INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA

UMI®
800-521-0600

THE EXPERIENCE OF LEARNING AND TEACHING IN A NON-CONVENTIONAL NURSING CURRICULUM

by

ELIZABETH RIDEOUT

A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy
Department of Curriculum, Teaching and Learning
Ontario Institute for Studies in Education of the
University of Toronto

ABSTRACT

The Experience of Learning and Teaching in a Non-Conventional Nursing Curriculum

Doctor of Philosophy

1998

Elizabeth Rideout

Department of Curriculum, Teaching and Learning

Ontario Institute for Studies in Education of the University of Toronto

Changes in health care require that nurses have increased abilities in the areas of critical thinking, decision-making, delegation and independence. Changes in nursing education are needed that foster these abilities. One educational approach believed to result in these outcomes is problem-based, small group and self-directed learning. This study explored the experiences of students and teachers participating in a curriculum grounded in this approach to education. Data were collected using both qualitative and quantitative methods within a case study design. The Course Experience Questionnaire, which was administered to all students enrolled in the Generic Stream of the Bachelor of Science in Nursing Programme at McMaster University, provided quantitative data (Response rate 80%; N=274). Qualitative data were collected though individual interviews conducted with eighteen students and four faculty members from Levels Two and Four of the four year programme. Further qualitative data came from three open-ended questions that were part of the Course Experience Questionnaire.

Both students and faculty expressed high levels of satisfaction with the educational approach. Student level of satisfaction was not related significantly to age, previous education or

employment status. Students described professional benefits of the programme including skills of problem-solving, information searching, critical thinking and communication, and such personal outcomes as assertiveness, confidence and the ability to work with others. Faculty appreciated the freedom and the opportunity to work closely with students. The importance of the tutor role to the process was highlighted by both students and faculty, and positive and negative tutor behaviours were identified.

Both students and faculty also described the challenges associated with the approach, and identified the requirement for student and faculty orientation to the process, and the need for ongoing faculty development. A major concern for students and faculty centred on the process of student assessment, which was seen by many students as too subjective and by both students and faculty as insufficient to confirm the level of knowledge attained through the programme.

Implications for research and education were identified, aimed at better articulating the process of learning, enhancing the orientation of both students and faculty to the approach, developing more satisfactory methods of student assessment, and evaluating the outcomes for participants of the problem-based, small group, self-directed approach to education compared to the more conventional approach still used in most schools of nursing.

ACKNOWLEDGEMENTS

My thanks to the following for their support and contributions to the completion of this thesis:

to my thesis committee: Dr. Jack Miller, my supervisor, and my committee members, Dr. Merlin Wahlstrom and Dr. William Alexander, for their suggestions, guidance and support.

to Dr. Joel Weiss, who provided assistance and direction during completion of my course work and comprehensive examination.

to the faculty in the Department of Curriculum, Teaching and Learning for the educational opportunities they provided through course work and discussion.

to the students and faculty of the BScN program of the School of Nursing, Faculty of Health Sciences, McMaster University for their participation in this study.

to my family and friends who have provided encouragement throughout.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER ONE

INTRODUCTION

RATIONALE FOR THE STUDY

Traditionally, curricula in schools of nursing have been dominated by the Tyler curriculum model, with its reliance on measurable behavioural objectives (Bevis & Watson, 1989; Diekelmann, 1993). In this approach students are provided with clear statements of intended learning outcomes, and descriptions of learning experiences, the organization of the learning experiences, and a plan for evaluation (Tyler, 1975). Direct instructional techniques and the transfer of knowledge and skills from teacher to student are emphasized. Learners are expected to master specific knowledge or skills identified as essential content by the curriculum designers. Traditional achievement tests are the usual mode of evaluation, and the focus of evaluation is generally the extent to which the student meets the expectations of the teacher as reflected in the course objectives. This approach to education is evident in the philosophy, course descriptions and evaluation processes of the majority of Schools of Nursing that continue to use a behavioural approach to education.

Although this approach has worked well in the past, changes are required. There is a growing literature that espouses a shift to curricula that would emphasize the development of skills of inquiry and problem-solving rather than discipline specific content (Bevis & Watson, 1989, Lindeman, 1989). The calls for change are due in large part to the upheaval occurring in the health care system, where budget reductions, the increasing transfer of care to the

community and the introduction of new categories of care providers all require nurses who are able to make independent decisions, and to base their decisions on evidence rather than custom. Altogether the changing demands in health care require that nurses have qualities of critical thinking, independence and inquiry.

How to best make the required changes in nursing education has been the focus of much discussion and debate (Bevis & Watson, 1989; Glen,1994; Irvine,1995; MacLeod & Farrell,1994; Valiga,1988), although there is consensus that educational programmes must provide a greater opportunity for individual learning within the broad confines of programme objectives. An example of such an approach is a curriculum that emphasizes small group, problem-based, self-directed learning (Barrows & Tamblyn,1980; Boud & Feletti, 1991; Walton & Matthews, 1989). I have been a faculty member for many years in a School of Nursing that espouses such an approach through the stated philosophy, course outlines and evaluation methods for all the nursing courses of the curriculum (Handbook, BScN Programme, McMaster University, 1997). Clinical problems (sometimes called cases) are presented as the stimulus for learning, and students are actively involved in selecting learning experiences and setting personal objectives within the broad framework established by program faculty.

How students experience the McMaster curriculum is not known. In fact there is a dearth of published research about the impact on nursing students of participating in a self-directed, problem based educational approach. Schools of nursing are moving to such approaches to education. This is evident from the increasing number of articles reporting the experience of nursing programmes and problem-based learning. A thorough review of the

education literature generally and the nursing literature in particular revealed no articles about PBL and nursing education prior to 1991. Since then reports have begun to appear, but they are focussed on defining PBL and the process of implementing it (see for example, Creedy, Horsfall & Hand, 1992; Heliker, 1994; Townsend, 1990a, 1990b). Two doctoral dissertations have examined the use of PBL in nursing education but in one instance PBL was used in only one course designed specifically for the research (Khoiny, 1995) while in the other study PBL was one of several educational approaches used (Ishida,1995). Therefore, it is important to learn about the student experience and faculty perceptions of a curriculum where problem-based, self-directed and small group learning is the central feature.

This study will explore student and faculty experiences of what could be termed a non-conventional nursing curriculum. Anecdotal evidence from some students suggests that, although the curriculum is described by faculty as student-centred, it is sometimes perceived by students as teacher-centred. Students comment that their energy is often directed to determining what each tutor expects in terms of level of preparation for classroom and clinical courses; they describe a lack of consistency among faculty in relation to the rigor expected in assignments. Some students describe experiences where they felt belittled in front of peers and generally felt fearful of seeking help from faculty. They also report what they perceive to be high levels of control by faculty, in a program which espouses student-faculty openness and sharing. On the other hand, many students describe high levels of independence and the establishment of effective and supportive relationships with faculty. They feel valued, and in turn place high value on the freedom and independence they are offered to pursue individual learning needs. Overall a study to explore student and faculty

experiences would increase our understanding about teaching and learning in a non-traditional curriculum and contribute to knowledge of teacher and student behaviours that facilitate learning about nursing.

DEFINITION OF TERMS

Generic programmes The four-year baccalaureate programmes in nursing are designed to educate students for careers in nursing. Generic programmes contrast with post-diploma nursing programmes which offer baccalaureate education to nurses who have already completed a diploma programme and who are practising nurses.

Learning environment The learning environment consists of the interactions among individuals, the content and process of instruction and the methods of assessment within a program. It is conceptualized by Entwistle and Ramsden (1983) as consisting of eight dimensions: relationships with students; commitment to teaching; workload; formal teaching methods; vocational relevance; social climate; clear goals and standards; freedom in learning.

Student-centred In a student-centred approach to the curriculum, the students have to take more responsibility for their own learning. The emphasis is on the students and on what and how they learn. Potential educational advantages include an emphasis on the student and their learning needs; it is believed to be more motivating for students and preparatory for their continuing education. (Harden, Sowden & Dunn, 1984).

Teacher-centred In a teacher-centred approach there is an emphasis on activities such as the formal lecture and laboratory. Individual students have limited control over what they

learn, the order in which material is presented and the methods they have to use. (Harden et al., 1984).

STATEMENT OF THE PROBLEM

The problem that will be investigated in this research is:

What is the impact on the learner of a non-conventional nursing curriculum?

The specific questions to be addressed by this research are:

1. How do students experience a curriculum that is described as problem-based and self-directed?
2. How do faculty experience a curriculum that is described as problem-based and self-directed?
3. What is the relationship between length of time in the program and student perception of the learning environment?
4. What is the relationship among age, previous educational background, employment status and student perception of the learning environment?

ORGANIZATION OF THE THESIS

As background to this study it was important to review the literature in the following areas: (1) the changes in nursing and the related need for changes in nursing education; (2) the definition and process of problem-based learning; (3) the theoretical rationale; (4) issues in implementation; (5) student and faculty experience with PBL; and (6) the purported benefits and limitations of the approach. The literature will be presented in Chapter Two. Details of the case study method used in the research will be presented in chapter three, along

with a description of the setting and the nursing curriculum at McMaster University School of Nursing. The fourth chapter contains the study results, while the fifth chapter is a discussion of the results. Conclusions drawn from the research and the implications for education and research are also presented in Chapter Five.

CHAPTER TWO

REVIEW OF THE LITERATURE

The literature review for this study focuses on the many issues related to PBL and its use in the education of health professionals in general and nurses in particular, in order to provide a background of information for the researcher and the readers of this investigation. The review is divided into six sections: (a) changes in nursing and nursing education; (b) definition and process for problem-based learning (PBL); (c) the rationale for PBL; (d) issues in implementation of PBL; (e) student and faculty experience with PBL; and (f) the purported benefits and limitations of PBL.

CHANGES IN NURSING AND NURSING EDUCATION

There is general agreement that the practice of nursing requires the satisfaction of three elements: a) emotive: this is the interpersonal or relational part of nursing; b) rational: this is the decision-making or critical-thinking part of nursing; and c) technical: this is the performance of specific procedures that are a part of nursing (Bevis & Watson, 1989).

Historically nursing programs have emphasized the technical component of nursing, in large part because the emphasis in nursing practice has been on the performance of technical and comfort procedures, largely within acute care settings. Speed and efficiency at the performance of tasks have served as the criteria of a 'good nurse'. Nursing education programs have emphasized the development of a knowledge base of medical diagnoses and

curriculum model has dominated curriculum development in nursing education for over thirty years (and continues to in a majority of nursing programs) (Bevis & Watson, 1989). With its reliance on measurable behavioural objectives, the Tyler model provides students with clear statements of intended learning outcomes and descriptions of the learning experiences, the organization of those experiences, and a plan for evaluation (Tyler, 1975). Advantages to nursing have resulted from use of the behaviourist model that are summarized by Bevis & Watson (1989): "The strict insistence of measurable behavioural objectives backed by the forces of law, custom and accreditation has focussed the training and instructional aspects of nursing in such a way as to lift it to a highly organized, evaluation-oriented and regulated group that provides service of reliable quality" (p.29).

However, nursing practice has been changing, from an emphasis on the technical skills and abilities described above, to one where autonomy and independence, and the decision-making component of nursing, are assuming greater importance (Bevis and Watson, 1989; Lindeman, 1989). Budget reductions, technological developments, increased patient participation, and political interventions are all contributing to unprecedented changes in nursing practice. More patient care is being transferred to the community where nurses experience a higher degree of independence than they do in hospital settings, while in hospitals more and more of the tasks traditionally associated with nursing are being done by nursing assistants and, in some cases, by non-nursing personnel. Nurses are more than ever the educators, the coordinators of care, the interveners in times of pain and crisis. Altogether the changing demands require that nurses have qualities of critical thinking, independence, creativity, and inquiry (MacLeod & Farrell, 1994). Consequently this mandates a change

from the traditional approaches to nursing education (Bevis, 1993; Chinn, 1990; Tanner, 1990)

The nursing literature indicates that educators have responded to this challenge to differing degrees. Some educational programmes have incorporated a reflective component into their otherwise traditional programmes, with the rationale that learning to critique one's actions will assist students to develop greater critical thinking, and awareness of self and the environment (Atkins & Murphy, 1993; Baker, 1996; Jones, 1995; Saylor, 1990). Others have introduced strategies such as concept mapping into traditional curricula in an effort to encourage more meaningful learning (Irvine, 1995). In the few reports of major shifts in the philosophy, structure and process of curricula, problem-based learning is embraced as the educational approach most congruent with the desired outcomes in the learner. Most programmes described are in Australia, where PBL has been adopted by the majority of Schools of Nursing (Creedy et al., 1992; Doring, Bramwell-Vial & Bingham, 1994; Heliker, 1994; Little & Ryan, 1992 ; McMillan & Dwyer, 1989; Townsend, 1990a; 1990b). Indeed, the only book devoted to PBL in nursing describes the curriculum from Griffith University, Queensland, Australia (Alivari, 1995). There are also reports of PBL use in Wales (Andrews & Jones, 1996), England (Frost, 1996) and Canada (Brandon & Majumdar, 1997). Altogether a thorough search of all literature sources revealed in total 10 articles, one book, two doctoral dissertations (Ishida, 1995; Khoiny, 1995), and one master's thesis (Newman, 1995) related to the use of PBL in nursing education. One can conclude that PBL has not been universally adopted as the solution to the conventional, behaviourist approach to education that is now being challenged.

DEFINITION AND PROCESS OF PROBLEM-BASED LEARNING

PBL Defined

Problem-based learning (PBL) was developed originally as an alternative to more conventional approaches to medical education (Barrows & Tamblyn, 1980; Barrows, 1996). PBL is derived from the case-based education used for many decades in Schools of Business and Law, and was first developed and implemented at McMaster University School of Medicine in 1969 (Neufeld and Barrows, 1974; Schmidt, Lipkin, deVries, and Greep, 1989). Since then PBL has spread world-wide in medical education and its use has been reported in such disciplines as engineering (Woods, 1996), architecture (Kingsland, 1996), science (Allen, Duch and Groh, 1996) and mathematics (Seltzer, Hilbert, Maceli, Robinson & Schwartz, 1996). PBL is described as an approach to learning rather than a teaching technique, wherein students are presented with real-life problems from clinical practice that provide a stimulus for learning (Boud & Feletti, 1991). The problems presented for discussion are determined by faculty to aid specific learning or are derived from the clinical experiences of students. Whatever the source and focus, the problems present issues for new learning and require active student involvement. Students work through each problem in a manner that encourages reasoning ability through a systematic problem-solving approach to managing real-life difficulties.

Walton & Matthews (1989) contend that problem-based learning is a means of developing learning for capability rather than learning for the sake of acquiring knowledge, and contrast PBL with a traditional curriculum which they see as overloading students with an excessive significance on memorization. Problem-based learning generally involves

greater input and responsibility on the part of students (compared to a conventional curriculum) in deciding what and how to learn, as they identify the knowledge known and the knowledge needed in particular situations. Thus a problem-based approach also utilizes principles of self-directed learning which emphasize development of skills for lifelong learning. Problem-based learning also purports to prepare individuals for working in teams, since PBL most often is structured to occur in small groups of ten or fewer students, where there is an emphasis on learning to work effectively with others.

PBL Process

The PBL process is variously described as consisting of seven steps (Schmidt, 1983), ten steps (Hebert & Bravo, 1996) or the five steps as originally defined by Barrows and Tamblyn (1980). Although the number of discrete steps differs among authors, there is consensus that students take the following actions when confronted with a problem for discussion:

1. The 'problem' is introduced to students before any preparation or study has occurred.

2. Students work together to generate a number of possible hypotheses or causes which are then used to guide the inquiry. This process allows students to reason and apply knowledge, in a way appropriate to the level of learning.

3. The hypotheses assist with identification of learning issues, or what the individuals and the group need to know in order to proceed with the problem. These learning issues in turn guide individual research.

4. The skills and knowledge acquired are then applied back to the problem, through discussion and sharing of new found information.

5. The learning that has occurred in working with the problem and through individualized study is summarized and integrated into the student's existing knowledge and skills.

Expected Outcomes

In summary, PBL represents a student-centred approach to learning that most often occurs in small groups, uses problems or cases as the stimulus for learning, and leads to the following intended outcomes:

* acquisition of a retrievable and usable knowledge base
* development of the clinical reasoning process
* development of effective self-directed learning skills
* increased motivation for learning
* acquisition of skill and ability to work effectively in groups
* promotion of caring student-faculty relationships

(Barrows and Tamblyn, 1980; Barrows, 1996; Boud and Felitti, 1991; Schmidt et. al., 1989).

