and clinical staff who are experienced in the teaching and preceptoring of first year undergraduate nursing students. It measures what it is designed to measure – cognitive function or theoretical knowledge of first year nursing students. The same quiz was administered to students on four occasions:

- Quiz 1** At the start of the study prior to any interventions. This provided a baseline of students' knowledge prior to commencing the main study

- Quiz 2** Immediately following completion of the two teaching sessions on rehabilitation and medical

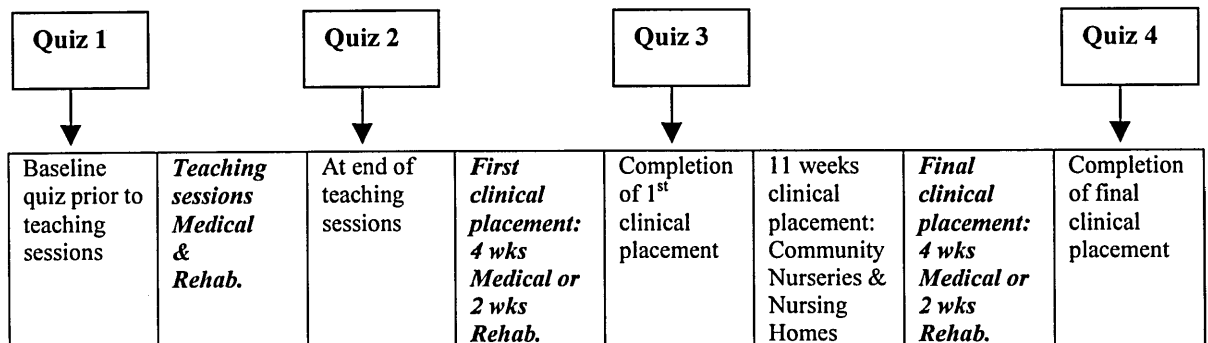
- Quiz 3** At the end of the students' first placement, which was either a two week rehabilitation or a four week medical placement

- Quiz 4** At the end of the students' final placement, following completion of a range of placements lasting a total of eleven weeks. This was again either a two week rehabilitation or a four week medical placement

The staging of the quizzes within the design of the study is shown in Figure 3.1 below:

Figure 3.1

Overview of study design, demonstrating stages at which quizzes were completed



3.4.5 Tool to measure practical skill – observation schedule

The attainment of psychomotor objectives and practical skills was measured using an observation tool. Barker (1991), says that techniques such as questionnaires and interviews are useful ways of establishing information relating to what individuals feel or think they do, but tell the researcher very little about what actually takes place. There can be a wide difference between what people say they do, and what they actually do. A view supported by LoBiondo-Wood & Haber (1998):

“...what people say they do often is not what they really do. Therefore if the study is designed to obtain substantive findings about human behaviour, observation may be the only way to ensure the validity of the findings.” (LoBiondo-Wood & Haber 1998 p.315)

As previously discussed, the aim within this study is to assess objectively students’ theoretical knowledge and practical skill acquisition, and an observation tool is seen to be the most objective method to measure the psychomotor skills students are developing as they progress through their clinical placements. The observation tool developed was used to assess students’ practical skill on three occasions. Students were observed at the end of their two week placement in rehabilitation and at the two and four week stage of their

medical placement. This allowed for the comparison of practical skill at the two and four week stage of medical placement. The effect of who taught the students and whether or not they collaborated on practical skill acquisition was also measured. On each occasion the students were observed for approximately one hour, a total of ninety-six hours of observation. Because these observations needed to be completed within short periods of time, it was impossible for the researcher to conduct these alone. Three clinical supervisors, who routinely work with, and assess students in the clinical area, agreed to assist with the collection of observational data. In total therefore, there were four observers involved in data collection.

3.4.5.1 Observation techniques

LoBiondo-Wood & Haber (1998) state that observational tools are particularly suitable for measuring skill acquisition. They identify four types of observational method:

- Concealment without intervention
- Concealment with intervention
- No concealment without intervention
- No concealment with intervention

The proposed method to be used within this study is no concealment without intervention:

“In this case the researcher obtains informed consent from the subject to be observed and then simply observes his or her behavior” (LoBiondo-Wood & Haber 1998 p.314)

This avoids any ethical difficulties that may arise from students being observed without their knowledge or consent. However, an ethical issue remains in that the observer may observe unsafe practice. Should this situation arise, the method of dealing with such is discussed below.

Observation tools can be structured or unstructured. Unstructured tools are used for participant observation, or intervention designs. Structured observational tools are designed to collect data about specific activities (Polit & Hungler, 1993). This was an appropriate method to use in order to collect information relating to the development of particular nursing skills in first year undergraduate nursing students, as specific skills are being observed. In adopting this structured approach, Polit & Hungler state that a category system needs to be developed which identifies all of the behaviours to be observed and recorded. Once this has been developed, a check list is constructed. This is the actual measuring tool used by the observer to record what behaviour is observed. This may be in the form of a rating scale which requires the observer to rate a behaviour or activity along some type of continuum. This can be open to bias as it relies to some degree on the subjective interpretation of the observer. A simpler approach is to break skills down into component parts and to record 'yes' or 'no' as to whether or not these were carried out in a safe manner. This was the approach used within this design.

There are problems inherent in using observational techniques. As already mentioned, the more open an observational tool is to the subjective interpretation of the observer, the more open it is to bias. The attitudes, values and emotions of the observer can interfere with the objective assessment of what is taking place. LoBiondo-Wood & Haber (1998) say that the more an observer needs to make inferences and judgements about what is seen, the more likely the recorded data will be distorted. This becomes even more problematic where more than one observer is recording information, as each observer may interpret what is observed in a different manner:

"A well-developed observational method is only as good as the skill of the observer." (Barker 1991, p.239)

Another difficulty with observational techniques is the Hawthorne effect. This refers to changes in behaviour which occur in those being observed because they know they are being watched. Polit and Hungler (1993) suggest this may have a double effect in studies where students are being observed in their interactions with patients. Not only do the students change their behaviour because they are being observed, but the patients may also change theirs:

“It is not unusual for patients to be ‘helpful’ when they realize that novice nurses are being observed.”
(Polit & Hungler 1993 p.444-445)

Barker (1991) also describes the Halo effect. This is a form of bias introduced because of the attitude or view of the observer towards the person observed. If the observer has a negative view of an individual, he/she may rate them lower than somebody he/she sees in a more positive light. Finally, Barker says that observers can err on the side of severity, being too tough on individuals, or on the side of leniency, feeling sorry for them. Alternatively, observers may tend to avoid extreme ratings and only give average recordings for everybody. Polit & Hungler (1993) comment that observational biases of this nature can be minimised via the careful training of observers.

3.4.5.2 Construction of observation tool

The observation tool was based on an existing clinical assessment tool that had been used for a number of years to assess the clinical skills of nursing students on the pre-registration programme at the time of the study. Students are expected to demonstrate a number of skills associated with each activity of living within Roper, Logan and Tierney’s Activities of Living model (Roper *et al* 1990). This skills assessment was built around Roper *et al*’s model because this is the framework most commonly used within clinical areas to direct patient care. It also forms the theoretical framework underpinning the theory and practice of nursing which is taught to the nursing students during their first year. Students are also expected to be able to perform a number of “core skills” such as, monitoring vital signs, admission and discharge procedures, carrying out aseptic technique, complying with control of infection measures, specimen collection and testing etc.

This clinical assessment tool is extensive and is completed over the duration of the foundation studies part of the course which is two years. As such, it was impossible to use the whole tool as the means of assessment within the scope of this study. In addition, it would not be expected for a first year nursing student to perform a number of the skills included within this, such as catheterisation. Other skills could only be carried out under the supervision, or with the involvement of another member of staff, such as drug

administration and were therefore also unsuitable for inclusion within the study. Other skills might not actually be practised within the rehabilitation or medical setting, such as care of the pre- and post-operative patient. Alternatively, the student may not be afforded the opportunity to practise certain skills, such as care of the dying patient or last offices.

The first step in adapting the tool to the purposes of the study was to go through each of the skills within the clinical assessment and identify those which were appropriate for a medical and rehabilitation setting. From these, skills were listed which students could be expected to perform independently of other staff. Within the clinical assessment tool, the students are graded according to their level of competency for each skill as either observer, participant observer, supervised practitioner or competent practitioner, following Benner's (1984) theory of the acquisition of expertise. However, the skills chosen from the clinical assessment tool as appropriate for inclusion within the study, were based on the surmise that students should be able to function as competent practitioners of those skills. Thus the range of skills chosen for the student to demonstrate, were basic nursing skills which first year nursing students would be expected to be able to perform independently without supervision. This resulted in only basic skills being included, but the range of these was quite extensive.

An observation tool was developed which identified particular skills for which the researcher was observing, with a simple yes/no format as to whether or not the student displayed these. These yes/no answers were also weighted according to the complexity of the skill being observed. For example the ability to take correctly the patient's temperature and the ability to assess correctly the patient's blood pressure each scored one point. The ability to tell correctly the researcher what actions were required in the event of an abnormal recording being taken, scored two points, as this required the ability both to recall normal and abnormal limits and the actions to take in the event of each. Skills such as correctly performing a urinalysis and aseptic technique were heavily weighted as these required more complex psychomotor skills. A copy of the observation tool and scoring system can be found in Appendix 4. There are two versions of this, one for observation in medical areas, the other for rehabilitation areas. These are identical except for the first part of section A. In the medical version students are to demonstrate emergency skills expected of a first year nursing student in relation to a cardiac arrest.

Within the rehabilitation setting, cardiac resuscitation is not common practice and students therefore were asked to demonstrate emergency skills in relation to the procedure to be followed in the event of a fire.

It was impossible to predict which skills would be observed during the hour the student was to be observed. The observation tool was therefore divided into two sections. The whole of section A was to be completed, as all of the skills within this section would be expected to be observed, such as communication skills, or could easily be set up for observation such as monitoring of vital signs. Section B consisted of skills which could be assessed if the opportunity arose. For example, if the student was to be assessed at a meal time, assistance with eating and drinking could be assessed. If the student was asked to assist somebody with eliminating, this could be assessed opportunistically, or if a patient required a simple aseptic dressing, it could be organised for the student to complete this. The results were calculated as a percentage of the total marks the student would have gained for those skills observed.

A draft of the observation tool was developed using the Longman Logotron Pinpoint software and then submitted to two of the clinical supervisors who are employed to work with students in the clinical area, supporting and teaching them clinical skills. They were asked to review the draft and to make comments on the suitability of the skills selected for observation. Two preceptors working within medical and rehabilitation settings were also asked to review the tool. The clinical supervisors and preceptors, who had not been involved in the qualitative stage of the study, felt that the skills included for observation were both relevant and realistic. Minor amendments were made and the tool was then submitted to the researcher's supervisory team for comment. This helped to establish the face and content validity of the tool.

The validity of the tool was further established by using it to assess three second year undergraduate student nurses on practice within a medical area. First year nursing students could not be used to pilot the tool as they were all to be part of the main study. It was impossible to test the tool in a rehabilitation setting as no students were allocated to this speciality at the time.

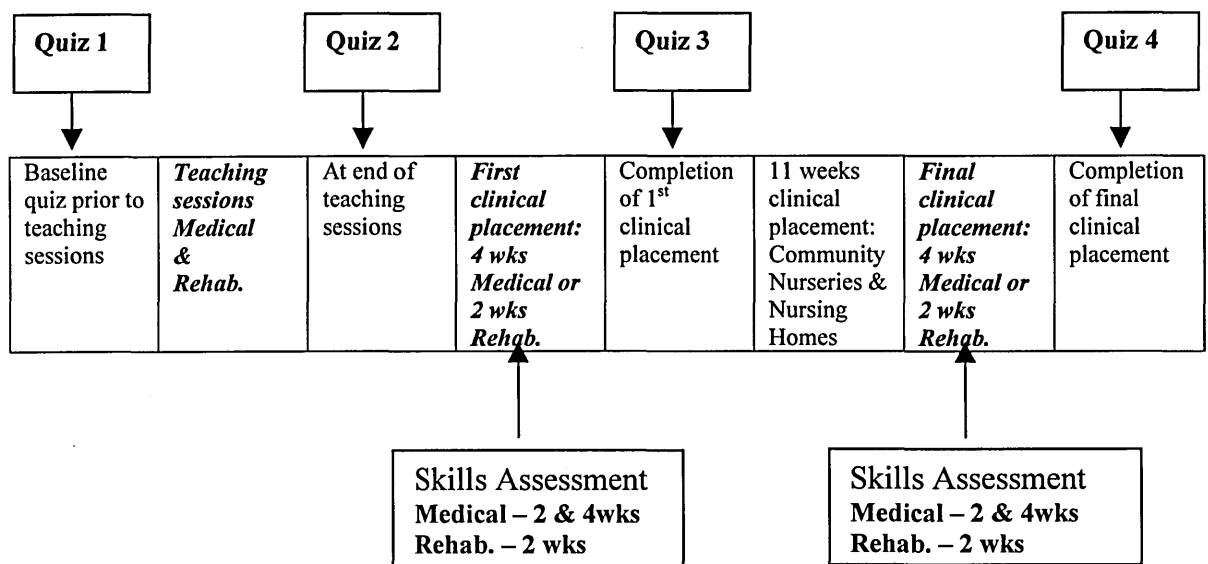
As discussed above, each student was observed on three separate occasions, with each observation lasting for approximately an hour. A total of ninety-six one-hour assessments required completion within a short time-scale. This was because all of the class would complete two weeks in rehabilitation, or two weeks in medical at the same time, requiring a large number of assessments to be completed within a couple of days. As it was not feasible for the researcher to complete all of these, the help of the three clinical supervisors who are employed within institution A was enlisted. The remit of the clinical supervisors is to support and teach students within clinical areas. They are the most experienced and skilled individuals available to complete the assessments, in addition to the researcher, who has maintained a clinical workload since becoming a lecturer.

One problem of using more than one assessor within the study was that of inter-rater reliability. Whilst the observation tool was designed to be completed as a simple yes/no answer, there is still room for subjective interpretation, with different assessors differing on their opinion as to whether or not a skill has been completed or displayed in a satisfactory manner. In order to establish whether inter-rater reliability could be established at a high level, the researcher completed three pre-tests, one with each of the clinical supervisors who had agreed to act as observers. Three second year undergraduate nursing students on medical placement agreed to be observed for this pre-testing. First year undergraduate nursing students could not be used, as they would all be involved in the main study. The researcher and supervisor observed the same student simultaneously for an hour and completed the observation sheet independently. The scores for each skill observed were then compared. There was complete agreement in each case. These pre-tests also afforded the observers the opportunity to practise completing the observation sheet and to discuss any difficulties or issues arising from this.

There was some concern as to the course of action in the event of unsafe skills being observed. It was agreed by the researcher and clinical supervisors, that if the observer felt the patient was being put at risk, they would intervene in the situation. It was felt that this was appropriate as students would normally be working with a preceptor. Whilst the students were being observed this was not the case; the observer was therefore responsible for the safe practice of the student. Whilst this contingency was planned for,

there was no need for intervention in any of the observations which took place. Figure 3.2 shows the stages at which practical skill was measured during the study:

Figure 3.2
Overview of study design, demonstrating stages at which practical skill assessments were completed



3.4.6 Tool to measure student satisfaction

In addition to testing theoretical knowledge and practical skill acquisition, a student satisfaction survey was also developed in order to determine whether students' levels of satisfaction were different according to who had taught them, whether collaboration had taken place and the sequencing and length of clinical placements. In order to measure student satisfaction a set of Likert scales were constructed.

3.4.6.1 Likert scales

Likert scales are commonly used to measure attitudes and can be very sophisticated in their ability to make fine discriminations between individuals with varying viewpoints

Polit & Hungler (1993). They are also an appropriate tool to use in the measurement of satisfaction with a product or service. A series of statements are constructed in relation to the attitude or viewpoint being measured, with an equal balance of negatively and positively worded items. Ten to twenty statements are normally included. Individuals are asked to indicate their degree of agreement or disagreement with each statement by ticking on a scale the response with which they most identify. Normally, the scale has five or seven points, varying from 'strongly disagree' to 'strongly agree' Barker (1991). A neutral response may or may not be included Skodol Wilson (1989). Likert scales are scored by points being awarded according to how strongly individuals agree or disagree with each statement, depending on whether it is positively or negatively worded.

3.4.6.2 Construction of satisfaction survey

The satisfaction survey developed for this study consists of four sections. Each section is composed of ten statements. A copy of the survey can be found in Appendix 5. The first two sections relate to the students' views of the orientation teaching sessions which took place prior to clinical placement. Each of these sections contains identical statements. The first section asks the students their views of the medical orientation session, the second the rehabilitation orientation session. Five of the statements are positively worded, five negatively worded. A five item scale is given, with students asked to indicate whether they: strongly agree, agree, are uncertain, disagree or strongly disagree with each statement. The purpose of this section of the survey is to assess any differences in students' satisfaction according to who had taught them and whether collaboration had taken place on the content of the teaching session.

The last two sections of the survey are also identical, each consisting of ten statements, five positive, five negative. The third section asks students their views in relation to their medical placement, the fourth section, their views of their rehabilitation placement. Again a five item scale is given for students to grade their responses. Data gained from these sections were analysed in order to determine any differences in students' satisfaction according to the sequencing of their clinical placements. The satisfaction survey was included at the end of the fourth quiz, which was administered following completion of all clinical placements.

Having constructed the three measuring tools, the population to be studied within the study is defined.

3.5 POPULATION STUDIED

A total population of all (n=32) first year undergraduate nursing students at institution A in 1998 was initially recruited to the study. It was only practical to investigate theoretical knowledge, practical skill acquisition and satisfaction within one cohort or year of the course. First year undergraduate nursing students were selected as it has already been argued that the theory-practice gap is greatest for these students and as large a number of students as possible was needed in order to apply appropriate statistical tests.

The study is designed to investigate the effect of three factors on theoretical knowledge, practical skill acquisition and satisfaction. As already discussed, this results in a 2^3 study design, requiring eight groups of students. The students were randomly allocated to these groups labelled A-H, with four students being allocated to each group. This was done by putting all the students' names in a hat, picking them out and allocating them to each group in turn. Because of the small numbers involved, this was actually quicker than constructing a random table using Minitab as was initially proposed. The random allocation of students minimised the possibility of introducing bias into the study. A table identifying the eight groups and the way in which the three factors were manipulated is shown in Table 3.2 below:

Table 3.2
Manipulation of factors according to group A-H

	X1	X2	X3
Group	Taught by	Collaboration	Straight to
A	Preceptor	Medical	Medical
B	Preceptor	Medical	Rehabilitation
C	Preceptor	Rehabilitation	Medical
D	Preceptor	Rehabilitation	Rehabilitation
E	Nurse Teacher	Medical	Medical
F	Nurse Teacher	Medical	Rehabilitation
G	Nurse Teacher	Rehabilitation	Medical
H	Nurse Teacher	Rehabilitation	Rehabilitation

Although thirty-two students were originally recruited to the study, two students left the course for various reasons whilst the investigation was being undertaken. A further student was allocated to a remote area of Tayside and it was impossible to complete practical skill assessments and quizzes for this student. As a result some of the groups only had three students with a total (n=29) being included. This was unavoidable.

3.6 RELIABILITY

It is important to take steps to establish both the reliability and validity of measuring tools used within a study in order to demonstrate that the design of such tools has been rigorous and any results are therefore an accurate interpretation of the phenomenon studied.

“...the reliability of an instrument is the degree of consistency with which the instrument measures the attribute...An instrument can be said to be reliable if its measures accurately reflect the true measures of the attribute under investigation.”
(Polit & Hungler 1993 p.244-245)

Polit & Hungler (1993) identify three aspects of reliability: stability, internal consistency and equivalence.

3.6.1 Stability

Stability refers to the ability of a measuring tool to obtain similar information from the same set of subjects on more than one occasion. If a measuring tool is used to measure some attribute within a group of subjects at one point in time, and is then re-administered to the same group again, the results obtained should be similar. This is referred to as test-retest reliability (Polit & Hungler, 1993). However as Polit & Hungler point out, some attributes do change over time, plus subjects' responses to the retest can be influenced by the first test. Testing for stability in this way is therefore only appropriate for attributes which are unlikely to change over time. Test-retest is not an appropriate method of establishing reliability of this study, as the researcher is actively looking for scores obtained using the measuring tools to alter over time, under various conditions.

3.6.2 Internal consistency

Internal consistency is the degree to which all of the parts of a measuring tool are measuring the attribute under investigation. A measuring tool should measure the same thing. For example, a tool seeking to establish empathy should not include items which actually measure diagnostic competence (Polit & Hungler, 1993). The method most commonly used to establish internal consistency is the split half technique. The measuring tool is split into halves and each half scored independently. The scores are used to calculate a reliability coefficient. This test could not be used on the measuring tools used within this study, as they could not be split into equal halves for comparison. In addition, both the theoretical knowledge and practical skill tools covered large areas of knowledge and skill, with different parts of the tool focusing on diverse areas. As such it

was therefore inappropriate to test for internal consistency of the different parts of the tools used.

3.6.3 Equivalence

Equivalence testing is often used to establish the reliability of observational tools that are being administered by more than one observer:

“The aim of this approach is to determine the consistency or equivalence of the instrument in yielding measurements of the same traits in the same subjects”. (Polit & Hungler 1993 p. 248)

Two or more observers simultaneously observe the same event and independently of each other complete the observational measuring tool. The results of each observer are then used to calculate an index of equivalence or agreement:

“When two observers score some phenomenon in a congruent fashion, there is a strong likelihood that the scores are accurate and reliable” (Polit & Hungler 1993 p.248)

The three clinical supervisors acting as observers for the present study each completed an hour of observation concurrently with the researcher on three second year undergraduate nursing students. As discussed previously, there was complete agreement with all supervisors on the scores obtained by each student. Thus there was inter-rater reliability between the four observers used to collect data relating to practical skill.

3.7 VALIDITY

Dempsey & Dempsey (1996) refer to validity as:

“...the ability of a data-gathering instrument to measure what it is supposed to measure, to obtain data relevant to what is being measured.” (Dempsey & Dempsey 1996 p.69)

Dempsey & Dempsey (1996) identify three approaches to establishing validity of quantitative research studies: content validity, construct validity, and criterion-referenced validity. Content validity refers to whether or not the measuring instrument used within a study accurately represents those factors being studied. Content validity is established by experts within the field of study reviewing the measuring tool and making judgements on how well the content of this relates to the area under investigation and whether it measures appropriate, relevant aspects of this.

3.7.1 Content validity

Within the present study, several methods of establishing content validity were employed. These have been previously discussed under design of measuring tools, but are summarised here:

3.7.1.1 Objective knowledge test

- The content areas of the objective knowledge test were generated by two charge nurses and two lecturers, chosen because of their knowledge and experience in teaching and preceptorship of first year students. They could be regarded as experts in the field of study. The researcher was not involved in the process of identifying content areas for inclusion. As a result, the areas tested reflect the combined opinions of several 'experts', both educational and clinical and are not subject to the biases of one individual.
- The draft was then viewed by members of teaching staff and preceptors also routinely involved in the teaching and support of students, but who were not involved in the preliminary design. They agreed the tool would test appropriate areas of knowledge.
- The draft was also viewed by the researcher's supervisory team. One of these is an experienced nurse teacher and therefore able to comment on the content of the tool. The other two supervisors are experienced researchers and were able to comment on the design and wording of the content areas.

- The tool was piloted on a group of third year students to check the clarity of wording and the time required to complete the quiz.

3.7.1.2 Observation tool

- The observation tool is based on a clinical assessment tool used for a number of years within institution A. The content areas had therefore already been established as being appropriate for measuring. However, the researcher needed to establish which of these could be expected to be demonstrated independently by first year students, as previously discussed.
- The draft tool produced was viewed by two clinical supervisors and two preceptors, all of whom are experts at assessing students clinically.
- The draft was viewed by members of the supervisory team.
- The tool was piloted using three second year students allocated to medical areas.

3.7.2 Construct validity

Construct validity refers to the ability of a measuring tool to measure a specific hypothetical trait or construct such as intelligence or grief (Dempsey & Dempsey 1996). They say it is a difficult and time-consuming process to establish construct validity and can only be achieved by comparing the results obtained using the measuring tool with a variety of other studies using different methods of establishing construct validity. Alternatively, the measuring tool can be used with groups of individuals known to differ on the construct being investigated. If results between groups are shown to be significantly different statistically, as expected, the measuring tool is said to have some degree of construct validity.

The construct validity of the objective item test could not be established within the timescale of the study. However, the observation tool could be said to have construct validity in

that the original clinical assessment tool on which it is based, is able to identify differences between students' practical skill at various stages of the course.

3.7.3 Criterion-related validity

Dempsey & Dempsey (1996) refer to criterion-related validity as the ability of a measuring tool to produce results comparable with other tools known to be valid. A way of establishing the validity of the objective knowledge test, could have been to compare the baseline test results, achieved by each student, with coursework and examination results obtained for theoretical nursing modules completed at the same time. It would be possible to review grades obtained by students at the end of semester one, within three months of completing the baseline objective knowledge test. However, these modules test a wide range of knowledge of professional issues and clinical skills, whereas the quiz related to knowledge relating to medical and rehabilitation placements. As such, the module content was not particularly relevant to those areas being tested in the quiz. A test for criterion-related validity was not therefore conducted.

3.7.4 Internal and external validity

LoBiondo-Wood & Haber (1998) discuss the concepts of internal and external validity:

"...one needs to feel that the results of a study are valid, based on precision, and faithful to what the researcher wants to measure... it must be believable and dependable."
(LoBiondo-Wood & Haper 1998 p.163)

They discuss internal and external validity:

"Internal validity asks whether the independent variable really made the difference. This requires the researcher to rule out other factors or threats as rival explanations of the relationship between the variables." (LoBiondo-Wood & Haper 1998 p.164)

3.7.4.1 Internal validity

Six threats to internal validity are identified: history, maturation, testing, instrumentation, mortality and selection bias.

History refers to events which occur concurrently with the independent variable, which can affect the dependent variables being measured. An example of this cited by LoBiondo-Wood & Haber (1998), is the effect a government initiative promoting breastfeeding, might have on a study establishing the effects of a breastfeeding teaching programme on the length of time breastfeeding is maintained. Such events are difficult to predict and control. It could be argued that the knowledge and practical skills demonstrated by a student may be the result of experiencing a placement where the student's preceptor is able to spend a great deal of time teaching the student. Alternatively, the student may be very motivated and spend time studying and practising. Thus there is another factor influencing the dependent variable being studied. However, the random allocation of students to each of the experimental groups and the use of all the available students within the study, should militate against the introduction of this type of bias.

Maturation refers to developments or processes occurring in individuals over time within a study. LoBiondo-Wood & Haber (1998) give an example of this, related to the present study:

"...suppose one wishes to evaluate the effects of a specific teaching method on baccalaureate students' achievements on a skills test. The investigator would record the students' abilities before and after the teaching method. Between the pre-test and post-test the students have grown older and wiser. This growth or change is unrelated to the investigation and may explain differences between the two testing periods rather than the experimental treatment."
(LoBiondo-Wood & Haper 1998 p.164-165)

Within the present study, the researcher is interested in which combination of variables produce the best end result – best knowledge and skills scores. It is accepted that students will develop and mature – grow older and wiser – throughout the duration of the study, although it is of a relatively short time-span, but which combination of variables will enhance this process the most?

The issue of testing is also particularly relevant to the present study. LoBiondo-Wood & Haber define this as:

“..the effect of taking a pre-test on the score of a post-test.”
(LoBiondo-Wood & Haper 1998 p.165)

Within the present study, students are required to take the objective knowledge test four times, and it could be argued that students begin to remember questions. However, they were not given any feedback as to what the correct answers were. Students would have to be sufficiently motivated to look the answers up for themselves. Students were assured on several occasions, that the tests did not form any part of their formative or summative assessment, thus they did not have a vested interest in looking up answers. In addition, whilst the same test was administered on each occasion, the students did not know that this would be the case, they had simply been told that they would be asked to complete tests on several occasions. Testing was unlikely to influence the repeated administration of the practical skill observation tool, as students were unaware of what was being assessed on all occasions.

Instrumentation threats refer to differences in measurement that may be obtained, even though the same measuring tool is being used. This was not a problem with the objective knowledge test, which had been chosen specifically because it is a purely objective method of measurement, there is no room for subjective variances of interpretation. It was an issue with the observation tool. LoBiondo-Wood & Haber (1998) identify that observation techniques are especially prone to threats to instrumentation if a researcher has to use several observers to collect information. Observers may interpret what they see differently resulting in a lack of consistency among them. This was minimised in this study by the researcher using clinical supervisors in addition to the researcher to perform the observations and by using a tool based on a clinical assessment tool with which everyone was familiar. Each clinical supervisor observed a student simultaneously with the researcher and completed the observation tool. The results were then compared. Without exception, the supervisor and the researcher had rated the student the same. The decision only to use ‘yes’, ‘no’ or ‘not applicable’ categories also meant there was less likelihood of subjective interpretation being applied. The student either did, or did not, safely and appropriately demonstrate the skill.

Mortality refers to the loss of subjects from a study over the course of its duration. Polit & Hungler (1993) say this can bias a study, as particular elements are more likely to drop out than others. They give the example of a study investigating the morale of nurses initiating primary nursing. Those less committed to the introduction of primary nursing might be less committed to the investigation and therefore drop out. Those that are committed, might be more motivated to remain in the study and give false results of high morale. Problems were experienced within the present study as follows:

- One student was withdrawn from the course due to lack of academic progress and was eliminated from the study.
- One student transferred to another course.
- One student completed clinical placements in a remote area of Tayside and could not have the practical skills assessments completed within the available time-scale.
- Four students did not attend either of the two teaching sessions for medical or rehabilitation.
- Six students attended one or the other of the teaching sessions, but not both.

The random allocation of students to each of the experimental groups and the statistical tests employed, minimised the effects of these.

The final number of students used for the study was twenty-nine. The results show students identified from one to thirty, although there are only twenty-nine sets of results from the students. This is because students had been allocated numbers before it was discovered that one student had been allocated to a remote area of Tayside and could not be included in the study. As a result, student number four is missing from the table of raw and percentage scores shown in Appendices 6 and 7.

Selection bias is a threat to internal validity if the methods employed to select individuals for inclusion within the study do not ensure that a representative sample is obtained. Thus

sampling techniques are of paramount importance. Selection bias was not a problem within this study as the total population of first year students available to the researcher were included within the study and these were randomly allocated to each of the experimental groups.

In summary, the internal validity of the tool and its findings were established by the following:

- Content and design of measuring tools developed using “experts”
- Piloting of measuring tools
- Establishing inter-rater reliability of observation tool for measuring practical skill
- Using objective test to measure theoretical knowledge
- Use of total population
- Random allocation of subjects to experimental groups

3.7.4.2 External Validity

External validity refers to the extent to which the findings of a study can be generalised to other populations and conditions:

*“External validity questions under what conditions and with what types of subjects the same results can be expected to occur.”
(LoBiondo-Wood & Haber 1998 p. 167)*

Maximising internal validity goes some way to establishing external validity, and the two concepts are related to some degree (LoBiondo-Wood & Haber, 1998). An important consideration in establishing the external validity of a study is the sampling methods employed. If the researcher has used a representative sample of the total population, it is more likely that the results can be generalised to this population. The present study used a

total population of first year undergraduate nursing students at one institution of higher education, with random allocation of students to each of the experimental groups. Whilst the results then apply to this population, it cannot be said with certainty that they apply to the wider population of all first year student nurses within Scotland, as sampling and testing of this larger population was not feasible within the scope of the study. The question rests on whether or not the students used for this study adequately represent first year student nurses as a whole. The answer is probably not, as other students undertake different programmes of education – Project 2000 – and the characteristics of these students may be different, for example the academic entry requirements are lower. However, as the study is designed to measure improvement in knowledge under various conditions this may not be pertinent. It would actually prove difficult to conduct a study using this design on a population comprised of students from more than one institution due to the problems of collecting students together for theoretical teaching sessions, administering tests and controlling the allocation of placements. This study is an initial pilot study. It might be possible to repeat the study with students at another institution to see if comparable results are obtained.

3.8 ETHICAL ISSUES

It is important to consider the ethical implications of a proposed research study in order to protect the rights of individuals who agree to participate in an investigation. Polit *et al* (2001) suggest three ethical principles need to be satisfied; these are the principles of beneficence, respect and justice.

According to Polit *et al* (2001), there are three components of the principle of beneficence. The first is freedom from harm and the researcher needs to ensure that participation in a research study will not result in any harm, injury, disability or undue distress to individuals. An obvious example of potential harm is participation in drug trials, where a new drug may be shown to have unforeseen physical side effects. Harm may also be psychological, social or economic. For example, a study investigating rape or abuse may result in psychological harm by reminding participants of past traumatic experiences (LoBiondo-Wood & Haber 1998). LoBiondo-Wood & Haber say harm and

discomfort ranges from being temporary to being permanent. The individual's right to freedom from harm is violated when the researcher knows in advance that participants in a study may suffer harm, death or disabling injury, in which case the benefits of the research are outweighed by the risks involved. The Medical Research Council (M.R.C.) issues guidelines with regard to the way in which personal information should be handled within medical research. They state:

“Researchers must also have procedures in place to minimise the risk of causing distress to the people they contact in the course of their research. Researchers must also be aware that, despite their best efforts, occasional untoward events may occur and plan for how to deal with these.” (M.R.C. 2000 p. 9)

Within the proposed research study, no physical harm or injury was envisaged, although it could be argued that some psychological distress may have resulted if students performed badly on the quizzes or observation tests and were worried that this could influence their progression on the course. However, students were not informed how well, or otherwise they had performed and were assured at the outset of the study that their performance within the research study would in no way affect their progression. They were also assured that their results would only be known to the researcher and the researcher's supervisor during the initial stages of data analysis in order to be able to correlate quiz scores with observation scores. Once these scores were completed, students were assigned a number, known only to the researcher for purposes of data analysis. Whilst the clinical supervisors completed a proportion of the practical skills assessments, they were not involved in the scoring of these and were not aware of how students had performed within the scope of the study.