THEORETICAL FOUNDATION OF PROBLEM-BASED LEARNING

The theoretical underpinnings of PBL were not well articulated in the early literature (Barrows & Tamblyn, 1980; Spaulding & Cochran, 1991). As time has passed and explorations of the structure, process and outcomes of PBL have multiplied, there has been

increasing attention paid to the theoretical rationale for PBL and why it is purported to be a relevant and useful educational approach.

The Work Of Jerome Bruner

Often mentioned as a basis for PBL is the work of Jerome Bruner. For example, Schmidt (1993) contends that the emphasis on problem analysis prior to information gathering and the emphasis on self-directed learning activities were strongly influenced by Bruner's notions of intrinsic motivation as an internal force that drives people to learn more about their world. Albanese and Mitchell (1993) also note the congruence between PBL and Bruner's theory of discovery (inquiry) learning, in which he suggested learning is enhanced when students actively participate in the process and when learning is organized around some problem (Bruner, 1977).

Cognitive Psychology and PBL

The congruence between PBL and learning theory grounded in cognitive psychology has also been described by Schmidt and colleagues (1989) and expanded upon in 1993 by Schmidt alone. He elucidates five principles that support PBL as a learning method for acquiring new information: activation of prior knowledge; elaboration of knowledge; encoding specificity, or the restructuring of knowledge to fit the problem presented; epistemic curiosity; and contextual dependency of learning.

Activation of prior knowledge presupposes the use of earlier knowledge in understanding new information. Since it is believed that learning, by its nature, has a

restructuring character, prior knowledge and the way it is structured in the long-term memory will influence new learning. Schmidt suggests PBL uses this principle, as students are asked to review what they already know about a problem before proceeding.

Schmidt bases his description of elaboration of knowledge as a condition of learning on the work of a psychologist, LM Reder (cited in Schmidt et al., 1989), who contends that elaborations provide redundancy in the memory structure and redundancy is in turn viewed as a safeguard against forgetting and an aid to rapid retrieval. Elaboration of information is stimulated in PBL as students formulate and criticize hypotheses about a given problem, discuss subject matter with other students, teach peers what they have first learned themselves, and write and present summaries of information they have researched.

Encoding specificity, a third condition that facilitates learning, refers to the resemblance between the situation in which something is learned and the situation in which it is applied. As Schmidt states: "successful retrieval of information in the future is promoted when the retrieval cues that are to reactivate the information are encoded together with that information" (1989, p. 106). In PBL students learn about patient issues in relation to problems that they will encounter in their clinical practice.

Schmidt proposes that epistemic curiosity or intrinsic interest is congruent with problem-based learning, since group discussion promotes the clarification of one's own point of view when confronted with other perspectives.

Finally, Schmidt sees PBL as an application of the principle that the ability to activate knowledge in the long-term memory and to make it available for use depends on contextual cues. Information learned in a particular context will more likely be retrieved if there is

availability of the same context at a future point. In PBL, information is learned in relation to commonly encountered problems, and thus information retrieval should be triggered when similar problems are confronted in the practice setting.

The Work of Lev Vygotsky

A further theoretical explanation of PBL is offered by Ishida (1995), who suggests that the PBL learning approach is compatible with the work of Lev Vygotsky and his followers (Vygotsky, 1978, 1987), who believed that learning takes place through social interactions with more knowledgeable individuals while they are engaged in socially meaningful activity. The learner interacts and receives assistance in a variety of ways such as directing, modelling, questioning, and/or providing cognitive structuring and feedback to the learner until he becomes able to do without assistance and guidance. Learning must be transformed to the individual level so that self-regulation occurs, allowing movement to a higher level of competency and independence.

The work of Vygotsky provides a theoretical rationale for PBL in two ways. First, PBL places learning within a social context as does Vygotsky's social origins of learning theory. Students meet together with a tutor to work on meaningful problems related to their area of practice. Students discuss and assist each other in making connections between new ideas and prior knowledge, creating new meanings as they complete their tasks. Secondly, the role of tutors and peers in PBL is congruent with the Vygotskian construct wherein more capable or knowledgeable persons assist but do not dominate the activities and experiences of the learner. In PBL each student is responsible for his or her learning and the tutor and other

students are responsible for assisting each learner to achieve optimal learning. The tutor has the additional responsibility of providing clear task and goal structures and facilitating the learning process through consultation, assisting with collaborative interactions and providing feedback to participants.

The Work of Dewey, and of Miller and Seller

Further rationale for PBL can be found in the work of Dewey on progressive education, and the transmission, transaction and transformation curriculum positions of Miller and Seller (1990). Problem-based learning reflects the progressive education espoused by Dewey (1938): "There is no point in the philosophy of progressive education which is sounder than its emphasis upon the importance of the participation of the learner in the formation of the purposes which direct his activities in the learning process" (p. 67). In PBL tutorials students are active learners as they generate learning issues that meet their personal learning objectives.

Problem-based learning incorporates some aspects of both the transaction and transformation curriculum positions of Miller and Seller (1990). For example, they contend: "The goal of curricula based on the transaction position is the development of rational intelligence in general and complex problem-solving skills in particular" (p.110). This goal is also a stated outcome of the PBL approach to education, where PBL tutorials emphasize the use of a problem-solving approach, so that students attempt to identify present and potential problems and their possible solution. They are expected to explore relevant concepts and the related literature, with an emphasis on a critique of the literature and its application to patient

care. Developing a base of scientific knowledge, and the ability to evaluate situations and take appropriate action is all part of problem-based learning

The transformation position of Miller and Seller is also congruent with problem-based learning, since both emphasize what they describe as "vast resources for self-understanding and for fostering self concepts, basic attitudes and self-directed behaviour" (Miller & Seller, 1990, p. 128). The traits of acceptance of self and others, naturalness and spontaneity, openness to lifes' experiences, identification with other human beings and a sense of humour are all part of the humanist perspective within the transformation position (Miller and Seller,1990) and development of these traits is a purported reason for moving from a conventional to problem-based approach to education (Boud and Feletti, 1991; Schmidt et al.,1989).

The social change perspective of Miller and Seller's transformation position is also congruent with problem-based learning and relevant for nursing practice. The problems students consider deal not only with patient care issues of a biomedical and psychosocial nature but also incorporate larger population-based issues, such as the economic, social and environmental influences on health. Students are encouraged to learn not only about the effect of these factors on the health of individuals and populations, but also how to critique and develop policy for social change.

Summary

In summary, a rationale for problem-based learning can be seen in the writings of many authors. Although PBL arose from the personal experiences and beliefs of a few

medical educators (Barrows, 1996; Spaulding & Cochran, 1991) and can be said to have had atheoretical beginnings, it has evolved as an educational method. With the growth of academic exploration in the areas of curriculum and cognitive psychology, the congruence between PBL and newer perspectives on curriculum development and learning has become more and more evident, thus providing a theory base for the problem-based educational approach.

ISSUES IN THE IMPLEMENTATION OF PROBLEM-BASED LEARNING

The issues in the implementation of PBL will be considered in three main categories: structure, content and process. Under the heading structure, literature will be presented about the various curricular designs that incorporate PBL. Under content, the methods used to determine the content and format of the problems that form the stimuli for PBL will be described. Although an outline of the process of a typical PBL class has been described, several other process issues will be addressed in this section. An essential determinant of the process of PBL is the role of teachers in PBL, so the extensive literature about the qualities of PBL tutors will be summarized. The approaches to student assessment within a PBL curriculum comprise another process issue. Finally, because of the centrality of group process and self-directed learning to PBL, these aspects of the curriculum approach will also be considered.

Programme Structure and PBL

Although all descriptions of PBL emphasize the use of problems as the stimulus for learning, the overall structuring of the curricula and the ways in which problems are presented to students may vary considerably (Barrows, 1986; Ross, 1991). A taxonomy developed by Barrows (1986) describes a range of possible structures. In case based lectures, students are first presented with case vignettes or case histories which they analyse using prior knowledge, and then attend a lecture where information relevant to the case is presented. The case method, often used in law and business, refers to situations where a complete case is given for study and research prior to class discussion, and the subsequent discussion combines student and teacher directed learning. It differs from classic PBL in that the case material is organized and synthesized before it is presented to students. In what is generally referred to as classic PBL, students are presented with the problems or scenarios in a format that allows for free inquiry. Prior learning is used to identify the need for new learning and application takes place with teacher facilitation. Barrows also uses the term closed loop or reiterative problem-based, to indicate that students evaluate the resources used and return to the patients' problem to see what they would do differently, after their self-directed learning. Although Barrows clearly favours classic PBL, he acknowledges that faculty must decide on desired educational objectives and select the method that fits best and is the most feasible in terms of time and cost.

A second variant in curriculum structure is the extent to which the PBL approach is used within a programme. Some programmes have opted for a completely integrated curriculum where all the content of a programme is taught using PBL (Creedy et al.,199),

while at the other extreme are programmes where one or two courses at most use the PBL methodology (Ishida, 1995; Stern, 1995). In the middle are hybrid curricula, where several PBL courses are offered along with courses presented in a more traditional way (Armstrong, 1991; Handbook, BScN Programme,1997). Factors that affect the choice of structure include cost and resources available as well as the philosophical beliefs of faculty (Stinson & Milter, 1996).

Selecting The Content For PBL

The process of problem-based learning begins with students encountering the problem for study, and there is a sizeable literature that describes how problems should be chosen, developed and presented to students. It should be noted that there is a dearth of empirical evidence to support or refute any of the contentions made by the various writers on this topic.

Determining Essential Content

The choice of the problems for study derives from the information and skills, ie., the content, that is to be learned, since the identified content areas provide the focus for problem development. Various approaches have been suggested for determining content, and therefore the problems, to be studied. Barrows and Tamblyn (1980) suggest five criteria for choosing the specific problems to be developed: (1) the problems are commonly seen; (2) they represent urgent situations that require skilful, effective management; (3) they have a potentially serious outcome to which an intervention can make a significant difference; (4)

they are often poorly handled; and (5) they emphasize or underline important concepts in the basic foundations for practice.

These criteria were extended by MacDonald, Chong, Chongtrakul, Neufeld, Tugwell, Chambers, Pickering & Oates (1991) in their model for determining the priority health problems to be included in the medical school curriculum at McMaster University. Categories in their model include: (1) the prevalence and/ or incidence of the problem; (2) the one-year case-fatality rate [ie., the number of individuals dying of a disease within one year of diagnosis divided by the total number of individuals with the disease during the same time period (Lilienfeld & Stolley, 1994)]; (3) the level of remaining quality of life (based often on a 'best estimate' by one or more clinicians); (4) duration of deviation from health; (5) urgency of the illness condition; (6) availability and applicability of preventative measures; (7) accuracy and applicability of the diagnostic process; and (8) efficacy of treatment measures. The authors developed a weighting scale, where each of the eight categories had a possible score range of 0-2, to allow for a quantitative approach to choosing priority conditions for medical education. Although they acknowledge that the usefulness of this approach is dependent on the quality and quantity of information available, they contend that the model encourages a more holistic analysis of health care data from which to derive curriculum content.

Arthur and Baumann (1995) revised the MacDonald et al. approach to make it applicable to nursing curricula, by incorporating the concept of amenability to nursing interventions, wherein "health-related issues where nursing can expect to have very little impact are of lower priority than those that can benefit from the unique services provided by

nurses" (p. 64). Their priority health issues formula has five areas: (1) magnitude of illness, or the incidence and/or prevalence of the problem; (2) the case-fatality rate which provides information about the severity of the problem; (3) lost quality of life, which the authors acknowledge is at present difficult to calculate; (4) duration of ill health, which addresses the length of time nursing interventions may be required; and (5) the concurrent burden factor, or the potential burden the problem may create within a community. The priority health issues derived from this formula are then assessed in relation to their amenability to nursing interventions. The limitation of this approach, like that of the MacDonald et al. approach, is its reliance on the information available, which may be flawed in accuracy. On the other hand, the approach provides some rationale for choice of curriculum content other than the expert opinion and possible faculty bias that have otherwise pervaded decisions. This approach of Arthur and Baumann was used to determine the content areas for inclusion in the BScN programme at McMaster University (BScN Handbook, 1997).

Designing Problems

The actual design of the problems for a programme of study must allow the student to interact with the patient problem in a manner that will challenge and develop the learners' clinical reasoning skills and stimulate self-directed learning (Barrows and Tamblyn, 1980). Problems should be designed so that all the information is not available at the outset of the problem, to allow for an unfolding of the issues and actions, as would be the case in everyday life. A list of criteria for this aspect of the process is offered by Barrows and Tamblyn (1980) and includes the following: (1) the problem should first be presented as it would be to the

practising professional, as a brief scenario rather than a predigested summary of the entire situation; (2) the format should allow for sequential, interdependent assessments and actions to be taken; (3) results from the assessments and actions should then be presented (ie., the data derived from history taking, physical assessment, diagnostic testing and treatment actions); and (4) ease of use by the student and cost should also be considered.

Among the many challenges in developing problems for study is the selection of the kind, amount and source of information to be included in the problem. Hafler (1991) contributed to our understanding of these issues through her survey of 22 case (or problem) writers at Harvard Medical School, which was conducted to learn about the process of case/ problem development. She concluded that "cases should have one central theme, similar to a mystery story, rather than multiple themes" (p. 153). Hafler also inquired about the best sources for cases and concluded they should come from actual situations, to ensure their realism and because they seemed to stimulate more interest than hypothetical situations.

Drummond-Young and her colleagues provide additional detail about problem development in their guide, which resulted from their survey of faculty within the BScN programme, McMaster University that indicated a lack of guidelines and resource people to assist with the process (Drummond-Young, Mohide, Tew , Baumann, & Byrne; 1996). The major tasks described in their Conceptual Model for the Development of PBL Paper Problems are: (1) identify educational objectives and course concepts; (2) identify priority health problems; (3) use a clinical case to develop scenarios of paper problem; (4) seek faculty feedback and revise as appropriate; (5) develop supplementary resource material; (6) pilot the paper problem package; (7) revise the paper problem package; and (8) integrate the

problem into the curriculum. Like Hafler (1991), Drummond-Young et al. (1996) stress the importance of basing the problem and using data from a real-life situation, and of ensuring that the problems chosen for development are relevant to the content and issues of importance in the study discipline.

Choosing the format for presentation.

Problems can be presented to students in one of several formats: (1) as written scenarios where relevant history and clinical findings are provided in a sequential manner as students seek information about the situation; (2) through a simulated patient, where people trained to simulate an actual patient in every detail are interviewed and examined by the learners; (3) with videotapes, where the initial scenario and subsequent interviews with the patient are provided on video; and (4) using computer formats, wherein students ask questions, request information, and suggest actions (Barrows & Tamblyn, 1980). Whatever the format used, the problem should unfold to the student as it would to a practitioner in clinical practice.

Most often, problems consist of several parts or 'scenarios', presented sequentially, that correspond to the phases or progression of the health and illness experience to be addressed (Armstrong, 1991; Drummond-Young et al.,1996). This issue of length or extensiveness of problem was investigated by Neville and Norman (1993), in a study that compared two formats. one consisting of eight to ten problem scenarios that described the unfolding course of the illness and the other a "mini-problem" version containing three or four short and focussed issues. The eighteen tutorial groups enrolled in a unit of study within

an integrated PBL medical curriculum were randomly assigned to one of the two formats. Upon completion of the unit students completed a form indicating the extent to which they had covered each of the objectives stated by the planners, as well as their rating of the effectiveness of the format in meeting their learning needs. No significant differences were found between the two formats in the generation of objectives, and students expressed a slight preference for the longer problems. While the authors acknowledged that the self-report measure might not be the most accurate reflection of actual learning, they did conclude that using fairly different problem formats does not appear to affect the identification of relevant learning objectives.

Since problems are designed to present particular content, the issue of congruency between learning issues identified by learners and those determined by curriculum planners has also been investigated. Dolmans, Gijeslaers, Schmidt & van der Meer (1993) asked students (N=120) enrolled in the medical school at Maastricht University to record all the learning issues generated in their PBL groups. When the issues were subsequently rated by 'expert judges' as congruent, incongruent or additional to the stated faculty objectives, 64% of the faculty objectives for a given problem were generated as learning issues by students, while a further 6% of the total objectives identified within the PBL groups were identified by students and not by faculty, and were deemed to be relevant. Overall, the findings of Dolmans and colleagues suggest "that students in a problem-based curriculum are able to determine what they need to know and what is relevant to learn" (p. 212). Furthermore, the process of identifying overlap between student and tutor generated learning objectives is useful in detecting problems that are ineffective in steering the learning choices of students.

This review of the literature describing content selection and presentation has highlighted the importance of this curriculum component to the PBL experience. If students are to learn to be nurses, doctors, engineers or architects, they must be exposed to the content integral to their chosen discipline or profession and it must be embedded in problems so that detection by students is possible, so they can will then pursue the content deemed to be essential by curriculum planners.

Process Issues in PBL

The process issues of particular interest in the implementation of PBL are the role of faculty, the assessment of students, issues related to self-directed learning and group process. Because it is widely acknowledged that faculty within a PBL curriculum must alter their teaching philosophy and actions, a considerable literature has developed about the tutor role in PBL. Similarly, approaches to student assessment are much debated in the PBL literature, since it is acknowledged that new methods are required to assess not only content but skills related to teamwork and self-directed learning. Finally, since PBL emphasizes the development of self-directed learning and most often takes place within small groups, there has been considerable interest in the development of group and self-directed learning skills in PBL.

Role of Faculty and PBL

Behaviours of PBL Tutors. A number of authors have described the role expected of tutors in small problem-based learning groups (Barrows and Tamblyn, 1980; Barrows, 1988;

Creedy et al., 1992; Stinson & Milter, 1996; Wilkerson & Hundert, 1991). The general consensus is that tutors should be facilitators, guiding students' learning and posing questions that stimulate students' thinking and cognitive processes. This requires a paradigm shift for faculty, from what has been called the "sage-on-the-stage" to the "guide-by-the-side", where the required skills include active listening, coaching, mentoring and facilitation (Stinson & Milter, 1996). The role has been further described as consisting of four components: (1) balancing student direction with assistance, wherein the tutor allows students freedom to set the direction for learning but intervenes to ensure rigour of learning (2) contributing knowledge and expertise, by encouraging critical thought and suggesting resources; (3) creating a pleasant learning environment by encouraging open discussion and showing enthusiasm for the role; and (4) stimulating critical evaluation of ideas, by encouraging students to think, reason and question (Wilkerson, 1996).

Expertise Required by Tutors. As we can see from this literature, a variety of behaviours are expected if tutors are to be effective, but what is the empirical evidence for the particular knowledge and skills required for the role? To date, the most fruitful research has investigated the specific kinds of expertise required to be an effective PBL tutor. For example, it has been generally acknowledged that expertise in group process is a requirement of any PBL tutor, but the level of content expertise required has been open to question. Should tutors be experts in the subject matter being considered in the PBL problem? Should they have a high level of skill only in the PBL process and group dynamics? Do the best results come from a combination of subject and process expertise?

Content Expertise by Tutors: There is some evidence to support the contention that tutors should have content expertise. Davis, Nairn, Paine, Anderson and Oh (1992) studied student-tutor interactions during one PBL course within a curriculum that otherwise was traditional in structure and process. Twenty-one tutorials were analysed, with half the groups led by expert tutors (defined as having advanced disciplinary and/or research experience in the subject matter) and the remainder using non-expert tutors. The groups were taped and the data coded using a method of interaction analysis; a satisfactory level of inter-rater agreement among the observers was noted. No statistical difference was found in the amounts of teacher and student directed activities between the groups led by experts and those led by non-experts, although there was a trend to a slightly higher percentage of time devoted to teacher-directed activities in the groups led by experts. Students evaluations were higher for the expert led groups, although the reasons for this were not obvious from viewing the tapes. Finally, the students' examination scores on the items related to the case studied during taping were significantly higher for the expert-led compared to the non expert-led groups. This study provides support for the use of expert tutors when the outcomes of interest are scores on end-of-course multiple choice exams and ratings of tutors by students. However, the findings should be viewed with caution, since all the observations were made during the study of only one case within one PBL course, and the interaction analysis was directed to the amount of student-tutor interaction rather than the specific content of that interaction.

Similar findings in support of content expertise are provided by Eagle, Harasym and Mandin (1992) who studied the number and relevance of learning issues identified by students in groups, some led by experts who either practised in the particular area or who had

developed the case, and some by non-expert tutors, defined as those who would not see the kind of case in clinical practice. All tutors were considered to be expert in the tutorial process. The groups tutored by experts generated almost twice as many learning issues, identified issues that were congruent with the case objectives, and spent almost twice as long pursuing the learning issues, as groups led by non-experts. The tutor behaviours in the groups were not observed, so why this occurred is not known, although Eagle and colleagues speculate that the expert tutors may have challenged the students when it became apparent there were deficiencies that the students did not perceive. Since this is an expectation of any tutor with process expertise, it seems equally likely that the expert tutors became more directive in pointing students to particular study areas. The investigators conclude that content as well as process expertise are required, and strategies need to be developed so that tutors become expert in the cases by considered within their tutorial groups.

Process Expertise: Conflicting evidence is provided by Silver and Wilkerson (1991), who compared the types of tutor comments, amounts of time taken up by comments of tutors and students, the pattern of exchanges during tutorials, and tutorial agenda-setting in four PBL tutorials, two where the tutors had subject expertise and two where they did not. Expert tutors were more likely to take a directive role in the tutorials, speaking more often and for longer periods, and providing more direct answers. The investigators concluded that the use of expert tutors resulted in more teacher-directed discussion, which is at odds with the educational philosophy and benefits of student-directed education, although they did not explore the consequences of more teacher-directed interaction on learning outcomes. Further support for the importance of process expertise comes from DesMarchais (1991) and

Kaufman & Holmes (1996) who investigated student perceptions of tutor behaviours. Being too directive, letting the group get off track, seeming unconcerned with group process and generally lacking group process expertise were all viewed as unhelpful and detrimental to learning, while flexibility and concern for students were seen as supportive behaviours. In a similar vein, Wilkerson, Hafler and Liu (1991) utilized a case study design to explore the particular process behaviours of tutors that encouraged student-directed learning. Data were collected by videotaping four PBL groups, eliciting student ratings of tutors, and interviewing the tutor participants, and their analysis revealed four themes. First, encouraging students to select their own topics for discussion and bowing to the consensus of the group was viewed as positive by both tutors and students. Secondly, the style and pattern of tutor talk influenced group learning, with effective tutors cooperating with students to build the discussion through comments that related directly to previous comments, clarified points of confusion, and moved the discussion along. Thirdly, the types of questions asked by tutors differentiated effective from less effective tutors, with probes such as "Are we in agreement that there may be other causes of these symptoms?" serving to guide group process, as compared to questions that requested specific facts or initiated topics. Finally, silence in the group was allowed by effective tutors to encourage the students to continue their discussion or to allow time to think. Less effective tutors indicated they were uncomfortable with silence.

The Case for Content and Process Expertise: Altogether these studies suggest that both process and content expertise are required by tutors, but what is the best mix? Can a tutor be effective without one or the other? Schmidt, van der Arend, Moust, Kox and Boon

(1993) contributed to our understanding with their large study that provided data from 336 groups within seven different PBL programmes on the effects of tutor subject-matter and tutorial-process expertise on students' achievement scores, self-study time and student rating of tutor behaviours. Although students guided by subject-matter experts spent more time on self-directed study and achieved somewhat better scores on end-of-unit achievement tests than students guided by non-expert tutors, there was also a positive effect on student achievement scores when tutors had only process expertise. Furthermore, content and process expertise were correlated, leading Schmidt and his colleagues to conclude that subject-matter knowledge and process-facilitation skills "are intimately intertwined in the behaviours of effective tutors and that both contribute to the learning of students" (p. 790).

Further evidence comes from a second study by Schmidt & Moust (1995) of 524 tutorial groups involving students enrolled in undergraduate health science programmes at Maastricht University. Correlations among tutor behaviours and students' self-study time, reported interest in subject material, and level of achievement were analysed. The results indicated that students learned best from tutors who combined subject-matter expertise with personal qualities that create an atmosphere for learning, namely a commitment to students' learning and their lives in a personal, authentic way, and the ability to express oneself in the language understood by students. Not surprisingly, they concluded that students' learning is enhanced by tutors who demonstrate strength of both content and process expertise.

Summary. Altogether this research supports the conclusion that students achieve better learning outcomes and higher levels of satisfaction with their tutorials when tutors demonstrate both content expertise (ie., ensuring the identification of the relevant learning

issues and assisting students to pursue the relevant objectives) and process expertise (ie., the facilitating group function and encouraging independent learning).

Assessing Student Learning

Although the terms assessment and evaluation are closely related and might on occasion be used interchangeably, more often the term assessment denotes the methods and measures used to describe a learner's achievements, while evaluation refers specifically to the value or judgements placed on performance on the selected assessment measures (Moran, 1997). The literature related to assessing learning outcomes in PBL curricula focuses primarily on the examination of assessment measures, and is generally referred to as student assessment rather than evaluation. Swanson, Case and van der Vleuten (1991) begin their description of strategies for student assessment in PBL curricula by stating that "assessment can drive student learning in antithetical directions and there is little agreement among problem-based learning advocates on methodologies for assessment" (p.260). These two themes recur throughout the literature about the assessment of student learning in the PBL approach.

Multiple Choice Examinations and PBL. Assessment strategies in traditional health professional programmes have relied primarily on examinations using MCQ's aimed at the measurement of changes in knowledge. The reliance on MCQ's has been viewed as contrary to PBL approaches for two reasons: (1) students are believed to study for the test rather than for their own learning; and (2) MCQ examinations do not assess the additional and different

PBL outcomes which are more process oriented, including self-directed learning, teamwork, and problem-solving skills (Norman, 1991; Swanson et al., 1991).

If multiple choice tests and exams are not the preferred method of assessment in the PBL approach, what should be used and why? As Norman (1994) points out "there is tremendous latitude for choice in the design of such a (evaluation) system; the challenge is to ensure that the choice ultimately rests on a careful and unbiased assessment of the relative importance of each (outcome) goal" (p.6) A variety of alternative methods of assessment have been developed, to allow for choice and to address the various required educational outcomes. They will be described briefly, including their strengths and limitations.

Knowledge and Decision-Making. The repertoire of methods available for the assessment of knowledge and decision-making (ie., the ability to apply knowledge) is extensive. The various methods, some old and some new, are described below.

Written assignments or essays are used frequently in PBL programmes, sometimes related to class presentations (Rangichari, 1996) and more often to issues selected by students in relation to overall curriculum objectives (Handbook, BScN Programme, 1997). With their emphasis on self-selection of topic, self-directed information search, and presentation of data in a clear and focussed manner, written assignments are viewed as a relevant assessment method within the PBL approach (Palmer & Rideout, 1995). However, issues of reliability and validity of written essays have been raised repeatedly (Day, Norcini, Diserens,Cebul, Schwartz, Beck, Webster, Schnabel & Elstein,1990; Neufeld, 1985; Nichols & Miller, 1984). Some authors believe they have no place in summative student assessment (Norman,

1991) while others believe faculty have the experience and objectivity to grade written work in a conscientious manner (Stenhouse, 1975).

The triple jump, a method of assessing the application of knowledge to clinical situations in a controlled setting outside the clinical environment, has been used in medical, nursing and science programmes (Allen et al., 1996; Callin & Ciliska, 1983, Smith, 1993). In this oral assessment method, students are presented with a problem and asked to generate hypotheses about the possible explanations, to collect data about the situation and to narrow or refine their hypotheses. They then identify learning issues and are given time, from two to twenty-four hours, to conduct research. The exam ends with the student reporting the research findings and relating them to the presenting problem. The strengths of the method are its reinforcement of the decision-making process that is central to PBL, and its emphasis on process as well as content assessment. Acceptable levels of inter-rater reliability have been reported; however, consistently low levels of inter-case reliability have been reported, indicating that students may do well on scenarios related to their areas of interest or strength and less well on scenarios in areas to which they have not been previously exposed (ie., asked to complete a triple jump situation related to the childbearing cycle without having encountered either theory or practice related to this area). Norman (1994) concludes that an exam consisting of many questions (probably 10-20) would be required to achieve satisfactory inter-case reliability.

A different method associated with the PBL approach is the Modified Essay Question [described by DesMarchais, Dumais, Jean & Vu (1993) as Problem Analysis Questions]. Each MEQ consists of a brief scenario reflecting a clinical situation and one or more

questions pertaining to it. Subsequent pages include information, questions and response space. The questions may ask the respondent about data collection and analysis, interpretation of additional data and management of the presenting situation. MEQ's are intended to examine ability to explore and manage clinical problems and to assess relevant knowledge. Acceptable levels of inter-rater reliability and validity have been reported for MEQ exams, although the inter-case reliability is estimated to be similar to that of the triple jump examination, therefore requiring tests that require many problems or cases (Knox, 1989; Stratford & Smeda, 1995).

Clinical Performance. The assessment of students' abilities to provide safe and effective care to clients is an essential outcome of health professional education, and direct observation is an age-old method for assessing clinical performance (Wakefield, 1985). As Thompson (1995) states: "It is intuitively attractive to choose to evaluate learners' abilities by observing them 'in action' "(p.70). Direct observation can be limited to the performance of a single skill (eg., examination of the knee joint or assessment of interpersonal skills) or the interactions between client and professional over a period of time. Checklists or rating scales are often provided to assist the assessor. As is the case with Triple Jump's and the MEQ's, there seems to be little inter-case reliability especially in relation to differential diagnosis and treatment, although acceptable levels are achieved when skills of history taking, physical examination and communication are assessed. In her review of relevant literature, Thompson (1995) concludes that a reliable estimate of overall skill in dimensions of clinical practice such as interviewing or physical examination can be achieved if at least 4-6 different situations or evaluations are sampled.

The Objective Structured Clinical Examination (OSCE) was developed in response to criticisms of the direct observation method, primarily because of its potential for testing a wide range of knowledge and skills during one examination period (Harden, 1975; McKnight, Rideout, Brown, Ciliska, Patton, Rankin & Woodward, 1987). In an OSCE students rotate around a series (up to 20) of timed stations (lasting anywhere from 5 to 25 minutes) where they may be asked to take a patient history, perform some part of a physical examination, teach/ counsel/ advise a patient, perform an action or interpret and/or document findings. A standardized form with specific criteria for scoring is prepared in advance (Stevens & Brown, 1989). Evidence of acceptance of the OSCE as an assessment method is its' inclusion as one component of both the medical and physiotherapy licensing processes in Canada (Reznick, Baumber, Cohen, Rothman, Blackmore & Berard, 1993; Solomon, Personal Communication, 1996).

A plethora of studies have investigated the reliability and validity of the OSCE (for example, Roberts & Brown, 1990; Roberts & Norman, 1990; Stratford, Thompson, Sanford, Saarinen, Dilworth, Nixon, Fraser-Mac Dougall & Pierce-Fenn,1990) and the overall conclusion is that high inter-rater reliability is generally achieved while inter-case reliability is poor, indicating that competence is situation or case specific. This low correlation among stations requires an increasing number of testing stations to obtain a stable estimate of performance (Salvatori & Brown, 1995). Content and construct validity have been demonstrated although criterion validity is weak. There are obvious advantages to using the OSCE as a method of assessing clinical competence, among them: the ability to test a wide range of skills in a relatively short period of time; low preparation time since a bank of

stations, once developed, can be used on numerous occasions; flexibility in the format, allowing for choice of stations and range of competencies to be tested. The disadvantages include the large number of stations (a minimum of 10 is suggested) that are required to get a reliable estimate of overall competence and the associated costs and logistics of organizing a large scale OCSE for large numbers of students (Naylor, 1993).

Self-Directed Learning and Group Skills. Problem-based learning emphasizes not only the acquisition of knowledge and its' application in decision-making and clinical practice but also the ability to be a self-directed learner and to demonstrate personal characteristics including the ability to work effectively in groups. How best to evaluate these characteristics has been the subject of much discussion, although the general conclusion is that they can only be assessed in context by rating performance in the PBL tutorial groups (Barrows & Tamblyn, 1980; DesMarchais & Vu, 1996; Hay, 1995; Neufeld & Sibley, 1989). In considering who should rate performance, the consensus is that students and their peers should contribute to the formative and summative evaluations, with the final and summative evaluation resting with the tutor (DesMarchais & Vu, 1996; Hay, 1995).

There have been few published descriptions of how such an evaluation should be completed, or by what criteria performance is assessed. One example comes from the integrated medical programme at the University of Sherbrooke, where the competencies expected in small group tutorials are evaluated by the PBL tutor using a 44- item rating form completed at the end of each session (DesMarchais & Vu, 1996; Hebert & Bravo, 1996). Student reasoning skills on problems, communication and small group interaction, and autonomy and self-directed learning are all assessed. Evidence of validity of the form is based

on two findings: the form is considered relevant and useful by tutors and it has been effective in identifying students in need of improvement. The internal reliability of the form was 0.98, and good correlations were noted between the rating form score and global evaluations conducted by tutors. The authors conclude that evaluating tutorial performance is an integral part of a PBL assessment process, and the form developed at Sherbrooke is a reliable and valid instrument for evaluating students' skills and attitudes during tutorials.