The second component of the principle of beneficence is freedom from exploitation, whereby involvement in a study should not disadvantage participants in any way. Data collected for research purposes should not be used against individuals. For example, health or life insurance being refused to individuals who have disclosed life-threatening illnesses (Polit *et al* 2001). Freedom from exploitation was very pertinent to the proposed study, in that students may have been worried that their performance within the study could influence their progression on the course, or how they were perceived by lecturers. As discussed above, students were assured of the confidentiality of their results and that

their performance within the study would not affect their progression on the degree course.

Polit *et al* (2001) say the third component of the principle of beneficence to be evaluated is the risk/benefit ratio, ensuring that the risks taken by individuals in participating in the study are less than the potential humanitarian benefit. LoBiondo-Wood & Haber (1998) say that participants may experience only temporary discomfort, in such cases, the benefits of a research study may outweigh these temporary discomforts. For example, if a new drug to treat a life-threatening illness is discovered, this may outweigh minor or temporary discomfort such as headaches or nausea of those participating in trials testing the drug (LoBiondo-Wood & Haper 1998). Within this study, the benefits of potentially being able to develop strategies to close the theory-practice gap within nursing were seen to outweigh the possible distress caused to students, particularly in view of the fact that measures, as described above, were taken to try and minimise any such potential distress.

The principle of respect for human dignity rests on the right of individuals to be self-determining. Individuals have the right to decide for themselves whether or not they wish to participate in a study. They have the right to ask questions, refuse to give information and to withdraw from a study at any stage without fear of being penalised in some way, or prejudiced against (Polit *et al* 2001). LoBiondo-Wood & Haper (1998) say that individuals should be treated as autonomous agents. An autonomous agent is one who is informed with regard to a proposed study and can choose whether or not to participate. In order to be self-determining, individuals need to be in possession of sufficient information in order to make an informed choice as to whether or not they wish to be involved with a study. They therefore have the right to full disclosure with regard to the nature and purpose of a study, its risks and benefits, what would be required of them if they agreed to participate and the knowledge that they can refuse to participate without fear of penalty. The right to full disclosure and to be self-determining, form the basis of informed consent. Informed consent rests on the premise that individuals are given adequate information with regard to a research study, which they are able to understand and as a result are able to make a free choice as to whether or not they wish to participate (Polit *et al* 2001).

A number of measures were taken to ensure the principle of respect for human dignity was upheld within the proposed study. Permission had previously been gained from the Head of School at Institution A to recruit undergraduate nursing students within the university to the study. The purpose of the study was explained to the students in a group session, together with discussion of what would be entailed in terms of the number of quizzes and skills assessments they would be required to complete if they wished to participate in the study. The need to attend two three-hour teaching sessions at the start of the study was also discussed. Students were assured that participation was voluntary and that they would be free to withdraw at any stage of the study if they chose to do so. Students were then given time to ask questions and to decide whether or not they wished to participate. It was hoped that a group discussion would help them feel more confident to express any worries and anxieties they might have, rather than approaching students individually. Students were given approximately thirty minutes to decide whether or not they wanted to participate. All of the students at this stage of the study agreed to be involved and signed a form indicating their consent. Thus the researcher made efforts to ensure that students had sufficient information with regard to the study in order to make an informed choice as to whether or not they wanted to be involved. However, in order to be truly self-determining, individuals should not be subjected to any form of coercion. Coercion occurs when individuals are offered rewards or subjected to threats in order to make them agree to participate in a study (LoBiondo-Wood & Haber 1998). Polit *et al* (2001) say that coercion can be both overt or implicit and that the researcher needs to consider whether they are in a position of control, influence or authority over potential participants.

The issue of possible coercion was pertinent to this study due to the researcher's position as Programme Tutor for these first year student nurses. The researcher would have been regarded as being in a position of authority and control over the students and therefore possibly as being able to influence the position and progress of students on the course. Students may well have felt pressurised into agreeing to participate in the study in order to remain in the researcher's good graces. As a result, they may have agreed to participate in order to receive the researcher's approbation or approval, rather than because they genuinely wanted to be involved. They may also have been anxious that they would be viewed in a less favourable light or discriminated against in some way if they refused to

participate. It is difficult to see how this issue could have been completely eradicated from the study. Using a sample of students over whom the researcher was not in a position of authority would have been the best solution. However, as previously discussed, in order to be able to manipulate the factors under investigation, the researcher's own institution had to be used. The students were assured that participation was voluntary and that they could withdraw at any stage if they felt uncomfortable. They were assured there would be no prejudice against students who did not want to participate. They were also assured that any results from the quizzes and practical assessments would be known only to the researcher, would only be used for research purposes and would in no way affect their grades, progression or status on the course. In retrospect, it would perhaps have been more appropriate to have allowed the students twenty-four hours to think about whether they wanted to participate and to have given them consent forms to take away which could be returned to the researcher if they wanted to take part in the study. This strategy may have helped them feel less pressurised than having them sign a consent form following the discussion and whilst the researcher was still present.

The third principle discussed by Polit *et al* (2001) is that of justice, whereby individuals have the right to fair treatment and to privacy. Fair treatment involves ensuring that participants are selected fairly, rather than because they are vulnerable or compromised. Also, the researcher should be non-prejudicial towards individuals who do not wish to participate and should honour agreements with regards to what participants are told is expected of them. Participants should also have access to the researcher for additional information and to appropriate professionals if any damage ensues as a result of participating in the research. All students were treated equally within the proposed study, and the researcher made sure students knew they could have further discussions if they so wished.

The right to privacy centres on the need to maintain the confidentiality of any data volunteered by individuals. Also, measures should be taken to ensure data are kept secure and that the research is no more intrusive than necessary for the purposes of the investigation. The M.R.C. (2000) say that:

“...normally researchers must ensure they have each person’s explicit consent to obtain, hold and use personal information.”
(M.R.C. 2000 p.9)

They add:

“all personal information must be coded or anonymised as far as is possible and consistent with the needs of the study, and as early as possible in the data processing.” (M.R.C. 2000 p. 9)

As discussed above, students were assured that the results of the study would be confidential and that students’ scores would be known to the researcher and researcher’s supervisor during the early stages of data analysis, after which students would be identified by a number known only to the researcher. The data were held on the researcher’s home computer in a password protected file to which only the researcher had access. This computer is not networked. Once the data had been entered into the computer the quizzes and assessment sheets were destroyed and on completion of the study the computer files will also be destroyed.

The Data Protection Act (1998) is also concerned with ensuring the right of privacy with regard to how information held about individuals is used. The principles of the Act include the need to ensure that any personal data collected and held about individuals are fairly and lawfully processed, are used for only specified purposes, are adequate, relevant and not excessive, are accurate and kept up to date, are kept no longer than necessary, are processed in accordance with individuals’ rights, are kept secure and are not transferred to countries that offer inadequate data protection (H.M.S.O. 1998). The Data Protection Act provides a framework governing the use of information held in electronic form or in structured paper records. The Act also recognises that information collected and held for research purposes often requires information to be used for purposes other than those for which it was originally collected (M.R.C. 2000). Section 33 of the act sets out exemptions for data collected for research purposes.

The measures described above with regard to maintaining the privacy and confidentiality of those who participated in the study ensured that the principles of the Data Protection

Act were also upheld. In summary, these were that the data collected were used only for the purposes of the research study, the students were fully informed with regard to the aim and purpose of the study and what would be required of them if they agreed to participate. Students were given numbers to protect their identity, with students' individual performances known only to the researcher. Students were assured that all data were confidential and kept securely on computer with paper records being destroyed following the initial data analysis. Ensuring data security is a legal obligation under the Data Protection Act (M.R.C. 2000).

3.9 DATA ANALYSIS

The theoretical knowledge test or quizzes were scored by hand. For each quiz there were three marks, one for general nursing knowledge, one for rehabilitation knowledge and one for medical knowledge, with a total score possible of 150. Each student should have had four quizzes to be marked, resulting in twelve scores for analysis. This was less in a number of cases due to non-attendance at the teaching sessions when quizzes 1 and 2 were completed. These raw scores were entered into Minitab. A table of these can be found in Appendix 6, sorted according to group A-H. Where comparison of medical and rehabilitation scores was required these scores were subsequently converted to percentages as shown in Appendix 7. This is because there was an unequal number of rehabilitation and medical questions and different total scores possible. Comparison of raw scores would have given misleading results.

The practical skill assessments were also scored by hand. The total score possible in this case was 100. These results were also entered into Minitab and can be found in Appendix 6. The satisfaction survey was also scored by hand and the results entered into Minitab and can also be found in Appendix 8.

Minitab was used to perform a series of one-way analyses of variance for each factor under investigation. The statistical procedures used within the study are discussed more fully below.

3.9.1 Statistical analysis of experimental data

To illustrate the types of data analysis undertaken in the quantitative stage of the study (chapter 4), an example is given here. Consider the artificial data set below.

Suppose that a group of 38 students are randomly allocated to one of two groups. One group of students is taught material by a nurse teacher and the other group by a preceptor. At the end of the teaching session, each student is given a test on the material covered and the scores found. The scores are shown below in Table 3.3:

Table 3.3
Hypothetical scores for students taught by nurse teacher or preceptor

Taught by nurse teacher	Taught by preceptor
34	37
23	39
31	41
33	41
20	43
26	46
34	46
25	46
27	47
32	51
31	53
24	54
25	49
25	48
32	54
31	53
26	49
32	55
21	60

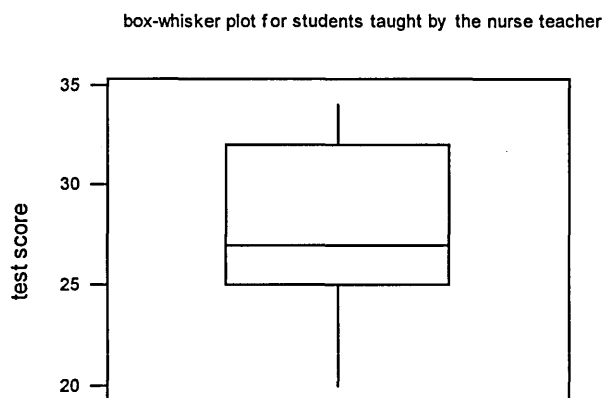
Consider first the students taught by the nurse teacher. These data can be summarised by finding the median. The median is defined as the middle data value when the data are arranged in ascending order. The 19 values arranged in order are:

20, 21, 23, 24, 25, 25, 25, 26, 26, 27, 31, 31, 31, 32, 32, 32, 33, 34, 34

The median is the 10th value, which is 27. The lower quartile is defined as the middle value of the lower half of the data set – the median of the first 10 values arranged in ascending order. This is the 5.5th item, defined as the average of the fifth and sixth values. For this data set both values are 25 so the lower quartile is 25. Similarly the upper quartile is defined as the 5.5th item in the upper half of the data set (items 10 to 19). The lower quartile for this data set is 32.

This summary of the data set, together with the minimum and maximum values (20 and 34 respectively), can be shown in a box-whisker plot, as given in Figure 3.3 below:

Figure 3.3.

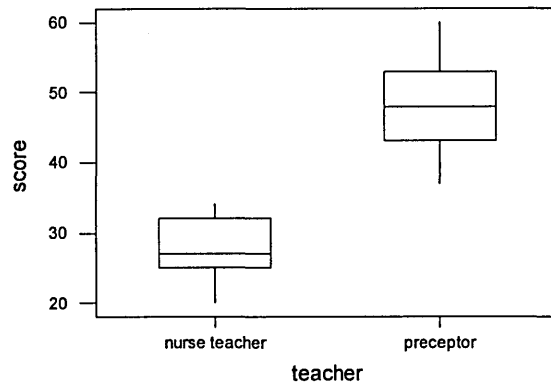


The minimum and maximum values are indicated by the lowest and highest values on the vertical line, which has a box around the two quartiles and is divided at the median.

Comparative box-whisker plots can be used to illustrate differences between data sets, such as students taught by the nurse teacher and preceptor, as shown below in Figure 3.4:

Figure 3.4

Comparative boxplot showing scores for students taught by nurse teacher or preceptor



The comparative boxplot suggests that students taught by the preceptor have higher and more variability scores than those taught by a nurse teacher. However, one disadvantage of the above approach is that it only uses the rank order of the data. For example, consider again the scores of those taught by the nurse teacher. The reordered scores are reproduced for convenience below:

20, 21, 23, 24, 25, 25, 25, 26, 26, **27**, 31, 31, 31, 32, 32, 32, 33, 34, 34

As shown before, the median (in bold) is the middle value and is equal to 27. However, if the data values above the median were all multiplied by 10 (say) to give values of 310, 310, 310, 320, 340, then the data set would have changed considerably but the median would remain at 27. Another summary statistic that uses all the data values is the mean.

The mean, denoted by \bar{x} (x-bar) is defined as the numerical average of the data set – the sum of the observations divided by the number of observations. The value of the mean score for those students taught by the nurse teacher is:

$$\frac{20+21+\dots+34+34}{19} = \frac{532}{19} = 28.$$

Similarly, the mean score for students taught by the preceptor is equal to 48, consistent with the observation from the comparative box-plot that the students taught by the preceptor have higher scores than those taught by a nurse teacher.

To complement the mean, a summary of the spread of numbers is also needed. One commonly used summary is the standard deviation, the square root of the variance. The standard deviation of a sample, s is defined as:

$$\sqrt{\frac{\sum(x - \bar{x})^2}{(N-1)}}$$

Where $\sum(x - \bar{x})^2$ is called the sum of squares and N is the number of observations. A data set without much variation will have all its values close to the mean, \bar{x} , and so all the values of $(x - \bar{x})^2$ and their sum the sum of squares and hence the standard deviation will be small.

For the students taught by the nurse tutor, the standard deviation is:

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{(N-1)}} = \sqrt{\frac{362}{18}} = 4.485.$$

Similarly, the students taught by the preceptor have a standard deviation equal to:

$$s = \sqrt{\frac{664}{18}} = 6.704.$$

This larger value of the standard deviation indicates that the scores of students taught by the preceptor are more variable, consistent with the observation from the comparative boxplot.

The comparative box-plot suggested that the scores of students taught by the preceptor are different from those taught by the nurse teacher. However, drawing conclusions from a diagram such as a comparative box-plot is subjective. A more objective analysis is available through a statistical inference test called one-way analysis of variance.

First, some of the notation used in statistical inference is explained. Consider the case where a decision needs to be made as to whether the mean scores of students taught by two different people are equal. The scores are called the **response** which may vary because of a **factor**, the teacher. The mean score of all students taught by the nurse teacher is defined as μ_1 and for those taught by the preceptor as μ_2 . If there were no difference in the teachers, then it would be expected that μ_1 and μ_2 would be equal and the means of the samples observed to be very similar. This is tested formally by proposing the null hypothesis, H_0 , written $H_0: \mu_1 = \mu_2$. If the data are not consistent with this hypothesis (because the sample means are very different) then the alternative hypothesis is accepted: H_A written $H_A: \mu_1 \neq \mu_2$.

To decide if the data are consistent with the null hypothesis, a **test statistic**, F , is calculated, based on the data. F is equal to zero if the sample means of the two groups are the same. If the sample means are similar, then F is small but if the sample means are very different then the value of F is large. The null hypothesis (that the overall mean scores for the two groups are the same) is rejected, if the value of F is so large that it is unlikely to be obtained by chance. The probability of obtaining the observed value of F (or larger) is called the **p value**. The usual threshold is to reject the null hypothesis if the p value is less than a predetermined value called the **significance level**, taken in this and many other studies to be 5% (0.05). Hence, there is a 5% chance of a false positive, by rejecting the null hypothesis when it is true.

The derivation of F for the one-way analysis of variance is described in many statistics books (e.g. Freund & Wilson 1993). In this section, the focus is on explanation of the output produced by the statistical package Minitab, used in chapter four and examining the assumptions inherent in using one-way ANOVA. The output produced by Minitab when testing if the mean score for students taught by the nurse teacher and preceptor is equal is shown below in Figure 3.5:

Figure 3.5

Example of output produced by Minitab when conducting one-way ANOVA

One-way Analysis of Variance					
Analysis of Variance for score					
Source	DF	SS	MS	F	P
teacher	1	3800.0	3800.0	133.33	0.000
Error	36	1026.0	28.5		
Total	37	4826.0			

Individual 95% CIs For Mean Based on Pooled StDev					
Level	N	Mean	StDev	-----+-----+-----+-----+-----	
nurse					
teacher	19	28.000	4.485	(---*---)	
preceptor	19	48.000	6.074		(---*---)
Pooled StDev = 5.339				28.0	35.0 42.0 49.0

First, consider the first part of the output, termed the ANOVA table, as shown below in Figure 3.6:

Figure 3.6

First part of ANOVA output

One-way Analysis of Variance					
Analysis of Variance for score					
Source	DF	SS	MS	F	P
teacher	1	3800.0	3800.0	133.33	0.000
Error	36	1026.0	28.5		
Total	37	4826.0			

Each column is considered in turn. The column headed 'source' indicates the source of variation among student scores. Some of the variation can be explained because a different teacher (the factor teacher) teaches the students. However, the scores for each student within each group also vary. This natural variation cannot be explained by knowing who teaches the student and is termed error. The sum of these two sources is summed to give the total variation.

The column headed 'DF' indicates the degrees of freedom. In general, if there is a total of N observations (38) in the above example then the total degrees of freedom is equal to N-1 (37 in this example). The degrees of freedom associated with the factor is one less than

the number of populations ($1 = 2 - 1$ in this example because there are two teachers). The degrees of freedom associated with error is found by subtraction ($37 - 1 = 36$ in this example).

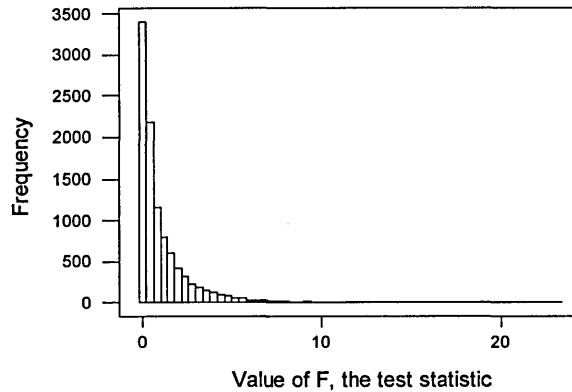
The column headed 'SS' shows the sum of squares. The error sum of squares is found by adding the sum of squares for each subgroup. Recall that the sum of squares for the students taught by the nurse teacher and preceptor are 362 and 664 respectively. Hence the error sum of squares is $362 + 664 = 1026$. The total sum of squares is found by combining the two groups and using the overall mean (38 in this example). The teacher sum of squares is found by subtraction.

The column headed 'MS' shows the mean square, defined as the sum of squares divided by the degrees of freedom. So, for example, the mean square for error is 1026 divided by $36 = 28.5$.

The column 'F' shows the values of the test statistic, defined as the mean square of the factor divided by the mean square for error (3800 divided by $28.5 = 133.33$). In later sections this will be abbreviated to $F(1, 36) = 133.33$ where $F(1,36)$ shows that an F test is being performed, which has degrees of freedom for the factor and error equal to 1 and 36 respectively.

A decision needs to be made if this value of F is small, and hence whether the null hypothesis should be accepted and a conclusion reached that the two populations have the same mean. Alternatively, if this value of F is large then the null hypothesis should be rejected, concluding that the two populations do not have the same mean. A simulation of values of F, *assuming the null hypothesis is correct*, is shown below in Figure 3.7:

Figure 3.7
Simulation of F values



Clearly, a value of 133.33 would be extremely unlikely as indicated by the very small value of p (0.000 to three decimal places). The p value is less than the benchmark figure of 0.05 hence the null hypothesis is rejected and a conclusion made that the mean values from the two populations are not equal. In later sections, a test is defined that has a p value less than 0.001, 0.01 and 0.05 as very highly significant, highly significant and significant respectively.

Considering the second part of the output (shown below in Figure 3.8) aids interpretation:

Figure 3.8
Second part of ANOVA output

Individual 95% CIs For Mean				Based on Pooled StDev			
Level	N	Mean	StDev	-----+-----+-----+-----+--			
nurse							
teacher	19	28.000	4.485	(- - - * - - -)			
preceptor	19	48.000	6.074	(- - - * - - -)			
Pooled StDev = 5.339				28.0	35.0	42.0	49.0

The left-hand part of this output shows the summary statistics found above. For example, there are 19 observations in the nurse teacher group, which have a mean of 28 and a

standard deviation of 4.485. The output on the right hand side shows the 95% confidence interval; the values between which the mean of 95% of groups of 19 students from each population is expected to lie. The non-overlapping confidence intervals are indicative of two populations that do not have a common mean and are hence unequal.

The one-way ANOVA explained above has a set of assumptions, outlined below:

- The samples are random and independent of each other
- Each population is normally distributed
- The populations have the same standard deviation

These are now examined in turn:

- The samples are random and independent of each other

As stated in the beginning of this section, the students were allocated at random to each group, independently.

- Each population is normally distributed

A population is said to follow a normal distribution if it has a frequency curve that is 'bell shaped'. This is the case if there are more observations around the mean value and the frequency decays symmetrically from the mean. An example of a normal curve is shown below in Figure 3.9. Note that the peak of this curve occurs at the mean value (48) and decreases symmetrically for scores away from the mean.

Figure 3.9

Example of normally distributed curve

Normal curve of scores by students taught by the preceptor

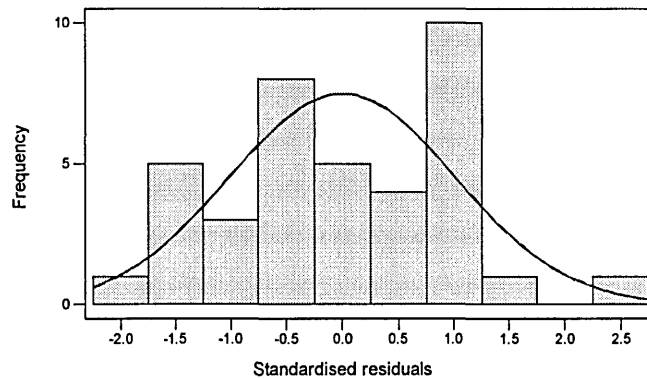


To test if each population follows a normal distribution first the residuals have to be found, defined as the score minus the mean of the population. For example, a student with a score of 34 in the population taught by the nurse teacher would have a residual of 34 minus 28, which equals 6. The residuals are then scaled so that they should follow a normal distribution with mean zero and standard deviation one. These transformed residuals are termed standardised residuals. The histogram and normal curve for the standardised residuals for the example is shown below in Figure 3.10:

Figure 3.10

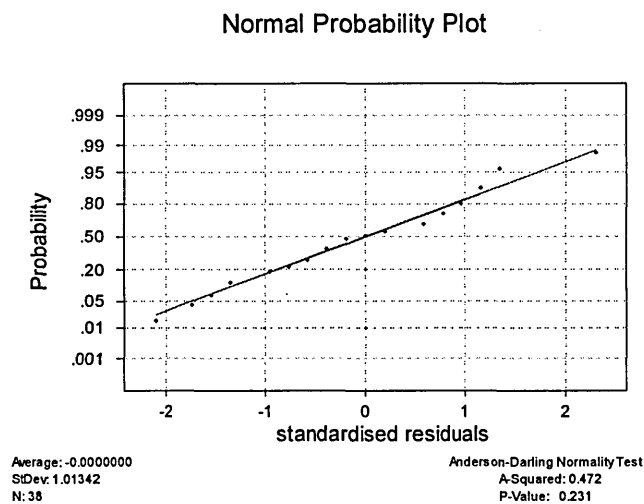
Histogram and normal curve for standardised residuals

Histogram of Standardised Residuals, with Normal Curve



Another statistical inference test, the Anderson-Darling test (D'Augustino & Stevens 1986) is used to test formally if the standardised residuals follow a normal distribution. The output from Minitab for the above data is shown below in Figure 3.11:

Figure 3.11

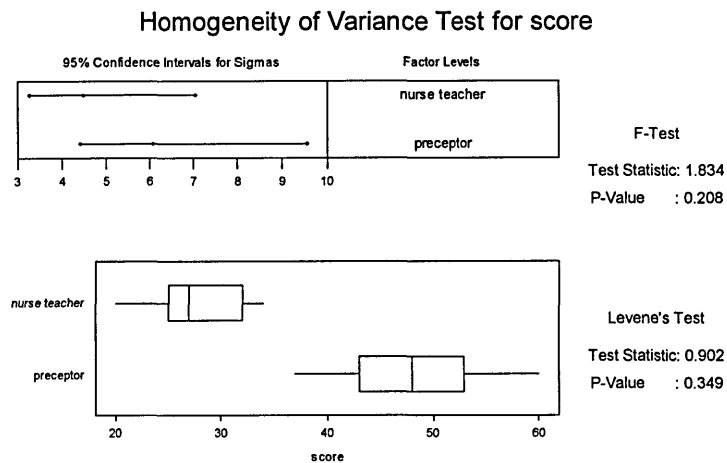


If the standardised residuals follow a normal distribution then the individual values should be close to the straight line in the above diagram and the p value for the Anderson-Darling test is larger than 0.05. The observed value of 0.231 is consistent with a data set that is drawn from a normal distribution. Hence, this assumption is satisfied for this example:

- The populations have the same standard deviation

The standard deviation of the scores for students taught by the nurse teacher and preceptor are 4.485 and 6.074 respectively. Another statistical inference test can be used to test if these values are significantly different. The relevant Minitab output for this test for homogeneity of variance is shown below in Figure 3.12:

Figure 3.12



The top part of the output shows that the 95% confidence intervals for the values of sigma (the standard deviation of each population) overlap considerably. This is consistent with two populations with a common standard deviation. The result is confirmed by the F test statistic which has a p value greater than 0.05. The lower part of the output shows the comparative box-plot (as seen earlier in this section) and the results of Levene's test for equal standard deviation. The F test and Levene's tests do not have the same p value because they have different assumptions. The F test assumes that the data follow a normal distribution which Levene's test does not. It has already been shown above, that the standardised residuals do follow a normal distribution and hence the F test is used in this example to confirm that this assumption is also satisfied.

As each of the ANOVA assumptions are satisfied it can be concluded that the means of the two populations are different and hence the scores for the two groups are not equal.

These techniques can be extended to cover cases where there is more than one factor. For example, students might be randomly allocated to be taught by different teachers, for those teachers to collaborate before teaching or not and for the students to go immediately to the relevant placement or not. Hence, there are three factors, each of which has two divisions (levels). As previously discussed, such an experiment is defined as a $2 \times 2 \times 2$ or a 2^3 experiment. This is shorthand for an experiment with three factors,

each of which has two levels. Such an experiment has eight combinations of treatments and hence the students would need to be allocated to the eight treatment combinations at random.

When using one-way ANOVA as a means of deciding whether or not the means of two or more groups vary significantly from each other, it is important to ensure that the sample sizes are sufficiently large enough to have a reasonable probability (usually at least 80%) of detecting any such differences. In order to do this power calculations are performed (Moore & McCabe 1998). The first stage is to identify the size of difference that the researcher wants to detect. The power calculation will then identify whether the sample size used (assuming approximately the same number in each group) is sufficiently large enough to detect such a difference with a reasonable probability, or conversely determine the minimum sample size to detect a difference for a given probability. This is useful if ANOVA has revealed no significant difference in the means of two groups, the researcher can then check whether this is because the sample size was too small (Grimm 1993).

For example, suppose the researcher wished to identify whether a sample of 10 students taught by a nurse teacher and 10 students taught by a preceptor was sufficiently large enough to detect a difference in theoretical knowledge scores of 10% between the two groups. The improvement in scores is as follows:

Table 3.4

Hypothetical improvement in scores for students taught by a nurse teacher or preceptor

Taught by	Improvement in score
Nurse Teacher	-3
Nurse Teacher	2
Nurse Teacher	3
Nurse Teacher	16
Nurse Teacher	1
Nurse Teacher	15
Nurse Teacher	4
Nurse Teacher	10
Nurse Teacher	8
Nurse Teacher	6
Preceptor	25
Preceptor	34
Preceptor	27
Preceptor	53
Preceptor	46
Preceptor	22
Preceptor	34
Preceptor	39
Preceptor	32
Preceptor	36

The Minitab readout of the power calculation using the data above and setting the difference in scores at 10% is as follows:

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus >)

Calculating power for mean 1 = mean 2 + 10

Alpha = 0.05 Sigma = 8.7

Sample

Size	Power
------	-------

10	0.7958
----	--------

Alpha is the level of acceptance or rejection of the null hypothesis, 0.05 being a commonly accepted level of significance (Grimm 1993). Sigma is the pooled standard deviation, which is estimated by the square root of the error of mean of squares for the theoretical scores for both groups found from the ANOVA table. In the above example it can be seen that the power is 0.7958. This indicates that with two groups each of sample size 10 there is nearly an 80% chance of spotting a difference of 10% in the scores between the two groups.

Suppose the results of the power calculation had been as follows:

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus >)

Calculating power for mean 1 = mean 2 + 10

Alpha = 0.05 Sigma = 12.6

Sample

Size	Power
------	-------

10	0.5250
----	--------

Here, the power is only 0.525, indicating that there is only a 52% chance of spotting a difference of 10% with sample sizes of 10. If the researcher decided that this figure was too low, then the researcher can calculate the sample size needed to detect such a difference with an acceptable probability.

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus >)

Calculating power for mean 1 = mean 2 + 10

Alpha = 0.05 Sigma = 12.6

Sample Target Actual

Size Power Power

21 0.8000 0.8114

The sample size necessary to detect a difference of 10% in the scores of the two groups is 21. This is consistent with the example above, showing that the sample used is therefore likely to be too small to detect any significant differences in score. It does not necessarily mean that there are no significant differences.

Within the researcher's study, a difference of 15% in theoretical knowledge or practical skill score was set as the size of difference to be detected. It was felt that a 15% difference in scores was sufficiently large enough to indicate a significant difference in theoretical and practical knowledge scores according to the way in which the factors under investigation were manipulated.

Power calculations are often conducted prior to the commencement of a study, particularly if research funding is being sought. It would be unethical to conduct a study using a sample which is too small to detect any statistical differences between groups with a reasonable probability, or too large and so putting some patients at risk unnecessarily. In one Local Medical Research Ethics committee typically more than 75% of applications are designated 'pilot study' and are conducted without a power calculation (H. Staines 2001 pers. comm.).

It was not possible to conduct power analyses prior to the commencement of the researcher's study. The instruments used to measure theoretical knowledge and practical skill were designed specifically for this study and had not been previously tested, other

than within the pilot study on four third year undergraduate nursing students, as discussed in section 3.4.4.4. Therefore no data were available on which to conduct power analyses. The sample used within the main study could have been used to perform a pilot study to carry out power analyses, but this would have meant delaying the main study for a year; this was not a realistic option within the timescale allowed for the study.

A power calculation was performed for each of the hypotheses tested, following the ANOVA calculations. This allowed the researcher to check that the sample size was sufficiently large enough to detect a difference of 15 percentage points with a reasonable probability. These results are shown in chapter 4, following the ANOVA table for each hypothesis tested.

In order to analyse data from the satisfaction surveys, a t test statistic is calculated in order to test whether students agree on average with Likert scaled statements. In order to illustrate the use of this test in chapter four, consider again the scores achieved by students taught by a nurse teacher in the hypothetical scores given in Table 3.3. Suppose there was reason to believe (based on previous years' data) that the mean score of such students was 30 and that this year's students would be expected to score, on average less than 30. A one sample t test can be used to test objectively if the scores in our sample were consistent being drawn from a population with a mean less than 30. Using the notation introduced above, the null hypothesis is that the mean of the population $\mu = 30$ and the alternative hypothesis is that $\mu < 30$.

The test statistic used is $t = (\text{sample mean} - \text{hypothesised mean})$ times the square root of the sample size divided by the standard deviation:

$$t = \frac{(\bar{x} - \mu)\sqrt{n}}{s}$$

which for this data set is:

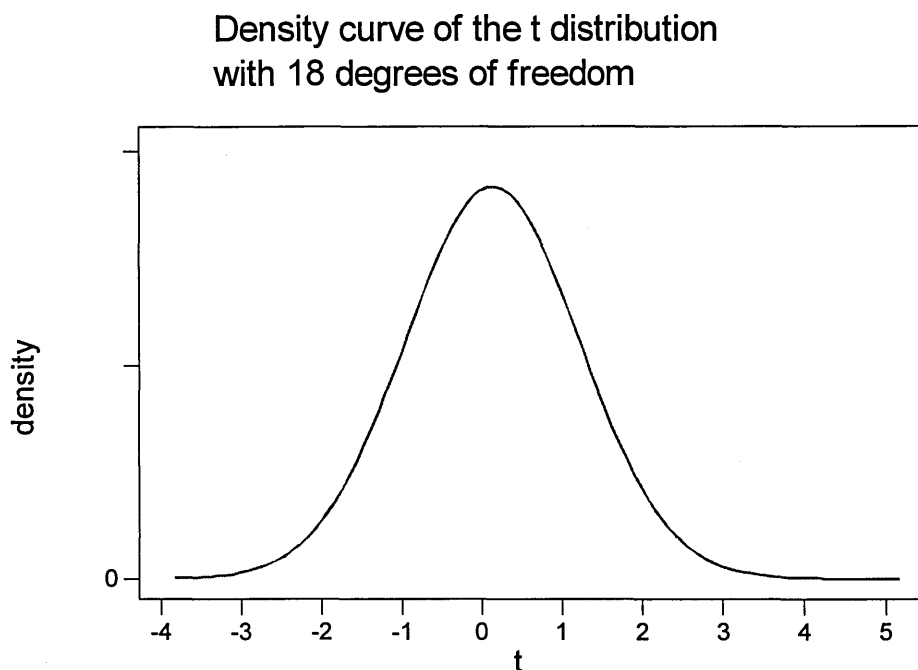
$$\frac{(28-30) \times \sqrt{19}}$$

$$4.485$$

$$= -1.94.$$

If the students' score had reduced from previous years then it would be expected that the mean of the sample is much less than 30. This would result in a large negative value for t . A simulation of such values, assuming that the null hypothesis is true (i.e. that the mean had NOT reduced), is shown below in Figure 3.13:

Figure 3.13



A value of -1.94 has a p value of 0.034, indicating that such a value (or more extreme) would only occur in 34 of 1000 samples. This is considered unlikely (a probability of less than 0.05) so it is concluded that the null hypothesis ($\mu = 30$) is rejected in favour of the alternative hypothesis ($\mu < 30$). Hence, it is concluded that this year's students taught by the nurse teacher have a lower score, on average, than those taught by the nurse teacher in previous years.

This test has been used in chapter four to test whether students agree on average with Likert scaled statements. A five point Likert scale has been used with 1 = 'strongly agree' through to 5 = 'strongly disagree'. The null hypothesis is that the average agreement is in the middle of the scale (i.e. $\mu = 3$). If it is suspected that students, on average, agreed with

the statement, then whether $\mu < 3$ is tested. Similarly, it can be tested if students, on average, disagree with a statement using the alternative hypothesis $\mu > 3$.

All of the statistical procedures discussed in this section are those used to analyse the data in chapter four.

3.10 CONDUCT OF THE STUDY

Discussion took place with all first year undergraduate nursing students approximately one month before it was planned to commence the collection of data. Students were informed of the purpose of the study and that if they agreed to take part it would involve attendance at two teaching sessions aimed at teaching them theoretical knowledge relating to medical and rehabilitation clinical specialties. It was emphasised that these sessions would be in addition to those normally taught within the first year syllabus. They were told that they would also be required to complete four quiz tests at various stages during their summer placements, plus being observed in the clinical area on three occasions. It was stressed that participation was voluntary, that the results of the quizzes and skills assessments would be confidential and would in no way affect any of their usual assessments or progress on the course. Students were told they could withdraw at any stage of the study if they wished. All of the students agreed to take part and signed their names to confirm participation in the study. The Head of the School at institution A had previously agreed to allow the study to be conducted.

Two preceptors and two nurse teachers from the teaching staff within the university were approached and agreed to each teach two three-hour sessions. One preceptor and nurse teacher were asked to teach sessions on rehabilitation, the other preceptor and nurse teacher were asked to teach sessions relating to medical placement. The preceptors who were asked to participate in the study were both experienced clinicians, one from rehabilitation, the other from medical, who had been in their present post for a number of years and who regularly preceptored and taught all levels of student nurses within the clinical environment. The members of university teaching staff who were asked to teach,

were routinely involved in teaching first year undergraduate nursing students theoretical and practical elements of the syllabus relating to their clinical placements.

These individuals were given minimal guidance as to what was to be taught; they were simply asked to conduct a three-hour teaching session related to either the medical or rehabilitation clinical setting about which they had been invited to teach. They were told that the session they planned should be a reflection of what knowledge they felt important for first year student nurses to have before they entered either medical or rehabilitation clinical areas. The reason for the lack of direction was to ensure that the researcher did not influence the content of the teaching sessions in any way. The theoretical knowledge subsequently demonstrated by the students could be attributed to the input given by the nurse teacher or preceptor. It would then be possible to establish whether preceptors or nurse teachers were better at promoting the theoretical knowledge previously identified by both clinicians and academics as being relevant and important for first year student nurses to possess and which had been incorporated into the quiz.

All students completed the first objective test quiz before the teachers began their first session. The teachers were not aware of the content of this quiz. This provided a baseline of theoretical knowledge against which to compare future performance. The first teaching sessions took place on the Monday of the week before students were due to commence their summer placements (scheduled to last a total of seventeen weeks). Students had been assigned to their groups A-H although at this stage of the study only four groups were required: two to be taught by the preceptors, one for medical, one for rehabilitation and two groups to be taught by the nurse teachers, again one each for medical and rehabilitation. Each of the four groups were in a separate classroom for the teaching sessions. The teaching sessions lasted three hours, with teachers having free rein to plan how they wished to use this time.

At the end of the first teaching session the preceptor and nurse teacher teaching medical theory, met to discuss the content of their sessions and to agree what the content of their second session would cover. Similarly the preceptor and nurse teacher teaching rehabilitation theory met to discuss what should be included in their next session. Thus for the second teaching sessions, there had been collaboration on what was to be taught to

the students between the preceptor and nurse teacher. The second sessions took place two days later, on the Wednesday, again with four groups in separate rooms, but the preceptors and nurse teachers taught different groups. Students who had been taught medical theory without collaboration on the first session, were taught rehabilitation theory on the second occasion after collaboration had taken place. Students taught rehabilitation theory without collaboration were taught medical theory after collaboration occurred. On both occasions students were taught by either a preceptor or an academic member of teaching staff.

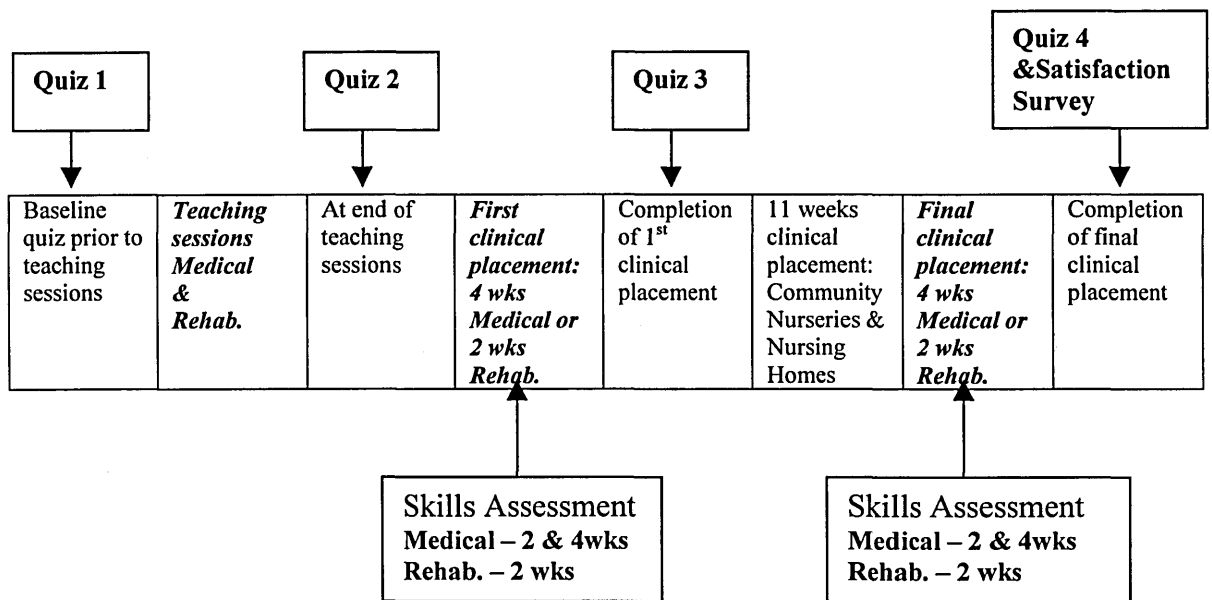
Immediately following completion of the second teaching session, which was also programmed to last three hours, students completed the quiz for a second time. Comparison between quiz 1 and quiz 2 scores for students should therefore highlight the effectiveness of who taught the students and whether or not collaboration occurred.

The following week, students commenced their clinical placements. Half of the students went to a two-week rehabilitation placement at the end of which a practical skill assessment was made using the observation tool previously discussed. The other half of the class went to a four-week medical placement. Practical skill assessments were performed at two weeks into the medical placement and at the end of four weeks. This allowed for the effect of the length of a placement on practical skill acquisition to be ascertained for the medical area.

The third quiz took place straight after completion of the students' first placement. Students then spent eleven weeks completing nursing home, community and nursery placements. The final placement was two weeks rehabilitation if they had completed a medical placement at the beginning of the summer, or four weeks medical if they had previously been to rehabilitation. Again practical skill assessments were completed at the end of two weeks rehabilitation and at two and four weeks medical placement. The fourth quiz was undertaken on completion of the final placement. This allowed for comparison of quiz scores according to the sequencing of placements – whether students had gone straight to a rehabilitation or medical placement or experienced a delay. The satisfaction survey was included at the end of the fourth quiz.

Data collection using the quizzes, observation schedules and satisfaction surveys took place over a period of eighteen weeks. A recap of the design of the quantitative stage of the study is given below in Figure 3.14:

Figure 3.14
Design of quantitative stage of study



CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

This chapter presents the results of the quantitative stage of the study employing the statistical procedures outlined in section 3.9.1 of the previous chapter. Firstly, the design of the study is reviewed. This is followed by presentation of the results of the series of one-way ANOVA performed. Finally the results of the three-way ANOVA are demonstrated. Table 4.12 summarises the hypotheses tested, the data used to perform the statistical analyses and the results of each test.

4.2 OVERVIEW OF DESIGN OF STUDY

The qualitative stage of this study has identified a number of factors perceived by the nurse teachers, student nurses and preceptors who were interviewed to affect the theory-practice gap. The aim of this second, quantitative stage is to subject three of these factors to empirical testing within an experimental design in order to determine whether the factors affect theoretical knowledge and practical skill development and satisfaction in a cohort of first year undergraduate nursing students. The factors selected for investigation are:

- **X1 Teacher** – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher
- **X2 Collaboration** – students are taught theoretical elements relating to a clinical speciality upon which the preceptor and nurse teacher have or have not collaborated

- **X3 Sequencing of theory and practice** – students go straight to the relevant clinical speciality following theoretical input, or delay the clinical experience

It is argued that if factors that affect knowledge and skill development can be identified, then strategies which promote these can be developed and this may go some way to helping to close the theory-practice gap which is evident within nursing.

Within this 2³ experimental design, eight groups were required in order to produce all the possible combinations of the factors and levels under investigation. These were labelled A to H and students were randomly allocated to each of these groups as shown in Table 4.1 below:

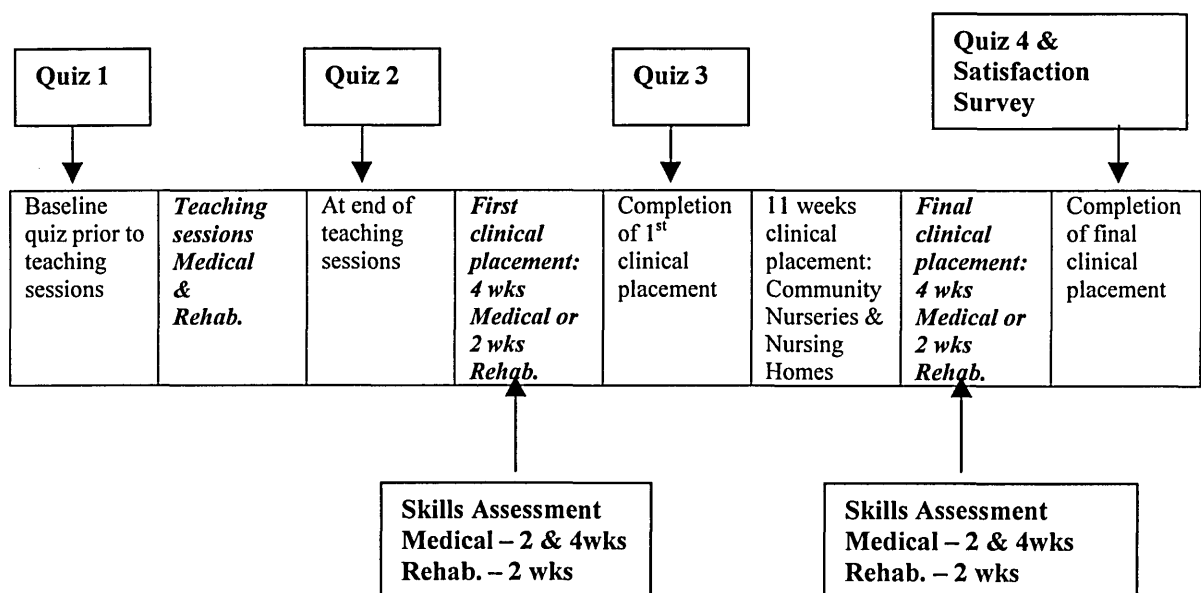
Table 4.1
Manipulation of factors according to group A-H

Group	X1	X2	X3
	Taught by	Collaboration	Straight to
A	Preceptor	Medical	Medical
B	Preceptor	Medical	Rehabilitation
C	Preceptor	Rehabilitation	Medical
D	Preceptor	Rehabilitation	Rehabilitation
E	Nurse Teacher	Medical	Medical
F	Nurse Teacher	Medical	Rehabilitation
G	Nurse Teacher	Rehabilitation	Medical
H	Nurse Teacher	Rehabilitation	Rehabilitation

In the week immediately prior to clinical placement, students were taught for two, three-hour sessions. One session provided them with theoretical input relating to the medical placement, the other the rehabilitation placement. These sessions were in addition to the curricula normally delivered to first year undergraduate nursing students. Students were taught by a preceptor or nurse teacher on both occasions. For one session they were taught prior to collaboration between the preceptor and nurse teacher on the content of the session, for the second session they were taught following collaboration. Students then went straight to a two-week rehabilitation, or a four-week medical placement. If their first placement was rehabilitation, their final placement was medical and vice versa. This final placement took place after a period of eleven weeks following completion of the first placement. Students' theoretical knowledge, practical skill and satisfaction were assessed at pre-determined points within the study as shown in Figure 3.14, reproduced for convenience here as Figure 4.1 below:

Figure 4.1

Design of study showing sequencing of quizzes and skills assessments



Each quiz was scored by hand and the raw scores entered into Minitab as a table of results as shown in Appendix 6. These were sorted according to student and the group to which the student had been randomly allocated. To ensure anonymity, students were only identified by a number. Each student should have had the results of four quizzes, but due to non-attendance at the teaching sessions by a number of students, some results for quiz 1 and 2 are missing. In addition to an overall score for each quiz (T), scores were also broken down into scores for general (G), medical (M) and rehabilitation (R) for each quiz. The mean scores according to group are also given. The maximum possible raw score for each section and overall is shown in Table 4.2 below:

Table 4.2
Raw scores and percentages of each section of quiz

	Raw score	%
General (G)	58	38.666
Medical (M)	49	32.666
Rehabilitation (R)	43	28.666
Total (T)	150	100

A second table of results was also constructed as shown in Appendix 7, in which all the quiz raw scores were converted into percentages as a number of the analyses to be performed required percentage scores, rather than raw scores. This table also gives the percentage scores for each of the three skills assessments completed at two weeks medical (SM2 wks), four weeks medical (SM4 wks) and at two weeks rehabilitation (SR2). Scores for the skills assessments were converted into a percentage at the time of marking, as each assessment

would be different, according to which skills the observer had seen the student performing. The figure given is the percentage scored by the student out of the maximum possible score for those skills observed during an assessment. One skills assessment score is missing due to the student (student no 20) being ill.

The results of the satisfaction survey are shown in Appendix 8. The survey was divided into four sections. The first two sections contained the same ten statements, with the first section asking students' views of the medical orientation teaching session, the second section asking their views of the rehabilitation teaching session. The last two sections also contained the same ten statements. In the third section students' views of their medical placement were sought and in section four, their views of the rehabilitation placement. For each statement in every section, the mean value was calculated (1 = strongly agree, 5 = strongly disagree). Also, the percentage of students that agreed or strongly agreed with the statement and whether overall students agreed or disagreed with the statement. All of these are shown in table form in Appendix 9. In addition, a one-way ANOVA was calculated for each statement. This was to show whether there was more agreement with the statement according to whether a nurse teacher or preceptor taught the student, whether the nurse teacher and preceptor had collaborated on the content of the session to be taught and whether students went straight to, or delayed the related clinical placement.

4.3 RESULTS OF ONE-WAY ANOVA

A series of one-way analysis of variance (ANOVA) was performed initially for each factor under study. The procedures used to statistically analyse the experimental data have been discussed in detail within section 3.9.1.

The first one-way ANOVA is demonstrated fully below, whilst the remainder of the ANOVA results are presented in summary form.

4.3.1 Factor X1

Teacher – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher.

Comments gained from the qualitative stage of the study suggested that the theory-practice gap might be lessened if experienced clinical preceptors came into the classroom setting to teach students about their particular clinical speciality. Evidence to support this idea is tested here, by determining whether students' theoretical knowledge scores relating to medical and rehabilitation placement differ according to whether they are taught by a preceptor or nurse teacher. Practical skill and satisfaction is also compared according to who has taught the students.

Four hypotheses were tested to establish:

- Whether there were any differences in students' theoretical knowledge following the teaching sessions according to whether a preceptor or nurse teacher taught them
- Whether any differences were maintained over time

- Whether students improved their theoretical knowledge over the duration of clinical placements
- Whether there are any differences in practical skill scores according to who has initially taught the students

In addition, the satisfaction survey was analysed in order to establish whether there were any differences in levels of satisfaction with the teaching sessions according to whether a preceptor or nurse teacher initially taught the students

4.3.1.1 Differences in theoretical knowledge scores according to whether the medical and rehabilitation teaching sessions were taught by a preceptor or nurse teacher.

Improvement in students' total percentage pre-test scores (quiz 1) and following completion of the teaching sessions (quiz 2), prior to any clinical experience were compared according to whether they had been taught by a clinical preceptor or nurse teacher. The information used for this statistical analysis is shown below in Table 4.3:

Table 4.3

Data used to calculate differences in students' theoretical scores

Taught by:	n=	Quiz 1		Quiz 2		Improvement Q1 to Q2	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Nurse Teacher	8	49.09	8.56	51.1	10.58	4.75	5.6
Preceptor	11	34.86	9.47	68.64	7.03	33.09	10.62

Improvement in students' total percentage quiz scores from the baseline quiz 1 to quiz 2, which was performed upon completion of the teaching sessions, was used in order to ensure that what was tested was students' improvement in knowledge as a result of the teaching sessions. Some students may have started with a higher level of knowledge than others and could have gained a higher score as a result of this previous knowledge, rather than as a result of the teaching sessions. Obtaining a baseline score prior to any teaching input and then comparing this with scores immediately on completion of teaching, ensured that only improvement in knowledge as a result of teaching was measured.

Although thirty-two students were originally recruited to the study, two of these dropped out and one student could not be included in the study because they were allocated to a remote part of Tayside for the duration of clinical placements. This left a population of twenty-nine. Because a number of students did not attend one or other of the teaching sessions, their results could not be included for analysis, as it was not possible to determine improvements in their quiz scores. The final number of students whose data could be analysed was nineteen as shown in Table 4.3 above (n=19); eleven students were taught by a preceptor, eight by a nurse teacher.

One-way Analysis of Variance on improvement between quiz 1 and quiz 2 total % scores according to who taught the students

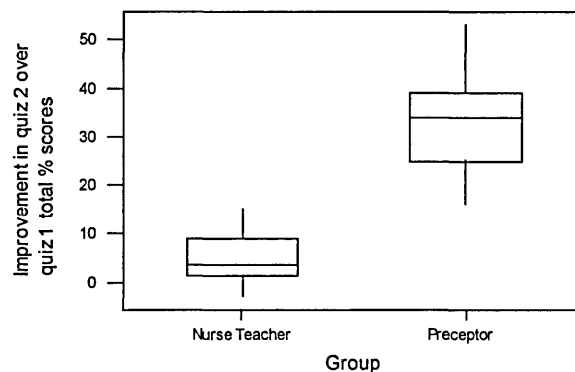
Hypothesis 1.

Ho: Improvement between quiz 1 and quiz 2 total % scores will be the same, whether students are taught by a preceptor or by a nurse teacher.

Ha: Improvement between quiz 1 and quiz 2 total % scores will be different, depending on whether they have been taught by a preceptor or by a nurse teacher.

Figure 4.2

Comparative boxplot showing improvement in total % quiz scores between baseline quiz (quiz 1) and following teaching sessions (quiz 2) according to who has taught the students



A comparative boxplot is a useful way to represent the data visually. As discussed in section 3.9.1, boxplots summarise the central tendency and spread of data by showing the median and

quartiles of the data (Monk 1991). They are very useful in comparing two or more data distributions and are particularly useful in visualising variation within a group or groups (Moore & McCabe 1998). The boxplot above demonstrates that the improvement in total % quiz scores is much lower for students taught by a nurse teacher, with no overlap with scores obtained by students taught by a preceptor. The spread of scores is more dispersed for the preceptor-taught group, than for the nurse teacher-taught group, although the spread of scores for both groups is quite small. In summary the boxplot shows that students taught by a preceptor improve more and have more variability in their improvement than those taught by a nurse teacher. This suggests that the scores obtained by students following teaching by a preceptor are different to scores obtained by nurse teacher-taught groups. One-way ANOVA will establish whether these differences are significant or not.

Source	DF	SS	MS	F	P
Group	1	3720.1	3720.1	46.97	0.000
Error	17	1346.4	79.2		
Total	18	5066.5			

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Nurse Teacher	8	4.750	5.600	---+-----+-----+-----+----- (-----*-----)
Preceptor	11	33.091	10.616	(-----*-----)

Pooled StDev = 8.899

0 12 24 36

The mean improvement in scores for students who have been taught by a preceptor is 33.09, with a standard deviation of 10.62, compared with a mean improvement of 4.75 and a standard deviation of 5.60 for students taught by a nurse teacher. A significance level of 0.05 has previously been identified as the usual level to determine whether or not a result is significant. If $p < 0.05$ then in 95 out of 100 cases the result is due to a significant difference

between the groups being investigated and not merely due to chance. The one-way ANOVA test statistic ($F(1,17) = 46.97$; $p < 0.001$) in the above case is highly significant. The p value is recorded to three decimal places as 0.000. There is a very low likelihood (less than 1 in 2000) that these results were obtained by chance. Students demonstrate a significantly better improvement in theoretical knowledge scores if they have been taught by a preceptor, rather than a nurse teacher.

A power calculation is performed for hypothesis 1 in order to check that the sample size is sufficiently large enough to detect a significant improvement of theoretical knowledge scores between those students taught by a nurse teacher and those taught by a preceptor. As discussed previously in section 3.9.1, a difference of 15% has been established as the size of difference that is to be detected. The results of the power calculation are demonstrated below:

Hypothesis 1

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + 15
Alpha = 0.05 Sigma = 8.89

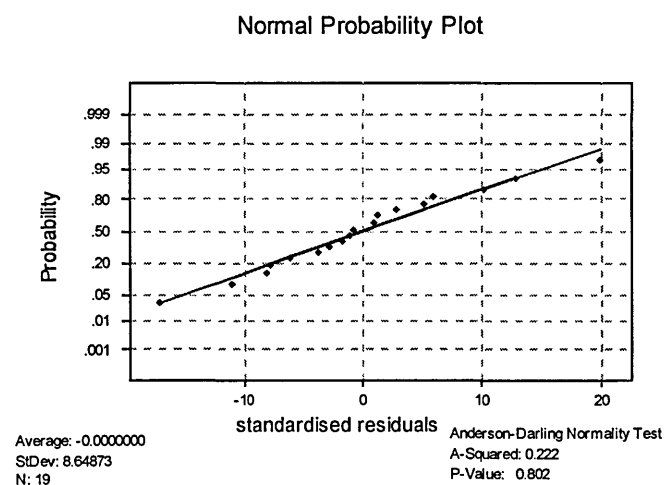
Sample Size	Power
8	0.8802
11	0.9641

This shows that had both groups been of size eight or eleven, then the probability of detecting a difference of fifteen percentage points would have been 0.8802 and 0.9641 respectively. Both of these figures are above 0.8 and it can be said that the sample is large enough to detect any significant differences in theoretical scores between the two groups.

As explained in section 3.9.1, one-way ANOVA has a set of associated assumptions which have to be satisfied before it can be accepted that conclusions drawn from the one-way ANOVA are appropriate. The assumptions are that the samples are random and independent of each other, each population is normally distributed and that the populations have the same standard deviation. The first assumption is satisfied in that students were randomly allocated to each group independently. The normal distribution of each population is established by showing whether or not the standardised residuals follow a normal distribution, whilst a test for homogeneity of variance establishes whether the populations have the same standard deviation.

Figure 4.3

Normality plot of Residuals for one-way ANOVA Model

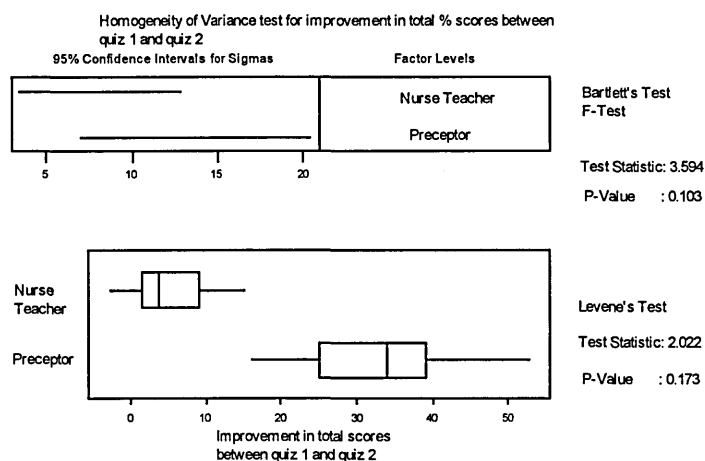


If the population studied is normally distributed, the standardised residuals should be close to a straight line and the p value for the Anderson-Darling test larger than 0.05. It can be seen

that the normality plot of residuals is close to a straight line with a p value <0.05 , indicating deviations from this are not significant. The population does follow a normal distribution.

Figure 4.4

Homogeneity of Variance Test for improvement between total % quiz 1 and quiz 2 scores



The top part of Figure 4.4 shows there is considerable overlap of the 95% confidence intervals for the values of sigma (the standard deviation of each population), which is expected with two populations having a common standard deviation. The F test statistic confirms this as $p < 0.05$. The lower part of Figure 4.4 shows the same boxplots as Figure 4.2, together with the results of Levene's test for equal standard deviation. Here again $p < 0.05$, showing that although there is a dispersion of results as demonstrated by the boxplots, these are not significant and the standard deviation of each population is the same.

The one-way ANOVA assumptions are satisfied and the conclusion can be drawn that students, who have initially been taught theoretical elements relating to a clinical placement by a preceptor demonstrate a significantly better improvement in theoretical knowledge acquisition than if they are taught by a nurse teacher.

The procedures described above were followed throughout the analysis process, with diagnostic checks and a power calculation made on each hypothesis tested. A summary of results is given below for the remaining one-way ANOVA conducted.

4.3.1.2 Are differences in theoretical knowledge scores according to whether students were taught by a preceptor or nurse teacher maintained over time?

A one-way ANOVA of total % scores for quiz 4 (at completion of final placement) was conducted to see whether the difference in improvement between preceptor and nurse teacher-taught students is maintained over time. This was calculated using total % scores for quiz 4, having eliminated any students who had not attended either of the preliminary teaching sessions.

One-way Analysis of Variance on students' total % quiz 4 scores according to who taught the students

Hypothesis 2.

Ho: There is no difference in total % quiz 4 scores depending on whether students were initially taught by a preceptor or nurse teacher.

Ha: There is a difference in total % quiz 4 scores, depending on whether students were initially taught by a preceptor or nurse teacher.

Source	DF	SS	MS	F	P
Group	1	175.0	175.0	2.15	0.161
Error	17	1385.1	81.5		
Total	18	1560.1			

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev	
Nurse Teacher	8	66.125	8.855	-----+----- (-----*-----)	
Preceptor	11	72.273	9.144	-----+----- (-----*-----)	
Pooled StDev = 9.026				60.0	66.0
				72.0	78.0

The test statistic ($F(1,17) = 2.15; p>0.05$) is not significant. Hence, the null hypothesis is accepted and it is concluded there is no difference in students' final quiz scores, whether they were initially taught by a preceptor or a nurse teacher. Students initially taught by a nurse teacher have caught up with those taught by a preceptor by the time all clinical placements are completed.

Hypothesis 2

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 9.03

Difference	Sample Size	Power
15	8	0.8702
15	11	0.9593

With power values of 0.8702 and 0.9593, the samples used were large enough to detect a difference of 15% in theoretical knowledge scores between the two groups.

4.3.1.3 Do students' theoretical knowledge scores improve over the duration of clinical placements?

A one-way ANOVA was conducted to assess whether students' theoretical scores improve over the duration of clinical placements, or whether students taught by a nurse teacher simply catch up with those taught by a preceptor. Total % scores for quiz 4 (at completion of final placement) are compared with total % scores for quiz 2 (immediately prior to commencement of clinical placement), again disregarding any students not present at both teaching sessions.

One-way Analysis of Variance on total % scores for quiz 2 and quiz 4

Hypothesis 3.

Ho: There is no difference in total quiz scores between quiz 2 and quiz 4

Ha: There is a difference in total quiz scores between quiz 2 and quiz 4

Source	DF	SS	MS	F	P
Quiz	1	508.4	508.4	5.17	0.029
Error	36	3542.5	98.4		
Total	37	4051.0			

Level	N	Mean	StDev
Quiz 2	19	62.368	10.494
Quiz 4	19	69.684	9.310

Pooled StDev = 9.920

Individual 95% CIs For Mean
Based on Pooled StDev

The test statistic ($F = (1,36) = 5.17$; $p < 0.05$) is significant. The null hypothesis is rejected, there is a significant difference between total % scores for quiz 2 and quiz 4. Overall students have

improved on their theoretical knowledge scores following completion of all clinical placements.

Hypothesis 3

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 9.92

Difference	Sample Size	Power
15	19	0.9950

With a power value of 0.9950, the sample used was large enough to detect a difference of 15% in theoretical knowledge scores between the start and end of clinical placements.

4.3.1.4 Differences in practical skill scores at two weeks according to whether students were initially taught by a preceptor or nurse teacher

The effect of who taught the students on practical skill scores could also be ascertained. The first practical skill score achieved by students at two weeks on their first placement, whether this was medical or rehabilitation, was used for this calculation.

One-way Analysis of Variance of students' practical skill score at two weeks on first placement according to whether they were taught by a preceptor or nurse teacher

Hypothesis 4.

Ho: There is no difference in students' practical skill score at two weeks in their first placement whether they were previously taught by a preceptor or nurse teacher.

Ha: There is a difference in students' practical skill score at two weeks in their first placement whether they were previously taught by a preceptor or nurse teacher.

Source	DF	SS	MS	F	P
Group	1	183	183	0.38	0.549
Error	16	7815	488		
Total	17	7998			

Level	N	Mean	StDev
Nurse	8	63.87	16.69
Preceptor	10	70.30	25.53

Pooled StDev = 22.10

Individual 95% CIs For Mean
Based on Pooled StDev

N.B. The students taught by a preceptor in this case (n=10) because one student was ill when practical skill assessments were being completed.

The test statistic ($F(1,16) = 0.38; p > 0.05$) is not significant in this case. There is no significant difference in students' skill scores at two weeks of their first clinical placement whether they were initially taught by a preceptor or nurse teacher. However, a power calculation demonstrates that in this case the sample was not sufficiently large enough to detect a difference of 15% between the two groups:

Hypothesis 4

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + 15
Alpha = 0.05 Sigma = 22.09

Sample Size	Power
8	0.2445
10	0.3011

A further calculation is performed to ascertain the size of sample that is required to demonstrate such a difference:

Hypothesis 4, Sample Size needed

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + 15
Alpha = 0.05 Sigma = 22.09

Sample Size	Target Power	Actual Power
36	0.8000	0.8109

The sample size needed to detect a difference of 15% in the scores of the two groups is thirty-six. The sample used is too small to detect significant differences in scores, but as discussed in section 3.9.1, it does not necessarily mean there are no significant differences.