Hay (1994) reports the development of a 10-item form used in the Occupational Therapy programme at McMaster University, which assesses group skills, learning skills, knowledge and critical thinking. Tutors were able to identify very weak areas of performance and to rank-order students, although all were ranked above the B-level. It seems that, although rating forms are helpful in stating the behaviours to be evaluated within small groups, their use in differentiating levels of student performance is questionable and their ability to predict performance, as judged by other assessment measures, is unproven (Hay, 1995; Norman, Wakefield & Shannon, 1995).

Progress testing. The methods of student assessment described above, while congruent with the philosophy and process of PBL, have varying levels of reliability and validity and have been reported to leave students unsure, indeed anxious, about whether they have learned what they need to know in order to function as competent health professionals (Blake, Johnson, Mueller, Norman, Keane, Cunnington, Coates, & Rosenfeld, 1994; van der Vleuten & Verwijen, 1990). However, there continues to be reluctance to reintroduce traditional MCQ examinations into PBL curricula because of the reasons noted at the beginning of this section, namely, the steering effect on student activity and an emphasis on

knowledge acquisition and de-emphasis on the other learning outcomes valued in PBL. A response to this dilemma is Progress Testing, which was developed concurrently at the University of Missouri-Kansas City School of Medicine and The University of Maastricht, The Netherlands and subsequently introduced into the medical programme of McMaster University (Arnold & Willoughby, 1990; Blake, Norman, Keane, Meuller, Cunnington & Didyk, 1996; Boshizen, van der Vleuten, Schmidt & Machiels-Bongaerts, 1997; van der Vleuten & Verwijnen, 1990). Whether called the Quarterly Profile Exam (as at the University of Missouri) or the Personal Progress Index (PPI) (McMaster University), the test consists of an examination given to all students at regular intervals throughout the programme consisting of up to 300 multiple choice questions that together form a sample from the entire cognitive domain of medicine. Performance on the examination is used for formative evaluation only, with the results going to students and an advisor not involved in the summative evaluation of the student. The results are used to provide feedback to students about their developing knowledge base (which has been shown to grow exponentially over the years in the programmes) and to identify students who are not performing at the expected level, so that remedial activity can be made available. Students have reported that Progress Testing is valuable, fair and does not cause them to change their study habits and preparation for tutorials (Blake, et al., 1996).

Summary. Assessment of student learning, an issue of discussion and debate in the educational literature generally, has received particular attention within the PBL literature due to concerns about balancing the assessment of content and process in a manner that does not divert student attention away from the tutorial group activities and individual student

learning. The consensus is that the first step in developing the assessment process must be identification of the learning outcomes to be achieved and there is agreement that these include knowledge, clinical decision-making, clinical performance, self-directed learning and group skills. The most appropriate measures should then be chosen to assess this range of outcomes. It is generally conceded that developing an assessment system that is congruent with the purpose and philosophy of PBL, while having acceptable levels of reliability and validity, is an ongoing challenge (Barrows & Tamblyn, 1980; Neufeld & Sibley, 1989; van der Vleuten & Verwijnen, 1990).

Group Process and PBL

Although PBL can take place in large groups where both critical inquiry and self-directed learning can be fostered (Barrows, 1988; Woods, 1996), it is generally acknowledged that the development of communication skills and self-knowledge are best learned through being a member of a small learning group. The early descriptions of PBL emphasized the purported benefits of small group tutorials as follows: developing interpersonal skills; becoming aware of emotional reactions of self and others; learning how to give and receive criticism; developing a sense of responsibility for the group and its' progress; and building self-confidence and understanding of others (Barrows & Tamblyn, 1980; Barrows, 1988; Neufeld & Barrows, 1974). There is some evidence that small group learning contributes to the development of interpersonal skills (Bernstein, Tipping, Bercovitz and Skinner, 1995; Stern 1995). However, the relationship between group function and other learning outcomes has been under-explored. For example, in three recent review articles

about PBL outcomes (Albanese & Mitchell, 1993; Berkson, 1993; Vernon & Blake, 1993), there are no comments about the PBL process used, or the functioning of the groups, in the studies used to compare outcomes between PBL and traditional programmes.

The problems that can be encountered in PBL groups, including differing levels of individual commitment, personality difference and lack of progress on the group's task have been identified (Barrows, 1988). The perceived importance of effective group function to students' thoughts and feelings about PBL have also been described. For example, Kalaian & Mullan (1996) used a 19-item questionnaire (neither reliability nor validity of the questionnaire are reported) that evaluated students' PBL experiences in four domains: tutor effectiveness; learning materials; small group process; and academic support. Small group process experience accounted for sixteen percent of variance in their assessment of the experience, indicating the importance of the small group experience to overall perceptions of the PBL approach.

Although the importance of effective group functioning to the PBL experience is acknowledged, there has been a paucity of writing and research on how students develop groups skills. Wallis & Mitchell (1985) outlined a programme used in the medical curriculum at Newcastle University, Australia, which consists of eight sessions, designed to develop the group process skills of students. Although they describe the programme in some detail, no evaluation of its' effectiveness is indicated. The role of the tutor in promoting group function has also been explored, with some studies outlining the role of the tutor in facilitating group process (Barrows & Tamblyn, 1980; Barrows, 1988; DesMarchais, 1991; Wilkerson, 1996) and others describing faculty development programmes designed to prepare

tutors for the role (Holmes & Kaufman, 1994; Wetzel, 1995; Wilkerson & Hundert, 1991). Particular strategies for tutors to use in small group settings are outlined by Barrows (1988) and Tiberius (1990).

Overall, writers and researchers have attended to the important role of group process in the implementation of PBL. However, much work remains to be done in this area, to better understand the intricacies of PBL group process and the relationship between that process and learning outcomes.

Self-Directed Learning and PBL

Despite the consensus that self-directed learning (SDL) is an integral component of the PBL process (Barrows & Tamblyn, 1980; Boud & Feletti, 1991; Schmidt, 1983; Walton & Matthews, 1989), there is a remarkable lack of literature devoted to describing self-directed learning within the context of PBL. Some authors have described the expectations of students, which include defining their learning needs, selecting resources, synthesizing and presenting their research to others, and participating in self-assessment (Barrows, 1988; Towle & Cottrell, 1996), while others have gone on to explore just what SDL students do. For example, Williams, Saarinen-Rahikka & Norman (1995) investigated the amount of time students spent in scheduled and non-scheduled educational activities and whether this increased or decreased as they progressed through the occupational and physiotherapy programmes at McMaster University. They found that, on average, students spent 2.8 hours in self-study for every scheduled hour, and this time decreased as the students proceeded

through the programme. No comparison data are available so the generalizability of these findings is not possible, nor do the authors comment on whether the results were expected.

In another approach to studying the SDL behaviours of students, the quantity and kind of resources used and the amount of time spent in the library were explored (Blumberg & Michael, 1992; Rankin, 1992; Saunders, Northrup & Mennin, 1985). All three studies reported greater use of the library and library resources by PBL students than those in conventional programmes. However, how this library use affected learning outcomes and whether it in turn influenced library use following graduation were not explored, nor have these questions been investigated since then.

The feelings and reactions of students to the SDL expectations have also been reported. For example, Stinson & Milter (1996) report that students frequently express frustration when they are first expected to take responsibility for their own learning within the PBL experience and the teacher does not tell them the right answer. Statements such as "What am I supposed to do?" and "If only you would tell me what you want I would do it" were made frequently, leading the authors to conclude students need coaching and talking though the process in the early stages. Walton & Matthews (1989) also concluded that the frequent and usual experience of students new to PBL and SDL was one of confusion and a lack of purpose in the new approach. Feelings of anxiety are also reported by van Doblen (1996) and Olsen (1987) who described their experiences as medical students in fully integrated PBL programmes. Overall it seems that students experience initial stress and uncertainly in programmes where self-directed learning behaviours are expected, yet they go

on to demonstrate SDL skills of library and resource use. Further exploration is required to determine strategies to assist students through the process of becoming self-directed learners.

STUDENT AND FACULTY PERCEPTIONS OF THE LEARNING ENVIRONMENT

Student Perceptions of the Learning Environment

Studies of student perceptions of their learning environments have generally compared the experiences of medical students in student-centred and/or problem-based curricula with those experiencing a more conventional curriculum approach, some using quantitative measures (Bernstein et al., 1995; Clarke et al., 1984; Moore-West, Harrington, Mennin, Kaufman & Skipper, 1989; Kaufman & Mann, 1997) while others have employed qualitative methods of data collection (Davis, 1995; Ishida,1995; Khoiny, 1995; Stern, 1995). Altogether this has been an area of interest to researchers seeking to understand the strengths and limitations of problem-based learning.

Quantitative Studies

Clarke et al. (1984) used the 58-item Medical School Learning Environment Survey in a cross-sectional study of student perceptions of a newly introduced problem-based curriculum across the years of the program. The scale, assessed as both reliable and valid, is comprised of the following seven subscales: flexibility, student-student interaction, emotional climate, supportiveness, meaningful life experience, organization, and breadth of interest. Overall mean scores of the students in the problem-based curriculum were higher than those of students in traditional programs in other universities and, although PBL scores did become

less favourable over the years in the program, they indicated a persistently favourable educational environment. In a similar study, Moore-West and her colleagues at the University of New Mexico (1989) evaluated their problem-based, student-centred approach to medical education by comparing students in the PBL curriculum with those enrolled in the existing traditional approach being offered within the same university. Students were compared on perceived level of stress and attitudes toward the learning environment. The latter were assessed using a modified version of the instrument used by Clarke et al., (1984), and their findings were similar, in that students in the problem-based group perceived the emotional climate of the program and the interpersonal relationships among students to be better in their program than did the students in the traditional group, although perceptions of both student groups were progressively less positive over time in the program.

Further evidence of positive responses from students to the PBL approach comes from Bernstein et al., in their 1995 study of attitudes and experiences of medical students before and after a five week session where they used the PBL approach for the first time in their medical education. Responses to a questionnaire designed for the study revealed a statistically significant shift to a more positive perception of PBL at completion of the course. Students described the advantages of PBL as better retention and reinforcement of learning; more enjoyable, stimulating and interesting; enhancement of interpersonal skills; and students learn how to learn rather than memorize. Students expressed concerns about acquiring required knowledge, both before and after the PBL experience, indicating this is an ongoing issue in the PBL approach despite the overall positive perception associated with it.

Finally, Kaufman & Mann (1997) focussed their attention on student attitudes to one component of medical education, basic sciences, among students in a PBL compared to a conventional lecture-based programme. Students were surveyed about the importance of basic science knowledge for clinical practice and the level of satisfaction with the learning method to which they were exposed using a questionnaire developed by the investigators. The authors found a statistically significant difference in favour of the PBL group.

Taken together these investigations of learning environments suggest that PBL students perceived their learning environments to be more positive than did their counterparts in conventional programs. All of the identified studies used medical students as their subjects. All the reported studies used questionnaires, some with satisfactory reliability and validity (eg., the Medical School Leaning Environment Survey) and some whose reliability and validity were not reported.

Qualitative Studies

Although perceptions can be explored using quantitative measures, the use of more open ended approaches is also important in any investigation of thoughts and feelings (Cohen & Manion, 1989). Four recent studies were identified that used qualitative approaches to explore the experiences of students in programmes that incorporated student-centred, problem-based pedagogy.

Ishida (1995) studied the responses of Japanese, Filipino and mixed-ancestry students (N=17) to problem-based learning, due in part to her hunch that non-Caucasian students might report different responses to PBL than their caucasian counterparts. Inquiry focussed

learning was the philosophy underlying the BScN curriculum where PBL was used in some courses within the programme, while other strategies such as lecture/ discussion and computer-assisted learning were employed in other courses. To determine the level of satisfaction with the PBL component of the programme, students were asked to choose between PBL and lecture/discussion for subsequent courses in their programme, and give reasons for their choice. A majority of informants (71%) selected PBL, and cited as reasons the level of involvement, opportunity for "student direction", flexibility, independence and the relationships developed between students and faculty. The students also identified some limitations with the method, among them the time required to "figure it out", the different expectation among faculty in the course, the lack of security that the information they were sharing was accurate, and the conflicts that sometimes arose in the learning groups. Ishida also expressed surprise that students from a variety of ethnic backgrounds found PBL "congenial and supportive of their learning" (p. 110).

Khoiny (1995) investigated the perceptions of PBL among nurse practitioner students (N=15) who participated in four PBL sessions that took place within a curriculum that was otherwise traditional, with lectures and clinical practice used as the methods of teaching. Data were collected using two methods: a PBL attitude questionnaire consisting of open-ended questions developed by the investigator; and focus group interviews conducted with all participating students. In response to the question, "If you had a choice between lecture and PBL, which one would you choose, and why?" most students expressed a preference for the PBL approach, stating they felt more involved in discussion, it was more active, more fun and more practical. They also commented that, although they liked the interactive nature of the

PBL sessions and their relevance to clinical practice, they obtained more information in a shorter period of time when the lecture method was used. Other weaknesses mentioned by respondents were similar to those reported by Ishida and included the sense that some students did not prepare enough, concerns about having learned all the important content, and the lack of immediate answers to questions raised in the group. Khoiny concludes that the PBL method was perceived in a positive way but that concerns remained on the part of students about the depth and breadth of learning obtained.

A third qualitative study examined the interactions of a group consisting of six medical students and two facilitators in the first year of an integrated PBL programme (Davis, 1994). Data were collected using participant observation, informal interviewing, document analysis and videotaping. Students described the programme as enjoyable, holistic, active, social and everything they hoped it would be, while the facilitators commented that the joy of learning was obvious in the students. No concerns with the approach were reported, leading Davis to conclude that the PBL approach is viewed positively by both students and faculty.

Finally, Stern (1995) found that occupational therapy students enrolled in a PBL course within a traditional programme attributed many positive benefits to the PBL approach, including enhancing their professional behaviour, helping them integrate the various elements of their academic programme, enhancing their clinical reasoning skills and providing personal benefit or gain. Students were overwhelmingly positive about the experience and no negative comments about PBL were reported in Sterns' study.

Of these four studies, all but one took place in otherwise traditional programmes where all or part of only one course was offered using the PBL approach. One study was

conducted with medical students, a second with occupational therapy students and the remaining two with nursing students. It is also noteworthy that the comments of students in all four studies were overwhelmingly positive, although some limitations were noted by respondents in the studies with nursing students conducted by Khoiny and Ishida and they related to three issues, (1) concerns about having learned enough, (2) issues related to group process, and (3) the lack of correspondence in expectations among tutors.

Faculty Perceptions of PBL

Faculty perceptions and attitudes toward PBL, like those expressed by students, are generally positive. Faculty interviewed by Maxwell and Wilkerson (1990) before and after participating as tutors for the first time in the newly introduced PBL curriculum at Harvard University reported that the experience was much more positive than they expected and the opportunity to interact on a more personal level with students was the chief source of satisfaction. Other benefits included a sense of personal growth and accomplishment derived from the experience. In a similar study of student and faculty perceptions of PBL conducted at the time PBL was introduced at the University of Toronto, Bernstein et al. (1995) found virtually all the attitudes expressed by students were shared by faculty, who commented they found the interaction between themselves and the students more collegial, fun, easy, engaging and relaxed than in the traditional programme. They also commented on the benefits they derived from learning a new approach to teaching.

Vernon (1995) corroborated the positive attitudes of faculty in his survey of tutors from 22 US and Canadian medical schools that use PBL in either all or part of their

programmes. Respondents rated PBL more positively than traditional methods overall, and differences were noted in five of eight areas explored, namely, student interest and enthusiasm, faculty interest, personal satisfaction, student reasoning, and preparation for clinical practice. Learning efficiency was judged to be equal in both methods and the traditional method was judged superior for learning factual knowledge in the basic sciences. When asked what tutors liked best and least about PBL, student contact, student motivation, group atmosphere, self-directed learning were all identified as positive aspects of PBL while time requirements of faculty, poor motivation, student evaluation problems, lack of structure and faculty control and basic science knowledge problems were all noted as the most disliked features of PBL.

Summary

In summary, all these studies together indicate that the PBL approach is viewed positively by students and faculty. These findings emerge from data collected using a variety of methods, including fixed-choice and open-ended questionnaires and personal and group interviews. Both students and faculty described PBL as enjoyable, interactive, relevant, practical and holistic. Limitations with the methods were also noted by students, including a lack of confirmation that they were learning the essential content, a belief that group process issues were sometimes problematic, and the sense that different tutors sometimes had different expectations of students. The few negative comments from faculty related to the lack of efficiency of the method (in terms of tutor time and student learning), difficulties with student assessment, and loss of tutor control. Generally, the areas of concern or issues for

improvement were few, leaving the impression that PBL is viewed in a uniformly positive way by participants, whether students or faculty.