4.3.1.5 Differences in satisfaction according to whether students were initially taught by a preceptor or nurse teacher

Finally for factor X1, satisfaction with teaching sessions were compared, according to who taught the students. This was calculated using the first two sections of the satisfaction survey. The first section (TM) asked students to rate satisfaction with the medical orientation teaching session, the second section (TR) asked students to rate satisfaction with the rehabilitation orientation teaching session. As discussed in the example demonstrated in section 4.1, for each of the ten statements in the two sections, the mean value was calculated (1 = strongly agree, 5 = strongly disagree), the percentage of students that agreed or strongly agreed and whether overall students agreed or disagreed with the statement. Also, a one-way ANOVA was calculated for each statement. This was to show if there was more agreement with the statement according to whether a nurse teacher or preceptor taught the student.

Tables 4.4 and 4.5 summarise these results. For each of the ten statements the mean value calculated from the satisfaction surveys of all nineteen students who attended the teaching sessions is shown. The mean values are shown in the column headed 'Mean'. It can be seen that for statements which were positively worded (statements 1, 2, 4, 6 and 8) all have a mean value of less than 3, demonstrating that students, on average, agreed with positive statements

about the teaching sessions. They agreed that they were informative, valuable and beneficial in helping them to prepare for practice. They also felt that the teaching sessions included information which helped them to apply theory to practice. Conversely, negatively worded statements (statements 3, 5, 7, 9 and 10), achieved a mean value higher than 3, with students disagreeing, on average that the sessions were boring, a waste of time, irrelevant to what they experienced on placement and of no benefit to that placement. For both the medical and rehabilitation teaching sessions, mean values for statement 5, which asks students whether or not the session included information which was useful to practice, are 3.10 and 3.0 respectively, indicating that students were ambivalent about this statement.

The next column in Tables 4.4 and 4.5, identifies the percentage of students who agree with the statement. This is shown in the column headed ‘% Agree’ and is calculated by adding the number of scores which are below 3 and dividing this by the total number of scores for each statement ($n = 19$). The next column, headed ‘A/D,’ shows the results of the t test statistic. When testing for agreement, we test the hypothesis $\mu = 3$, against the alternative hypothesis $\mu < 3$. We reject the null hypothesis (and hence conclude respondents, on average agree with the statement) if $p < 0.05$. Testing for disagreement is similar, except that the alternative hypothesis is $\mu > 3$.

The final column shows the results of the one-way ANOVA. Here, any difference in level of agreement, according to whether students were taught by a preceptor or nurse teacher, would have been indicated by the notation ‘Preceptor’ or ‘Nurse teacher’, according to who had taught the students, together with a p value, indicating its significance. However, no

information has been entered into this column, as there were no significant differences in strength of agreement with each statement, whether students had been taught by a nurse teacher or preceptor. Overall the teaching sessions on both medical and rehabilitation were viewed positively and there was no difference in the strength of agreement with each statement according to who had taught the students. Students felt positive about the teaching sessions, whoever had taught them.

Table 4.4
Summary of results for satisfaction survey of medical teaching session

Statement	Mean	% Agree	A/D	Taught by
The medical orientation teaching session:				
1. Was informative	2.10	89.47	A	
2. Helped prepare me for what I experienced on medical placement	2.53	63.6	A	
3. Was a waste of time	4.31	0.0	D	
4. Was a valuable learning experience	2.31	68.42	A	
5. Included information which was different to what I experienced on medical placement	3.10	21.05		
6. Helped me to relate theory to practice	2.42	68.42	A	
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.21	78.95	A	
9. Was of no benefit to my medical placement	4.31	0.0	D	
10. Was not relevant to what I experienced on medical placement	3.89	5.26	D	

Table 4.5
Summary of results for satisfaction survey of rehabilitation teaching session

Statement	Mean	% Agree	A/D	Taught by
The rehabilitation orientation teaching session:				
1. Was informative	2.31	73.68	A	
2. Helped prepare me for what I experienced on rehabilitation placement	2.31	73.68	A	
3. Was a waste of time	4.31	0.0	D	
4. Was a valuable learning experience	2.37	68.42	A	
5. Included information which was different to what I experienced on rehabilitation placement	3.0	31.58		
6. Helped me to relate theory to practice	2.21	73.68	A	
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.42	63.16	A	
9. Was of no benefit to my rehabilitation placement	4.1	5.26	D	
10. Was not relevant to what I experienced on rehabilitation placement	4.16	0.0	D	

4.3.1.6 Summary of findings for X1 – the effect of who initially teaches the students on theoretical knowledge, practical skill and satisfaction

In conclusion, statistical analysis has demonstrated that students who are taught theory related to a particular clinical specialty (medical and rehabilitation), by a nurse teacher, increase their scores less than students taught by a preceptor following the teaching sessions, immediately prior to clinical placement. By the completion of clinical placement their performance is not significantly different, they appear to have ‘caught up’. On average, both groups of students improve their theoretical knowledge scores to a significant degree whilst on placement. Who teaches the students has no effect on practical skill. There is no difference in satisfaction with

the teaching sessions whether students are taught by a preceptor or nurse teacher. Students' views of the teaching session are positive and seen as a valuable experience, regardless of who taught them.

4.3.2 Factor X2

Collaboration – students are taught medical and rehabilitation theory upon which the preceptor and nurse teacher have or have not collaborated.

Comments from the qualitative stage of the study emphasised the need to improve the degree of communication and collaboration between institutions of education and clinical areas. A view subsequently endorsed within the *Fitness for Practice* (U.K.C.C. 1999) document, which stresses the need for collaboration at both operational and strategic levels. As discussed in section 3.1, investigation here focuses specifically on collaboration at an operational level by investigating the effect of collaboration between the nurse teacher and preceptor teaching theory relating to medical and rehabilitation placements. It is thought that collaboration should result in teaching sessions that are a reflection of what both nurse teachers and clinicians regard as important for students to know and that theoretical knowledge scores should be better in those students taught following collaboration between the nurse teacher and student.

Two hypotheses were tested to identify:

- Whether or not collaboration improved scores for rehabilitation questions
- Whether or not collaboration improved scores for medical questions

In addition the satisfaction survey was analysed to establish whether there were any differences in levels of satisfaction with the teaching sessions according to whether or not collaboration took place.

4.3.2.1 Does collaboration between the preceptor and nurse teacher improve the rehabilitation scores achieved by students?

To calculate whether collaboration has a significant effect on the theoretical knowledge demonstrated by students, improvement in quiz scores for rehabilitation questions from quiz 1 (baseline quiz) to quiz 2 (completion of teaching sessions) were calculated. These were then sorted according to whether or not the preceptor and nurse teacher had collaborated on the content of the rehabilitation teaching session. As with the analyses for factor X1, only those scores obtained by students who had attended both the teaching sessions and had completed quiz 1 and 2 could be used.

One-way Analysis of Variance on improvement in rehabilitation quiz scores between quiz 1 and quiz 2 according to whether the preceptor and nurse teacher have collaborated on the content of the teaching session

Hypothesis 5.

Ho: There is no difference in students' improvement of rehabilitation quiz scores depending on whether the preceptor and nurse teacher have collaborated on the content of the teaching session.

Ha: There is a difference in students' improvement of rehabilitation quiz scores depending on whether the preceptor and nurse teacher have collaborated on the content of the teaching session.

Source	DF	SS	MS	F	P
Collaboration	1	43.6	43.6	0.64	0.436
Error	17	1163.1	68.4		
Total	18	1206.7			

Level	N	Mean	StDev
Collaboration	11	10.182	10.018
No collaboration	8	13.250	4.773

Individual 95% CIs For Mean
Based on Pooled StDev

Level	Lower CI	Upper CI
Collaboration	8.0	12.0
No collaboration	12.0	16.0

Pooled StDev = 8.272

The test statistic ($F(1,17) = 0.64$; $p > 0.05$) is not significant; there is no difference in students' rehabilitation quiz scores whether or not the preceptor and teacher had collaborated on the content of the rehabilitation session to be taught.

Hypothesis 5

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 8.27

Difference	Sample Size	Power
15	8	0.9207
15	11	0.9813

With power values of 0.9207 and 0.9813, the samples were large enough to detect a difference of 15% in rehabilitation theoretical knowledge scores between the two groups.

4.3.2.2 Does collaboration between the preceptor and nurse teacher improve the medical scores achieved by students?

The same process was adopted as previously, this time using medical scores for quiz 1 and 2.

One-way Analysis of Variance on improvement in medical quiz scores between quiz 1 and quiz 2 according to whether the preceptor and nurse teacher have collaborated on the content of the teaching session

Hypothesis 6.

Ho: There is no difference in students' improvement of medical quiz scores depending on whether the preceptor and nurse teacher have collaborated on the content of the teaching session.

Ha: There is a difference in students' improvement of medical quiz scores depending on whether the preceptor and nurse teacher have collaborated on the content of the teaching session.

Source	DF	SS	MS	F	P
Collaboration	1	399	399	3.02	0.100
Error	17	2247	132		
Total	18	2646			

Level	N	Mean	StDev
Collaboration	8	17.37	14.24
No Collaboration	11	8.09	9.09

Individual 95% CIs For Mean
Based on Pooled StDev

Level	Mean	StDev	95% CI Lower	95% CI Upper
Collaboration	17.37	14.24	7.0	21.0
No Collaboration	8.09	9.09	7.0	14.0

Pooled StDev = 11.50

Again, the test statistic ($F(1,17) = 3.02$; $p > 0.05$) is not significant; there is no difference in students' medical scores, whether or not the preceptor and nurse teacher have collaborated on the content of the teaching session. However, a power calculation demonstrates that the sample of eight students gives only a power of 68% to detect a difference of 15% between the two groups:

Hypothesis 6

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 11.49

Difference	Sample Size	Power
15	8	0.6805
15	11	0.8294

A further calculation demonstrates the sample size needed to detect such a difference:

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 11.49

Difference	Sample Size	Target Power	Actual Power
15	11	0.8000	0.8294

A sample of eleven students in each group was needed in order to detect a difference of 15% between the two groups.

4.3.2.3 Are there any differences in levels of satisfaction with the teaching sessions according to whether or not collaboration took place?

Table 4.6 and 4.7 summarise the data from the first and second sections of the satisfaction survey, which sought students' satisfaction with the medical and rehabilitation teaching sessions. As discussed in section 4.2.1.5, overall, these teaching sessions were viewed positively by all students. The last column in Table 4.6, headed 'With or without

collaboration' shows that for the medical teaching session, there were no differences in strength of agreement with the statements, whether or not the nurse teacher and preceptor had collaborated on the content of the teaching session. In Table 4.7 under this column there is the notation 'Collaboration' for statements 1, 4 and 6, together with a p value less than <0.05 in each case. This shows that for the rehabilitation session, students were more likely to agree that the teaching session was informative, and a valuable learning experience helping them to relate theory to practice if it followed collaboration between the nurse teacher and preceptor.

Table 4.6

Summary of results for satisfaction survey of medical teaching session

Statement	Mean	% Agree		With or without collaboration
The medical orientation teaching session:				
1. Was informative	2.10	89.47	A	
2. Helped prepare me for what I experienced on medical placement	2.53	63.6	A	
3. Was a waste of time	4.31	0.0	D	
4. Was a valuable learning experience	2.31	68.42	A	
5. Included information which was different to what I experienced on medical placement	3.10	21.05		
6. Helped me to relate theory to practice	2.42	68.42	A	
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.21	78.95	A	
9. Was of no benefit to my medical placement	4.31	0.0	D	
10. Was not relevant to what I experienced on medical placement	3.89	5.26	D	

Table 4.7

Summary of results for satisfaction survey of rehabilitation teaching session

Statement	Mean	% Agree	A/D	With or without collaboration
The rehabilitation orientation teaching session:				
1. Was informative	2.31	73.68	A	Collaboration (p = 0.024)
2. Helped prepare me for what I experienced on rehabilitation placement	2.31	73.68	A	
3. Was a waste of time	4.31	0.0	D	
4. Was a valuable learning experience	2.37	68.42	A	Collaboration (p = 0.011)
5. Included information which was different to what I experienced on rehabilitation placement	3.0	31.58		
6. Helped me to relate theory to practice	2.21	73.68	A	Collaboration (p = 0.015)
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.42	63.16	A	
9. Was of no benefit to my rehabilitation placement	4.1	5.26	D	
10. Was not relevant to what I experienced on rehabilitation placement	4.16	0.0	D	

4.3.2.4 Summary of findings for X2 – the effect of whether collaboration takes place between the preceptor and nurse teacher on theoretical knowledge and satisfaction scores

Collaboration between the preceptor and nurse teacher was shown to have no significant effect on the rehabilitation theoretical knowledge scores attained by students. No significant differences were found in the medical theoretical knowledge demonstrated by students whether or not the preceptor and nurse teacher had collaborated on the content of the medical

teaching sessions, but this may have been because the sample used in this case was too small, giving a power of 68% to detect a difference of 15%. There is no difference in the levels of satisfaction with the medical teaching session, whether or not collaboration has taken place. However, the rehabilitation teaching session was viewed more positively following collaboration for three of the statements.

4.3.3 Factor X3

Sequencing of theory and practice - students go straight to or delay a medical or rehabilitation placement.

The need to improve the sequencing of theoretical input with related clinical practice was a major theme to emerge from the interviews carried out within the qualitative stage of the study. Indeed, the importance of sequencing theory and practice, with theory immediately preceding clinical practice is emphasised by a number of authors, (Ferguson & Jinks 1994; Hislop *et al* 1996; May & Veitch 1998). However, there is a lack of recent empirical evidence to support these views in terms of the effect sequencing has on theoretical knowledge and practical skill acquisition in student nurses. Classic studies, which have previously investigated this phenomenon, are now somewhat dated (Bendall 1975; Alexander, 1983) and there has been considerable reform to nurse education and curriculum design since these investigations took place, including the move into higher education and the increase in student nurse numbers. There is a need to re-examine the effect of sequencing in light of these changes.

Two hypotheses were tested to identify:

- Any differences in medical knowledge scores depending on whether the students go straight to or delay their medical clinical experience
- Any differences in rehabilitation knowledge scores depending on whether the students go straight to or delay their rehabilitation clinical experience

The satisfaction surveys were also analysed in order to identify any differences in satisfaction scores whether students went straight to or delayed the medical and rehabilitation placements

The intention had been to assess also the effect of sequencing on practical skill development. However, this analysis was not performed. This was because the observation assessments completed for both the medical and rehabilitation placements were found to be very similar. The only pre-determined difference between the observation tools was in section A, which had to be completed. Students in medical were asked to describe the correct procedure in the event of cardiac arrest and to locate the resuscitation trolley. Students in rehabilitation were asked the procedure in event of a fire, as it is not common practice for resuscitation to occur within the rehabilitation setting. It was thought that students would complete different parts of section B whether they were in medical or rehabilitation. However, the initial hand analysis of the observation assessments highlighted the fact that the parts completed were similar and it could not be said that the skills demonstrated were simply as a result of the way in which placements were sequenced.

4.3.3.1 Are there any differences in medical theoretical knowledge scores depending on whether students go straight to or delay the medical placement?

The effect of sequencing placements on students' theoretical scores was calculated by first identifying which placement students had gone straight to and which they had delayed. If students had gone straight to a **medical** placement, the improvement in **medical** scores between quiz 2 (following teaching but prior to clinical placement) and quiz 3 (following completion of first clinical placement) were calculated. These were compared with improvement in medical scores between quiz 3 and quiz 4 (following completion of delayed placement) for students who a delayed the medical placement. This allowed for comparison of improvement in medical theoretical knowledge scores whether students went straight to or delayed the medical experience. The same process was used to calculate improvement in rehabilitation scores depending on whether the rehabilitation placement was delayed or not.

Improvement in scores between quiz 2 and 3 were used for students' first or immediate placement as this should reflect knowledge gained whilst on this placement. Improvement in scores between quiz 3 and 4 were used to calculate knowledge gained on the delayed placement because this is a more accurate reflection of the knowledge gained on the delayed placement. If quiz 2 scores had been compared to quiz 4 scores for the delayed placement, this would not have taken into account knowledge that students had gained on the immediate placement.

A larger number of students' quiz scores could be included in this analysis, as more students completed the quizzes. For quiz 2 (n=26), quiz 3 (n=29) and quiz 4 (n=29). However, the

scores used depended on whether students went straight to or delayed as explained above, thus there are different numbers of scores used for the following series of one-way ANOVA as can be seen from the ANOVA tables.

One-way Analysis of Variance of improvement in medical scores according to whether students go straight to a medical placement, or delay this experience

Hypothesis 7

Ho: There is no difference in improvement of medical scores whether students go straight to or delay a medical placement.

Ha: There is a difference in improvement of medical scores whether students go straight to or delay a medical placement.

Source	DF	SS	MS	F	P
Medical	1	0.4	0.4	0.01	0.928
Error	24	1149.7	47.9		
Total	25	1150.2			

Level	N	Mean	StDev
Delay	14	4.500	4.735
Straight	12	4.250	8.833

Individual 95% CIs For Mean
Based on Pooled StDev

Pooled StDev = 6.921

The test statistic ($F(1,24) = 0.01$; $p > 0.05$) is not significant, there being no difference in medical theoretical knowledge scores following completion of medical placement, whether students go straight to, or delay their medical placement.

Hypothesis 7

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 6.92

Difference	Sample	
	Size	Power
15	12	0.9991
15	14	0.9998

With power values of 0.9991 and 0.9998, the samples were sufficiently large to detect a difference of 15% in medical theoretical knowledge scores between the two groups.

4.3.3.2 Are there any differences in rehabilitation theoretical knowledge scores depending on whether students go straight to or delay the rehabilitation placement?

The same process as described above was used to sort students' quiz results, this time using rehabilitation scores for quizzes 2, 3 and 4 according to whether students had gone straight to, or delayed their rehabilitation experience.

One-way Analysis of Variance of improvement in rehabilitation scores according to whether students go straight to a rehabilitation placement, or delay this experience

Hypothesis 8

Ho: There is no difference in improvement of rehabilitation scores whether students go straight to or delay a rehabilitation placement.

Ha: There is a difference in improvement of rehabilitation scores whether students go straight to or delay a rehabilitation placement.

Source	DF	SS	MS	F	P
Rehabil.	1	255.2	255.2	7.43	0.013
Error	21	721.7	34.4		
Total	22	977.0			

Level	N	Mean	StDev
Delay	14	5.714	5.539
Straight	9	-1.111	6.353

Pooled StDev = 5.862

Individual 95% CIs For Mean
Based on Pooled StDev

In this case, the test statistic ($F(1,21) = 7.43$; $p < 0.05$) is significant, there is a difference in rehabilitation theoretical knowledge scores following completion of rehabilitation placement. Students score significantly better if they delay the rehabilitation placement.

Hypothesis 8

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 5.86

Difference	Sample Size	Power
15	9	0.9991
15	14	1.0000

With power values of 0.9991 and 1.000, the samples were sufficiently large to detect a difference of 15% in rehabilitation theoretical knowledge scores between the two groups.

4.3.3.3 Are there any differences in levels of satisfaction expressed about the teaching sessions or associated clinical placements, according to whether students go straight to or delay that clinical experience?

All four sections of the satisfaction survey were used to establish whether there were any differences in satisfaction according to the way in which placements were sequenced. Tables 4.8 and 4.9 show the results of the first two sections of the survey and whether or not students were more or less satisfied with the teaching sessions according to whether they went straight to or delayed the related clinical placement. Table 4.8 shows that the only difference in satisfaction with the medical teaching session, was that students were more likely to disagree that the medical teaching session was of no benefit to their medical placement if they went straight to that placement. Table 4.9 demonstrates a similar result in relation to the rehabilitation placement, with students more likely to disagree that the rehabilitation teaching session was of no benefit if they went straight to that placement. In addition, students were more likely to disagree that the rehabilitation teaching session was a waste of time if they went straight to rehabilitation following theoretical input.

Table 4.8
Summary of results for satisfaction survey of medical teaching session

Statement	Mean	% Agree		Sequencing
The medical orientation teaching session:				
1. Was informative	2.10	89.47	A	
2. Helped prepare me for what I experienced on medical placement	2.53	63.6	A	
3. Was a waste of time	4.31	0.0	D	
4. Was a valuable learning experience	2.31	68.42	A	
5. Included information which was different to what I experienced on medical placement	3.10	21.05		
6. Helped me to relate theory to practice	2.42	68.42	A	
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.21	78.95	A	
9. Was of no benefit to my medical placement	4.31	0.0	D	Straight to (p = 0.04)
10. Was not relevant to what I experienced on medical placement	3.89	5.26	D	

Table 4.9
Summary of results for satisfaction survey of rehabilitation teaching session

Statement	Mean	% Agree	A/D	Sequencing
The rehabilitation orientation teaching session:				
1. Was informative	2.31	73.68	A	
2. Helped prepare me for what I experienced on rehabilitation placement	2.31	73.68	A	
3. Was a waste of time	4.31	0.0	D	Straight to (p = 0.04)
4. Was a valuable learning experience	2.37	68.42	A	
5. Included information which was different to what I experienced on rehabilitation placement	3.0	31.58		
6. Helped me to relate theory to practice	2.21	73.68	A	
7. Was boring	4.05	5.26	D	
8. Included information which I was able to apply to practice	2.42	63.16	A	
9. Was of no benefit to my rehabilitation placement	4.1	5.26	D	Straight to (p = 0.022)
10. Was not relevant to what I experienced on rehabilitation placement	4.16	0.0	D	

Sections three and four of the satisfaction survey were also used to assess students' satisfaction with their medical and rehabilitation placements and to identify if there were any differences in satisfaction according to whether they went straight to or delayed the placement following the teaching sessions. Tables 4.10 and 4.11 summarise the results for the medical and rehabilitation placements. As with sections one and two, this shows the mean value for each statement (1 = strongly agree, 5 = strongly disagree), the percentage of respondents that agreed or strongly agreed with the statement and whether respondents agreed or disagreed with the statement. One-way ANOVA was also conducted for each statement in order to determine if students were more likely to agree with the statement according to whether they had gone straight to or delayed the placement.

Levels of satisfaction with the medical and rehabilitation placements were mixed. The preceptorship experiences of students on the four week medical placement were positive, in that students felt they had been able to work with their preceptor on a regular basis, preceptors knew about the course they were on and what their learning needs were. The students also felt they had sufficient time to develop practical skills. Views of preceptorship on the rehabilitation placement were less positive, with students on average feeling that the placement was not sufficiently long enough to develop practical skills and they were ambivalent as to whether or not their preceptor knew what course they were on and what their learning needs on. They were also unsure if they felt they had worked with their preceptor on a regular basis.

Students felt that both the four-week medical and two-week rehabilitation placements were too short for them to be able to learn everything they needed and that placements should be longer. Whilst students on the medical placement disagreed that they had not learned much, students on the rehabilitation placement, on average, strongly agreed they had not learned very much. Interestingly, there were no differences in agreement with each statement whether students went straight to or delayed the medical and rehabilitation placements as indicated by the blank column under the heading ‘Sequencing’.

Table 4.10

Summary of results for satisfaction survey of medical placement

Statement	Mean	% Agree	A/D	Sequencing
On my medical placement:				
1.I worked with my preceptor on a regular basis	2.31	68.42	A	
2.I had long enough to develop my practical skills	2.63	63.16	A	
3.I had long enough to learn everything I needed to	3.68	15.79	D	
4.My preceptor knew about the course I was on	2.63	63.16	A	
5.I needed a longer placement	2.37	57.89	A	
6.My preceptor knew what my learning needs were	2.47	68.42	A	
7.There was not enough time for me to learn about the speciality	2.53	63.16	A	
8.I was asked to do things I had not been taught in theory	2.84	47.37		
9.I was unable to work with my preceptor regularly	3.53	26.32	D	
10.I did not learn very much	4.42	0.0	D	

Table 4.11

Summary of results for satisfaction survey of rehabilitation placement

Statement	Mean	% Agree	A/D	Sequencing
On my rehabilitation placement:				
1.I worked with my preceptor on a regular basis	2.89	47.37		
2.I had long enough to develop my practical skills	3.47	31.58	D	
3.I had long enough to learn everything I needed to	3.89	5.26	D	
4.My preceptor knew about the course I was on	2.95	47.37		
5.I needed a longer placement	1.95	78.95	A	
6.My preceptor knew what my learning needs were	2.74	52.63		
7.There was not enough time for me to learn about the speciality	2.21	73.68	A	
8.I was asked to do things I had not been taught in theory	3.0	42.11		
9.I was unable to work with my preceptor regularly	3.0	42.11		
10.I did not learn very much	4.05	0.0	A	

4.3.3.4 Are there any differences in practical skill score between two weeks and four weeks on medical placement?

Practical constraints prohibited comparison of theoretical knowledge and satisfaction between a two- and four-week placement, because the type of clinical specialty, rehabilitation and medical, could not be varied independently from its length. Rehabilitation was always two weeks long and medical always four weeks. However, it was possible to establish any differences in practical skill acquisition. This was achieved by comparing students' practical skill score at two weeks and four weeks on the medical placement. Whilst n=29, one student

was not assessed at two weeks on the medical placement due to illness, therefore this student's scores were discarded.

One-way Analysis of Variance of practical skill score at two and four weeks on medical placement

Hypothesis 9.

Ho: There is no difference in practical skill score at two weeks and four weeks on medical placement

Ha: There is a difference in skill score at two and four weeks on medical placement

Source	DF	SS	MS	F	P
Week	1	1220	1220	4.86	0.032
Error	55	14046	251		
Total	56	15266			

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev		
2 weeks	28	66.62	17.09	-----+-----+-----+-----		
4 weeks	28	75.79	14.48	(------*-----)		
				(------*-----)		
				-----+-----+-----+-----		
Pooled StDev =		15.84		66.0	72.0	78.0

The test statistic ($F(1,55) = 4.86; p < 0.05$) is significant. There is a difference in practical skill score, with students performing significantly better at four weeks than at two weeks on medical placement.

Hypothesis 9

Power and Sample Size

2-Sample t Test

Testing mean 1 = mean 2 (versus not =)
Calculating power for mean 1 = mean 2 + difference
Alpha = 0.05 Sigma = 15.84

Difference	Sample Size	Power
15	28	0.9357

With a power value of 0.9357 the sample was sufficiently large to detect a difference of 15% in skills scores between the two groups.

4.3.3.5 Summary of findings for X3 – the effect of sequencing on theoretical knowledge and satisfaction scores

Statistical analysis has demonstrated there is no significant difference in the improvement of theoretical knowledge relating to a four-week medical placement whether students go straight to or delay this experience. Students who delay their two-week rehabilitation placement score significantly better on theoretical knowledge relating to rehabilitation than those students going straight to this clinical speciality. Overall, levels of satisfaction with both the medical and rehabilitation placements were mixed. Satisfaction with preceptorship was higher on the four-week medical placement, than on the two-week medical placement. In addition, students felt that both the four-week medical and two-week rehabilitation placements were too short to learn everything they needed to and to develop practical skills. There were no differences in satisfaction with medical or rehabilitation placements whether students went straight to or

delayed these clinical specialities. Finally, students performed significantly better on practical skills at four weeks than at two weeks on medical placement.

4.4 RESULTS OF THREE-WAY ANOVA

As discussed in section 3.9, one-way ANOVA can be extended in order to examine more than one factor at a time in order to establish whether there are any differences in the means of groups according to the way in which factors are combined. Within this study, three factors were under investigation, each with two levels, resulting in eight different combinations of the factors under study. Three-way ANOVA identifies whether the means of these eight groups are different. The same procedures are used as for one-way ANOVA, with an F test statistic and p value being calculated (Moore & McCabe 1998).

The intention was to conduct a three-way ANOVA in order to establish whether or not there were any relationships and interactions between all the three factors and levels under study and to determine which combination of factors resulted in the highest theoretical knowledge and practical skill scores. However, because of the similarities of the observation assessments, it was not possible to assess the effect of sequencing on practical skill development. In addition, the aliasing of type of clinical speciality, with length of placement presented difficulties. As a result only three-way ANOVA to assess the effect of the three factors under study on theoretical knowledge was conducted. Two of these were performed. The first establishes whether improvement in medical scores differ according to who teaches the students, whether or not they have collaborated and whether the students go straight to or delay their medical clinical placement. The second establishes differences in rehabilitation scores according to who taught the students, whether or not collaboration took place and whether students went straight to or delayed their rehabilitation placement.

4.4.1 Are there differences in students' medical quiz scores according to whether they go straight to or delay this experience and according to who has taught them and whether or not they collaborated on the content of the medical teaching session?

The improvement in medical scores from quiz 2 to quiz 3 were used if the students had gone straight to medical placement, whilst improvement in medical scores from quiz 3 to quiz 4 were used if the students had delayed this clinical experience. This was the same procedure as adopted during analysis for factor three. These improvements in score were then sorted according to whether a preceptor or nurse teacher had taught the theoretical elements relating to medical specialty and whether or not collaboration had taken place on the content of the medical teaching session. Only those results of students who had attended the medical teaching session could be used for this analysis (n = 19).

Three-way Analysis of Variance of improvement in medical quiz scores according to who has taught the students, whether they collaborated and whether students go straight to or delay their medical placement

Hypothesis 10.

Ho: There is no difference in students' medical theoretical knowledge whether a preceptor or nurse teacher teaches them theoretical elements relating to a medical placement, whether or not the preceptor and nurse teacher collaborate on the content of the teaching session and whether students go straight to or delay their medical placement.

Ha: There is a difference in students' medical theoretical knowledge whether a preceptor or nurse teacher teaches them theoretical elements relating to a medical placement, whether or not the preceptor and nurse teacher collaborate on the content of the teaching session and whether students go straight to or delay their medical placement.

Factor	Type	Levels	Values
Taught by	fixed	2	Nurse Teacher Preceptor
Collaboration	fixed	2	No Yes
Sequencing	fixed	2	Delay Straight to

Source	DF	Seq SS	Adj SS	Adj MS	F	P
X1(Preceptor/Nurse Teacher)	1	82.72	5.12	5.12	0.12	0.740
X2(Collaboration or not)	1	96.00	107.08	107.08	2.41	0.149
X3(Straight to/Delay)	1	20.47	8.47	8.47	0.19	0.671
X1 and X2	1	23.82	26.77	26.77	0.60	0.454
X1 and X3	1	199.77	159.06	159.06	3.59	0.085
X2 and X3	1	5.30	1.67	1.67	0.04	0.850
X1 and X2 and X3	1	10.46	10.46	10.46	0.24	0.637
Error	11	488.00	488.00	44.36		
Total	18	926.53				

Unusual Observations for ImpM234

Obs	ImpM234	Fit	StDev Fit	Residual	St Resid
1	11.0000	-3.6667	3.8455	14.6667	2.70R
10	3.0000	3.0000	6.6606	0.0000	* X
11	-3.0000	-3.0000	6.6606	-0.0000	* X

R denotes an observation with a large standardized residual.

X denotes an observation whose X value gives it large influence.

The results of the three-way interaction analysis demonstrates that all the main effects and interactions are not significant and the null hypothesis is accepted. There is no difference in students' medical theoretical knowledge scores, regardless of who teaches them, whether or not they have collaborated on the content of the teaching session and whether they go straight to or delay their medical experience.

4.4.2 Are there differences in students' rehabilitation quiz scores according to whether they go straight to or delay this experience and according to who has taught them and whether or not they collaborated on the content of the rehabilitation teaching session?

The same process was repeated to assess the effect of the three factors on rehabilitation knowledge using improvement in rehabilitation scores.

Three-way Analysis of Variance of improvement in rehabilitation quiz scores according to who has taught the students, whether they collaborated and whether students go straight to or delay their rehabilitation placement

Hypothesis 11.

Ho: There is no difference in students' rehabilitation theoretical knowledge whether a preceptor or nurse teacher teaches them theoretical elements relating to a medical placement, whether or not the preceptor and nurse teacher collaborate on the content of the teaching session and whether students go straight to or delay their rehabilitation placement.

Ha: There is a difference in students' rehabilitation theoretical knowledge whether a preceptor or nurse teacher teaches them theoretical elements relating to a medical placement, whether or not the preceptor and nurse teacher collaborate on the content of the teaching session and whether students go straight to or delay their rehabilitation placement.

Factor	Type	Levels	Values				
Taught by	fixed	2	Nurse Teacher Preceptor				
Collaboration	fixed	2	No Yes				
Sequencing	fixed	2	Delay Straight to				
Source	DF	Seq SS	Adj SS	Adj MS	F	P	
X1(Preceptor/Nurse Teacher)	1	2.25	16.34	16.34	0.44	0.523	
X2(Collaboration or not)	1	5.29	12.65	12.65	0.34	0.573	
X3(Straight to/Delay)	1	137.23	139.32	139.32	3.72	0.080	
X1 and X2	1	38.63	43.95	43.95	1.17	0.302	
X1 and X3	1	30.00	17.67	17.67	0.47	0.506	
X2 and X3	1	0.68	9.44	9.44	0.25	0.626	
X1 and X2 and X3	1	20.50	20.50	20.50	0.55	0.475	
Error	11	412.17	412.17	37.47			
Total	18	666.74					

Again, the results of the three-way interaction analysis demonstrates that all the main effects and interactions are not significant and the null hypothesis is accepted. There is no difference

in students' rehabilitation theoretical knowledge scores, regardless of who teaches them, whether or not they have collaborated on the content of the teaching session and whether they go straight to or delay their rehabilitation experience.

Three-way ANOVA has demonstrated that there is no difference in students' medical and rehabilitation theoretical scores, whether they are taught by a nurse teacher or preceptor, whether collaboration on the content of the teaching session takes place and whether they go straight to or delay the clinical experience.

4.5 SUMMARY OF FINDINGS

Whilst the primary hypothesis could not be fully tested and the three-way ANOVA did not identify any differences in theoretical knowledge according to manipulation of all three factors under study, the series of one-way ANOVA performed has highlighted a number of interesting findings. These are summarised in Table 4.12 below:

Table 4.12

Summary table of hypotheses

no.	hypothesis	data used	F statistic	p value	significant	power
1	Students' theoretical quiz scores are better following teaching sessions if taught by a preceptor rather than a nurse teacher	Improvement in total scores Q2 – Q1	46.97	<0.001	Very Highly	8 = 0.8802 11 = 0.9641
2	There is a difference in the final quiz scores, depending on whether students were initially taught by a preceptor or a nurse teacher	Total scores Q4	2.15	>0.05	No	8 = 0.8702 11 = 0.9593
3	Students improve their theoretical knowledge over the duration of clinical placements	Total scores Q4 – Q2	5.17	<0.05	Yes	15 = 0.9950
4	There is a difference in students' practical skill score at two weeks in their first placement whether they were previously taught by a preceptor or nurse teacher	Observation 1	0.38	>0.05	No	8 = 0.2445
5	There is a difference in rehabilitation scores depending on whether collaboration on the content of the teaching sessions between the preceptor and the nurse teacher took place	Q2R – Q1R	0.64	>0.05	No	8 = 0.9207 11 = 0.9813
6	There is a difference in medical scores depending on whether collaboration on the content of the teaching sessions between the preceptor and the nurse teacher took place	Q2M – Q1M	3.02	>0.05	No	8 = 0.6805 11 = 0.8294

7	There is a difference in medical scores whether students go straight to or delay medical placement	Straight to: Q3M – Q2M Delay: Q4M – Q3M	0.01	>0.05	No	12 = 0.9991 14 = 0.9998
8	There is a difference in rehabilitation scores whether students go straight to or delay rehabilitation placement	Straight to: Q3R – Q2R Delay: Q4R – Q3R	7.43	p<0.05	Yes	9 = 0.9991 14 = 1.000
9	There is a difference in practical skill score at two and four weeks on medical placement	Observation 2 and 4 weeks medical	4.86	p<0.05	Yes	28 = 0.9357

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

In the qualitative stage of this study interviewees were asked how the theory-practice gap might be closed. Answers to this question formed theme eight of the qualitative investigation and within this theme four main ideas were identified. These were: preceptors teaching the students theoretical elements relating to particular clinical specialities; improved collaboration between clinicians and the educational institution; longer placements; and better sequencing of theory and practice. As discussed in section 3.1, these ideas were translated into four factors in order to conduct an experiment as there is a lack of empirical evidence to assess the impact these factors have on the theory-practice gap. One of the reasons for this is that it is difficult to assess quantitatively, the integration of theory with practice. Whilst the second, quantitative stage of this study also did not go so far as to measure the integration of theory and practice, it did seek to measure the effect of the factors on theoretical knowledge, practical skill and satisfaction in a cohort of undergraduate first year nursing students. As has been argued, both relevant theoretical knowledge and practical skill are needed to engage in nursing. If factors that maximise the development of such knowledge and skill can be identified, then strategies can be developed which maximise these and, it is hoped, go some way to closing the theory-practice gap phenomenon within nursing.

Whilst four factors were identified, due to aliasing of clinical speciality and length of placement, only three factors could be incorporated into a 2³ experimental design as follows:

- **Teacher** – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher

- **Collaboration** – students are taught theoretical elements relating to a clinical speciality upon which the preceptor and nurse teacher have or have not collaborated
- **Sequencing of theory and practice** – students go straight to the relevant clinical speciality following theoretical input, or delay the clinical experience

A full factorial experimental design was utilised to test the effect these three factors had on theoretical knowledge and skill development using two measuring tools. Theoretical knowledge was tested at four stages within the study design using an objective item test composed of multiple-choice and short answer questions. Practical skill was assessed on three occasions using an observational tool adapted from an existing clinical assessment tool. Satisfaction was measured at the end of the study using a series of Likert scales. Two clinical specialities were used to conduct the study; these were medical and rehabilitation clinical placements. Students' knowledge, skill and satisfaction scores were analysed using analysis of variance.

It was hoped that three-way analysis of variance would establish which combination of the three factors under study best promoted the development of knowledge and skill in student nurses. This could then be used to develop strategies which maximise the development of relevant theoretical knowledge and practical skill in student nurses.

5.2 DISCUSSION OF RESULTS

Whilst three-way analysis of variance failed to establish any significant differences in the main effects or interactions among all three factors under investigation, a number of interesting results were obtained when each factor was considered separately. These findings are discussed individually below.

5.2.1 Factor X1:

Teacher – students are taught theoretical elements relating to a clinical speciality by a preceptor or nurse teacher.

Four hypotheses were constructed to establish:

- Whether or not there were any differences in the increase of students' theoretical knowledge following the teaching sessions according to whether a preceptor or nurse teacher taught them
- Whether or not any differences were maintained over time
- Whether or not students improved their theoretical knowledge over the duration of clinical placements
- Whether or not there are any differences in practical skill scores according to who has initially taught the students

In addition, any differences in levels of satisfaction with the teaching sessions according to whether a preceptor or nurse teacher initially taught the students was established.

In summary, preceptors within the study were found to have been significantly better than nurse teachers at increasing theoretical knowledge relating to a specific clinical specialty, ($F(1,17) = 46.97$; $p < 0.01$) immediately following theoretical teaching sessions. However, by the time clinical placements had been completed, those students taught by a nurse teacher had caught up and there was no significant difference in students' theoretical knowledge scores, regardless of who initially taught them, ($F(1,17) = 2.15$; $p > 0.05$). There were no significant differences in practical skill score whether students had been taught by a nurse teacher or preceptor, ($F(1,16) = 0.38$; $p > 0.05$). Overall, students improved their theoretical knowledge relating to medical and rehabilitation clinical specialties by the time all clinical placements had been completed to a significant degree, ($F(1,36) = 5.17$; $p < 0.05$). Overall the students were satisfied with the teaching sessions.

Students thought the teaching sessions were informative and beneficial in helping them to prepare for practice and disagreed that they were boring, a waste of time, or irrelevant to clinical practice.

One of the key findings of the study was the fact that students' theoretical knowledge scores improved significantly, immediately following theoretical input if they were taught theoretical elements associated with a particular clinical specialty by a preceptor, rather than a nurse teacher. There are a number of arguments that could be put forward to suggest why this is the case.

It could be argued that preceptors were chosen specifically because they were specialists within particular clinical areas, with knowledge, experience and expertise of working within the medical or rehabilitation setting. As such, they have greater insight than nurse teachers into the knowledge and skills needed by students in order to practise within their clinical area. They are more able to focus on teaching the students what is most relevant to their own clinical specialty and have the knowledge and experience of that specialty to do this effectively. The nurse teachers were chosen because they routinely taught first year student nurses both the theoretical and practical elements associated with the first year syllabus. They did not however, have recent clinical experience of the specialties involved.

Nurse teachers, of necessity, have to be generic teachers, a situation perpetuated by the way in which pre-registration programmes of nursing have traditionally been organised and managed (Camiah, 1998). Historically, institutionally-based teachers have been expected to teach across a huge range of subjects, such as interpersonal and communication skills, health studies, research skills, concepts and paradigms of nursing, professional and ethical issues and often the biological and social sciences. In addition, nursing-related subject areas are divided into many sub-specialties. For example, adult nursing is often sub-divided into specialist categories such as cardiovascular, gastrointestinal, genito-urinary or respiratory nursing, according to physiological system. Alternatively, this may be according to clinical specialty such as orthopaedics, control of infection, intensive care or care of the elderly. A nurse teacher might have specialised knowledge of a few of these areas, based on previous work experience (although this

quickly becomes dated), or academic qualifications, but it is impossible to maintain expert knowledge across the whole range of subject areas that nurse teachers are expected to teach. Camiah (1998) comments that the traditional, conventional pattern of educational organisation has perpetuated the generic teacher, rather than one who is specialist and credible within a particular area.

D'A Slevin (1993) identifies four dimensions of credibility which nurse teachers must satisfy in order to be credible: teaching credibility; knowledge credibility; clinical credibility and academic credibility, but questions if it is realistically feasible for individual nurse teachers to meet all of these:

“Given the range of areas in which credibility may be pertinent is it realistic to expect a single teacher to meet this in all areas...?”
(D'A Slevin 1993 p.243)

D'A Slevin suggests that teaching credibility – the ‘how to teach’, is the one dimension in which, to date, nurse educationalists have been strongest. Historically, there have been very clear guidelines laid down with regard to the professional education required to become a nurse teacher, strictly controlled by the U.K.C.C.

In terms of knowledge credibility, D'A Slevin suggests that nurse teachers struggle with the generic versus specialist debate:

“ The notion of a generic nurse teacher (even within general nursing) who could teach effectively across all the life, social and behavioural sciences, all the humanities and all the requirements for ethical, moral and phenomenological philosophy, and who could apply these to nursing across all the sub-specialities involved, was a myth.”
(D'A Slevin 1993 p.245)

D'A Slevin (1993) suggests that nurse teachers cannot be expected realistically to be credible in knowledge terms across anything more than a focused, narrow band of sub-specialisms.

Recent changes within nurse education have resulted in nurse educationalists having to diversify even further. With the introduction of Project 2000 and the demise of the

clinical teacher role, nurse tutors, customarily used to teaching in a classroom setting, have been expected to develop clinical link teacher roles and to maintain some degree of clinical credibility. This in itself has created debate in terms of what the clinical link teacher role should entail. Whether it should consist of a 'hands on' approach of engaging in direct patient care, or be facilitative in nature and what precisely clinical credibility is, or should be. This has been discussed previously in section 2.6.7. However the role is defined, the problem of maintaining credibility over anything other than a focused area equally applies to clinical as well as knowledge credibility:

"...what breadth of clinical expertise can be humanly attained and – in a rapidly changing health care situation – maintained by an individual teacher. Given the rate of change in clinical practice it is hard to argue that within any major division such as adult/general nursing, an individual teacher could maintain up-to-date knowledge and competence in more than one sub-speciality such as intensive care or care of the elderly." (D' A Slevin 1993 p.246)

With the move to higher education there has been a shift of emphasis from teacher credibility to that of academic credibility, which D'A Slevin relates to the concept of prestige held by the individual and institution and which is defined primarily in terms of publication and research output. This is, of necessity, where educational institutions are in the business of needing to attract finance and funding – largely provided by research companies and grants. As Kirk *et al* (1997) state:

"...increasing emphasis has been placed upon research activity through the Higher Education Funding Council's research assessment exercise. Clearly research is now within the remit of all nurse teachers...They therefore face competing and potentially conflicting demands to develop both academically and clinically..." (Kirk et al 1997 p.1037)

Nurse teachers feel they must gain higher degrees, develop and publish research in order to maintain their credibility within the higher education sector and to have a career pathway. There also appears to have been an increase in the administrative duties teachers are expected to fulfil (Day *et al* 1998). Nurse teachers are struggling to maintain their credibility in an ever-expanding variety of roles and responsibilities within a climate of educational reform. It is hardly surprising that preceptors, who only work within one

particular specialty, are better equipped to promote relevant theoretical knowledge relating to that specialty than are nurse teachers.

The results of this study suggest that the teaching of clinical specialist areas could perhaps be left to those who have the knowledge and clinical credibility to teach these to students – the clinical practitioners. It seems more feasible for nurse teachers to concentrate on developing academic credibility and in teaching life-long learning skills, equipping students to deal with, as D'A Slevin says, the one constant of life in the late twentieth century (and indeed the twenty-first) - that of constant change. He suggests that the whole issue of credibility should be widened out from being based within the educational institution, to being both service and education based, with service providers and educational institutions working in partnership to develop credibility and maximise the learning experiences offered to students. Involving clinical staff in classroom teaching may be one means of achieving this. The *Fitness for Practice* (UKCC 1999) document has also highlighted the way forward, emphasising the need for service and education providers to work in collaboration to ensure the credibility of the educational experiences offered to students. The document suggests this will enhance the end result of qualified nurses with appropriate knowledge and skills upon qualification as professional nurses.

It is recognised that this study is composed of only a small sample and that the same results may not be obtained when other groups of nursing students, within other institutions are studied. However, there does seem to be evidence to suggest that preceptors are better at promoting theoretical knowledge relating to their particular clinical area within a classroom setting than are nurse teachers, at least for first year nurse students. Perhaps any strategies that are developed as a result of the study should examine ways in which responsibility for teaching students elements of the syllabus relating to particular clinical specialties could be devolved to experienced clinical preceptors.

It could be argued that since students taught by a nurse teacher caught up with those taught by a preceptor, together with the fact that theoretical knowledge improved significantly for all students during clinical placement, it is irrelevant who initially teaches the students. This seems to be a somewhat negative argument to use in attempting to establish which strategies best promote knowledge and skill acquisition in students.

The students within this study who were taught by a preceptor, seem to gain a head start over those taught by a nurse teacher and the important factor then to consider, is how this could be maintained over time. Whilst the theoretical knowledge of students was shown to improve significantly over the duration of clinical placement, these improvements demonstrated only small increases in mean scores. The mean score for quiz 4 was 69.68, compared to 62.36 for quiz 2, a mean improvement in score of only 7.32. The mean score for quiz four, completed at the end of all clinical placements was less than 70%, yet this quiz is composed of areas considered to be the essential basics of knowledge needed by first year student nurses in order to practise effectively. Such knowledge is also necessary underpinning for study in year two. More needs to be done to maintain further, and to promote theoretical knowledge development during clinical placement.

Another argument put forward as to why theoretical knowledge scores improve more in groups of students taught by a preceptor, rather than a nurse teacher, is related to the perceived credibility of the nurse teacher and the preceptor. Possibly, the preceptors are deemed to be more credible than the nurse teachers, in the eyes of the students, to teach areas of knowledge relating to a specific clinical speciality. If students have a positive image of the teacher as being knowledgeable and experienced, they are more likely to attend to and absorb what is being taught. They are more likely to regard it as being important and useful to their ability to perform within the clinical area. It could be that the preceptors are able to draw on personal experience and anecdotal evidence as useful teaching skills, thereby making the material the students are learning more interesting and relevant to them.

Most authors' definitions include some notion of credibility as keeping up to date with practice (Cave, 1994) with D'A Slevin (1993) defining it as being "*worthy of confidence or belief*", questioning if nurse lecturers are believable to students. Forrest *et al* (1996) suggest that for students to perceive nurse teachers as credible, and therefore having something worthwhile to teach them, they need to have specialist knowledge which they could apply to a clinical setting. These interpretations of the concept of credibility fit the argument being forwarded here. Students are more able, or more willing, to engage in theoretical learning from preceptors as they regard them as being up to date with current practice and as having something useful and important to impart. Preceptors, coming

from clinical practice, are more believable to students, than are nurse teachers, who are regarded as academics, and who, according to the findings cited in the qualitative stage of this study, are regarded as being out of touch, out of date and of questionable credibility.

It is interesting to note that whilst preceptors were better at promoting theoretical knowledge than their nurse teacher counterparts, there was no difference in the facilitation of practical skills. Preceptors could be expected to have a better insight into the practical skills with which students need to be equipped and to teach the students about these. The results do not support this idea, as no differences in practical skill score at two weeks on the first placement were apparent, regardless of who initially taught them. However, a power calculation indicated that the sample was too small to identify a difference of 15% between the two groups. In addition, the brief given to both preceptors and nurse teachers was to promote the theoretical knowledge they saw as being relevant to either the medical or rehabilitation setting. The emphasis was thus on theoretical knowledge acquisition, not practical skill. This could account for the lack of difference in practical skill score at two weeks on the first placement between those taught by preceptors and nurse teachers.

Also of interest was the fact that whilst preceptors were significantly better at promoting theoretical knowledge than the nurse teachers, there was no significant difference in levels of satisfaction with the teaching sessions expressed by students according to who had taught them. It might be expected that students taught by the preceptors would be more satisfied with the teaching sessions than those taught by the nurse teachers, since they achieved higher theoretical scores, but this was not the case. Whilst all the students who attended the teaching sessions agreed on average that they were both useful and beneficial, there were no differences in satisfaction whether students were taught by a preceptor or nurse teacher. Students do not appear to be able to discern who is best able to teach them relevant theory.

This finding does not appear to support the theory that students regarded the preceptors as being more credible and having relevant knowledge and experience to impart to them than the nurse teachers. However, this may be due to other factors coming into play. It could be argued that the satisfaction survey does not specifically examine credibility of

the teacher. The students could be more or less satisfied due to other factors, such as teaching style, interest in subject material and teaching resources used. However, it does ask the students to compare the usefulness of the teaching sessions in relation to subsequent practice. Overall, all students felt the teaching sessions were relevant to clinical practice and did help prepare them for this, but again there were no differences according to whether they had been taught by a nurse teacher or a preceptor.

The timing of the satisfaction survey could also have influenced the results. This was administered at the completion of clinical placements. It had been planned to administer the survey in this way, so that students could reflect back on their experiences and judge which teaching sessions had best equipped them with the theoretical knowledge they needed to engage in practice. In retrospect, the distancing of the survey from the actual teaching sessions (a total of seventeen weeks) may have resulted in the students being unable to recall clearly what the content of the session had been. It might have been more useful to administer a satisfaction survey at two points in time: one immediately following the teaching sessions and the other at the completion of clinical placements.

5.2.2 Factor X2

Collaboration – students are taught medical and rehabilitation theory upon which the preceptor and nurse teacher have or have not collaborated.

Two hypotheses were conducted to establish:

- Whether or not collaboration improved scores for rehabilitation questions
- Whether or not collaboration improved scores for medical questions

Again, the satisfaction survey was used to test if there were any differences in levels of satisfaction with the teaching sessions according to whether or not collaboration took place.

A number of recent reports have emphasised the need for improved collaboration between education and service providers. This has been cited as one way in which the

theory-practice gap can be lessened (Department of Health, 1999a; UKCC 1999). Collaboration and partnership needs to be fostered at all levels, both strategic and operational:

“Our recommendations are intended to promote closer collaboration between purchasers of education, HEIs and service providers.”
(U.K.C.C. 1999 p.5)

As discussed in section 3.1, this study attempted to assess the effect of collaboration at a very specific level by investigating whether or not students demonstrated better theoretical knowledge scores if preceptors and nurse teachers collaborated on the content of what was to be taught to students. The results for this factor were disappointing. It had been thought that collaboration between the preceptor and nurse teacher on the content of the theoretical teaching sessions would improve theoretical knowledge scores. This was because the teaching session following collaboration should be a reflection of what both educationalists and clinical specialists viewed as relevant knowledge for students to possess. Within this study, collaboration on the content of both the rehabilitation and medical teaching sessions was proven to be an ineffective means of promoting theoretical knowledge. There were no significant differences in theoretical scores whether or not collaboration occurred for medical ($F(1,17) = 3.02$; $p > 0.05$) or rehabilitation ($F(1,17) = 0.64$; $p > 0.05$). However, for the medical scores, a power analysis demonstrated that the sample of eight students gave only a power of 68% to detect a difference of 15% between the two groups. In retrospect, investigation of this factor perhaps required greater clarification and control.

Preceptors and nurse teachers were asked to meet following the first teaching session, to compare what had been taught to the students and to consider if any changes would be beneficial prior to the second teaching session. No record of this meeting was kept and the preceptors and teachers were not asked if they changed the format of their teaching session as a result of this collaboration, or how. It would have been useful to request lesson plans for each session from the nurse teachers and preceptors in order to compare differences between the first and second teaching sessions. Alternatively, a focus group discussion with the participants may have been a useful way to establish what interaction took place between the preceptors and nurse teachers.

It may have been the case that following discussion, the preceptors and teachers did not make any changes to what or how they taught the students. This would account for the lack of significant differences in theoretical score according to whether or not collaboration had taken place. This in itself has implications. The preceptors have already been shown to be better at promoting theoretical knowledge relating to their clinical speciality than the nurse teachers. If the nurse teachers did not make changes to what they taught the students following discussion with the preceptors, this would suggest that they were unable, or unwilling to see the benefits or relevance of what the preceptors taught the students. Alternatively, it could be related to the balance of power between the preceptors and nurse teachers.

Duffy & Scott (1998) suggest there is an imbalance in the power relationships between clinicians and educationalists. Historically, knowing has been more valued than doing, resulting in the devaluing of practice. Nurse teachers are seen to be the gatekeepers of knowledge by both students and clinicians. Duffy & Scott discuss this power and knowledge imbalance in relation to the reluctance of clinical staff to fail students' clinical assessments, even though students were clearly not meeting the criteria for passing. This issue has also been highlighted more recently in the work of Watson & Harris (1999). The perceived lack of power and confidence of clinical staff may have been apparent in the discussions between the preceptors and nurse teachers which took place following the first teaching session. Preceptors may have been reluctant to make suggestions with regard to the knowledge needed by the students and how the second teaching session should be structured, if they regarded the nurse teachers as the powerful gatekeepers of what theoretical knowledge the students need.

Whilst recent publications, such as those cited above, have stressed the need for improved collaboration, there is little in the way of practical suggestions as to how this might be achieved. The results of this study, which examined the very specific aspect of collaboration between preceptors and nurse teachers on theoretical teaching content, suggest that the concept of collaboration, certainly at this level, may not be as straightforward as it first appears. Further study with larger samples is needed which examines, in depth, the effects of this type of collaboration to ensure that such

collaboration is beneficial and that there is an equal distribution of power between the parties involved.

5.2.3 Factor X3

Sequencing of theory and practice - students go straight to or delay a medical or rehabilitation placement

Two hypotheses were tested to identify:

- Any differences in medical knowledge scores depending on whether the students go straight to or delay their medical clinical experience
- Any differences in rehabilitation knowledge scores depending on whether the students go straight to or delay their rehabilitation clinical experience

In addition, the satisfaction surveys were analysed in order to determine whether or not there were any differences in satisfaction according to whether students went straight to, or delayed their clinical placement following theoretical input.

A number of studies have emphasised the need for students to receive theoretical input before they can apply that theory to practice (Wong 1979; Davies *et al* 1996; Hislop *et al* 1996). The collective view of respondents interviewed within the qualitative stage of the study also suggested that the juxtaposition of theoretical input with related clinical experience would minimise the theory-practice gap. Students receiving theoretical input relating to medical and rehabilitation and then going straight to or delaying the associated clinical experience tested this assumption in the quantitative stage of the study. Students who went straight to the clinical experience had been expected to perform better on theoretical and practical skill than those students delaying the experience. However, this was not found to be the case. As previously discussed, it was not possible to compare practical skill according to the sequencing or delay of clinical placement, but the effect on theoretical knowledge could be ascertained. There was no difference in theoretical knowledge score whether students went straight to or delayed a four-week medical

placement ($F(1,24) = 0.01$; $p > 0.05$). In addition, students delaying a two-week rehabilitation placement actually improved their theoretical score to a significant degree over those going straight to rehabilitation, ($F(1,21) = 7.43$; $p < 0.05$).

It could be suggested that on their first clinical experience, students are concentrating on developing practical skills. This is the first time they are within a clinical environment and they need to acquire rapidly, practical skills in order to function effectively in this setting. They may be focussing on practical skill acquisition to the detriment of developing theoretical knowledge. Interview data from the qualitative stage of the study supports this idea in that first and second year students were far more concerned with developing practical skills which would allow them to survive in the clinical area, than on acquiring theoretical knowledge.

By the time students reach their final placement, they should have attained competence in basic practical skills and can thus focus on gaining theoretical knowledge. This would account for the better rehabilitation scores where this placement is delayed. However, if this were the case, the medical scores should also have improved for the delayed medical placement, which was not the case.

Possibly the type of clinical placement is having an effect here. Medical wards are work-intensive areas, with a high turnover of patients. Students may be so busy performing practical nursing skills, they do not have the time to engage in theoretical knowledge development. In addition to acquiring skills in nursing care relating to activities of living, students also have the opportunity to observe more advanced clinical skills, for example: naso-gastic feeding; intravenous therapy; cannulation and catheterisation. These are skills they have little opportunity to experience within the other first year clinical placements they complete. Students are actively encouraged to make the most of such learning opportunities by observing and assisting qualified staff performing these activities and accompanying patients to other departments for tests and treatment. It may be that for the medical placement, whether this was delayed or not, students were making the most of the unique opportunities afforded them to maximise the development of these clinical skills, to the detriment of theoretical knowledge development.

The pace of rehabilitation, tends to be slower. Nursing care in general revolves around providing assistance with activities of living such as washing and dressing patients, assisting with eating and drinking, mobilising. These are basic nursing skills that students would have had ample opportunity to practise in earlier clinical placements, such as in nursing homes. Thus if the rehabilitation placement is their final placement, they may feel sufficiently competent in the practical nursing skills required of them to be able to engage in developing an understanding of theoretical aspects underpinning rehabilitation processes. May *et al* (1997) also identify the impact the pace of work has on student learning, suggesting that where the pace of work is fast, this is detrimental to students' learning. Interestingly, they include a quote from a student who states that medical and surgical placements were not enjoyable because of the fast pace of work they are expected to cope with.

This argument gives a possible explanation for the results found in relation to the sequencing of clinical placements within this study. However, it is not entirely satisfactory, as it suggests that theoretical knowledge and practical skill do not develop simultaneously, but rather in tandem, with either one or the other being focussed upon at any one time. Theory and practice develop sequentially, rather than being integrated together.

It is interesting to note that whilst the students interviewed within the qualitative stage of the study were the most vocal in recommending better sequencing of theory and practice, there were few differences in satisfaction with placements, whether or not these were delayed. Students did on average disagree that the teaching sessions had been of no benefit to their placement if they went straight there following theoretical teaching input. Levels of satisfaction with the placements differed according to speciality. Students' experiences of preceptorship on the four-week medical placement were more positive than for the two-week rehabilitation placement. Students felt they had been able to work with their preceptor on a regular basis on the medical placement and that the preceptor knew what their learning needs were. On the two-week rehabilitation placement students did not feel they had worked with their preceptor on a regular basis and that preceptors were unaware of their learning needs. It is impossible to say whether these differences are a result of the differences in length of placement, or differences in speciality. For both

medical and rehabilitation placements, whilst students felt they had learned a lot, they still felt that the placements were too short; a finding which adds yet further support to the views of those interviewed within the qualitative stage of the study.

In the current climate of increasing student numbers and scarcity of clinical placements, it is impossible for all students to receive theoretical input and then to go straight to the associated clinical speciality. The results of this study are perhaps reassuring in that it provides evidence to suggest that sequencing of theory and practice, with the close approximation of theoretical input with subsequent clinical experience, is less important than previously thought. Delay of clinical experience within this study was not detrimental to the students. Indeed delay appeared to be beneficial in the case of the shorter two-week rehabilitation placement. Although this is a small-scale study, it has been useful in questioning a commonly-held assumption with regard to the sequencing of theory and practice.

The U.K.C.C. (1999) *Fitness for Practice* document recommends that theory and practice requires better sequencing:

Recommendation 16

4.35

“The sequencing and balance between university and practice-based study should be planned to promote an integration of knowledge, attitudes and skills” U.K.C.C. 1999 p.39)

Further investigation is perhaps needed before this recommendation can be implemented, in order to establish the best sequencing of theory and practice. The results of this study suggest it may not be a simple case of juxtaposing theory and practice; the type of practice placement undertaken by students also requires further examination. It is recognised that this study represents only a small attempt to sequence theory and practice, with only twenty-one students involved in the analysis of sequencing for rehabilitation and twenty-four students for the medical placement. Repeat studies are needed with larger samples in order to establish clearly the effect of sequencing theory and practice. In addition, this study did not attempt to investigate a complete lack of sequencing, as discussed in section 3.1, which was seen as problematic, particularly by students

interviewed within the qualitative stage of the study. Whilst it was not feasible to study the effect of a complete lack of sequencing within this study, this area is also worthy of further investigation.

5.2.4 Summary of results

Examination of the effect of collaboration and sequencing on knowledge and skill development in first year undergraduate student nurses produced surprising results, suggesting the way in which these factors operate is more complex than previously thought. Within this study, collaboration between preceptors and nurse teachers in terms of what is taught to students theoretically prior to clinical experience was shown to be ineffective. It is recognised that in the case of the medical placement the lack of difference demonstrated may have been due to the small sample size which gave only a 68% change of a difference of 15% being detected. The view expressed within the qualitative stage of the study that students should be provided with theoretical input immediately prior to clinical placement was not supported within this study. Indeed, a delay was shown to be beneficial in the case of rehabilitation. However, the study did not attempt to investigate a complete lack of sequencing, which was also seen to be a cause of the theory-practice gap by those interviewed. The need for longer placements was supported by the fact that practical skill was significantly better at four weeks than at two weeks for the medical placement, although the effect of length of placement on theoretical knowledge could not be established. Using a two- and four-week placement may in retrospect may not have been valid in any case. In their N.B.S funded study, Watson & Harris (1999) state that five weeks is a critical point, with five-week placements having a significantly greater impact on students' learning than shorter placements.

The suggestion that preceptors come into a classroom setting to teach theoretical elements relating to their clinical speciality was supported, with preceptors being able to improve theoretical scores significantly better than teachers. Perhaps this factor is the one to concentrate on in terms of suggesting a tentative strategy for improving theoretical knowledge of students.

5.3 LIMITATIONS OF STUDY

It is recognised that the quantitative stage of the study has a number of limitations. The main limitation being, that whilst the first stage of the study identifies factors which are seen to influence the theory-practice gap and ways in which the gap could be closed, the quantitative stage does not measure if manipulation of these factors achieves a better integration of theory and practice. No study to date has provided empirical evidence that manipulation of such factors closes the theory-practice gap. This is primarily because of the difficulty in designing a tool which measures integration of theory and practice. There is much discussion about the need for integration and teaching and learning techniques that can be used to facilitate integration, but there is little evidence to establish that such integration is achieved. This study does however, provide information with regard to how factors perceived to affect the theory-practice gap affect knowledge and skill acquisition. This in itself adds to what is known about the way in which these factors operate and has called into question some of the commonly-held assumptions about the theory-practice phenomenon.

Whilst the qualitative stage involved the study of students within two institutions of higher education, within the quantitative stage only one institution could be used. This was because it was not feasible to control teaching sessions, the type, length and sequencing of placements other than in the researcher's own institution. In addition, the large number of practical skill observations requiring to be completed within a short time span meant that the number of students that could be studied was limited.

First year undergraduate students were chosen for study because it has been argued that the theory-practice gap is greatest for these inexperienced practitioners. The aim of the study was to measure which of the factors under investigation promoted the most improvement in theoretical knowledge, practical skill and satisfaction for these novice nurses. It is recognised that studying only one year of a course is a limitation in that theoretical knowledge and practical skill acquisition may be affected differently by the factors under investigation within other years. Whilst it would have been interesting to study other years of the course, this would have required the construction of theoretical

knowledge tests and practical skill assessments for each year studied, again not a feasible proposition within this study.

Whilst a complete cohort of students was originally recruited to the study (n=32), the non-attendance at one or both theoretical teaching sessions resulted in a smaller number of students' results being included for analysis (n=19). The non-attendance at teaching sessions was disappointing, but it is difficult to know how this might have been improved upon. Discussion took place with the cohort of students who all agreed to participate in the study and appeared committed to do so. Once participation had been agreed, the need to attend both teaching sessions was emphasised. The week before clinical placement is the only time some students are able to return home within term time, due to the distances involved. This may have affected students' attendance. The teaching sessions had to be programmed into the week before clinical placement commenced, in order to determine whether the sequencing of theory and practice was a significant factor. If a larger number of students had been recruited to the study, the impact of non-attendance may have been less. Whatever the causes of non-attendance, the small sample size, consisting of one cohort of students within one institution mean that the results gained can only be said to apply to those students studied; generalisations beyond this would not be valid or appropriate. Within this restriction a number of surprising results were found, suggesting that further research into the factors studied here is needed.

Another limitation of the study arose from the inability to vary independently the length and type of clinical placement. The two-week placement was always rehabilitation, the four-week placement always medical. This meant it was inappropriate to study the effect of length of placement on theoretical knowledge, as it may well have been the type of placement rather than its length affecting knowledge acquisition. In retrospect, it might have been more expedient only to have used the medical placement and to have assessed theoretical knowledge at two and four weeks, similar to practical skill. However, this would have meant that the data regarding sequencing and delaying the two-week rehabilitation placement would not have been elicited, which in itself is very interesting.

It could also be suggested that measuring the ability of preceptors, who are experienced practitioners within their particular clinical speciality, to promote theoretical knowledge

relating to this, against nurse teachers who do not possess such clinical expertise, is not a fair comparison to make. This is the reality of nurse education. Whilst teachers are hopefully afforded the opportunity to teach areas in which they are expert, they also often have to teach areas of which they have little experience.

Another difficulty was the generic nature of the tool used to measure practical skill. This focuses on the practical skills students should acquire throughout their first year. As such it centres on helping patients with activities of living and skills essential within any clinical setting such as emergency procedures, universal control of infection precautions and monitoring vital signs. Students would not be expected to be competent in more advanced skills at this stage of their education. As a result it was impossible to identify skills a first year student would only develop within either a rehabilitation or medical setting. Skills at this stage are generic and used across all clinical settings. It would have been inappropriate to measure the effect of sequencing on practical skill because practical skill scores for the delayed placements would not be a reflection only of those skills developed on the delayed placement, but across the whole range of placements completed.