BENEFITS AND LIMITATIONS OF PROBLEM-BASED LEARNING

The adoption of PBL by more and more programmes within an increasing number of disciplines has resulted in an profusion of studies of the positive and negative outcomes of this learning approach. Three meta-analyses published in 1993 provide comprehensive reviews of the literature in this area. A brief overview of the purpose and process of the three reviews will be presented, followed by the findings summarized according to the questions posed commonly by those interested in but still sceptical about PBL:

- How does the academic achievement of PBL students compare to that of students in conventional curricula?

- Do students in PBL programmes develop the same, higher or lower levels of clinical decision-making and clinical practice skills compared to their counterparts in conventional curricula?

- Do PBL students demonstrate increased involvement in lifelong learning as compared to students from conventional curricula?

Descriptions of the Meta-Analyses

Albanese & Mitchell (1993) begin their review by noting the" tremendous pressure to implement PBL across the country and around the world" (p.52) and continue "considering the current high level of interest, a review of literature on the outcomes of PBL is in order" (p.52). They identified all studies in the medical education literature from 1972 to 1992 that

had problem-based learning in the title, and included for analysis all those where information was provided about the scope of the intervention, type of study design, number of PBL participants and specific outcome measures and results. A meta-analysis strategy was used where effect sizes as well as p-values were reported. It is noteworthy that details about the type of PBL (integrated, hybrid, limited to one course) or the quality of PBL (eg., level of functioning of the small groups or even size of group) were not addressed by the reviewers.

The second review was conducted by Vernon & Blake (1993) concurrently with that of Albanese and Mitchell and for the same stated purpose: "This period of heightened interest (in PBL) is a good time to summarize what we can demonstrate about the possible outcomes of PBL in general" (p.550). Analysis was conducted on "all identifiable research on health-related educational programs that contained a significant PBL emphasis" (p.550), while studies that were "purely descriptive and afforded no comparison of any sort" (p.551) were excluded. A meta-analysis strategy using twenty-two research reports on fourteen programs employed common techniques such as calculating effect sizes for original research results, supplemented with 'vote counts' (and associated sign tests).

The third review, conducted by Berkson (1993), included literature on the theoretical foundations of PBL as well as empirical and experimental data, in order to "examine whether the faith in PBL embodied by (these) prestigious endorsements can find support in the current literature" (p.S79). She summarized the data (101 references are included) according to specified questions and reached conclusions based on the findings of the various studies reviewed. Her findings are therefore descriptive and were not subjected to statistical analysis.

Thus a quite similar literature was reviewed for similar purposes in three reviews conducted and published within months of each other. Now, what of their results?

How does the academic achievement of PBL students compare to that of students in conventional curricula?

Albanese and Mitchell examined studies that compared the academic performance of students in PBL and traditional curricula on specific standardized tests (eg., the National Board of Medical Examiners Parts 1 and 11, an examination taken by all medical students in the USA), and reached the following conclusion: "Thus, while the expectation that PBL students will not do as well as conventional students on basic science tests appears to be generally true, it is not always true." (p. 57). Vernon and Blake also used data from studies of student performance on similar standardized tests and concluded that "these ES (effect size) data suggest a significant trend favouring traditional teaching methods" (p. 556). Berkson compared academic achievement of traditional and PBL medical students by examining studies that had used a wide array of measures of knowledge acquisition (true/false questions, multiple choice questions, rating scores and qualifying or licensing exams) and concluded that "no one has been able to demonstrate an important advantage of one curriculum over the other."(p.S80). Berkson's conclusions should be viewed with caution since the studies she examined used such a variety of measures of academic achievement, included no statistical analysis and instead reported results of the various studies as "PBL slightly better", "PBL slightly worse" or "equivalent outcome".

In a post-1992 study with nursing students, Newman (1995) compared the knowledge of students enrolled in PBL with those in a non-PBL approach in one course within a conventional BScN curriculum. Scores on the final examination, which consisted of multiple choice and short answer questions, were slightly but non-significantly higher for the non-PBL approach on the multiple choice questions, while PBL students scored slightly higher on the short answer questions, but again the differences were non-significant. Thus one curriculum approach was not favoured over the other. These results should be viewed conservatively since they are based on one course only within a total four year nursing programme.

Altogether the evidence concerning academic achievement is slightly in favour of non-PBL programmes when the outcome is measured using traditional fixed choice examinations. However, whether the knowledge is retained equally well has not been reported. Further examination of this issue is needed.

Do students in PBL programmes develop the same, higher or lower levels of clinical decision-making and clinical practice skills compared to their counterparts in conventional curricula?

To answer this question, Albanese and Mitchell included in their analysis seven studies that compared the clinical ratings by faculty supervisors of graduates of PBL compared to conventional curricula. In all the studies, "ratings by faculty were either more positive for students in the PBL curriculum or non-significantly different from the ratings of the conventional group." (p.65). They go on to state: "High clinical ratings would not be expected if PBL residents had deficits in their diagnostic acumen" (p. 67). Vernon and Blake also used studies that compared clinical performance on one or more measures, most often

observations of behaviour with real or simulated patients, and they reached a conclusion similar to that of Albanese and Mitchel, namely, that PBL students exhibited better clinical performance than did students from conventional programmes. No literature on the issue of clinical competence was included by Berkson in her review.

Do PBL students demonstrate different self-directed learning behaviours and increased involvement in lifelong learning as compared to students from conventional curricula?

Self-directed study behaviours: Studies that compared the time used in self-study and the use of library resources were reviewed to determine similarities and differences in self-study behaviours between PBL and other students. Albanese and Mitchell reviewed three relevant studies and concluded that PBL students reported higher library utilization rates, were more likely to study in the library than at home, and to use a wider variety of written materials. No clear pattern emerged in relation to time spent in study. Albanese and Mitchell conclude that "PBL students are substantially more likely to use the library and library resources to study" (p.62).

Berkson reviewed the same three studies as Albanese and Mitchell and, like them, concluded that PBL students used a wider variety of resources and checked out more books from the library than did conventional students. She questioned the meaning of this difference, and concluded that evidence is still lacking to support the premise that "the practice of self-directed learning in the context of a PBL curriculum enhances self-directed learning skills, thus maximising the probability of the quality of learning continuing once the student has graduated and throughout a physician's career" (p. S84). Furthermore, Berkson states: "The post-graduate practice of self-directed learning strategies may prove more

dependent on the proximity of available resources, peer expectations, role models, the physicians' profile and time constraints than on "putative" skills previously acquired or refined in a PBL or traditional curriculum". (p. S84).

Vernon and Blake reviewed four studies that provided data on the use of various learning resources by students in PBL and conventional programmes and concluded that "PBL students (1) placed more emphasis on journals and on-line literature searches as resources and (2) made greater use of the library" (p. 557). They did not comment on the possible relationships between these findings and the likelihood of engaging in lifelong learning behaviours.

Lifelong learning: All three review articles reported a dearth of research exploring similarities or differences between PBL and conventional curricula in promoting lifelong learning, while conceding that it is a difficult construct for which to develop measures. All three refer to the study by Shin, Haynes and Johnston (1991) where McMaster and University of Toronto graduates were compared five to ten years post-graduation on their use of current treatments for hypertension. They found McMaster graduates were more likely to use newer treatments than those from the University of Toronto. There was consensus that the study was not well designed, in that no pretest was included and McMaster graduates may have received a better grounding in the management of hypertension since it is an area of expertise in research at McMaster.

Summary

In summary, there is a growing literature on the benefits and limitations of PBL compared to conventional curricula. Although to date the studies have almost unanimously used medical students from diverse programmes, some conclusions can be drawn from the available literature. First, there is a prevailing trend in all the studies reported to somewhat better performance on standard examinations by students from conventional curricula compared to those from PBL programmes. Secondly, students from PBL curricula tend to be rated somewhat better in regards to their clinical performance, with the difference especially evident in their interpersonal communication. Finally, the evidence clearly supports increased library use and use of a wider variety of library resources by PBL students. However the relationships among library/ resource use and the outcomes of knowledge, clinical practice and lifelong learning have not been reported.

The final word on the reported research on the outcomes of PBL goes to Wolf (1993) who concluded in his critique of the three meta-analyses reviewed above, that "(1) there is a paucity of good-quality studies and evidence available regarding the hypothesis that PBL produces learning and/or learners different than or superior to those derived from traditional approaches; (2) results often are incomplete and poorly reported in the existing primary research reports; and (3) there is a tremendous need for well designed, creative primary research-evaluation studies that examine important, clinically relevant behaviours and outcomes" (p. 544). There continues to be a need for research that examines the process and outcomes of PBL, indicating that the call for research made by Wolf in 1993 is still relevant in 1998.

CHAPTER THREE

METHODS

This chapter will provide a description of the method used to address the research questions. Details will be provided about the study setting and subjects. The study design, namely a case study approach, and the data collection methods will be described and rationale provided for their selection. The approach to data analysis will be summarized. The chapter will conclude with information about ethical considerations and issues of trustworthiness.

RESEARCH SETTING AND PROGRAMME DESCRIPTION

The setting for this study was the School of Nursing, McMaster University, which admitted their first BScN students in 1942. The School was originally within the Faculty of Science, and joined together with the fledgling School of Medicine to form the Faculty of Health Sciences in 1974 (Alderson, 1976). At that time the approach to education moved from a more traditional, lecture based programme where faculty defined and controlled the learning objctives, processes and outcomes to the problem-based, small group, self-directed format that is still in existence today. This change in approach was influenced by the new partnership with the School of Medicine which originated this innovative educational method (Barrows & Tamblyn, 1980; Spaulding & Cochran,1991). Over the years, curriculum reviews and revisions have taken place, the clinical settings used to develop clinical expertise have changed, the focus of the problems for PBL classes has been altered, yet the underlying philosophy and process of education have been maintained.

Concepts and Values of the BScN Programme

The approach to education is described in the Handbook of Undergraduate Nursing Education (1996) as follows:

> Undergraduate Nursing at McMaster University is based on an andragogical educational philosophy within which the process of self-directed and problem-based learning are central. We believe that learning for the professional practice of nursing is both a process of inquiry and a skill which is developed as a life-long activity.
>
> Student-directed or student-centred learning is an approach to learning that: encourages students to identify their own goals and learning needs; allows students to suggest strategies to meet those learning needs; and assumes an interest in evaluating one's own progress towards the achievement of goals. The level and course objectives provide a framework within which the student's goals are identified.
>
> Problem-based learning is a method of teaching and learning in which the learner is presented with a situation or "problem" as a starting point for the identification of learning needs. Problem-based learning has two educational objectives: the acquisition of an integrated body of knowledge related to the problem and relevant for future problems; and the development or application of problem-solving skills.

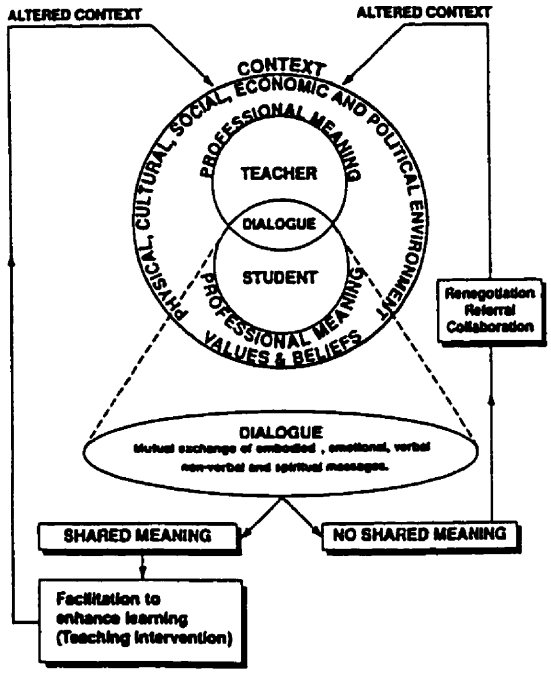
This philosophy is also contained in the pictorial representation of the McMaster Model of Nursing Education (Figure One), which encompasses the following related concepts and their definitions:

> (1) environment is composed of both the objective nature of people and things and their subjective meaning (or the way they are perceived); and includes the social, physical, cultural, economic and political contexts of human beings. Examples include both the objective and perceived aspects of such things as government or such people as family members.
>
> (2) health is defined as being all of which one is capable in one's life situation and as a resource for everyday life. Health is a dynamic life experience. Health changes with an individual's perceptions of what is possible in each situation, one's awareness of personal health practices and the meaning of the situation. Important contributors to health are caring and feeling cared for.

(3) learning for the professional practice of nursing is both a process of inquiry and a skill which is developed as a life-long activity. The process is learner-centred and focussed on solving clinical problems or addressing potential health care issues through the use of inductive and deductive reasoning. It requires the acquisition of appropriate knowledge, skills and personal qualities. Self-directed learning skills such as defining personal objectives, understanding the dynamics of behaviour change, information acquisition/ assimilation, and self-evaluation are acquired within the context of a respectful and facilitative teacher-learner relationship where learners take responsibility for their own learning.

(4) teaching for the professional practice of nursing is a system of teaching and learning processes consistent with the setting, students and content knowledge base (information and processes) of the profession

Figure 1
McMaster Model of Nursing Education



The descriptions of (a) the McMaster Model of Nursing; (b) the values and concepts central to the model; and (c) the content knowledge base of the profession, constitute the building blocks or framework for the programme. The knowledge base consists of information (facts, laws, theories, etc.) as well as cognitive and operational processes for

using such information in the specific practice of nursing. The structure of the curriculum and the selection of teaching/ learning strategies arise from the framework. We believe that health care is a team responsibility and that nursing education can be offered most beneficially in an inter-professional setting.

Structure and Content of the BScN programme

The BScN programme is structured to include four types of courses: (1) nursing courses (clinical practice and classroom); (2) required health science courses (eg., anatomy, physiology, introduction to research and critical appraisal of research literature); (3) required non-health science courses (eg., psychology); and (4) elective courses (chosen from liberal arts, basic sciences and health sciences). Each level of the programme includes courses from all four of these categories, and all courses contribute to the overall desired educational outcomes. However, it is in the nursing courses that the concepts and values described in the McMaster Model of Education are incorporated and reflected most clearly and consistently .

- The content for the nursing courses is centred around the following themes, which were derived from an analysis of the current and future roles of nursing, the health care system in general, and the Standards of Nursing Practice (CNO, 1996): (1) nursing role; (2) communication; (3) teaching-learning (4) core concepts and theories for nursing practice; (5) health care system; and (6) professional evolution. All these themes come together in the investigation of issues and development of plans for action related to priority health care issues and problems (the seventh theme), which may be physical, psychological, social and/or cultural in focus. These priority health issues were identified through the analysis of

provincial and national reports on health problems and the assessment of the likely burden of illness for the patient, family and society. The problems in the problem-based courses were developed around these priority health problems, and incorporated content related to other curriculum themes. (See Appendix A for a sample PBL problem). The specific programme content is reviewed yearly and modified to reflect changes in nursing, the health care system, and the health issues of the day.

In summary, the BScN programme emphasizes the development of problem-solving, life-long learning and competence in nursing practice through an educational approach that features problem-based, self-directed, and small group learning. The following brief descriptions of the classroom and clinical nursing courses for each of the four programme levels demonstrate how curriculum process, structure and content come together in the learning opportunities for students.

Level One Courses

The content areas for this course are presented in Table 1, according to the curriculum themes. In the clinical course, twenty of the twenty-six weeks are spent in the Clinical Skills Lab, developing knowledge and skills related to interpersonal communication and health assessment. In the final six weeks, students have the opportunity to practice and perfect the abilities learned in the skills lab, in a variety of long term care settings. On-site supervision to groups of eight students is provided by faculty. Student assessment, completed by faculty with input from students and their peers, is based on observation of clinical competence in

the practice setting and the clinical skills laboratory, and a practice exam of communication skills.

In Level One, students have two hours of small group PBL tutorial per week. Students are introduced to the programme philosophy through two large group sessions: one on group process and the other on the process of problem-based learning, including the role of self-directed learning, that are held in the first three weeks of the programme. Students then begin to work through a patient scenario (problem), which they select from the list of problems developed for the course. The group of eight to ten students meets weekly, with the same tutor, throughout two terms, and they generally deal with two problems per term. Student assessment consists of essays, group presentations and tutorial performance (the latter graded on a pass/fail basis by the tutor with input from the students and their peers).