5.4 STRATEGIES TO PROMOTE KNOWLEDGE AND SKILL ACQUISITION

The aim of this Ph.D study was to suggest strategies that promote the development of both relevant theoretical knowledge and practical skill in student nurses. It has been argued that if factors demonstrated to facilitate knowledge and skill development can be identified, then implementation of strategies which maximise the use of these, may help towards closing the complex phenomenon known as the theory-practice gap. Three factors commonly perceived to contribute to the theory-practice gap phenomenon have been subjected to experimental testing and some surprising results obtained in relation to the effect they have on theoretical knowledge and practical skill development in a cohort of first year student nurses.

It is recognised that the investigation has been conducted on a very small scale with a limited number of students and, in retrospect, to base any strategies upon these without further larger-scale research would be inappropriate and invalid. However, tentative

strategies are proposed here which could be subjected to further testing in order to establish whether or not they contain valid and reliable means of facilitating the theory and practical skill development in student nurses.

It has been argued that nurse teachers can no longer maintain the credibility expected of them over diverse roles that include academic, clinical, administrative and teaching responsibilities. Nurse teachers perhaps need to redefine their role, concentrating on areas in which they are expert, or in which they can develop expertise, leaving areas of clinical specialist knowledge to be taught by clinically-based practitioners. This is not to suggest there is no place in nurse education for academically-based nurse teachers, or that nurse education should be service-, rather than education-led, but there needs to be clear delineation of who is the best to teach what to students. The results of this study suggest that preceptors are better able to develop theoretical knowledge relating to their specific clinical specialty in a classroom setting, than academic teaching staff. It is therefore suggested that strategies or models of nurse education should be developed which utilise the strengths of both educationalists and clinicians involved in teaching students. Nurse lecturers and clinically-based preceptors should complement and enhance each others' areas of knowledge and expertise in order to maximise the learning opportunities for the student.

The traditional model of nurse education, with the nurse teacher as the centre of all nursing knowledge which they will instil into students is now obsolete (Cowman, 2000). Instead, nurse teachers can be pivotal in developing lifelong learning, transferable skills essential for students to qualify and develop a career as a professional nurse. Teachers need to concentrate on teaching students how to learn in an environment of continual change, the pace of which is ever accelerating. Students and nurses will always be faced with new situations with which they need to deal effectively. They need to be able to seek out the relevant information they require and to apply it in an appropriate manner. They need to be able to evaluate accurately the outcomes of the care they give. They need to be able to reflect on their practice in order to learn from it. They need to be able to engage in evidence-based care and problem-based care. This can be both classroom and clinically-based. It involves a move from a teacher-based stance, to a student-centred approach, and the facilitation of learning.

This view is supported by Camiah (1998) who states that now nurse teachers are firmly within the higher education sector, they need to develop and implement new skills which include the facilitation of learning, rather than the traditional didactic approach commonly employed. Skills of clinical supervision, and communication are also prerequisites of effective teaching and support of students. Camiah further suggests that a significant number of nurse teachers will also need to develop skills in curriculum innovation, marketing, negotiation, research, clinical audit and entrepreneurial work.

There are large areas of the nurse education curriculum in which nurse teachers have the most experience for teaching, such as: communication and interpersonal skills; research and research utilisation skills; professional issues; theories and models of health and nursing. These can be taught in a classroom setting, but also need to be transferred to practice. This can be achieved by the facilitative approach to link teaching. Thus, the nurse teacher remains at the centre of the nursing curriculum, teaching and facilitating both in the classroom and areas of clinical practice. However, areas relating to clinical specialities could be taught by experienced clinical staff, who have an interest in teaching and are experienced preceptors.

Within adult nursing this could relate to specific clinical areas such as orthopaedics, cardiovascular, respiratory, urological, gynaecological nursing. Within a mental health setting the basis might be more skills-based, with experienced clinicians teaching management of aggression and de-escalation techniques, intervention and collaborative skills. Specialists such as those responsible for audit and clinical governance, health and safety and control of infection within the clinical area could teach students these subjects. Community specialists such as health visitors, community psychiatric nurses and district nurses can give students an insight into their roles in maintaining health within the community setting. The use of clinicians to teach theoretical elements will vary from institution to institution depending on the curriculum design and the types of registration offered. The emphasis is on an approach where the nurse teacher builds the framework of universal learning skills within which clinical experts provide the up-to-date knowledge, experience and expertise wherever possible. Both clinician and teacher work in collaboration to develop a knowledgeable doer, who has the necessary relevant knowledge, clinical and learning skills at the point of registration (U.K.C.C. 1999).

Many nurse teachers would perhaps argue that this already takes place, with guest speakers being invited into the university to speak to students. Clinical staff are also usually involved in curriculum development processes. However, using clinical staff to deliver classroom-based teaching, tends to operate on an ad hoc basis and at the discretion of individual teachers. The philosophy is still that the academic nurse teacher has ownership of the teaching/learning process with clinical experts being invited in to teach about specific subjects as the academic feels is appropriate. Academic nurse teachers routinely teach areas such as cardiovascular nursing or respiratory nursing, because they usually have some previous knowledge or experience of these subject areas. Other areas seen to be more specialised, such as ophthalmology or ear nose and throat nursing might be taught by an appropriate clinical specialist, unless there happens to be a lecturer available who has the relevant experience. What is argued for here is a model in which theory relevant to clinical areas is taught by appropriately experienced, knowledgeable and qualified preceptors in a regular and structured approach. This model recognises that each area of clinical practice is a speciality in its own right and should therefore be taught by clinical specialists, rather than the generic teacher. It also recognises that clinicians should also have some ownership of the learning process, with responsibility for what is taught to students.

A service-orientated model employing the use of clinical staff to provide input into programmes of nurse education, obviously has a number of implications. Not the least of these is the financing of such an approach. Would clinical staff be remunerated for their teaching input or would it be regarded as a part of their normal duties? If clinical staff were to be paid, what are the financial implications for the educational institution in meeting these? How would Trusts be reimbursed for providing cover whilst their experienced staff are away teaching? This type of model may not be realistic in institutions that have large numbers of students divided into several groups requiring the duplication of classroom teaching. The cost and the reality of attempting to manage and organise such an approach where large numbers of students are involved may well be prohibitive. It would require a process of negotiation and collaboration between service and education providers in order to determine if and how such a scheme could be viable and whether or not the benefits warranted the expenditure on such a programme. There are also organisational issues to be considered if this type of model of education were to

be adopted. For example maintaining information with regard to which clinical staff can teach which particular subjects and specialities and the scheduling of these individuals into timetables.

There is also the issue of recruitment to the scheme. Not all preceptors are good teachers and indeed many of them would not want to teach within a classroom setting. Many preceptors themselves are inexperienced practitioners and unlikely to be appropriate to recruit to such a scheme. It is recommended here that if a model of nurse education which utilises the skills, knowledge and expertise of clinicians is adopted, such clinicians would need to be experienced within their field and that they receive training in learning and teaching methodologies, assessment, support and counselling of students. The Council of Deans and Heads of UK University Faculties of Nursing, Midwifery and Health Visiting has suggested there is a need to develop a clinical academic career structure which would perhaps allow this tentative strategy to become a reality (Watson & Harris 1999). There are again issues of finance if this approach is adopted. Lessons learned from previous attempts to introduce posts combining clinical and academic roles suggest that such roles are not easy to maintain (sections 1.2.5.1 – 1.2.5.3).

It is also important that the power balance between the education and service providers is such that it facilitates a genuine partnership of collaboration and responsibility for the students' learning experiences. The educational institution should not merely pay lip-service to service providers. Clinicians need to feel empowered if they are to make a contribution to the educational process.

It might appear that an argument is being forwarded which will make nurse education by academic staff based within an institution of higher education obsolete, but this is not the case. Nurse teachers still have a central part to play in the education of nurses, but this would focus on developing lifelong, core skills and concepts of nursing which embrace all areas of clinical practice, such as holistic care, evidence-based practice and health promotion, rather than teaching subjects relating to specific clinical specialities. Such a strategy would allow nurse teachers more time to develop clinical link roles and to facilitate learning within the clinical environment as well as in the classroom. It would also free up time for teachers to engage in research activities, which are being

increasingly emphasised by education providers. If clinical links are developed, this may be in the form of collaborative practice-related research between clinicians and educationalists.

As discussed within the introduction to this study in section 1.2.3.1, Rolfe (1998) suggests that the theory-practice gap is the result of a “*crisis in confidence*” (p.673) amongst clinical nurses. They feel that academic research is of little relevance or use to them because it has become so divorced from the realities of clinical nursing practice. He argues that statistical, generalisable research informs the nurse how the average patient will behave, but not how the individual patient will respond in a particular situation. Such studies are of limited use in nursing which centres on unique, one-to-one situations between the nurse and patient. In an earlier work (Rolfe 1996) suggests a new paradigm for nursing which he calls ‘hypothetico-abductivism’:

*“...a model which generates theory of direct relevance to individual encounters between the nurse and her patients, and which closes the theory-practice gap by directly bringing about clinical change”
(Rolfe 1996 p.131)*

Within this model, research is led by practice. Nurses formulate and test out theories in order to deal with the problems of patient care which face them every day. These informal theories can be tested out within practice by formulating and testing hypotheses using the processes of reflection and reflexion – reflection in and on action. Thus there is no theory-practice gap; theory is firmly grounded within practice. Collaborative research between clinical link teachers and clinical staff would further strengthen Rolfe’s model by using educationalists’ research skills within the clinical setting to support the nurse in this theorising and testing of hypotheses. In addition, if this model was seen to be a way forward and theory is generated within practice, then preceptors coming into the classroom setting to share the knowledge gained from these research processes, can only serve to further close the theory-practice gap. Whilst theory is generated and tested out on an individual basis by the nurse within her clinical role, this can be disseminated to students through her teaching theoretical elements relating to that role within the classroom setting.

Strategies in which clinical staff play a central role in the education of student nurses both within the clinical and classroom setting would require radical rethinking and restructuring of the nursing curriculum. However, the *Fitness for Practice* document (U.K.C.C. 1999) has highlighted the need for service and education providers to work together to maximise learning opportunities for students. This will involve the breaking down of the traditional boundaries which at present exist between service and education and the facilitation of movement of teachers and clinicians between the two environments. In addition, the restructuring and re-validation of programmes of nursing which are required as a result of the *Fitness for Practice* recommendations has provided the ideal opportunity for such restructuring to take place.

5.5 RECOMMENDATIONS FOR FURTHER RESEARCH

This preliminary investigative study has called into question a number of commonly-held perceptions with regard to factors seen to affect the theory-practice gap and the effect these have on theoretical and practical skill acquisition when subjected to empirical testing. In some ways the research has posed more questions than it has answered and there is a need for further investigative study into a number of areas. Whilst the most significant finding of the study was that preceptors were better able to promote theoretical knowledge relating to their clinical specialty than were nurse teachers; this in itself requires further study. A number of recommendations are made here as to how the research could be continued:

1. A study adopting a similar factorial experimental design, but using a larger sample of first year nursing students is needed in order to substantiate the findings of this study. A replication study using another cohort of first year undergraduate student nurses from the same institution to allow comparison with the original findings would be useful in helping to establish validity and reliability of the results of the study. It would also be interesting to use students from another institution, ideally that used within the qualitative stage of this study. The institution used within the qualitative stage, but not the quantitative stage has much larger student numbers than the

researcher's own institution, which would overcome the difficulties experienced within this study of small sample size.

2. It would also be of interest to measure the effect of the same experimental factors on cohorts of second and third year students in order to establish whether the factors affect theoretical knowledge, practical skill and satisfaction in the same way as with first year students. This would require the construction of new tools to measure theoretical knowledge and skill at levels appropriate to second and third year students.
3. The concept of collaboration may be more complex than at first thought. Any repeat studies should incorporate some monitoring or measurement of the content of the theoretical teaching sessions conducted by preceptors and nurse teachers. This could be in the form of teaching plans or outlines. It would also be of interest to observe or record the discussion which takes place between nurse teacher and preceptor following the preliminary teaching session.
4. The whole issue of power and relationships between the education and service sectors requires further investigation if truly collaborative partnerships between service and education providers are to be developed.
5. This research has suggested that the type of placement undertaken by students may be a factor in whether or not theoretical knowledge is developed whilst students are on clinical placement. Further research into knowledge and skill acquisition within specific types of clinical experience is needed in order to make optimal use of clinical areas as learning environments.
6. This research has also suggested that theoretical knowledge and practical skill develop sequentially in tandem, rather than simultaneously; again this warrants further evaluation if the theory-practice gap is to be closed.
7. It has been suggested that strategies could be developed which utilise a model of nurse education in which clinical preceptors share equally in the teaching of students

and engage in classroom teaching. Before this model is adopted, research which focuses on the use of clinical preceptors and the outcome of this approach on knowledge and skill development of student nurses is necessary. This could focus on particular areas of nursing and the nursing syllabus. For example, if third year adult branch nurses are taught theoretical elements relating to nursing within a respiratory ward, by a preceptor from that ward, do they subsequently display greater knowledge and skill than those taught by a nurse teacher? This is a good example to investigate further as a number of the practical skills and theoretical knowledge needed to underpin these, whilst routine within the respiratory setting, are not so common elsewhere, such as care of the patient with an intercostal chest drain or endotracheal tube. This would, in part overcome the problem of practical skills being generic as was the case with the study of first year students. However, there will always be some degree of transferability of skills across clinical settings.

8. Within this study, two measuring tools were constructed, one to measure theoretical knowledge, the other practical skill. However, if the integration of skill and knowledge is to be assessed accurately, one tool which measures both simultaneously is needed. An example of this might be a tool which observes the student performing a psychomotor skill such as collection of a specimen of urine from a catheter for urinalysis and also asks the student to demonstrate knowledge that underpins this procedure. This could be in the form of an explanation of why particular activities such as maintaining a closed catheter system, handwashing and wearing gloves are carried out. Students could also be asked to interpret the urinalysis results.

5.6 DISSEMINATION OF FINDINGS

The results of this study are timely in view of the re-structuring and re-validation of programmes of nurse education which is currently underway across the U.K. A number of the findings directly relate to recommendations made within the *Fitness for Practice* (U.K.C.C. 1999) document which is shaping the way in which nurse education will be delivered in the future. Whilst only a small-scale study, a number of findings are pertinent to the proposed changes, suggesting that further research is carried out before these

recommendations are fully and finally implemented. It is therefore important to disseminate the findings of the study. To date a number of conference presentations and publications have been completed as follows:

Conference Presentations

The theory-practice gap. What is the way forward? RCN Research Society (Scotland) Symposium. 1st June 2000. Perth.

The theory-practice gap. What is the way forward? 1st Annual Research Conference in Nursing and Midwifery in Education. 23rd & 24th June 2000. University of Dublin Trinity College.

The theory-practice gap. What is the way forward? Nurse Education Tomorrow Conference 2000. 5-7th September 2000. Durham

All of the above papers present the work and findings of both the qualitative and quantitative stages of the study. Earlier papers based on the first, qualitative stage have been presented as follows:

The perceptions of nurse teachers, students nurses and preceptors of the theory-practice gap in nurse education. NBS Service: Education Partnership Conference. 18th February 1999. Aberdeen.

The theory-practice gap in nurse education and its effect on the quality of health care. NBS Teachers' Conferences. January, February and March 1996. Aviemore.

Publications

Corlett J. (2000) The perceptions of nurse teachers, students nurses and preceptors of the theory-practice gap in nurse education. Nurse Education Today. 20(6): 499-505.

CHAPTER SIX

CONCLUSION

A two-stage study has been conducted investigating the theory-practice gap said to exist within nursing. Within the first qualitative stage, nurse teachers, student nurses and preceptors were interviewed in order to elicit their perceptions of this phenomenon and their views as to how the gap might be lessened. Eight themes were evident within the data collected and a number of factors were seen to affect the theory-practice gap. Factors seen to contribute to the gap included the lack of communication between educational institutions and clinical areas, lack of time for students and preceptors to engage in teaching/learning opportunities, lack of clarity with regard to the link teacher role, the sequencing of theoretical input with clinical experience and the shortness of clinical placements. It was suggested that longer placements, better sequencing of theory and practice, increasing collaboration and preceptors teaching theoretical elements relating to their clinical speciality were ways in which the gap could be lessened.

These findings are supported by a number of research articles appearing within the nursing press in recent years in addition to a number of studies commissioned by the professional organisations responsible for the quality of education provided to students. However, there is a lack of empirically-based work that demonstrates the effect of these factors on theoretical knowledge and practical skill acquisition in student nurses. The second, quantitative, stage of the study sought to provide such evidence.

Three factors were subjected to testing within a 2³ experimental design in order to establish their effect, if any, on theoretical knowledge, practical skill acquisition and satisfaction in a cohort of first year undergraduate nursing students within one institution of higher education. The first factor compared differences in knowledge, skill and satisfaction according to whether students received theoretical input relating to a specific clinical speciality from a nurse teacher or preceptor. The second factor examined a very specific element of the collaboration issue, examining whether there were differences in knowledge, skill and satisfaction according to whether or not the nurse teacher and

preceptor had collaborated on the content of what was to be taught to the students during the theoretical, classroom-based sessions prior to clinical placement. The third factor examined whether there were any differences according to whether students went straight to or delayed the related clinical placement following theoretical input. Whilst this was a small-scale study and may not be typical of other nursing students or institutions of education, a number of surprising results were obtained, which at the very least indicate the need for further research in view of the recent re-structuring of programmes of nurse education.

Within the study, preceptors were shown to be more effective at promoting theoretical knowledge relating to their clinical speciality than were nurse teachers, within a classroom setting. It has been argued that this is hardly surprising, in view of the diversity of roles and responsibilities nurse teachers are expected to maintain. It has also been suggested that it is time for areas of the nursing curriculum relating to clinical specialisms to be taught by the clinical experts within those specialties and that this should be incorporated into the way in which nursing curricula are developed in the future. A joint partnership between education and service is seen as a possible strategy to take forward in relation to this. However, this has been a study involving only a small number of students and further study is needed, particularly in view of the financial and organisational issues to be considered, which may make such an approach unrealistic.

The lack of improvement in knowledge scores, following collaboration between the preceptor and nurse teacher on the content of what was taught to students, is cause for concern. Although in the case of medical theoretical knowledge, this may have been because the sample was too small to detect any significant difference. It has been suggested that the lack of improvement in knowledge scores may be due to the imbalance of power between educationalists and clinicians. If collaborative partnerships are the way forward in the future, there is a need to examine this phenomenon in more detail. There needs to be equality of power between education and service sectors for truly collaborative relationships to be facilitated.

The results in relation to sequencing suggest that the type and nature of placement may be as important as the sequencing of theoretical input with practical experience and again

this warrants further attention. This study did not attempt to examine the effect of no sequencing, with students going to clinical placements having received no theoretical input. This, as previously discussed, is also an area worthy of investigation.

In conclusion, this study has contributed further evidence with regard to the causes of the theory-practice gap, which continues to be of concern to the nursing profession and nurse educationalists in particular. A number of commonly-held perceptions have been scrutinised and called into question. It has been demonstrated that a number of factors seen to cause the so-called gap do not effect theoretical knowledge and practical skill development in the way expected, when tested under experimental conditions.

The theory-practice phenomenon is a complex issue, proving difficult to solve and this study does not claim to have the solution to the problem. As Khatib & Ford (1999) said, it is a multifaceted problem, requiring more than one solution. What this study has achieved is to provide further information as to the way in which factors seen to influence the gap, affect knowledge, skill and satisfaction in a group of undergraduate first year student nurses and as such has added further knowledge to what is known about the concept.

The development of a curriculum which incorporates the use of experienced clinical preceptors to teach clinically related subjects on a regular and structured basis within the academic institution might appear somewhat radical. There is a need for further investigation into the benefits of such a model before adopting this approach. This may be one way of realising the recommendations made within the *Fitness for Practice* document (U.K.C.C. 1999) and ensuring that in the future nurse education is a joint venture between educationalists and clinicians.

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APPENDIX 1
Copies of letters



UNIVERSITY
of
ABERTAY DUNDEE

Dear student,

I am a lecturer at the University of Abertay Dundee within the School of Health and Nursing. I am currently undertaking a M/Phil/PhD which investigates the theory-practice gap within nurse education from the perspective of students, nurse teachers and clinical staff. The project is in two parts. Within the first stage I am hoping to interview a random sample of students and staff from [REDACTED] as well as preceptors within the clinical area. Using a qualitative approach, my intention is to use these interviews to generate themes and areas for a questionnaire which will form the second stage of the study. This questionnaire will then be distributed to a larger sample of students, teaching staff and preceptors. The overall aim is to investigate the theory-practice gap from the perspectives of these three different groups in order to identify similarities and differences between them and to try and propose ways in which this perceived gap might be lessened.

[REDACTED] has given me permission to approach Project 2000 students from the Foundation programme and Adult and Mental Health branches whose names have been randomly selected, to invite them to participate in the study. Participation would involve being interviewed together with two other students from the same class. The group interview would last approximately 30-45 minutes, the aim being to explore you and your colleagues' perceptions of the theory-practice gap.

I appreciate that you have many other commitments and may not wish, or may not be able, to participate in the study. I would therefore, be grateful if you would complete the form enclosed indicating whether or not you wish to participate and return to me in the enclosed envelope. If you agree to be involved, I will then contact you to set up an interview time. The interviews will be conducted during June and July.

Whilst the method of using group interviews disallows complete anonymity, all information would be treated as confidential and any subsequent publication of the results of the study would not allow individual participants to be identified.

I look forward to hearing from you,

Yours faithfully

(Miss Jo Corlett)



UNIVERSITY
of
ABERTAY DUNDEE

Dear preceptor,

I am a lecturer at the University of Abertay Dundee within the School of Health and Nursing. I am currently undertaking a M/Phil/PhD which investigates the theory-practice gap within nurse education from the perspective of students, nurse teachers and clinical staff. The project is in two parts. Within the first stage I am hoping to interview a random sample of students and staff from [REDACTED] as well as preceptors within the clinical area.

Using a qualitative approach, my intention is to use these interviews to generate themes and areas for a questionnaire which will form the second stage of the study. This questionnaire will then be distributed to a larger sample of students, teaching staff and preceptors. The overall aim is to investigate the theory-practice gap from the perspectives of these three different groups in order to identify similarities and differences between them and to try and propose ways in which this perceived gap might be lessened.

[REDACTED] has given me permission to approach preceptors working within the Dundee Teaching Hospitals Trust whose names have been randomly selected, to invite them to participate in the study. Participation would involve being interviewed together with two other preceptors from the same clinical area. The group interview would last approximately 30-45 minutes, the aim being to explore you and your colleagues' perceptions of the theory-practice gap.

I appreciate that you have many other commitments and may not wish, or may not be able, to participate in the study. I would therefore, be grateful if you would complete the form enclosed indicating whether or not you wish to participate and return to me in the enclosed envelope. If you agree to be involved, I will then contact you to set up an interview time. The interviews will be conducted during May and June.

Whilst the method of using group interviews disallows complete anonymity, all information would be treated as confidential and any subsequent publication of the results of the study would not allow individual participants to be identified.

I look forward to hearing from you,

Yours faithfully

(Miss Jo Corlett)

NAME:.....

I AM ABLE/UNABLE TO BE INTERVIEWED

(Please delete as appropriate)

If you are willing to participate please would you write down your telephone extension at work so that I can contact you to set up an interview.

WORK TELEPHONE NUMBER:.....

(Please return this form to me in the enclosed envelope.)

Thank you for your help.



UNIVERSITY
of
ABERTAY DUNDEE

[REDACTED]
Head of School
School of Health & Nursing

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
18th March 1996.

Dear [REDACTED]

Further to our conversation, I am formally writing to request permission to approach undergraduate students and nursing lecturers within the School of Health and Nursing, for interviewing purposes in connection with my research studies,

Yours sincerely,

(Miss J.F. Corlett)



UNIVERSITY
of
ABERTAY DUNDEE

[REDACTED]
Principal
[REDACTED]
[REDACTED]

Dundee

27th February 1996.

Dear [REDACTED],

I am a lecturer at the University of Abertay Dundee within the School of Health and Nursing. I am currently undertaking a M.Phil/PhD and I am writing to request permission to approach P2000 students and teaching staff within [REDACTED] in relation to my studies.

The subject of my research is an investigation into the theory-practice gap within nurse education from the perspective of students, nurse teachers and clinical staff. The project is in two parts. Within the first stage I am hoping to interview a random sample of students and staff from [REDACTED], as well as preceptors within the clinical area. Using a qualitative approach, my intention is to use these interviews to generate themes and areas for a questionnaire which will form the second stage of the study. This questionnaire will then be distributed to a larger sample of students, teaching staff and preceptors. The overall aim is to investigate the theory-practice gap from these three different perspectives in order to identify similarities and differences and to try and propose ways in which this perceived gap might be lessened.

I am thus seeking permission to approach P2000 students and teaching staff who predominantly teach on the P2000 programme, initially for interviewing purposes, subsequently to complete a questionnaire. It is my intention to use random sampling techniques for both stages. If you are willing to allow your students and staff to participate, I would appreciate it if I could have a list of all the P2000 students and of staff whose main teaching responsibilities are to this course, in order for me to generate a random sample.

I hope you will be able to help me in this project and I look forward to hearing from you,

Yours sincerely

(Miss J.F. Corlett)



UNIVERSITY
of
ABERTAY DUNDEE

[REDACTED]
Director of Nursing Services & Quality
[REDACTED]
[REDACTED]

18th March 1996.

Dear [REDACTED]

I am a lecturer at the University of Abertay Dundee within the School of Health and Nursing. I am currently undertaking a M.Phil/PhD and I am writing to request permission to approach clinical nursing staff who are trained preceptors, in relation to my studies.

The subject of my research is an investigation into the theory-practice gap within nurse education from the perspective of students, nurse teachers and clinical staff. The project is in two parts. Within the first stage I am hoping to interview a random sample of trained preceptors working within a variety of clinical settings within the [REDACTED] region. Using a qualitative approach, my intention is to use these interviews to generate themes and areas for a questionnaire which will form the second stage of the study. This questionnaire will then be distributed to a larger sample of preceptors.

In addition to interviewing preceptors from clinical areas, I also intend interviewing students and teaching staff from both the [REDACTED] [REDACTED]. The overall aim is to investigate the theory-practice gap from these three different perspectives in order to identify similarities and differences between them and to try and propose ways in which this perceived gap might be lessened.

I am thus seeking permission to approach trained preceptors working within [REDACTED]. For the interview I wish to randomly pick two surgical and two medical wards and then from those wards selected, randomly pick three preceptors from each.

I hope you will be able to help me in this project and I look forward to hearing from you,

Yours sincerely

(Miss J.F. Corlett)



UNIVERSITY
of
ABERTAY DUNDEE

[REDACTED]
Director of Nursing Services & Quality

[REDACTED]
[REDACTED]
Dundee

18th March 1996.
[REDACTED]

I am a lecturer at the University of Abertay Dundee within the School of Health and Nursing. I am currently undertaking a M.Phil/PhD and I am writing to request permission to approach clinical nursing staff who are trained preceptors, in relation to my studies.

The subject of my research is an investigation into the theory-practice gap within nurse education from the perspective of students, nurse teachers and clinical staff. The project is in two parts. Within the first stage I am hoping to interview a random sample of trained preceptors working within a variety of clinical settings within the [REDACTED] region. Using a qualitative approach, my intention is to use these interviews to generate themes and areas for a questionnaire which will form the second stage of the study. This questionnaire will then be distributed to a larger sample of preceptors.

In addition to interviewing preceptors from clinical areas, I also intend interviewing students and teaching staff from both the [REDACTED] [REDACTED]. The overall aim is to investigate the theory-practice gap from these three different perspectives in order to identify similarities and differences between them and to try and propose ways in which this perceived gap might be lessened.

I am thus seeking permission to approach trained preceptors working within [REDACTED] [REDACTED]. For the interview I wish to randomly pick two psychiatric wards and two care of the elderly wards. From those wards selected, I will then randomly pick three preceptors from each.

I hope you will be able to help me in this project and I look forward to hearing from you,

Yours sincerely

(Miss J.F. Corlett)

APPENDIX 2

Module pro formas

MODULE PRO-FORMA

Reference	NM 101A
Title	:Communication Studies
Level	:1
Prerequisites	:none
Co-requisites	:none
Prohibited combinations	:none

Aims

:To develop a knowledge of the complexities of communication in its widest context as it relates to nursing, nursing practice and health care systems.

Learning outcomes

:The student will be able to:

Understand the communication process and it's complexity
Recognise the elements of the communication process
Appraise one model of communication
Explore how effective communication can be facilitated and identify potential barriers to effective communication
Recognise and begin to develop an understanding and working knowledge of information technology
Recognise the value of the application of this knowledge and understanding to nursing practice and nursing research.

Syllabus

:

The process of communication

The contribution of cybernetics to the understanding of the communication process: models of communication: language and paralanguage

Communication across the lifespan

The concept of communication at various stages throughout the lifespan e.g. prenatal, childhood and adolescence. adulthood and old age.

Factors influencing communication process

Concept of dependence and independence, biological influences and functioning body structures, speaking, listening, reading, writing, psychological influences, IQ, emotions, human relationships, body image, socio-cultural influences, race and ethnicity, age, gender, social class, values and beliefs, dyads and organisations, environmental influences, politico-economic influences.

Technological Advances

Technology and health care. IT systems for healthcare and health research, Internet, WWW, Technology and confidentiality..

Teaching & learning workload (indicative)	Lecture	:24	
	Tutorial/Seminar	:12	:
	Laboratory	:	
	Study time	:84	

Coursework :x2
1 - class test
2 - project

Final grade weighting __ 0 __ % examination/ __100__ % coursework
(Add any special conditions here)

Supportive reading :
Argyle M 1994 5th ed. *The psychology of interpersonal behaviour* Penguin London
Benner P 1984 *From Novice to Expert: Excellence and Power in clinical nursing practice*
Addison Wesley
Burnard P 1992 *A communication skills guide for health care workers* Edwards Arnold
Department of Health 1993 *Ethnicity and health; a guide for the NHS* DoH London
Ellis RB et al 1995 *Interpersonal communication in nursing theory and practice* Churchill
Livingstone
HMSO 1992 *The Patient's Charter* HMSO Edinburgh
Sherman KM 1994 *Communication and image in nursing* Real Nursing Series Delmar
Publications

Specialised resources :Library and IT
Subject group :nursing
Department :School of Social and Health Sciences
Date of last amendment :June 1997

Module Assessment Profile Part A

Module No	NM 101a	Title	Communication Studies												
Semester	2	Module Tutor	Mrs S. McKinnon												
Group of Students	BSc/Bsc (Hons) Nursing														
	Week Number														
Assessment	29	30	31	32	33	34	35	36	38	39	40	41	42	43	44
Test 1							X								
Test 2															
Test 3															
Test 4															
Coursework 1		I								S					
Coursework 2															
Coursework 3															
Coursework 4															
Practical 1															
Practical 2															
Practical 3															
Practical 4															
Project															
Examination															

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I = week of issue of assessment.

S = week for submission of completed assessment.

D = week by which marked assessment is to be returned to students (an absence of a D indicates that the assessment will not be returned)

Module Assessment Profile Part B

Assessment	Specification	Member of Staff	Unit
Test 1	Class Test	Mrs McKinnon	1
Test 2			
Test 3			
Test 4			
Coursework 1	Essay 1,500 words	Mrs McKinnon	2
Coursework 2			
Coursework 3			
Coursework 4			
Practical 1			
Practical 2			
Practical 3			
Practical 4			
Project			
Examination			

Module Assessment Profile Part C

Unit	% Weighting	Compulsory units indicated with "C"	Component of unit for which resit facilities will not be available
1	25%	C	
2	75%	C	
3			
4			

MODULE PRO-FORMA

Reference	: NM102A
Title	: Personal and Professional Development
Level	: 1
Prerequisites	: none
Co-requisites	: none
Prohibited combinations	: none
Aims	

To develop an awareness of the development of nursing as a profession from a historical perspective to contemporary practice
To explore the roles and functions of the nurse across and the scope of professional practice
To recognise the need to develop personally and professionally within the profession

Learning outcomes

The student will be able to

Understand the evolution of nursing from a historical perspective
Recognise and value nursing as a profession
Understand society's influence on nursing
Recognise and begin to develop the qualities and skills required of a professional nurse
Explore the roles and functions of the nurse
Be familiar with the scope of professional practice

Syllabus

The History of Nursing

Nursing as old medicine; Nursing as a community service; women's role as nurses and midwives; The influence of Florence Nightingale; nursing theory and theorists;

The Scope of Professional Practice

Standards of Nursing Practice; Code of Conduct; Hospitals and other institutions; Community settings; Primary Health Care settings; Schools; Public Health

Roles and functions of the nurse

Caring; Advocacy; Manager; Rehabilitator; Comforter; Communicator, Teacher, Empowerer, Nursing Career Roles, Educator, Clinical Nurse Specialist, Nurse Manager, Researcher, Advanced Nurse Practitioner, Midwife

Nursing as a Profession

Professionalism; Education; Theory; Autonomy; Professional Organisations

Society's Influence on Nursing

Technological advances; Demographic Changes; Consumer movement; Health Promotion; Women's Movement

Teaching & learning workload (indicative)	Lecture/	24
	Tutorial/Seminar	12
	Laboratory	:
	Study time	:84

Module Assessment Profile Part A

Module No	NM 102a	Title	Personal and Professional Development													
Semester	1	Module Tutor	Mrs S. McKinnon													
Group of Students	BSc/BSc (Hons) Nursing															
	Week Number															
Assessment	10	11	12	13	14	15	16	17	18	19	20	21	25	26	27	
Test 1																
Test 2																
Test 3																
Test 4																
Coursework 1		I					S									
Coursework 2		I										S				
Coursework 3																
Coursework 4																
Practical 1																
Practical 2																
Practical 3																
Practical 4																
Project																
Examination																

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Module Assessment Profile Part B

Assessment	Specification	Member of Staff	Unit
Test 1			
Test 2			
Test 3			
Test 4			
Coursework 1	Essay 1,500 words	Mrs McKinnon	1
Coursework 2	Poster Presentation	Mrs McKinnon	2
Coursework 3			
Coursework 4			
Practical 1			
Practical 2			
Practical 3			
Practical 4			
Project			
Examination			

Module Assessment Profile Part C

Unit	% Weighting	Compulsory units indicated with "C"	Component of unit for which resit facilities will not be available
1	25%	C	
2	75%	C	
3			
4			

MODULE PRO-FORMA

Reference : NM 103 A
Title : Health Studies
Level : 1
Prerequisites : none
Co-requisites : none
Prohibited combinations : none

Aims

To develop an understanding of health, well-being and social care across the lifespan and in different contexts

Learning outcomes :
The student will be able to

Define health and well-being according to the WHO definitions
Understand the professional and lay interpretations of health
Understand the nature of modern caring across the lifespan
Explore different contexts in which health care is delivered

Syllabus :

Health and Well-being

Individual concepts of health and well-being; individual values and ethical dilemmas in health care delivery; empowerment and self-determination; physical and psychological health and well-being; challenges to the individual's health integrity

Professional and Lay interpretations of Health

Medical and Social Models of Health; health choices; individual responsibility; building 'healthy futures' Users movements;

Modern caring across the lifespan

Contemporary social policy and social provision; the impact of social, political and economic change; Health targets

Teaching & learning workload (indicative)	Lecture/	:24	
	Tutorial/Seminar	:12	:
	Laboratory	:	
	Study time	:84	

Assessment format : Coursework : Class test
Project

Final grade weighting : 100% coursework

Supportive reading

:

Dept of Health (1991)
HMSO

The Health of the Nation

Dally (1988)
Macmillan

Ideologies of Caring

Garret G (1990)
Macmillan

Older People: their support and care

Ginsburg N (1993)
Sage

Divisions of welfare

Health H (1995)
CV Mosby

Foundations in Nursing Theory and Practice

Jolley M et al (1992)
Edward Arnold

Nursing Care: the challenge to change

The Open University (1990)
OU Press

Health and Well-being

Spurgeon (1995)
Longman

The New Face of the NHS

WHO (1985)
WHO Copenhagen

Targets for health for all : the health policy for Europe

Specialised resources

: none

Subject group

: Nursing

Department

: School of Social and Health Sciences

Date of last amendment

: June 1997

Module Assessment Profile Part A

Module No	NM 103A	Title	Health Studies													
Semester	1	Module Tutor	Mrs E. Paton													
Group of Students	BSc/BSc (Hons) Nursing															
	Week Number															
Assessment	10	11	12	13	14	15	16	17	18	19	20	21	25	26	27	
Test 1										X						
Test 2																
Test 3																
Test 4																
Coursework 1		I							S							
Coursework 2																
Coursework 3																
Coursework 4																
Practical 1																
Practical 2																
Practical 3																
Practical 4																
Project																
Examination																

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Module Assessment Profile Part B

Assessment	Specification	Member of Staff	Unit
Test 1	Class Test	Mrs Paton	1
Test 2			
Test 3			
Test 4			
Coursework 1	Essay 1,5000words	Mrs Paton	2
Coursework 2			
Coursework 3			
Coursework 4			
Practical 1			
Practical 2			
Practical 3			
Practical 4			
Project			
Examination			

Module Assessment Profile Part C

Unit	% Weighting	Compulsory units indicated with "C"	Component of unit for which resit facilities will not be available
1	50%	C	
2	50%	C	
3			
4			

MODULE PRO-FORMA

Reference : NM 104A
Title : Nursing Studies Theory and Practice
Level : 1
Prerequisites : none
Co-requisites : none
Prohibited combinations : none

Aims

To promote and understanding of systematic care delivery across the age span and with differing client groups
To recognise the diversity of contexts in which care can be delivered

Learning outcomes :
The student will be able to

Differentiate between task allocation; team nursing; client allocation; primary and named nursing principles
Relate the nursing process to nursing care delivery
Assessment planning implementation and evaluation of common health problems in children, adults, the elderly

Syllabus :

Systems of Care Delivery

Task allocation; team nursing; client allocations; primary nursing; named nurse

Structure of the Nursing Process

Definitions of the nursing process; nursing process and nursing models; documentation of the nursing process

Assessment Planning Implementation and Evaluation

Children's nursing; Adult Nursing; Elderly Nursing; Mental Health Problems; Accident and Emergency; Out patient Clinics; Community Care

Teaching & learning workload (indicative)	Lecture/	:24
	Tutorial/Seminar	:12
	Laboratory	:
	Study time	:84

Assessment format : Coursework : Class test
Project

Final grade weighting : 100% coursework

Supportive reading :

Gordon MG (1990) : Nursing diagnosis: process and application
St Louis Mosby

Jolley M et al (1992) : Nursing Care the Challenge to Change
Edward Arnold

Ward M (1992)
2nd ed Churchill Livingstone

The nursing Process in Psychiatry

Specialised resources
Subject group
Department
Date of last amendment

: external clinical speakers
: Nursing
: School of Social and Health Sciences
: June 1997

Module Assessment Profile Part A

Module No	NM 104A	Title	Nursing Studies Theory and Practice													
Semester	2	Module Tutor	Mrs McKinnon													
Group of Students	BSc/BSc (Hons) Nursing															
	Week Number															
Assessment	29	30	31	32	33	34	35	36	38	39	40	41	42	43	44	
Test 1		I							X							
Test 2																
Test 3																
Test 4																
Coursework 1		I										S				
Coursework 2																
Coursework 3																
Coursework 4																
Practical 1																
Practical 2																
Practical 3																
Practical 4																
Project																
Examination																

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I = week of issue of assessment.

S = week for submission of completed assessment.

D = week by which marked assessment is to be returned to students (an absence of a D indicates that the assessment will not be returned)

Module Assessment Profile Part B

Assessment	Specification	Member of Staff	Unit
Test 1	Class Test	Mrs McKinnon	1
Test 2			
Test 3			
Test 4			
Coursework 1	Essay 1,500words	Mrs McKinnon	2
Coursework 2			
Coursework 3			
Coursework 4			
Practical 1			
Practical 2			
Practical 3			
Practical 4			
Project			
Examination			

Module Assessment Profile Part C

Unit	% Weighting	Compulsory units indicated with "C"	Component of unit for which resit facilities will not be available
1	50% Class Test	C	
2	Essay 50%	C	
3			
4			

MODULE PRO-FORMA

Reference : NM 105A
Title : Clinical Nursing 1
Level : 1
Prerequisites : none
Co-requisites : none
Prohibited combinations : none

Aims

To develop core skills in nursing practice

To be aware of the importance of health and safety issues in nursing practice

Learning outcomes :
The student will be able to

Understand and practice safe lifting and handling techniques

Understand and practice the prevention and management of violence

Be competent at a beginning level regarding nursing observations

Be competent at a beginning level of the process of assessment, planning, implementation and evaluation of care, within the Activities of Daily Living framework

Be aware of the last offices procedures

Syllabus :

Safe Lifting and Handling

Potential hazards of lifting; Biomechanics of lifting; Factors affecting spinal stress during lifting; the load; lifting techniques; Equipment

Prevention and Management of Violence

Definition of violence; theories of violence; Indications of the need for management of violence; Principles of management of violence; Physiological considerations; Care of violent patients or visitors; Organisation, prevention and management issues

Assessment Planning Implementation and Evaluation

Admission, Discharge and Transfer; Aseptic Technique; Bladder and Bowel Care; Drug Administration; Eye care; Mouth care; Mobilising; Diet and Nutrition

Nursing Observations

Temperature pulse and respiration's; Blood Pressure; Specimen collection Oxygen Therapy

Last Offices

Death with dignity; post mortem care; dealing with relatives; procedural issues;

Teaching & learning workload (indicative)	Lecture/	:24
	Tutorial/Seminar	
	Laboratory	:24
	Study time	:72

Assessment format : Coursework : OSCE
Project

Final grade weighting : 100% coursework

Supportive reading

Bethlem Royal and Maudsley
Hospital (1976)

Guidelines for nursing management of violence

Bethlem & Maudlsey Hospital
London
RCN (1990)
Nursing Standard, 4 (34), 26-8

Equipment to save your back

Back Pain Association (1987)
RCN London

The handling of patients : A guide for nurses

Williams A (1982)
Institute of Health Service
Administrators London

Procedures following deaths in hospitals

Specialised resources
Subject group
Department
Date of last amendment

: Clinical Areas; Clinical Equipment
: Nursing
: School of Social and Health Sciences
: June 1997

Module Assessment Profile Part A

Module No	NM105 A	Title	Clinical Nursing												
Semester	1	Module Tutor	Miss Armstrong/Mr Starr/Mr Docherty												
Group of Students	BSc/BSc (Hons) Nursing														
	Week Number														
Assessment	10	11	12	13	14	15	16	17	18	19	20	21	25	26	27
Test 1															
Test 2															
Test 3															
Test 4															
Coursework 1		I										S			
Coursework 2															
Coursework 3															
Coursework 4															
Practical 1		I											X		
Practical 2															
Practical 3															
Practical 4															
Project															
Examination															

X = week in which an assessment takes place.

I = week of issue of assessment.

S = week for submission of completed assessment.

D = week by which marked assessment is to be returned to students (an absence of a D indicates that the assessment will not be returned)

Module Assessment Profile Part B

Assessment	Specification	Member of Staff	Unit
Test 1			
Test 2			
Test 3			
Test 4			
Coursework 1	Essay 1,500 words	Miss Armstrong	1
Coursework 2			
Coursework 3			
Coursework 4			
Practical 1	OSCE	Miss Armstrong	
Practical 2			
Practical 3			
Practical 4			
Project			
Examination			

Module Assessment Profile Part C

Unit	% Weighting	Compulsory units indicated with "C"	Component of unit for which resit facilities will not be available
1	50%	C	
2	50%	C	
3			
4			

APPENDIX 3

**Tool to measure theoretical knowledge – quiz
Quiz answer key**

MEDICAL/REHABILITATION ASSESSMENT

Name:

SECTION A - MULTIPLE CHOICE QUESTIONS

For each of the following questions, please place a tick in the box corresponding to what you think is the correct answer. There is only one correct answer for each question. Please do not confer with anyone. (Each correct answer in section A scores two points)

Q1. Which one of the following is a sign of potential pressure sore development?

- a. Necrosis
- b. Redness
- c. Bleeding
- d. Haematoma

Q2. Which one of the following assessment scales can be used to determine a patient's risk of pressure sore development?

- a. Pain Assessment Scale
- b. Body Mass Index
- c. Norton Scale
- d. Nutritional Intake Assessment

Q3. Which one of the following is a pressure relieving type of mattress/bed?

- a. Clinitron
- b. Waterlowe
- c. Ambulift
- d. Airaid

Q4. Which one of the following is the correct procedure for cleaning a wound?

- a. Irrigate wound using cotton wool balls
- b. Irrigate wound using a syringe
- c. Wipe wound with cotton wool balls
- d. Wipe wound with gauze swabs

Q5. Which one of the following solutions is usually used to clean a wound?

- a. Sterile Water
- b. Savlon Solution
- c. Chlorhexidine Solution
- d. Normal Saline

Q6. What is the correct temperature for the solution used to clean a wound?

- a. Cold
- b. Warm
- c. Hot
- d. Boiled

Q7. Which one of the following is an example of therapeutic communication?

- a. Advice
- b. Reassurance
- c. Educating
- d. Listening

Q8. If a patient had a urinary tract infection, which one of the following would you expect to see on urinalysis?

- a. Protein
- b. Glucose
- c. Ketones
- d. Urobilinogen

Q9. When dealing with body fluids, which one of the following is the correct procedure?

- a. Wear gloves
- b. Wash hands prior to and after procedure
- c. Wear gloves and wash hands prior to procedure
- d. Wear gloves and wash hands prior to and after procedure

Q10. Which one of the following is a sign of cardiac arrest?

- a. Absence of ulnar pulse
- b. Haemorrhage from an artery
- c. Absence of carotid pulse
- d. Elevated temperature

Q11. On discovering a cardiac arrest, which one of the following is the correct procedure?

- a. Telephone the cardiac arrest number
- b. Check the patient's blood pressure
- c. Call for help and lie patient flat
- d. Place patient in the recovery position

Q12. When should the position of a naso-gastric tube should be checked?

- a. Following a naso-gastric feed
- b. Following a change of patient's position
- c. Following any nursing intervention
- d. Following aspiration of the naso-gastric tube

Q13. What type of syringe should be used to aspirate a wide-bore naso-gastric tube?

- a. A catheter tipped syringe
- b. An insulin syringe
- c. An injection syringe
- d. An aspiration syringe

Q14. If a naso-gastric tube is in the correct position, what colour will the aspirate turn litmus paper?

- a. Blue
- b. Green
- c. Pink
- d. Black

Q15. Which one of the following is a sign of infection at a venflon site?

- a. Bleeding
- b. Exudate
- c. Redness
- d. Bruising

Q16. Which one of the following should be used to secure a venflon in place?

- a. Elastoplast
- b. Zinc Oxide tape
- c. Vecafix dressing
- d. Bioclusive dressing

Q17. When a patient becomes breathless, which one of the following is the correct procedure?

- a. Sit the patient in a semi-recumbent position
- b. Lie the patient flat
- c. Sit the patient in an upright position
- d. Lie the patient in a prone position

Q18. When a patient is on oxygen therapy, which one of the following should be performed on a regular basis?

- a. Sputum collections
- b. Oral hygiene
- c. Deep breathing exercises
- d. Blood pressure recordings

Q19. How often should oxygen masks and tubes be changed

- a. After every use
- b. Daily
- c. Weekly
- d. Monthly

Q20. Which of the following indicates a bradycardia?

- a. Less than 60 beats per minute
- b. More than 60 beats per minute
- c. Less than 120 beats per minute
- d. More than 120 beats per minute

Q21. Which one of the following indicates a tachycardia?

- a. Less than 60 beats per minute
- b. More than 60 beats per minute
- c. Less than 120 beats per minute
- d. More than 120 beats per minute

Q22. Which one of the following blood pressure readings would indicate a patient is hypertensive?

- a. 140/90
- b. 90/140
- c. 90/60
- d. 60/90

Q23. Which one of the following blood pressure recordings would indicate that a patient is hypotensive?

- a. 140/90
- b. 90/140
- c. 90/60
- d. 60/90

Q24. What is a pyrexia?

- a. A high blood pressure
- b. A high pulse rate
- c. A high temperature
- d. A high respiratory rate

Q25. Which one of the following is a sign of oral thrush?

- a. Bleeding gums
- b. White spots in oral cavity
- c. Tooth decay
- d. Red spots in oral cavity

Q26. Which one of the following is the correct definition of Dysphagia?

- a. Difficulty swallowing
- b. Difficulty speaking
- c. Difficulty breathing
- d. Difficulty mobilising

Q27. Within rehabilitation, what is the primary purpose of passive exercises?

- a. Maintain cardiovascular function
- b. Maintain respiratory function
- c. Maintain joint function
- d. Maintain muscular function

Q28. In rehabilitation, what does M.S.Q. stand for?

- a. Medical Specimen Questionnaire
- b. Medical State Questionnaire
- c. Mental State Questionnaire
- d. Mental Specimen Questionnaire

Q29. What is the minimum score required in an M.S.Q. in order for a patient to be suitable for rehabilitation?

- a. Five
- b. Eight
- c. Ten
- d. Thirteen

Q30. Which one of the following is the correct definition of Dysphasia?

- A. Difficulty swallowing
- b. Difficulty speaking
- c. Difficulty breathing
- d. Difficulty mobilising

Q31. If a patient was less able to dress themselves today, than they were yesterday, which of the following is the most probable cause?

- a. Deafness
- b. Urinary infection
- c. Blindness
- d. Dysphagia

Q32. Which one of the following interventions can be used to promote awareness of a paralysed limb?

- a. Placing objects out of reach
- b. Placing objects on unaffected side
- c. Placing objects on paralysed side
- d. Splinting paralysed limb

Q33. Which one of the following is a primary aim of physiotherapy within rehabilitation?

- a. Increasing ability to balance
- b. Increasing cardiovascular fitness
- c. Increasing respiratory fitness
- d. Increasing ability to speak

SECTION B

For each of the questions in this section please answer in the space provided

Q34. List five methods of non-verbal communication:

Q35. List four active listening skills

Q36. List the 12 activities of Roper, Logan & Tierney's Model of Nursing:

<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

Q37. List the four components of the communication process:

Q38. List the 2 continuums used within Roper, Logan & Tierney's Model of Nursing

Q39. List the 5 factors influencing nursing in Roper, Logan & Tierney's Model of Nursing

Q40. List the 4 stages of the nursing process

Q41. List five body fluids/secretions which when dealing with, gloves should be worn:

Q42. List three colours of linen bag used in the clinical area and the type of linen which should be disposed of within it:

Colour of Bag

Type of linen

Q43. List four items which can be disposed of in a Sharp's bin:

Q44. List two nursing interventions that can be implemented to reduce an elevated temperature:

Q45. Define Primary Nursing:

Q46. Define Team Nursing:

Q47. List three possible problems a patient who has had a stroke might have with eating and drinking:

Q48. List five members of the multidisciplinary team (other than doctors and nurses) within rehabilitation, and their role in patient care:

Team Member

Role in Patient Care

Team Member	Role in Patient Care
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

Q49. What is a Home Visit?

Q50. What is the purpose of a Home Visit?

Q51. What is the philosophy of rehabilitation?

Q52. List four factors which may affect a hospitalised elderly patient's ability to communicate:

Q53. List four elements of reality orientation:

MEDICAL/REHABILITATION ASSESSMENT

Name:

SECTION A - MULTIPLE CHOICE QUESTIONS

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- d. More than 120 beats per minute

Q21. Which one of the following indicates a tachycardia?

- a. Less than 60 beats per minute
- b. More than 60 beats per minute
- c. Less than 120 beats per minute
- d. More than 120 beats per minute

Q22. Which one of the following blood pressure readings would indicate a patient is hypertensive?

- a. 140/90
- b. 90/140
- c. 90/60
- d. 60/90

Q23. Which one of the following blood pressure recordings would indicate that a patient is hypotensive?

- a. 140/90
- b. 90/140
- c. 90/60
- d. 60/90

Q24. What is a pyrexia?

- a. A high blood pressure
- b. A high pulse rate
- c. A high temperature
- d. A high respiratory rate

Q25. Which one of the following is a sign of oral thrush?

- a. Bleeding gums
- b. White spots in oral cavity
- c. Tooth decay
- d. Red spots in oral cavity

Q26. Which one of the following is the correct definition of Dysphagia?

- a. Difficulty swallowing
- b. Difficulty speaking
- c. Difficulty breathing
- d. Difficulty mobilising

Q27. Within rehabilitation, what is the primary purpose of passive exercises?

- a. Maintain cardiovascular function
- b. Maintain respiratory function
- c. Maintain joint function
- d. Maintain muscular function

Q28. In rehabilitation, what does M.S.Q. stand for?

- a. Medical Specimen Questionnaire
- b. Medical State Questionnaire
- c. Mental State Questionnaire
- d. Mental Specimen Questionnaire

Q29. What is the minimum score required in an M.S.Q. in order for a patient to be suitable for rehabilitation?

- a. Five
- b. Eight
- c. Ten
- d. Thirteen

Q30. Which one of the following is the correct definition of Dysphasia?

- A. Difficulty swallowing
- b. Difficulty speaking
- c. Difficulty breathing
- d. Difficulty mobilising

Q31. If a patient was less able to dress themselves today, than they were yesterday, which of the following is the most probable cause?

- a. Deafness
- b. Urinary infection
- c. Blindness
- d. Dysphagia

Q32. Which one of the following interventions can be used to promote awareness of a paralysed limb?

- a. Placing objects out of reach
- b. Placing objects on unaffected side
- c. Placing objects on paralysed side
- d. Splinting paralysed limb

Q33. Which one of the following is a primary aim of physiotherapy within rehabilitation?

- a. Increasing ability to balance
- b. Increasing cardiovascular fitness
- c. Increasing respiratory fitness
- d. Increasing ability to speak

SECTION B

For each of the questions in this section please answer in the space provided

Q34. List five methods of non-verbal communication:

Eye contact,
Facial expression
Gestures
Proximity
Posture (1 point each)

Q35. List four active listening skills

Sitting squarely
Eye contact
Open position
Lean forward (1 point each)

Q36. List the 12 activities of Roper, Logan & Tierney's Model of Nursing:

Breathing
Communicating
Eating & Drinking
Elimination
Washing & Dressing
Mobilising

Expressing Sexuality
Sleeping
Controlling Body Temperature
Working & Playing
Maintaining a Safe Environment
Dying (1 point each)

Q37. List the four components of the communication process:

Sender
Receiver
Message
Feedback (1 point each)

Q38. List the 2 continuums used within Roper, Logan & Tierney's Model of Nursing

Age/Lifespan (1 point each)

Independence/ Dependence

Q39. List the 5 factors influencing nursing in Roper, Logan & Tierney's Model of Nursing

Physical

Psychological

Sociocultural

Environmental

Politicoeconomic (1 point each)

Q40. List the 4 stages of the nursing process

Assessment

Planning

Implementation

Evaluation (1 point each)

Q41. List five body fluids/secretions which when dealing with, gloves should be worn:

Blood

Urine

Faeces

Vomit

Sputum (1 point each)

Q42. List three colours of linen bag used in the clinical area and the type of linen which should be disposed of within it:

Colour of Bag

White

Pink

Red (1 point each)

Type of linen

Normal

Clothing

Infected (1 point each)

Q43. List four items which can be disposed of in a Sharp's bin:

Needles also accept Scissors

Syringes

Apoules

Venflons (1 point each)

Q44. List two nursing interventions that can be implemented to reduce an elevated temperature:

Two of: tepid sponge, remove bedclothes, remove clothing, fan, cool drinks, paracetamol (1 point each)

Q45. Define Primary Nursing:

One nurse being responsible for a patient's care

(2 points)

Q46. Define Team Nursing:

A team of nurses responsible for undertaking nursing care of a group of patients (2 points)

Q47. List three possible problems a patient who has had a stroke might have with eating and drinking:

Any two (1 point each): chewing, swallowing, dribbling, holding utensils

Q48. List five members of the multidisciplinary team (other than doctors and nurses) within rehabilitation, and their role in patient care:

Team Member	Role in Patient Care
Occupational Therapist	Improve independence with activities of living
Social Worker	Provide social services and support
Speech Therapist	Improve ability to communicate clearly
Physiotherapist	Improve balance and mobility
Dietician	Improve nutritional intake and appropriate diet

Q49. What is a Home Visit?

A visit by members of the multidisciplinary team and patient to the patient's home (2 points)

Q50. What is the purpose of a Home Visit?

To assess suitability/safety of patient's home environment to provide support/aids where necessary (2 points)

Q51. What is the philosophy of rehabilitation?

Help us to help you and the promotion of independence (2 points)

Q52. List four factors which may affect a hospitalised elderly patient's ability to communicate:

Blindness also accept Unconsciousness

Deafness

Dysphasia

Confusion (1 point each)

Q53. List four elements of reality orientation:

Time

Date

Place

Person (1 point each)

APPENDIX 4

**Tool to measure practical skill – observation schedule
Observation answer key**

MEDICAL SKILLS ASSESSMENT

Please complete all of section A, and those skills observed in section B.

Name of student

SECTION A - Complete ALL of this section

CARDIOPULMONARY RESUSCITATION

Q1. The student is able to:

Q1a. Correctly identify the location of CPR, oxygen and suctioning equipment Yes No

Q1b. Correctly state the telephone number to call in the event of a cardiac arrest Yes No

Q1c. Correctly state the information to be given over the telephone Yes No

ORGANISATION OF NURSING

Q2. The student refers to the patient's care plan before planning or implementing nursing care Yes No

PATIENT OBSERVATIONS

Q3. The student is able to:

Q3a. Follow the correct procedure for measuring a patient's temperature Yes No

Q3b. Accurately measures the patient's temperature Yes No

Q3c. Accurately records the patient's temperature on the appropriate chart Yes No

Q3d. Follow the correct procedure for measuring the patient's pulse Yes No

Q3e. Accurately measures the patient's pulse Yes No

Q3f. Accurately records the patient's pulse on the appropriate chart Yes No

Q3g. Follow the correct procedure for measuring the patient's blood pressure Yes No

Q3h. Accurately measures the patient's blood pressure Yes No

Q3i. Accurately records the patient's blood pressure on the appropriate chart Yes No

Q3j. State action in the event of an abnormal recording (i.e. report to appropriate staff) Yes No

COMMUNICATION SKILLS

Q4. The student demonstrates the following:

- | | | |
|--|------------------------------|-----------------------------|
| Q4a. Pays attention to the patient's needs | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4b. Actively listens to the patient | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4c. Considers the patient's ability/inability to communicate and responds appropriately | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4d. Uses effective verbal skills | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4e. Uses effective non-verbal skills: | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4f. Eye contact | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4g. Facial expressions | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4h. Posture | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4i. Proximity | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4j. Gestures | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4k. Uses empathy when communicating with the patient | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4l. Uses appropriate interpersonal skills in dealing with significant others | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q4m. Uses appropriate interpersonal skills in communicating with other members of staff | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

MOBILISING

Q5. The student demonstrates the following::

- | | | |
|---|------------------------------|-----------------------------|
| Q5a. Refers to the patient's care plan for information re. assistance/lift required | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q5b. Accurately assesses the patient's need for assistance with mobilising | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q5c. Uses appropriate moving and handling techniques | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Q5d. Uses moving and handling techniques in a safe manner | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

PREVENTING CROSS INFECTION

Q6. *The student:*

- Q6a. Washes their hands before and after handling body fluids/secretions Yes No
- Q6b. Wears gloves when handling body fluids/secretions Yes No
- Q6c. Disposes of body fluids/secretions safely Yes No

SECTION B - Complete those skills observed

ELIMINATION

Q7. *The student demonstrates the following:*

- Q7a. Accurately assesses the patient's need for assistance with elimination Yes No
- Q7b. Provides appropriate assistance with elimination needs Yes No
- Q7c. Empties catheters safely and correctly disposes of contents Yes No
- Q7d. Disposes of products of elimination safely Yes No
- Q7e. Accurately records body fluid/secretion output where this has been ordered Yes No
- Q7f. Safely collects specimen of urine for analysis Yes No
- Q7g. Accurately performs urinalysis and correctly interprets results Yes No
- Q7h. Provides handwashing facilities to patient following elimination Yes No
- Q7i. Correctly performs catheter care Yes No

EATING & DRINKING

Q8. *The student is able to:*

- Q8a. Accurately assess the patient's need for assistance with eating and drinking Yes No
- Q8b. Provide appropriate assistance with eating and drinking Yes No
- Q8c. Accurately record nutritional intake where this has been ordered Yes No
- Q8d. Accurately record fluid input where this has been ordered Yes No
- Q8e. Correctly ascertains the position of a nasogastric tube Yes No

BREATHING

Q9. *The student is able to:*

- Q9a. Correctly position a breathless patient Yes No
- Q9b. Provide appropriate help with the expectoration of sputum Yes No
- Q9c. Assist the patient with oxygen therapy Yes No
- Q9d. Demonstrate an awareness of the hazards of oxygen therapy Yes No

PERSONAL CLEANSING & DRESSING

Q10. *The student is able to:*

- Q10a. Accurately assess the patient's need for assistance with cleansing & dressing Yes No
- Q10b. Promote the patient's independence with cleansing & dressing Yes No
- Q10c. Provide appropriate assistance with cleansing & dressing Yes No
- Q10d. Correctly perform oral hygiene Yes No
- Q10e. Correctly perform aseptic technique Yes No

PRESSURE AREA CARE

Q11. *The student demonstrates the following:*

- Q11a. Observes and reports on the condition of the skin of a patient at risk of pressure sore development Yes No
- Q11b. Carries out changes of position with the patient and verbalises why this is necessary Yes No
- Q11c. Accurately completes a Waterlow score for a patient Yes No

MEDICAL SKILLS ASSESSMENT

Please complete all of section A, and those skills observed in section B.

Name of student

SECTION A - Complete ALL of this section

STUDENTS SCORE POINTS FOR VERY 'YES' MARKED

CARDIOPULMONARY RESUSCITATION - - ONE POINT EACH, Maximum 3 Points

Q1. The student is able to:

Q1a. Correctly identify the location of CPR, oxygen and suctioning equipment Yes No

Q1b. Correctly state the telephone number to call in the event of a cardiac arrest Yes No

Q1c. Correctly state the information to be given over the telephone Yes No

ORGANISATION OF NURSING - THREE POINTS, Maximum 3 Points

Q2. The student refers to the patient's care plan before planning or implementing nursing care Yes No

PATIENT OBSERVATIONS ONE POINT EACH FOR a - i; TWO POINTS FOR j. Maximum 11 Points

Q3. The student is able to:

Q3a. Follow the correct procedure for measuring a patient's temperature Yes No

Q3b. Accurately measures the patient's temperature Yes No

Q3c. Accurately records the patient's temperature on the appropriate chart Yes No

Q3d. Follow the correct procedure for measuring the patient's pulse Yes No

Q3e. Accurately measures the patient's pulse Yes No

Q3f. Accurately records the patient's pulse on the appropriate chart Yes No

Q3g. Follow the correct procedure for measuring the patient's blood pressure Yes No

Q3h. Accurately measures the patient's blood pressure Yes No

Q3i. Accurately records the patient's blood pressure on the appropriate chart Yes No

Q3j. State action in the event of an abnormal recording (i.e. report to appropriate staff) Yes No

COMMUNICATION SKILLS - TWO POINTS EACH FOR c, k, l & m; ALL OTHERS ONE POINT EACH,- Maximum of 17 Points

Q4. The student demonstrates the following:

- Q4a. Pays attention to the patient's needs Yes No
- Q4b. Actively listens to the patient Yes No
- Q4c. Considers the patient's ability/inability to communicate and responds appropriately Yes No
- Q4d. Uses effective verbal skills Yes No
- Q4e. Uses effective non-verbal skills: Yes No
- Q4f. Eye contact Yes No
- Q4g. Facial expressions Yes No
- Q4h. Posture Yes No
- Q4i. Proximity Yes No
- Q4j. Gestures Yes No
- Q4k. Uses empathy when communicating with the patient Yes No
- Q4l. Uses appropriate interpersonal skills in dealing with significant others Yes No
- Q4m. Uses appropriate interpersonal skills in communicating with other members of staff Yes No

MOBILISING - TWO POINTS EACH FOR a & b; ONE POINT EACH FOR c & d, Maximum of 6 Points

Q5. The student demonstrates the following:

- Q5a. Refers to the patient's care plan for information re. assistance/lift required Yes No
- Q5b. Accurately assesses the patient's need for assistance with mobilising Yes No
- Q5c. Uses appropriate moving and handling techniques Yes No
- Q5d. Uses moving and handling techniques in a safe manner Yes No

PREVENTING CROSS INFECTION -THREE POINTS EACH, Maximum 12 Points

Q6. The student:

Q6a. Washes their hands before and after handling body fluids/secretions Yes No

Q6b. Wears gloves when handling body fluids/secretions Yes No

Q6c. Disposes of body fluids/secretions safely Yes No

SECTION B - Complete those skills observed

ELIMINATION - ONE POINT EACH FOR a, b & h; TWO POINTS EACH FOR OTHERS, Maximum of 15 Points

Q7. The student demonstrates the following:

Q7a. Accurately assesses the patient's need for assistance with elimination Yes No

Q7b. Provides appropriate assistance with elimination needs Yes No

Q7c. Empties catheters safely and correctly disposes of contents Yes No

Q7d. Disposes of products of elimination safely Yes No

Q7e. Accurately records body fluid/secretion output where this has been ordered Yes No

Q7f. Safely collects specimen of urine for analysis Yes No

Q7g. Accurately performs urinalysis and correctly interprets results Yes No

Q7h. Provides handwashing facilities to patient following elimination Yes No

Q7i. Correctly performs catheter care Yes No

EATING & DRINKING- ONE POINT EACH FOR a,b, c & d; TWO POINTS FOR e, Maximum of 6 Points

Q8. The student is able to:

Q8a. Accurately assess the patient's need for assistance with eating and drinking Yes No

Q8b. Provide appropriate assistance with eating and drinking Yes No

Q8c. Accurately record nutritional intake where this has been ordered Yes No

Q8d. Accurately record fluid input where this has been ordered Yes No

Q8e. Correctly ascertains the position of a nasogastric tube Yes No

**BREATHING- TWO POINTS EACH FOR a & d; ONE POINT EACH FOR b & c,
Maximum of 6 Points**

Q9. *The student is able to:*

Q9a. Correctly position a breathless patient Yes No

Q9b. Provide appropriate help with the expectoration of sputum Yes No

Q9c. Assist the patient with oxygen therapy Yes No

Q9d. Demonstrate an awareness of the hazards of oxygen therapy Yes No

**PERSONAL CLEANSING & DRESSING- ONE POINT EACH FOR a, c & d;
TWO POINTS FOR b; FOUR POINTS FOR e, Maximum 9 Points**

Q10. *The student is able to:*

Q10a. Accurately assess the patient's need for assistance with cleansing & dressing Yes No

Q10b. Promote the patient's independence with cleansing & dressing Yes No

Q10c. Provide appropriate assistance with cleansing & dressing Yes No

Q10d. Correctly perform oral hygiene Yes No

Q10e. Correctly perform aseptic technique Yes No

PRESSURE AREA CARE - FOUR POINTS EACH, Maximum 12 Points

Q11. *The student demonstrates the following:*

Q11a. Observes and reports on the condition of the skin of a patient at risk of pressure sore development Yes No

Q11b. Carries out changes of position with the patient and verbalises why this is necessary Yes No

Q11c. Accurately completes a Waterlowe score for a patient Yes No

REHABILITATION SKILLS ASSESSMENT

Please complete all of section A, and those skills observed in section B.