Table One
Level I Content (Themes)

NURSING	COMMUNICATION	TEACH/LEARN	CONCEPTS	HEALTH ISSUES	PROFESSION	HEALTH CARE
Caring, empathy, support, tolerance	Techniques	Introduction to self-assessment	Humanism	Family planning	Standards of Nursing Practice	Entry into and movement in the health care system
Nursing process	Personal assessment of style	Introduction to group theory	Growth and development	Prenatal care	History of nursing	Sociodemo-graphic influences on health
McMaster Model	Non-verbal, verbal embodied communication	Problem-based learning	Anatomy	Nutrition		
Nursing behaviours and basic assessment	Context: effect on communication		Physiology	Substance abuse		
Health			Pathophysiology	Accidents		
Context: Values/beliefs			Culture and Ethnicity	Osteoporosis		

Level Two Courses

In Level Two students spend eight hours per week in clinical practice in the hospital setting, again supervised by programme faculty. Students are assigned to an acute surgical setting one term and to a maternity setting the opposite term, where they focus on providing care to patients and their families. Students also select a family to visit, for the purpose of conducting a family assessment. Weekly tutorials accompany the clinical experience, and provide the opportunity for students to discuss the learning occurring in the clinical setting and to present information to their peers about issues arising from practice. Student assessment, based on clinical performance, is on a pass/ fail basis, and incorporates data from tutors, students and their peers.

In the classroom PBL course students work through a series of patient problems developed by faculty to incorporate specific content areas. Students meet in small group tutorials of ten students per group for three hours per week for two, thirteen week terms, and work through a minimum of two problems per term. Student assessment is based on a combination of tutorial performance (graded on a pass/fail basis), essays, class presentations, and Double Jumps (see Appendix B for a description and example of a Double Jump).

The content areas for Level Two are outlined in Table 2.

Table 2
Level II Content (Themes)

NURSING	COMMUNICATION	TEACH/ LEARN	CONCEPTS/ THEORIES	HEALTH ISSUES	PROFESSION	HEALTH CARE SYSTEM
Caring - protection advocacy	Use of terminology/ documentation	Giving Feedback	Health Aging	Cancer	Multi- / inter-disciplinary practice	Group, family, community
Problem solving process	Intra-/ interpersonal communication and collaboration	Learning resources	Anatomy	Stroke	Collaboration	Future population trends
McMaster Model		Teaching-learning theory	Physiology	Ischemic Heart Disease	Beginning application of research	Determinants of Health
Other nursing models		Formative use of self-appraisal	Pathophysiology	Adolescent health issues	Conflict resolution	Principles of Primary Health Care
Nursing care behaviours			Coping Theory	Community assessment, prevention		
Illness/ disease			Self-esteem/Self-image	Antenatal and Postnatal Care		
Context: Poverty			Group Theory	Diabetes		

Level Three Courses

In Level Three the time in clinical practice increases to twelve hours per week, and students spend one term in a community setting and the other in an acute care in-hospital setting. Students pre-select their area of interest within these broad categories, and indicate their preference of such areas as pediatrics, mental health, or cardiology. Thus more opportunity for choice in clinical practice is offered to Level Three students. Student assessment is again based on feedback and observation of clinical performance and incorporates data from students, peers, nurses and the faculty.

The PBL course is much like the Level Two course: the problems for consideration are developed by faculty to incorporate particular content; the tutorials are three hours per

week for two terms; and student assessment is comprised of tutorial performance, essays, presentations and double jumps. The curriculum for Level Three also includes two research courses, one that introduces students to the research termininology and process, and a second that applies this knowledge to critical appraisal of research literature, and a course entitled Health, Science and Society, where the emphasis is on learning about the broader determinants of health and their implications for health care policy. The content areas for Level Three are noted in Table 3.

Table 3
Level III Content (Themes)

NURSING	COMMUNI-CATION	TEACH/ LEARN	CONCEPTS/ THEORIES	HEALTH ISSUES	PROFESSION	HEALTH CARE SYSTEM
Health Promotion	Legalities of documentation	Motivation Theory	Stress and coping theory	Mental health/ Illness	Research Process	Community resources
Nursing Care Behaviours	Communication Theory	Learner Assessment	Family Systems (started in Level II)	Cardiac/ Respiratory	Concepts - natural history, bias, compliance	Primary health Care principles
Caring - empowerment	Analysis of interactions	Health Teaching	Critical Appraisal	Arthritis	Professional/ Legislative bodies	
Nursing/ Models			Decision theory	AIDS		
Multicultural Context			Crisis Theory	Family Violence		
			Change (as it relates to patient changes only)	Elderly		
			Pathophysiology	Cancer		

Level Four Courses

In the final year, Level Four, the clinical hours increase to twenty-four hours per week, and students select their clinical practice setting. Thus they can focus their learning on a particular area of interest, for example, a student may choose to do a term in a community

setting and one in a critical care setting such as the Emergency Department, while another may pursue an interest in mental health nursing by choosing to do one term in an acute care psychiatric hospital and the other in an after-care programme such as the Hamilton Programme for Schizophrenia. Students are no longer in groups supervised by faculty members, but are assigned individually and supervised directly by a nurse-preceptor and indirectly by a faculty member. Student assessment, again based on clinical performance and the application of theory to practice, is based on data from students, preceptors and faculty.

Choice is also apparent in the PBL course, where students bring issues and problems from their clinical practice for discussion and analysis. PBL student evaluation derives from a combination of essays, presentations and facilitation of the group. Two other courses complete the nursing component of the programme: the third and final research course matches students with research projects being undertaken by faculty, allowing students hands-on research experience, and a course entitled Trends and Issues introduces students to the major issues facing the nursing profession and the possible strategies that nurses may use to foster change. All the content areas for Level Four are contained in Table 4.

Table 4
Level IV Content (Themes)

NURSING	COMMUNICATION	TEACH/ LEARN	CONCEPTS/ THEORIES	HEALTH ISSUES	PROFESSION	HEALTH CARE SYSTEM
Nursing Care Behaviours	Group/Family assessment	Planned teaching/ intervention	Change Theory	Clinical practice problems	Leadership	Provincial/ National Health Care Systems
Holistic Practice and Nursing Care	Communication in a group	Evaluation of: a) nursing b) self c) others		Multi-problem cases	Power/ Authority	Policy Development
Nursing Models (critique)	Leadership of a group				Organizations	
Faculty Image (critique)					Administration, Management and Supervision	

In summary, the programme builds in focus and complexity across the years. The core PBL and clinical courses have similarities across the years, yet demonstrate increasing student choice and an increasing emphasis on clinical practice. This study will seek to better understand the experience of students, and of faculty, who participate in this programme.

STUDY DESIGN

A case-study method was chosen to explore the experience of learning and teaching in a program that uses an innovative curriculum approach. The case study is defined as an empirical inquiry that investigates a phenomena within its real-life context, using multiple sources of evidence (Yin, 1989). The case study method was chosen for this investigation since it not only results in a detailed account of the phenomenon under study but is particularly useful in educational research of "innovative programmes and practices" (Merriam, 1988, p.27).

The case study method has three particular features which made it the best choice for this study. First, a case study is particularistic in that it focuses on a particular situation, event, programme or phenomenon, which Yin (1989) describes as the unit of analysis (or the case). The case selected for investigation must be carefully defined. In this study the particular case was the generic stream of the Bachelor of Science in Nursing programme at McMaster University. Secondly, case studies are descriptive, which means the end product is a rich, "thick" description of the phenomenon under study. Thick description is a term from anthropology and means the complete literal description of the incident or entity being investigated (Merriam, 1988). Such description is enhanced through the multiplicity of data

sources that can be used in the case study method. Thirdly, case studies are heuristic. They bring about the discovery of new meaning, extend the reader's experience, or confirm what is known (Merriam, 1988). This study sought to discover the experiences of students and faculty from their perspective and in their words, and so to achieve understanding of the educational approach.

Two quotes from Robert Stake (1994) summarize the rationale for the use of case study: "The purpose of case study is not to represent the world but to represent the case" (p. 245) and "the emphasis is on learning the most about both the individual case and the phenomenon, especially if the special circumstances may yield unusual insight into an issue" (p.246). The purpose of this study was not to learn about or compare a variety of approaches to nursing education but to gain new insights into the experience of learning and teaching in the case being investigated, the generic stream of the BScN programme at McMaster University School of Nursing.

Sources of Data

Stake (1994) offers a useful perspective on the methods of data collection to be used in a case study: "The methods of casework actually used are to (not only) learn enough about the case to encapsulate complex meanings into a finite report but to describe the case in sufficient descriptive narrative so that readers can vicariously experience these happenings and draw their own conclusions" (p. 243). Yin (1989) reiterates that a major strength of case study data collection is the opportunity to use several different sources of evidence. Although some authors (eg., Merriam, 1988) espouse the use of qualitative strategies only, others (eg.,

Lincoln & Guba, 1985; Stake, 1994) suggest that no limits be placed on the methods of data generation used. Along with Morse (1991), they advocate the use of methodological triangulation that may use both quantitative and qualitative data collection techniques to ensure the most comprehensive approach to a research problem. As Firestone (1987, p. 20) states: "qualitative and quantitative approaches provide different kinds of information. When focussed on the same issue, ...(they) can angulate - that is, use different methods to assess the robustness or stability of findings". To achieve the purposes of this study, both quantitative and qualitative strategies were employed, since the combination of approaches was expected to result in the richest description of the case being explored.

Quantitative strategy

A questionnaire (Appendix C) was used that consisted of two components; (1) demographic data; and (2) perceptions of the learning environment. The demographic questions were limited to those factors which might impact on the student experience. Since on average 30 per cent of students enrolled in the BScN programme at the time the study was conducted had part or all of a previous university degree, it was considered important to collect information on level of previous education. It was postulated that students with previous university experience might have different expectations, study habits and overall different life events that could influence their learning experiences. For example, students who have already completed some university level education might be better suited for the level of independence expected in the programme and enjoy it more. Full or part time status in the programme was similarly believed to be an important variable to consider. Information

on work status was obtained since it too was seen as a possible influence on perceptions of the programme. Questions about number of hours worked and type of work were included in the questionnaire, since the amount that students work might also influence their perceptions. As well the independent and self-directed nature of the programme could well be seen as a positive attribute by students who work. Whether or not the work was in the health care field was also of interest, since students working in the health care field might connect their work and their school in ways that students in other work areas would not.

Age, marital status and number of children are all demographic factors that may affect the learning experience. Older students bring the richness of life experience and the level of motivation required to return to school, at the same time bringing particular concerns and styles of learning based in their experiences. The responsibilities (and potential support) of a spouse and children may also influence the experience of any learner. Therefore these particular items were included in the questionnaire given to all students in the generic BScN programme.

General perceptions of the learning environment were explored using the Course Experience Questionnaire, designed originally by Entwistle and Ramsden (1983) to investigate student perceptions of the learning environments of different departments and disciplines, which consisted of 50-items grouped into the following seven subscales: good teaching; clear goals and standards; appropriate workload; appropriate assessment; emphasis on student independence; memory subscale and perceived outcomes; and three unattached items. Internal consistency coefficients for the subscales ranged from 0.65 for social climate to 0.80 for workload. The questionnaire was able to differentiate between departments such

as English, Economics and Psychology in ways that were intrinsically believable, suggesting a good degree of validity for the tool.

The questionnaire was further refined by Ramsden (Personal Communication, 1993) to a 38 item measure, where 37 of the items tap such areas as workload, quality of teaching, clarity of goals and standards, emphasis on student independence, appropriateness of assessment and expected outcomes while the last item, number 38, asks for a global rating of the program with the question "Overall, I am satisfied with the quality of this program". The questionnaire thus explored those areas that are important in problem-based learning. For example, student independence, which is espoused in problem-based learning, is addressed in items such as "The program has helped me develop the ability to plan my own work" and "There are few opportunities to choose the particular areas you want to study". Appropriate assessment in problem-based, self-directed learning stresses student self-evaluation and encourages student involvement in the choice of assessment method. This questionnaire gathers information about this issue through items such as: "There's very little choice in this program in the ways you are assessed". Clarity of goals and standards is an issue in problem-based learning where students select learning issues and experiences from within a clear set of possible objectives. This area is explored through such items as: "The aims and objectives of this program are not made very clear and It's always easy here to know the standard of work expected". Workload and quality of teaching are relevant to the student experience whatever the educational approach used, and the Course Experience Questionnaire assesses these areas through items such as "The workload is too heavy, The sheer volume of work to be got through means you can't comprehend it thoroughly" and "Tutors here show no real

interest in what students have to say". Although details concerning psychometric properties of the new version have not been reported, Ramsden (Personal Communication, 1993) indicated the questionnaire has been used with a variety of student groups and has been found to be acceptable and understandable to students (indicating face validity), and useful in assessing student perception of the learning environment.

Qualitative Strategies

Interviews conducted with a sample of students and faculty comprised one of two sources of qualitative data (the other being open-ended questions added to the Course Experience Questionnaire). The purpose of the interviews was to develop an in-depth understanding of the experience of learning and teaching in the problem-based, self-directed curriculum of the BScN programme, as well as to explore the congruency, or lack of congruency, between the intent of the program and the perceptions of the students.

Selecting the interviewer. The interviews were conducted by the investigator. Yin (1989) describes several reasons why the investigator rather than a research assistant should collect the data. First, the case study investigator must be well trained as an interviewer and have knowledge of the context of the case, because of the ongoing interaction between the data being collected and the theoretical issues being explored. Being a faculty member in the programme being studied, and a health professional where interview skills are a major component of practice ensured that the investigator fulfilled these criteria. Secondly, the investigator must have a firm grasp of the issues being studied. This means having not only a sense of the context of the case under study but also a theoretical perspective. Familiarity

with small group, problem-based learning, from the perspective of tutor and researcher, equipped the investigator with an understanding of the issues to be explored. Finally, the investigator must show a lack of bias. The investigator must take care not to use the case study to substantiate a preconceived position. The potential for bias is of particular concern in case study research since an understanding of the issues being explored is an essential component of case study research. Investigators must exercise care and discretion to prevent bias. One test of possible bias is the degree to which the investigator is open to contrary opinions, which should be evident in the description of data collection, analysis and conclusions. Ensuring that the reader can follow the derivation of evidence from initial research questions to ultimate case study conclusions [what Yin (1989) refers to as the 'chain of evidence'] should allow the reader to rule out the presence of bias.

As Yin states in his description of the importance of good interview skills (1989, p. 57): " research is about questions and not necessarily about answers." The questions that guided the interviews were selected to explore the experiences of the learners and teacher. The questions were open-ended, allowing respondents to describe particular situations as well as their opinions of events. Careful listening and flexibility on the part of the investigator allowed further exploration of information presented by respondents.

Student Questions. All student interviews began with the broad open-ended question: "How would you describe your experience of being a student in the program? " This was followed by questions related to the educational philosophy of the program. Students were asked: "How would you describe the philosophy of education in the program?" This question sought to explore student perceptions of the philosophy, and to determine, in

particular, references to the small group, problem-based and self-directed nature of the approach to education. Students were then asked for examples of how the philosophy is implemented, with the question: "Could you give me some examples of how the philosophy is put into practice in the program?" Examples of student behaviours that demonstrated incorporation of the philosophy were elicited with the question: "What are some things that you do as a student that reflect the philosophy?" Faculty expectations that were or were not congruent with the philosophy, were explored with the questions: "What do the faculty do to demonstrate the philosophy of the program?" and "What do you think the faculty expects of you as a student?" Finally, all students were given the opportunity to provide any further information that had not been elicited through the interview, with the question: "Could you please tell me anything else that would help me to understand your experience of being a student in the BScN program?"

Faculty Questions. The same questions were asked of faculty. They were asked to describe the philosophy of the programme, the actions they took to implement it, the particular behaviours they thought helped (or hindered) the process. The interview concluded with the same open-ended question as had been asked of the students. Throughout the interview faculty were asked to elaborate on comments as needed to gain maximum understanding.

Open-ended Questions from the Course Experience Questionnaire A second source of qualitative data were the three open-ended questions that were added to the Course Experience Questionnaire and administered to all generic BScN students. Erickson and Shultz (1992) recommend this as an effective way to "elicit information on the texture of

experience as perceived by students." (p.480). In questions one and two participants were asked to name the three things they liked best about the program and the three things they liked least. They were also invited to add any final comments, with the third question: "Please add any additional comments that would help me understand your experience in the programme". These three open-ended questions provided the opportunity for respondents to state their opinions about the program, including their perceptions of its strengths and weaknesses, outside the restraints of fixed-choice items.

Relationship of Data Sources to Research Questions.

The relationship of the various sources of data were matched to the four research questions that guided the study and are presented in Table 5. Data for the four research questions in turn provide an understanding of learning and teaching in the BScN programme.

Table 5
Matching of Research Questions with Sources of Data And Instruments for this Study

QUESTION	SOURCES OF DATA	INSTRUMENTS
How do students experience a curriculum that is described as problem-based and self-directed?	Students	CEQ* Interviews
How do faculty experience a curriculum that is described as problem-based and self-directed?	Faculty	Interviews
What is the relationship between length of time in the programme and perceptions of the learning environment?	Students	CEQ
What is the relationship among age, previous educational background, employment status and student perception of the learning environment?	Students	CEQ

*Open-ended questions

STUDY SUBJECTS

Overview of Potential Subjects

The subjects for the study were nursing students enrolled in the generic stream of the BScN program of McMaster University (N=342), and faculty teaching in Levels Two or Four of the program (N=22). All the students entered the programme either straight from secondary school (termed OAC students) or with all or part of another degree (termed non-OAC students). The faculty teaching in Levels Two and/or Four of the programme were all female, had on average 8 years (Range = 2-24 years) experience as McMaster faculty, and represented different categories of appointment and focuses of their teaching: some were full time while others were part-time; some had tenure while others had either contract or sessional appointments; some were involved primarily in classroom teaching while others taught only in the clinical area. Thus both students and faculty came from a variety of backgrounds, with different life experiences and with different perspectives about learning and teaching.

Selection of Study Participants

Since there is evidence that perceptions of the learning environment are influenced by length of time in program (Clarke et al., 1984), it was important to determine the effect of time in the program on student perceptions and reported experiences. Thus all students enrolled in the program were asked to participate in the study, by providing demographic data and completing the Course Experience Questionnaire.

More in depth information was elicited through interviews with students who were at the end of either the second or fourth years of the program. Second year was chosen because students had completed two years in their program and so had developed a sense of familiarity with the process of the specific program. By the end of fourth year, students were in a position to reflect on their educational experience as they were completing their undergraduate education and preparing to begin their careers as nurses.

Since the study also focussed on the perceptions and experiences of faculty, a sample of faculty was also selected for interview from among the those teaching in the second and/or fourth years of the program.

Sample selection of both students and faculty employed what Goetz and LeCompte (1984) refer to as criterion-based sampling. In this procedure researchers consciously select the criteria, basis or standards necessary for cases to be included in the investigation, and then find a sample that matches the criteria. They suggest that criteria should be set according to the potential for developing new insights, including the selection of "negative cases" to ensure that variation is present.

In this study the criteria for the student sample included: (1) willingness to participate in a one-to-one interview with the investigator and (2) a rating of 5 definitely agree or 3 or less definitely disagree on item 38 of the Course Experience Questionnaire, which asked students to give their global rating of the programme. Thus students who were most enthusiastic (ratings of 5) as well as those who voiced reservations about the process of education (ratings of 3 or less) met the criteria to be interviewed. From all eligible candidates for interview, nine student respondents from Level Two and nine from Level Four were

randomly selected to be interviewed. The choice of eighteen students was purely arbitrary, as there are no formulae for sample size selection such as exist for quantitative research approaches. Instead the number of informants was chosen with the intent that additional individuals would be recruited if necessary, to achieve theoretical saturation, which is described as the point at which no additional themes or ideas are being presented by the informants (Glaser and Strauss, 1967). In this study no additional respondents were required to be interviewed.

Four faculty members who taught in Levels Two and/or Four were invited to be interviewed, based on the following selection process. First, all Level Two and Level Four faculty were categorized according to their type of appointment and focus of their teaching. They were then categorized by the Chair of the BScN programme (based on her perception) according to their level of comfort and commitment to the educational philosophy of the McMaster program. Thus all faculty were categorized according to two criteria, and four faculty members were then randomly selected from the resulting cells.

PROCEDURE

Administration of Questionnaires

At the time of data collection, there were 342 students enrolled in the generic stream of the BScN program at the School of Nursing, McMaster University. Questionnaires were distributed to all students during the final two weeks of the spring term. This time was chosen for several reasons: (1) to allow data collection to proceed rather than wait until the next academic year; (2) it represented a set time point for all participants to complete the

questionnaires and interviews; and (3) because the majority of assignments had been completed and the pressures of workload were diminished, decreasing the likelihood that student (and faculty) responses would be confounded by the stresses associated with the end of term. Because all classes are held as small group tutorials rather than large group classes (where all students in a particular year would be present), the questionnaires were given to the tutors who were asked to distribute the questionnaires to the students. The tutors either had students complete them during class time, then collected them and returned them to the investigator, or had the students complete them outside class and return them to the investigator directly. In both instances students were asked to place the completed questionnaires in an envelop and then returned to the investigator. In this way, the questionnaire responses were made available only to the investigator and were not available to the tutors who had distributed them. There was variation in the response rate across the four years of the programme, possibly due to this difference in the procedure for questionnaire distribution and collection.

Interview Procedure

The interviews took place within the School of Nursing at a time convenient to the interviewees. All the interviews were focused in that they lasted a particular length of time (about one hour) and included the same open-ended questions as a starting point. All interviews were taped and then transcribed verbatim. The verbatims were then read as the taped interviews were played, to ensure accuracy of the transcriptions.

DATA ANALYSES

Analysis of Quantitative Data

All data were entered into files using SPSS-DE and analysis was conducted using SPSS Version 3.1. Descriptive statistics were calculated for all the demographic variables, including means and standard deviations or proportions. The Course Experience Questionnaire was examined for its psychometric properties: factor analysis was conducted to determine the factors identifiable from use with this study sample and to explore any similarities and differences to the factors (or subscales) identified by Ramsden (Personal Communication, 1993) as discrete constructs, namely, workload, quality of teaching, clarity of goals and standards, emphasis on student independence, appropriateness of assessment and expected outcomes.

The factor analysis procedure consisted of three steps. First a correlation matrix was developed and inspected to determine any missing data issues and to ascertain that the sample size was adequate. The second phase was factor extraction using the principal components method, where successive linear combinations of the observed variables were created. The first factor, or principal component, accounted for the greatest amount of variance. The second component, formed from residual correlations, accounted for the second largest amount of variance that is uncorrelated with the first component, while successive components accounted for smaller and smaller proportions of variance in the data set. The number of factors to be extracted was determined from the amount of total variance explained by each factor (the eigenvalue). The third phase of factor analysis was factor rotation, performed to achieve factors that are as pure as possible. Varimax rotation was used

to facilitate the interpretation of the factors, by minimizing the number of factors with a high loading on any factor. Results of the psychometric testing of the Course Evaluation Questionnaire are presented in the next chapter. The internal reliability of each subscale identified was assessed with coefficient alpha, to ensure that an acceptable level of reliability was attained.

The Course Experience Questionnaire was the source of data for study questions three and four. Analysis of variance was used to address question number three, which compared the perceptions of the components of the learning environment among students in the four levels of the program. Regression analysis was performed to determine the influence of the demographic factors of age, level of previous education, and employment status on perceptions of the learning environment

Analysis of Qualitative Data

The analysis of qualitative data began with the transcripts from the interviews with students and faculty, a total of one hundred and sixty-eight single spaced pages of data. These qualitative data were analysed to reveal the common meanings in the student and faculty experiences, to "come up with reasonable conclusions and generalizations based on a preponderance of the data" (Taylor & Bogdan, 1984, p. 139). The process of analysis began with reading and rereading the transcripts of the interviews with students. The same process was then repeated with the interviews with faculty. As Merriam (1988) states: "At this stage the investigator is virtually holding a conversation with the data, asking questions of it, making comments and so on." (p. 131). From the reading, units of data were identified.

Lincoln and Guba state that units should have two characteristics. They should be heuristic, that is, aimed at some understanding or some action, and they should be the smallest piece of information about something that can stand by itself. Units can be as small as a few words to as large as a paragraph or two. In this study units were phrases or paragraphs that described some aspect of the experience of learning, or teaching. After identifying units in the data set, each unit was read and assigned to a category on a "feels right" or "looks right" basis (Lincoln and Guba, 1985, p.340). This process continued until all data had been broken into units and assigned to a category. These categories were then reviewed and refined, using the constant comparative method developed by Glaser and Strauss (1967) and adapted by Lincoln and Guba (1985) for use in case studies. In this latter use, the end result is not the generation of theory to explain and predict behaviour, as was intended by Glaser and Strauss, but instead the method is used for the processing of data. This process continued until all the categories that recurred were identified and the common meanings were evident. Once data had been assigned to categories, it was reread to determine the existence of sub-categories. When these were evident from careful reading within categories, the process by which the categories were derived and confirmed was repeated to provide a sense of confidence in the existence of the sub-categories. The categories and sub-categories were explored among students in the Levels Two and Four for similarities and differences, and the process repeated to establish similarities and differences between students and faculty.

The comments of respondents to the three open-ended questions contained in the Course Evaluation Questionnaire were analysed using a similar process. The typewritten comments from students were read and reread to identify categories, then read and reread to

determine any existing sub-categories. Similarities and differences across levels in the programme were identified. The numbers of comments within each theme were also counted, to facilitate comparisons in responses across programme levels.

The final step in the analysis of the qualitative data was examination of the findings, to note their relationships, to determine whether the evidence of one kind of information reinforced that from other sources, to look for overarching themes and thus to describe the student and faculty experience of learning and teaching.

DESIGN LIMITATIONS

There are three particular limitations associated with this study. First, some concerns may be expressed about the relationship between the researcher and the participants. At the time the study was conducted, I had been a faculty member of the School of Nursing for eighteen years. Only eight of these were in the generic stream of the BScN programme and during the year the study was conducted I was seconded to another programme within the school. I had no teaching contact with any of the students interviewed. Efforts to ensure full and honest disclosure were made throughout the interviews, with probes such as "I want to hear your concerns as well as the things you liked about the programme". Participants were also assured about the confidentiality of information. I was a colleague of all the participating faculty, two of whom I had worked closely with and two whom I knew but had not worked with directly. Again care was taken to assure them of the confidentially of their responses and efforts were made to encourage open and honest responses, through comments such as "It is really important to hear your point of view. There are no right or wrong

answers". Throughout the interviews, participants expressed negative as well as positive views, implying they felt free to express the full range of impressions and be honest in their responses. Any potential interference with full disclosure was outweighed by the benefits, indeed, necessity of knowledge of the case being studied. As Yin (1989) indicates, an insider knowledge allows a richer description of the case being studied.

A second limitation of the study was the response rate to the Course Experience Questionnaire. Although the overall response rate for all four levels combined was 80%, which is considered very good, there was variation on response rates across levels, and none exceeded 85%. Thus the findings are based on the views of less than 100% of the possible informants to the study.

The timing of the interviews and questionnaire completion might be considered a limitation. It was done at the end of the school year, which for many is a time of relief, which could influence the participant to view things in a particularly positive way. On the other hand, students who had not done as well as they had expected or who were facing a number of examinations (in their elective courses) might be feeling stressed and rather jaded and this could in turn lead to less positive responses. However, there is probably no time in the academic year when some sources of stress are not paramount in the minds of some or all students.

ISSUES OF TRUSTWORTHINESS

The term trustworthiness and the manner of its' application in the assessment of research were developed by Lincoln and Guba (1985) to substitute for the concepts of

internal and external validity, which are used commonly in quantitative research. Credibility, applicability, dependability and confirmability comprise the criteria for trustworthiness, and the ways in which this study meets those criteria are discussed below.

Credibility

To meet the criteria of credibility the inquiry must be carried out in such a way that the findings are viewed by others as plausible. One technique to enhance credibility involved the triangulation of sources and methods: sources were the students and faculty, and the data methods were personal interviews and self-report questionnaires. Credibility was also addressed by the long exposure and involvement of the researcher in the case being investigated, which contributed to the feeling of trust that allowed disclosure on the part of participants. A technique described as crucial by Lincoln & Guba (1985) is the member check, wherein data analytic categories, interpretation and conclusions are tested with those from whom the data were collected. Faculty participants had the opportunity to comment on the accuracy of the findings when I presented them at School of Nursing Academic Seminars and to the BScN Executive, the curriculum committee of the School of Nursing. Because of the timing of data collection and subsequent analysis, the student participants did not have the opportunity to review the materials, and this could be seen as a threat to credibility.

Applicability

Applicability (also referred to as transferability) refers to the option afforded other researchers to transfer (or not transfer) the findings in another setting. It is the investigator's

responsibility to provide sufficient descriptive data to make such a decision possible. Transferability was addressed in this study through the thick description of the setting, the participants and the process of education being explored. The choice to use (or not use) the findings in another setting is the decision of the reader.

Dependability

The criteria of dependability (or consistency) refers to the completeness of the description of the process of investigation. Dependability is demonstrated by the description of the investigation process and through keeping records of all documents pertaining to the study for review (sometimes called the audit trail). These actions were taken, and in addition, copies of the research instruments and examples of the curriculum being addressed are included in the appendices.

Confirmability

Confirmability is also referred to as neutrality, and refers to the degree to which the findings make reasonable sense. The techniques of triangulation and the audit trail contribute to this criteria of confirmabilty. It should be noted that all the actions taken to meet the criteria of trustworthiness are done to benefit the consumer of the report, who in the end makes the decision about the quality of the research.

ETHICAL CONSIDERATIONS

Ethical approval for the study was obtained from the Undergraduate Nursing Education Committee of McMaster University Faculty of Health Sciences and the Ethical Review Committee of the Ontario Institute for Studies in Education. All participants were asked to sign informed consent prior to administering the questionnaires and conducting the interviews (Appendix D). All participants were informed of their right to refuse to participate in the study without fear that refusal would affect their progress or position in the programme. As well, each participant had the right to decline answering any questions that might cause discomfort.

The following actions were taken to ensure confidentiality. First, in instances where the students completed the questionnaires individually, outside the tutorial, they returned them directly to me. In instances where they completed them in the tutorial, they placed them in an envelop which was sealed and then returned to me. Thus the questionnaire responses were not available to the tutor and only the investigator had access to them. Secondly, all interview data were collected, transcribed and analysed by me and were not available to anyone else.

CHAPTER FOUR

RESULTS

The results of the data analysis will be presented in this chapter. The study participants will be described, followed be a description of the psychometric properties of the Course Experience Questionnaire (CEQ). The results related to each of the four research questions that guided the study will then be presented. In each instance, I will begin with a brief review of the data sources and data analysis that informed the question, followed by the results. Direct quotes from participants have been used liberally, to allow them to describe their experiences.

SUBJECTS

Response Rate

Of the 342 students enrolled in the generic BScN programme at the time the study was conducted, 274 (80%) completed the Course Experience Questionnaire (CEQ). There was variation across the four levels of the programme in response rate, with Level Three having the highest rate and Level One the lowest. (Table 6)

Table 6
Response Rate by Level in Programme

Level in Programme	Enrolled	Responded	Rate (%)
Level One	96	74	77
Level Two	101	81	80
Level Three	73	62	85
Level Four	72	57	79
Totals	**342**	**274**	**80**

Description of Student Participants

The majority of participants who completed the CEQ were female, although this differed across years, from a low of eighty-nine percent females in Level One to a high of ninety-eight percent females in Level Four. The differences in female:male ratio across the programme were not significant (χ^2 =6.2; df=3; p=0.1). The mean age of participants increased over the four Levels, from 21.2 years in Level One to 23.4 years in Level Four. Most were single, with eleven percent of Level Three and Four respondents married compared to seven and eight percent respectively in Levels One and Two. Again these differences were not significant (χ^2=3.7; df=6; p=0.7). Only ten (four percent) of the two hundred and seventy-four participants had children. (Table 7)

Table 7
Characteristics of Participants: Age, Sex, Marital Status, Number of Children

	Level One		Level Two		Level Three		Level Four	
	N	%	N	%	N	%	N	%
Sex								
Female	66	(89)	76	(94)	60	(97)	56	(98)
Male	8	(11)	4	(6)	2	(3)	1	(2)
Marital Status								
Single	68	(92)	73	(90)	53	(86)	50	(87)
Married	6	(8)	5	(7)	7	(11)	6	(11)
Widowed/ Divorced	0	(0)	2	(3)	2	(3)	1	(2)
Children								
No	72	(97)	78	(98)	58	(94)	55	(96)
Yes	2	(3)	2	(2)	4	(6)	2	(4)
	$\bar{x}$ (SD) Range		$\bar{x}$ (SD) Range		$\bar{x}$ (SD) Range		$\bar{x}$ (SD) Range	
Age	21 (4.5) 18-40		22.1 (3.1) 19-37		23.4 (4.8) 20-48		23.4 (3.3) 22-40	

The entry qualifications reported varied, with eighty-three percent of the Level Four class having been admitted straight from high school (termed OAC applicants), while two-thirds or fewer of the Levels One, Two and Three students were OAC applicants and the

remaining entered with part or all of another university degree (termed non-OAC applicants). These differences in admission qualifications were significant (χ^2=18.0; df=6; p=0.01). The majority of the participants (N=260; 95%) were enrolled full-time in the programme, meaning they took at least 24 units of course work per term.