Name of student

SECTION A - Complete ALL of this section

FIRE PROCEDURE

The student is able to:

Correctly identify the location of fire alarms and fire fighting equipment Yes No

Correctly state the telephone number to call in the event of a fire Yes No

Correctly state the information to be given over the telephone Yes No

ORGANISATION OF NURSING

Q2. The student refers to the patient's care plan before planning or implementing nursing care Yes No

PATIENT OBSERVATIONS

Q3. The student is able to:

Q3a. Follow the correct procedure for measuring a patient's temperature Yes No

Q3b. Accurately measures the patient's temperature Yes No

Q3c. Accurately records the patient's temperature on the appropriate chart Yes No

Q3d. Follow the correct procedure for measuring the patient's pulse Yes No

Q3e. Accurately measures the patient's pulse Yes No

Q3f. Accurately records the patient's pulse on the appropriate chart Yes No

Q3g. Follow the correct procedure for measuring the patient's blood pressure Yes No

Q3h. Accurately measures the patient's blood pressure Yes No

Q3i. Accurately records the patient's blood pressure on the appropriate chart Yes No

Q3j. State action in the event of an abnormal recording (i.e. report to appropriate staff) Yes No

COMMUNICATION SKILLS

Q4. *The student demonstrates the following:*

- Q4a. Pays attention to the patient's needs Yes No
- Q4b. Actively listens to the patient Yes No
- Q4c. Considers the patient's ability/inability to communicate and responds appropriately Yes No
- Q4d. Uses effective verbal skills Yes No
- Q4e. Uses effective non-verbal skills: Yes No
- Q4f. Eye contact Yes No
- Q4g. Facial expressions Yes No
- Q4h. Posture Yes No
- Q4i. Proximity Yes No
- Q4j. Gestures Yes No
- Q4k. Uses empathy when communicating with the patient Yes No
- Q4l. Uses appropriate interpersonal skills in dealing with significant others Yes No
- Q4m. Uses appropriate interpersonal skills in communicating with other members of staff Yes No

MOBILISING

Q5. *The student demonstrates the following::*

- Q5a. Refers to the patient's care plan for information re. assistance/lift required Yes No
- Q5b. Accurately assesses the patient's need for assistance with mobilising Yes No
- Q5c. Uses appropriate moving and handling techniques Yes No
- Q5d. Uses moving and handling techniques in a safe manner Yes No

PREVENTING CROSS INFECTION

Q6. *The student:*

- Q6a. Washes their hands before and after handling body fluids/secretions Yes No
- Q6b. Wears gloves when handling body fluids/secretions Yes No
- Q6c. Disposes of body fluids/secretions safely Yes No

SECTION B - Complete those skills observed

ELIMINATION

Q7. *The student demonstrates the following:*

- Q7a. Accurately assesses the patient's need for assistance with elimination Yes No
- Q7b. Provides appropriate assistance with elimination needs Yes No
- Q7c. Empties catheters safely and correctly disposes of contents Yes No
- Q7d. Disposes of products of elimination safely Yes No
- Q7e. Accurately records body fluid/secretion output where this has been ordered Yes No
- Q7f. Safely collects specimen of urine for analysis Yes No
- Q7g. Accurately performs urinalysis and correctly interprets results Yes No
- Q7h. Provides handwashing facilities to patient following elimination Yes No
- Q7i. Correctly performs catheter care Yes No

EATING & DRINKING

Q8. *The student is able to:*

- Q8a. Accurately assess the patient's need for assistance with eating and drinking Yes No
- Q8b. Provide appropriate assistance with eating and drinking Yes No
- Q8c. Accurately record nutritional intake where this has been ordered Yes No
- Q8d. Accurately record fluid input where this has been ordered Yes No
- Q8e. Correctly ascertains the position of a nasogastric tube Yes No

BREATHING

Q9. *The student is able to:*

Q9a. Correctly position a breathless patient Yes No

Q9b. Provide appropriate help with the expectoration of sputum Yes No

Q9c. Assist the patient with oxygen therapy Yes No

Q9d. Demonstrate an awareness of the hazards of oxygen therapy Yes No

PERSONAL CLEANSING & DRESSING

Q10. *The student is able to:*

Q10a. Accurately assess the patient's need for assistance with cleansing & dressing Yes No

Q10b. Promote the patient's independence with cleansing & dressing Yes No

Q10c. Provide appropriate assistance with cleansing & dressing Yes No

Q10d. Correctly perform oral hygiene Yes No

Q10e. Correctly perform aseptic technique Yes No

PRESSURE AREA CARE

Q11. *The student demonstrates the following:*

Q11a. Observes and reports on the condition of the skin of a patient at risk of pressure sore development Yes No

Q11b. Carries out changes of position with the patient and verbalises why this is necessary Yes No

Q11c. Accurately completes a Waterlow score for a patient Yes No

REHABILITATION SKILLS ASSESSMENT

Please complete all of section A, and those skills observed in section B.

Name of student

SECTION A - Complete ALL of this section

STUDENTS SCORE POINTS FOR VERY 'YES' MARKED

FIRE PROCEDURE - - ONE POINT EACH, Maximum 3 Points

The student is able to:

Correctly identify the location of fire alarms and fire fighting equipment Yes No

Correctly state the telephone number to call in the event of a fire Yes No

Correctly state the information to be given over the telephone Yes No

ORGANISATION OF NURSING - THREE POINTS, Maximum 3 Points

Q2. The student refers to the patient's care plan before planning or implementing nursing care Yes No

**PATIENT OBSERVATIONS ONE POINT EACH FOR a - i; TWO POINTS FOR j.
Maximum 11 Points**

Q3. The student is able to:

Q3a. Follow the correct procedure for measuring a patient's temperature Yes No

Q3b. Accurately measures the patient's temperature Yes No

Q3c. Accurately records the patient's temperature on the appropriate chart Yes No

Q3d. Follow the correct procedure for measuring the patient's pulse Yes No

Q3e. Accurately measures the patient's pulse Yes No

Q3f. Accurately records the patient's pulse on the appropriate chart Yes No

Q3g. Follow the correct procedure for measuring the patient's blood pressure Yes No

Q3h. Accurately measures the patient's blood pressure Yes No

Q3i. Accurately records the patient's blood pressure on the appropriate chart Yes No

Q3j. State action in the event of an abnormal recording (i.e. report to appropriate staff) Yes No

COMMUNICATION SKILLS - TWO POINTS EACH FOR c, k, l & m; ALL OTHERS ONE POINT EACH,- Maximum of 17 Points

Q4. The student demonstrates the following:

- | | |
|--|--|
| Q4a. Pays attention to the patient's needs | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4b. Actively listens to the patient | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4c. Considers the patient's ability/inability to communicate and responds appropriately | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4d. Uses effective verbal skills | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4e. Uses effective non-verbal skills: | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4f. Eye contact | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4g. Facial expressions | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4h. Posture | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4i. Proximity | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4j. Gestures | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4k. Uses empathy when communicating with the patient | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4l. Uses appropriate interpersonal skills in dealing with significant others | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q4m. Uses appropriate interpersonal skills in communicating with other members of staff | <input type="checkbox"/> Yes <input type="checkbox"/> No |

MOBILISING - TWO POINTS EACH FOR a & b; ONE POINT EACH FOR c & d, Maximum of 6 Points

Q5. The student demonstrates the following:

- | | |
|---|--|
| Q5a. Refers to the patient's care plan for information re. assistance/lift required | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q5b. Accurately assesses the patient's need for assistance with mobilising | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q5c. Uses appropriate moving and handling techniques | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Q5d. Uses moving and handling techniques in a safe manner | <input type="checkbox"/> Yes <input type="checkbox"/> No |

PREVENTING CROSS INFECTION -THREE POINTS EACH, Maximum 12 Points

Q6. *The student:*

Q6a. Washes their hands before and after handling body fluids/secretions Yes No

Q6b. Wears gloves when handling body fluids/secretions Yes No

Q6c. Disposes of body fluids/secretions safely Yes No

SECTION B - Complete those skills observed

ELIMINATION - ONE POINT EACH FOR a, b & h; TWO POINTS EACH FOR OTHERS, Maximum of 15 Points

Q7. *The student demonstrates the following:*

Q7a. Accurately assesses the patient's need for assistance with elimination Yes No

Q7b. Provides appropriate assistance with elimination needs Yes No

Q7c. Empties catheters safely and correctly disposes of contents Yes No

Q7d. Disposes of products of elimination safely Yes No

Q7e. Accurately records body fluid/secretion output where this has been ordered Yes No

Q7f. Safely collects specimen of urine for analysis Yes No

Q7g. Accurately performs urinalysis and correctly interprets results Yes No

Q7h. Provides handwashing facilities to patient following elimination Yes No

Q7i. Correctly performs catheter care Yes No

EATING & DRINKING- ONE POINT EACH FOR a,b, c & d; TWO POINTS FOR e, Maximum of 6 Points

Q8. *The student is able to:*

Q8a. Accurately assess the patient's need for assistance with eating and drinking Yes No

Q8b. Provide appropriate assistance with eating and drinking Yes No

Q8c. Accurately record nutritional intake where this has been ordered Yes No

Q8d. Accurately record fluid input where this has been ordered Yes No

Q8e. Correctly ascertains the position of a nasogastric tube Yes No

BREATHING- TWO POINTS EACH FOR a & d; ONE POINT EACH FOR b & c,

Q9. *The student is able to:*

- Q9a. Correctly position a breathless patient Yes No
- Q9b. Provide appropriate help with the expectoration of sputum Yes No
- Q9c. Assist the patient with oxygen therapy Yes No
- Q9d. Demonstrate an awareness of the hazards of oxygen therapy Yes No

**PERSONAL CLEANSING & DRESSING- ONE POINT EACH FOR a, c & d;
TWO POINTS FOR b; FOUR POINTS FOR e, Maximum 9 Points**

Q10. *The student is able to:*

- Q10a. Accurately assess the patient's need for assistance with cleansing & dressing Yes No
- Q10b. Promote the patient's independence with cleansing & dressing Yes No
- Q10c. Provide appropriate assistance with cleansing & dressing Yes No
- Q10d. Correctly perform oral hygiene Yes No
- Q10e. Correctly perform aseptic technique Yes No

PRESSURE AREA CARE - FOUR POINTS EACH, Maximum 12 Points

Q11. *The student demonstrates the following:*

- Q11a. Observes and reports on the condition of the skin of a patient at risk of pressure sore development Yes No
- Q11b. Carries out changes of position with the patient and verbalises why this is necessary Yes No
- Q11c. Accurately completes a Waterlowe score for a patient Yes No

APPENDIX 5

Tool to measure satisfaction

STUDENT SATISFACTION SURVEY

For each of the following statements, please indicate your degree of agreement or disagreement by ticking one of the boxes

The medical teaching session prior to my Medical placement:

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Was interesting and informative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helped prepare me for what I experienced on medical placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a waste of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a valuable learning experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Included information which was different to what I experienced on medical placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helped me to relate theory to practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was boring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Included information which I was able to apply in practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was of no benefit to my medical placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was irrelevant to what I experienced on medical placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The rehabilitation teaching session prior to my rehabilitation placement:

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Was interesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helped prepare me for what I experienced on rehabilitation placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a waste of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a valuable learning experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Included information which was different to what I experienced on rehabilitation placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helped me to relate theory to practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was boring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Included information which I was able to apply to practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was of no benefit to my rehabilitation placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was irrelevant to what I experienced on rehabilitation placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

On my Medical placement:

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I worked with my preceptor on a regular basis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learned more from other students than from my preceptor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had long enough to learn everything I needed to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My preceptor knew about the course I was on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would have liked to have a longer placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My preceptor knew what my learning needs were	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was not enough time to learn about the speciality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was asked to do things I had not been taught in theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was unable to work with my preceptor regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not learn very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

On my Rehabilitation placement:

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I worked with my preceptor on a regular basis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learned more from other students than from my preceptor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had long enough to learn everything I needed to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My preceptor knew about the course I was on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would have liked to have a longer placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My preceptor knew what my learning needs were	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was not enough time to learn about the speciality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was asked to do things I had not been taught in theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was unable to work with my preceptor regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not learn very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX 6

Quiz raw scores

Appendix 6 Raw Scores

Group A

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T
7	24	16	8	48	*	*	*	0	38	29	14	81	37	35	27	99
14	22	3	3	28	48	26	28	102	43	37	27	107	46	38	34	118
18	29	23	12	64	35	40	22	97	33	31	22	86	31	35	20	86
26	28	10	14	52	44	29	28	101	19	16	25	60	30	23	26	79
Mean	25.75	13.00	9.25	48.00	42.33	31.67	26.00	100.00	33.25	28.25	22.00	83.50	36.00	32.75	26.75	95.50

Group B

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
16	25	6	7	38	50	36	21	107	46	29	26	101	53	37	32	122
10	30	9	8	47	44	32	22	98	36	34	27	97	44	40	36	120
25	20	18	10	48	43	37	27	107	46	32	23	101	43	38	28	109
Mean	25.00	11.00	8.33	44.33	45.67	35.00	23.33	104.00	42.67	31.67	25.33	99.67	46.67	38.33	32.00	117.00

Group C

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
2	28	14	6	48	*	*	*	0	40	34	19	93	36	29	22	87
8	37	15	2	54	38	34	6	78	40	38	15	93	39	45	27	111
13	39	22	18	79	47	35	38	120	45	35	36	116	47	37	34	118
20	35	15	6	56	44	34	29	107	46	34	29	109	44	36	30	110
Mean	34.75	16.50	8.00	59.25	43.00	34.33	24.33	101.67	42.75	35.25	24.75	102.75	41.50	36.75	28.25	106.50

Group D

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
1	36	11	4	51	44	34	27	105	43	35	32	110	44	36	29	109
9	35	26	14	75	43	34	35	112	45	35	23	103	47	36	26	109
21	33	9	7	49	*	*	*	0	34	15	15	64	37	25	25	87
Mean	34.67	15.33	8.33	58.33	43.50	34.00	31.00	108.50	40.67	28.33	23.33	92.33	42.67	32.33	26.67	101.67

Appendix 6 Raw Scores

Group E

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
29	*	*	*	0	28	10	6	44	32	25	8	65	31	24	23	78
15	39	36	18	93	42	31	21	94	44	34	33	111	44	38	32	114
27	*	*	*	0	*	*	*	0	*	*	*	0	51	36	28	115
Mean	39.00	36.00	18.00	93.00	35.00	20.50	13.50	69.00	38.00	29.50	20.50	88.00	42.00	32.67	27.67	102.33

Group F

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
3	42	33	16	91	*	*	*	0	47	36	19	102	43	34	29	106
11	36	25	10	71	*	*	*	0	44	28	17	89	40	36	22	98
19	*	*	*	0	*	*	*	0	35	29	12	76	35	28	19	82
30	45	27	16	88	45	26	27	98	47	34	19	100	47	31	17	95
Mean	41.00	28.33	14.00	83.33	45.00	26.00	27.00	98.00	43.25	31.75	16.75	91.75	41.25	32.25	21.75	95.25

Group G

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
6	30	17	13	60	33	18	13	64	30	25	20	75	42	33	26	101
12	37	20	14	71	35	22	9	66	37	28	19	84	41	21	26	88
28	31	24	14	69	35	24	25	84	39	39	24	102	44	38	32	114
24	36	22	21	79	39	22	24	85	39	34	23	96	41	36	33	110
Mean	34.67	22.00	16.33	73.00	36.33	22.67	19.33	78.33	38.33	33.67	22.00	94.00	42.00	31.67	30.33	104.00

Group H

Student	Q1 G	Q1 M	Q1 R	T Q1	Q2 G	Q2 M	Q2 R	T Q2	Q3 G	Q3 M	Q3 R	T Q3	Q4 G	Q4 M	Q4 R	T Q4
5	36	23	11	70	36	20	18	74	35	24	19	78	33	27	15	75
13	*	*	*	0	*	*	*	0	41	23	20	84	32	28	21	81
23	25	21	14	60	33	27	18	78	27	21	21	69	26	33	11	70
24	23	16	18	57	34	23	23	80	39	26	18	83	34	35	25	94
Mean	28.00	20.00	14.33	62.33	34.33	23.33	19.67	77.33	35.50	23.50	19.50	78.50	31.25	30.75	18.00	80.00

APPENDIX 7

Quiz scores converted to percentages

Appendix 7 Percentage Scores

Group A

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
7	41.38%	32.65%	18.60%	32.00%	*	*	*	*	65.52%	59.18%	32.56%	54.00%	63.79%	71.43%	62.79%	66.00%	76%	90%	63%
14	37.93%	6.12%	6.98%	18.67%	82.76%	53.06%	65.12%	68.00%	74.14%	75.51%	62.79%	71.33%	79.31%	77.55%	79.07%	78.67%	58%	64%	53%
18	50.00%	46.94%	27.91%	42.67%	60.34%	81.63%	51.16%	64.67%	56.90%	63.27%	51.16%	57.33%	53.45%	71.43%	46.51%	57.33%	84%	71%	61%
26	48.28%	20.41%	32.56%	34.67%	75.86%	59.18%	65.12%	67.33%	32.76%	32.65%	58.14%	40.00%	51.72%	46.94%	60.47%	52.67%	74%	63%	74%
Mean	44.40%	26.53%	21.51%	32.00%	72.99%	64.63%	60.47%	66.67%	57.33%	57.65%	51.16%	55.67%	62.07%	66.84%	62.21%	63.67%	73.00%	72.00%	62.75%

Group B

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
10	51.72%	18.37%	18.60%	31.33%	75.86%	65.31%	51.16%	65.33%	62.07%	69.39%	62.79%	64.67%	75.86%	81.63%	83.72%	80.00%	47%	67%	8%
16	43.10%	12.24%	16.28%	25.33%	86.21%	73.47%	48.84%	71.33%	79.31%	59.18%	60.47%	67.33%	91.38%	75.51%	74.42%	81.33%	68%	80%	54%
25	34.48%	36.73%	23.26%	32.00%	74.14%	75.51%	62.79%	71.33%	79.31%	65.31%	53.49%	67.33%	74.14%	77.55%	65.12%	72.67%	72%	77%	75%
Mean	43.10%	22.45%	19.38%	29.56%	78.74%	71.43%	54.26%	69.33%	73.56%	64.63%	58.91%	66.44%	80.46%	78.23%	74.42%	78.00%	62.33%	74.67%	45.67%

Group C

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
2	*	*	*	*	*	*	*	*	68.97%	69.39%	44.19%	62.00%	62.07%	59.18%	51.16%	58.00%	46%	68%	52%
8	63.79%	30.61%	4.65%	36.00%	65.52%	69.39%	13.95%	52.00%	68.97%	77.55%	34.88%	62.00%	67.24%	91.84%	62.79%	74.00%	96%	95%	55%
13	67.24%	44.90%	41.86%	52.67%	81.03%	71.43%	88.37%	80.00%	77.59%	71.43%	83.72%	77.33%	81.03%	75.51%	79.07%	78.67%	58%	59%	60%
20	60.34%	30.61%	13.95%	37.33%	75.86%	69.39%	67.44%	71.33%	79.31%	69.39%	67.44%	72.67%	75.86%	73.47%	69.77%	73.33%	*	88%	56%
Mean	63.79%	35.37%	20.16%	42.00%	74.14%	70.07%	56.59%	67.78%	73.71%	71.94%	57.56%	68.50%	71.55%	75.00%	65.70%	71.00%	66.67%	77.50%	55.75%

Group D

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
1	62.07%	22.45%	9.30%	34.00%	75.86%	69.39%	62.79%	70.00%	74.14%	71.43%	74.42%	73.33%	75.86%	73.47%	67.44%	72.67%	72%	77%	80%
9	60.34%	53.06%	32.56%	50.00%	74.14%	69.39%	81.40%	74.67%	77.59%	71.43%	53.49%	68.67%	81.03%	73.47%	60.47%	72.67%	75%	89%	83%
21	56.90%	18.37%	16.28%	32.67%	*	*	*	*	58.62%	30.61%	34.88%	42.67%	63.79%	51.02%	58.14%	58.00%	65%	81%	44%
Mean	59.77%	31.29%	19.38%	38.89%	75.00%	69.39%	72.09%	72.33%	70.11%	57.82%	54.26%	61.56%	73.56%	65.99%	62.02%	67.78%	70.67%	82.33%	69.00%

Appendix 7 Percentage Scores

Group E

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
15	67.24%	73.47%	41.86%	62.00%	72.41%	63.27%	48.84%	62.67%	75.86%	69.39%	74.42%	73.33%	75.86%	69.39%	76.74%	74.00%	87%	90%	49%
27	*	*	*	*	*	*	*	*	*	*	*	*	87.93%	73.47%	65.12%	76.67%	72%	89%	68%
29	*	*	*	*	48.28%	20.41%	13.95%	29.33%	55.17%	51.02%	18.60%	43.33%	53.45%	48.98%	53.49%	52.00%	35%	79%	56%
Mean	67.24%	73.47%	41.86%	62.00%	72.41%	63.27%	48.84%	62.67%	75.86%	69.39%	74.42%	73.33%	81.90%	71.43%	70.93%	75.33%	64.67%	86.00%	57.67%

Group F

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
3	72.41%	67.35%	37.21%	60.67%	*	*	*	*	81.03%	73.47%	44.19%	68.00%	74.14%	69.39%	67.44%	70.67%	85%	84%	85%
11	62.07%	51.02%	23.26%	47.33%	*	*	*	*	75.86%	57.14%	39.53%	59.33%	68.97%	73.47%	51.16%	65.33%	83%	80%	68%
19	*	*	*	*	*	*	*	*	60.34%	59.18%	27.91%	50.67%	60.34%	57.14%	44.19%	54.67%	73%	86%	57%
30	77.59%	55.10%	37.21%	58.67%	77.59%	53.06%	62.79%	65.33%	81.03%	69.39%	44.19%	66.67%	81.03%	63.27%	39.53%	63.33%	70%	84%	61%
Mean	70.69%	57.82%	32.56%	55.56%	77.59%	53.06%	62.79%	65.33%	74.57%	64.80%	38.95%	61.17%	71.12%	65.82%	50.58%	63.50%	77.75%	83.50%	67.75%

Group G

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
6	51.72%	34.69%	30.23%	40.00%	56.90%	36.73%	30.23%	42.67%	51.72%	51.02%	46.51%	50.00%	72.41%	67.35%	60.47%	67.33%	78%	78%	54%
12	63.79%	40.82%	32.56%	47.33%	60.34%	44.90%	20.93%	44.00%	63.79%	57.14%	44.19%	56.00%	70.69%	42.86%	60.47%	58.67%	91%	81%	69%
24	62.07%	44.90%	48.84%	52.67%	67.24%	44.90%	55.81%	56.67%	67.24%	69.39%	53.49%	64.00%	70.69%	73.47%	76.74%	73.33%	38%	59%	57%
28	53.45%	48.98%	32.56%	46.00%	60.34%	48.98%	58.14%	56.00%	67.24%	79.59%	55.81%	68.00%	75.86%	77.55%	74.42%	76.00%	57%	82%	61%
Mean	59.77%	44.90%	37.98%	46.50%	62.64%	46.26%	44.96%	49.83%	66.09%	68.71%	51.16%	59.50%	72.41%	64.63%	70.54%	68.83%	66.00%	75.00%	60.25%

Group H

Student	Q1 G	Q1 M	Q1 R	Q1 T	Q2 G	Q2 M	Q2 R	Q2 T	Q3 G	Q3 M	Q3 R	Q3 T	Q4 G	Q4 M	Q4 R	Q4 T	S M 2wks	S M 4wks	S R
5	62.07%	46.94%	25.58%	46.67%	62.07%	40.82%	41.86%	49.33%	60.34%	48.98%	44.19%	52.00%	56.90%	55.10%	34.88%	50.00%	79%	78%	49%
17	39.66%	32.65%	41.86%	38.00%	58.62%	46.94%	53.49%	53.33%	67.24%	53.06%	41.86%	55.33%	58.62%	71.43%	58.14%	62.67%	34%	32%	71%
22	*	*	*	*	56.90%	55.10%	41.86%	52.00%	46.55%	42.86%	48.84%	46.00%	44.83%	67.35%	25.58%	46.67%	52%	82%	56%
23	*	*	*	*	*	*	*	*	70.69%	46.94%	46.51%	56.00%	55.17%	57.14%	48.84%	54.00%	65%	91%	65%
Mean	50.86%	39.80%	33.72%	42.33%	59.20%	47.62%	45.74%	51.56%	61.21%	47.96%	45.35%	52.33%	53.88%	62.76%	41.86%	53.33%	57.50%	70.75%	60.25%

APPENDIX 8

Satisfaction scores

Appendix 8 Satisfaction Scores

Student No.	Prec	Collab	STM	Section 1										Section 2										Section 3										Section 4											
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10		
18	Yes	Yes	Yes	2	2	5	2	2	2	5	2	5	5	1	1	5	1	1	1	5	1	5	5	4	3	4	2	2	2	2	3	5	4	1	5	5	1	1	1	1	4	1	5		
26	Yes	Yes	Yes	2	2	4	2	2	2	4	2	4	3	2	2	4	2	2	2	4	3	4	4	3	5	5	5	1	5	1	2	2	3	5	5	5	5	1	5	1	2	1	5		
16	Yes	Yes	No	2	2	5	2	3	2	4	2	4	4	2	3	4	2	3	2	4	2	3	4	4	4	4	4	2	4	2	4	2	4	4	4	4	2	2	4	2	4	2	4		
10	Yes	Yes	No	2	2	5	1	4	2	5	2	5	5	2	2	5	2	5	2	5	2	5	5	2	2	5	2	1	2	2	2	4	5	2	2	4	2	2	2	2	4	4			
25	Yes	Yes	No	2	4	4	3	4	3	4	3	4	3	2	4	4	2	2	3	4	2	4	2	2	5	4	2	2	3	1	2	4	5	2	5	5	3	1	2	1	2	4	5		
8	Yes	No	Yes	2	2	5	2	3	2	5	2	5	2	4	2	5	2	3	2	4	3	4	4	2	2	2	2	2	2	4	2	1	4	2	2	2	2	2	4	2	4	4			
13	Yes	No	Yes	2	2	5	2	4	3	4	2	5	4	2	2	5	2	5	3	4	2	5	5	1	3	2	1	3	2	2	4	5	5	2	4	3	2	2	2	4	4	4			
20	Yes	No	Yes	2	3	4	2	3	2	5	2	4	4	4	2	5	2	3	2	5	2	4	4	3	2	4	4	2	3	2	3	3	4	3	2	4	4	2	3	2	3	3	4		
1	Yes	No	No	3	3	3	4	3	4	3	2	4	3	3	3	4	4	2	3	4	3	3	3	1	2	3	1	2	2	3	2	5	5	4	4	3	4	2	2	2	2	3			
9	Yes	No	No	2	3	4	3	3	4	3	3	3	3	2	2	3	3	3	4	3	4	4	4	4	2	4	4	3	4	3	2	1	3	4	4	3	3	4	4	3	2	4	4		
15	No	Yes	Yes	2	2	5	2	3	2	5	2	5	5	2	2	5	2	3	2	5	2	5	5	2	2	5	2	1	2	2	5	5	5	2	4	5	2	1	2	1	5	5	5		
30	No	Yes	No	2	2	4	2	4	2	4	2	4	4	2	2	4	2	4	2	4	2	4	4	2	2	2	1	3	2	4	5	4	4	3	2	3	2	2	3	2	4	3	4		
6	No	No	Yes	2	3	4	3	3	2	2	2	4	4	2	2	4	4	4	2	2	2	4	3	2	2	4	5	4	3	4	3	4	5	2	4	3	5	2	2	4	2	4	4		
12	No	No	Yes	2	4	3	3	4	3	4	3	4	4	2	4	4	3	3	3	4	3	4	3	2	2	4	4	4	2	2	2	4	5	4	3	5	4	3	3	2	4	2	4		
24	No	No	Yes	3	4	4	3	2	2	4	2	4	4	3	2	4	2	3	2	3	2	4	4	4	3	5	2	2	2	2	2	2	4	4	3	5	2	2	2	2	2	4	3	4	3
28	No	No	Yes	2	2	5	2	3	3	5	3	5	5	3	3	5	3	4	3	5	4	5	5	2	3	3	1	3	1	4	3	4	5	4	3	3	3	1	4	3	3	2	4	4	
5	No	No	No	2	2	4	2	2	2	4	2	4	4	2	2	4	2	2	4	2	4	4	4	2	2	3	2	3	2	4	1	4	5	2	2	4	2	3	2	2	2	4	4		
17	No	No	No	2	2	4	2	3	2	3	2	4	4	2	2	4	3	3	2	4	2	4	4	1	2	3	2	3	2	2	3	4	4	4	5	5	4	1	4	2	3	2	3		

Key
 Prec= Taught by Preceptors
 Collab= Collaboration for Medical Teaching Session
 STM= Straight to Medical Placement

APPENDIX 9

Satisfaction result tables

Summary of results for satisfaction survey of medical teaching session

Statement	Mean	% Agree	A/D	Taught by	With or without collaboration	Sequencing
The medical orientation teaching session:						
Was informative	2.10	89.47	A			
Helped prepare me for what I experienced on medical placement	2.53	63.6	A			
Was a waste of time	4.31	0.0	D			
Was a valuable learning experience	2.31	68.42	A			
Included information which as different to what I experienced on medical placement	3.10	21.05	A			
Helped me to relate theory to practice	2.42	68.42	A			
Was boring	4.05	5.26	D			
Included information which I was able to apply to practice	2.21	78.95	A			
Was of no benefit to my medical placement	4.31	0.0	D			Straight to (p = 0.04)
Was not relevant to what I experienced on medical placement	3.89	5.26	D			

Summary of results for satisfaction survey of rehabilitation teaching session

Statement	Mean	% Agree	A/D	Taught by	With or without collaboration	Sequencing
The rehabilitation orientation teaching session:						
Was informative	2.31	73.68	A		Collaboration (p = 0.024)	
Helped prepare me for what I experienced on rehabilitation placement	2.31	73.68	A			
Was a waste of time	4.31	0.0	D			Straight to (p = 0.04)
Was a valuable learning experience	2.37	68.42	A		Collaboration (p = 0.011)	
Included information which as different to what I experienced on rehabilitation placement	3.0	31.58				
Helped me to relate theory to practice	2.21	73.68	A		Collaboration (p = 0.015)	
Was boring	4.05	5.26	D			
Included information which I was able to apply to practice	2.42	63.16	A			
Was of no benefit to my rehabilitation placement	4.1	5.26	D			Straight to (p = 0.022)
Was not relevant to what I experienced on rehabilitation placement	4.16	0.0	D			

Summary of results for satisfaction survey of medical placement

Statement	Mean	% Agree	A/D	Taught by	With or without collaboration	Sequencing
On my medical placement:						
I worked with my preceptor on a regular basis	2.31	68.42	A			
I had long enough to develop my practical skills	2.63	63.16	D			
I had long enough to learn everything I needed to	3.68	15.79	D			
My preceptor knew about the course I was on	2.63	63.16	D			
I needed a longer placement	2.37	57.89	A	Preceptor (p= 0.031)	Collaboration (p= 0.006)	
My preceptor knew what my learning needs were	2.47	68.42	A			
There was not enough time for me to learn about the speciality	2.53	63.16	A			
I was asked to do things I had not been taught in theory	2.84	47.37	D			
I was unable to work with my preceptor regularly	3.53	26.32	D			
I did not learn very much	4.42	0.0	D			

Summary of results for satisfaction survey of rehabilitation placement

Statement	Mean	% Agree	A/D	Taught by	With or without collaboration	Sequencing
On my rehabilitation placement:						
I worked with my preceptor on a regular basis	2.89	47.37	D			
I had long enough to develop my practical skills	3.47	31.58	D			
I had long enough to learn everything I needed to	3.89	5.26	D			
My preceptor knew about the course I was on	2.95	47.37	D			
I needed a longer placement	1.95	78.95	A	Preceptor (p= 0.046)		
My preceptor knew what my learning needs were	2.74	52.63	D			
There was not enough time for me to learn about the speciality	2.21	73.68	A			
I was asked to do things I had not been taught in theory	3.0	42.11				
I was unable to work with my preceptor regularly	3.0	42.11				
I did not learn very much	4.05	0.0	D	Preceptor (p= 0.004)		