While on average forty percent of Levels One and Two participants reported being employed while attending school, sixty-five and sixty-one percent respectively of Level Three and Four students indicated they were employed. This represented a significant difference across levels of the programme (χ^2=14.7; df=3; p=0.00). The mean number of hours worked also varied, with students in Level One working fewer hours per week compared to those in Levels Two, Three and Four. As well, those in upper levels were more likely to be employed in health care (Table 8).

Table 8
Characteristics of Participants: Education and Employment Status

	Level One		Level Two		Level Three		Level Four	
	N	%	N	%	N	%	N	%
Previous Education								
High School	49	(66)	42	(52)	39	(63)	47	(83)
Some University	19	(27)	24	(30)	12	(19)	7	(12)
Baccalaureate	5	(7)	15	(18)	11	(18)	3	(5)
Employed								
Yes	29	(39)	33	(41)	40	(65)	35	(60)
No	45	(61)	48	(59)	22	(35)	22	(40)
Employed in Health Care								
Yes	10	(34)	21	(64)	25	(63)	28	(80)
No	19	(66)	12	(36)	15	(37)	7	(20)
Mean Hours Worked /Week	$\bar{x}$ SD Range 10.9 (5.2) 2-24		$\bar{x}$ SD Range 13.4 (8.4) 3-37		$\bar{x}$ SD Range 13.4 (6.8) 2-30		$\bar{x}$ SD Range 13.2(8.0) 4-32	

Description of Faculty Participants

Four faculty members were interviewed for the study. One participant was tenured, with the rank of Professor. The second had a contract position that had been renewed yearly for 6 years, and held the rank of Assistant Professor. The third participant was a sessional lecturer, who had previous experience at another university. She usually taught two courses per term. The final faculty participant had a joint clinical/academic appointment, in which she spent one-half time as a Clinical Nurse Specialist in a clinical agency and one-half time as a faculty member at the rank of Assistant Professor. Among them they had 5.5 years of experience teaching in the BScN program. All four participants taught in the classroom PBL courses, while two also taught in clinical courses, providing direct supervision in an in-patient unit of an acute care hospital.

COURSE EXPERIENCE QUESTIONNAIRE

Psychometric Properties

The psychometric properties of the Course Experience Questionnaire (Ramsden, 1993), used to assess the level of satisfaction of the respondents with the BScN programme, were assessed prior to completing any further data analysis.

Factor Analysis.

Factor analysis was conducted to determine whether the subscales of the instrument as described by Ramsden (1993) were evident in its use with this group of respondents. Ramsden had identified the subscales through psychometric testing with the previous version

(Entwhistle and Ramsden, 1983) and grouped the items for the 1993 version into the same categories as follows: Good Teaching (eight items); Clear Goals and Standards (five items); Appropriate Workload (five items); Appropriate Assessment (six items); Emphasis on Student Independence (six items); Memory Subscale (three items) and Course Outcomes (1 item).

The factor analysis conducted with the responses from the 274 respondents in this study resulted in six subscales, which were very similar to those identified by Ramsden and Entwhistle. The six factors were determined using the three steps advocated by Kim and Mueller(1978), namely, preparing the correlation matrix, extracting the initial factors and rotating to a terminal solution. The first step, visual inspection of the correlation matrix of the 37 item scale, was not useful in this instance, which is not surprising given the complex matrix of test items that resulted.

The next step is the extraction of the initial factors, where the main objective is to determine the minimum number of common factors that would satisfactorily produce the correlations among the observed variables (Kim & Mueller, 1978). The specific goals of this step are to minimize the residual correlation after extracting a given number of factors and to assess the degree of fit between the reproduced correlations under the model and the observed correlations. The comparative magnitude of the eigenvalues of the factors was considered, and those with values greater than 1 were retained initially. Eigenvalues also provided a measure of the total variance accounted for by each factor. The six factor model met the greatest "reasonableness of the solution" (Kim and Mueller, 1978; Norman &

Streiner, 1997) evidenced by: (1) fifteen percent of residuals greater than 0.05, where the fewer such residuals the better; and (2) the variance explained by the factors was 50%.

The final step in factor analysis involves finding the simplest and most easily interpretable factors through rotation. The Varimax rotation was used with this data set. All items were accounted for in the rotation and all were retained in the final solution, since all had factor loadings greater than 0.3 and the items fit well with the factors identified through the analysis.

Overall, the factor structure was reasonable and factors similar to those identified by Ramsden emerged. The first factor, which accounted for 21.2 % of the variance, had 8 items with loadings above 40%, and described aspects of the role of the tutor and was named The Role of Tutors. The second factor had 7 items, five of which loaded most distinctly on Factor 2. This factor accounted for 7.2% of the variance, and all the items referred to the expectations of students by tutors and was called Clarity of Expectations.

Six items had high loadings on the third factor, and all described behaviours that students attributed their participation in the programme, hence it was called Outcomes of the Programme. All the items had variances greater than 40% (with one exception), and the factor explained 6.5 of total variance. The fourth factor contained six items, all of which referred to methods and process of student assessment, and so was called Assessment. This factor explained a further 5.7 of variance, and all but one item had loadings above 40%.

The fifth factor had five items, all with factor loadings greater than 50% . The items referred to the degree of independence offered within the programme and was called Independence. The sixth and final factor contained the remaining five items of the 37-item

questionnaire. This factor captured the dimension of the work involved in the programme and was called Workload. Like the fifth factor, it had high loadings on all items, all of which exceeded 50% and this factor accounted for 3.7% of total variance. The factor loadings for the 37 items of the questionnaire and the communality are presented in Appendix E. For all further analysis, factor scores were created by summing together the items most clearly associated with each of the six factors.

Reliability Testing.

The six factors identified through this analysis represented quite unique dimensions, and all achieved an acceptable level of internal reliability (r=0.7 or greater), determined using Cronbach's alpha. The first factor concerning the Role of Tutors had a reliability of 0.81.The second factor, labelled Clarity of Expectations, also had a reliability of 0.81. The third factor concerned with Outcomes of the Programme had a reliability of 0.77. Student Assessment, the fourth factor, had a reliability of 0.68. The fifth factor, which described Independence, achieved an internal consistency reliability of 0.73. The sixth and final factor, entitled Workload, had a reliability of 0.71. (See Appendix F for the items that comprised each factor).

QUESTION 1. HOW DO STUDENTS EXPERIENCE A CURRICULUM THAT IS DESCRIBED AS PROBLEM-BASED AND SELF-DIRECTED?

Data from two sources were used to gain an understanding of the experience of being a student in the BScN programme. First, data from the interviews with Level Two and Level Four students were analysed, using the process described in detail in the Methods chapter, and reviewed briefly as follows. All the interviews were transcribed, then each transcription was read to identify the existence of general categories. The transcriptions were reread, to clarify the general categories and to identify sub-categories. The data from each student interview were reorganized according to the categories, then all data from all the interviews were organized according to categories within and across programme levels. This allowed examination for similarities and differences among the students within each level and then between the Levels Two and Four. This process facilitated the confirmation of categories and enhanced the search for generally recurring patterns within the student responses.

Next, the responses to the open-ended questions from the Course Experience Questionnaire were examined, to further determine the general feelings of students from all four levels of the programme. Analysis of these responses consisted of five steps: (1) all the responses were transcribed; (2) they were then read and reread to determine common categories of responses; (3) categories were generated until all the responses were accounted for; (4) the additional written comments (the third open-ended question on the CEQ) were transcribed and reviewed; and (5) these comments were examined for congruence with the categories identified in Step 3. In addition the responses within each of the identified

categories were quantified and the percent of responses in each category by level in the programme are reported.

Data from both sources are presented below according to the identified categories. Comments from the interviews and open-ended questions are identified first according to the programme level of the student, and also labelled (INT) for interview data and (OEQ) for data from the open-ended questions of the Course Experience Questionnaire. Altogether five broad categories were identified and the comments of students are presented according to the identified categories.

Category #1: The Philosophy and Process of the Programme

Programme Philosophy

There was consistency in the descriptions of the programme philosophy among the students across the levels of the programme. In response to the request to describe the educational philosophy of the programme, students commented on the self-directed nature of the programme and the sense of freedom, control and personal choice that the approach allowed. Students also identified the uniqueness of this method in nursing education. When asked on the open-ended questions to state the three best things about the programme, the approach to education was mentioned frequently by students in all four levels of the programme (Table 9).

Table 9

Responses by Level to Open-ended Questions:
N(%) Identifying PBL/SDL/Group Process

	Level One		Level Two		Level Three		Level Four	
	N	%	N	%	N	%	N	%
PBL +	21	28	8	10	5	8	8	14
SDL +	31	42	20	25	30	48	29	51
Group Process +	34	46	28	36	28	45	24	42

Note: + denotes positive comments; - denotes negative comments.

Similar words and expressions were used repeatedly to describe the approach to education in which these students were participating, in both the student interviews and the open-ended questions of the CEQ. The student comments centred on the self-directed, small group aspects of the approach:

> *My overall impression of the programme is very positive and I am glad to receive my BScN through this unique self-directed and problem-solving approach. (Level One, OEQ)*
>
> *You have a lot of freedom to pursue your own goals. (Level Two, INT)*
>
> *You learn what you want to learn and are responsible for what you want to learn. (Level Two, INT)*
>
> *We are in charge of our learning to a certain extent in PBL; I have a lot more control of where I go with it. (Level Two, INT)*
>
> *It (the programme) teaches you how to find knowledge, how to explore that knowledge once you find it, how to follow your own interests. (Level Two, INT)*
>
> *I feel very content with the programme. The most attractive element to me is the self-directed, adult learner orientation. (Level Three; OEQ)*
>
> *It (the programme) focuses on your needs and interests and allows the flexibility to pursue your interests. (Level Four, INT)*

It is an ongoing learning experience where you decide what you want to learn. (Level Four, INT)

It is to foster independent learning in collaboration with the faculty in order to meet the student's learning needs in order to identify areas you need to work on in the interests of becoming a nurse. (Level Four, INT)

Several students also noted the emphasis on group process in response to the query about the philosophy of education:

I know this is the right programme for me because I like the small group and the fact I don't have to sit in lectures and be spoon fed. (Level Two, INT)

I am glad I chose this programme because of its self-directedness, small tutorials, and professors, teachers. It's very challenging and flexible, which helped learning. (Level Two, INT)

To work in groups, to be able to communicate, the need to be life-long learners, to be able to problem-solve, to model the holistic approach, doing everything you can to be empathetic and the patient's advocate. (Level Two, INT)

Overall, students' demonstrated an understanding of the educational approach, which they described as the best thing about the programme.

Programme process

Students choose similar words and phrases not only to describe the philosophy but also the process of the programme. Students talked about what went on within their PBL groups, and also commented on the influence of the dynamics within the group on their learning experience. While most of the descriptions related to their classroom experiences, comments were also made about the clinical component of the programme

A typical PBL class: In Levels One, Two and Three, students are required to choose from among the problems prepared by faculty, while in Level Four students bring problems from their clinical practice for exploration within the group. Students from all levels described the following steps as typical of their PBL classes:

> *We choose the problem and read the scenario.*
>
> *From this we hypothesize what could be wrong, brainstorm what could be happening with this problem,*
>
> *Then we generate learning issues.*
>
> *We divide up the learning issues, choosing the one(s) we are most interested in.*
>
> *We research the information, and come and present our information.*
>
> *Sometimes we have a standardized patient to interview, sometimes we have a guest speaker.*
>
> *We usually come up then with nursing diagnoses for the scenario, and develop a nursing care plan.*

Group Dynamics: This process takes place in groups of eight to ten students with one tutor (or in some cases a second tutor who is learning the process through acting as a co-tutor). Although the steps of the process described above are standard in all groups, there is great variability in the implementation, due in large part to the particular relationships and interactions among the group members. The centrality of an effective working group to learning was exemplified in the following comments.

> *If you have a group that doesn't work well together you are not going to accomplish everything you should accomplish. (Level Two, INT)*
>
> *The group makes or breaks it. (Level Four, INT)*

Students tended to describe problems their groups had encountered, rather than focusing on groups that worked. Level Two students made the following observations:

> *I wasn't walking out of every single class red and we finally started to get together and learn from each other. We had group evaluations every other week so if there was a problem we were allowed to bring it up and use your constructive criticism skills and not blame the person but blame the problems so if someone is monopolizing the conversation you say please don't in a nice way...so it took us a long time to get up the guts to bring up serious concerns, until mid-term first term and working on them until midterm second term until everything got going. (Level Two, INT)*

> *I like the group setting everyone gets involved it is hard at first, the whole group process thing. You don't really feel like you want to go through it you will probably get into another fight, but then it teaches you to problem-solve and that is what you have to do as a nurse. (Level Two, INT)*

A Level Four student identified the influence of group dynamics in the following comment:

> *..there is content but it is sometimes overshadowed by our frustrations (with the group). (INT)*

Information Sharing Within the Group As step five of the PBL process outlined above indicates, students first select their learning issues of interest, then go off to do research, and prepare to present their information to classmates at the next class meeting (usually one week later). Students described dissatisfaction with the typical method for sharing information, which is usually in the form of presentations (or mini-lectures) to the group, with little or no discussion. Concerns with the presentations were evident in the following comments:

> *A lot of times the information was just read off, I did learn something from that, just the same thing as in other programmes where the teacher is giving you information except here it is other students.(Level Two, INT)*

A lot of times we just did our research and then read our piece of paper and everyone else tunes out but we do give out references. Some people did try to present creatively. (Level Two, INT)

When others present it depends on the student what and if you learn. Sometimes I just think "I don't want to be here" and some of them are not very creative and some are almost too creative, like fun but not really getting it into your head. (Level Two, INT)

We didn't have very interesting feedback, it tended to turn into a presentation and then it was not so helpful. It is better with discussion. (Level Two, INT)

I can only describe it as show and tell. One would read it out and go on to the next person so when you weren't doing your part it was really easy to let your mind wander especially when there were so many things to be done (Level Two, INT).

Sometime we just brushed over sharing our information, we would set time aside but not everybody would share, a couple of people would and then time would be up, we spent so much time looking at the group. (Level Four, INT)

Some students described experiences where several (and sometimes all) of the students researched the same issues and there was discussion of the material rather than presentations. This was preferred by those who had such an experience. One student described suggesting to her group that they change from presentations to discussion to no avail. Thus, although the presentations were a source of dissatisfaction, strategies to change the approach were either not suggested or acted upon.

Overall, students were consistent in their descriptions of the process of PBL. The steps, as outlined in the PBL literature (eg., Barrows and Tamblyn, 1980) are being followed. The centrality of the group interaction to the learning experiences of students was also evident in the data. There is concern about the manner is which information is shared within

the groups, and but no strategies to change this part of the process had been introduced in a consistent manner.

Category #2: Becoming a Small Group,Problem-Based,Self-Directed Learner

Although the educational approach was noted repeatedly as one of the best things about the BScN programme, it is clearly not without its challenges. Students from all four programme levels commented on the confusion and stress associated with learning to learn in the McMaster environment. Many students made emotional pleas for more structure, and clarity of objectives and expectations. The students interviewed spoke eloquently about the struggles they encountered as they adjusted to the BScN programme, and there was an abundance of such comments in the open-ended questions on the Course Experience Questionnaire. Students also acknowledged the influence (or potential influence) of previous post-secondary education on their adjustment to the process of learning. Level Four students spoke persuasively of achieving and appreciating the approach by their final year. Student comments are reported under these three areas: (1) the challenges of self-directed, small group, problem-based learning; (2) the influence of prior education on the process of adjustment; and (3) the achievement of skill in the process by Level Four.

Challenges

Confusion, stress and floundering were words used to describe the feelings of students as they entered the BScN programme and were introduced to self-directed, problem-

based learning. The requests for more structure and guidance recurred throughout the responses of the participants.

Level One students described their experiences in the following comments:

It is very hard to change from high school where you are basically spoon fed to first year where you pay lots of money to teach yourself. I think a lot of people take the self-directed thing too far. I think it should be implemented more as you proceed to higher years in the nursing programme. (Level One; OEQ)

It would be a good idea to better explain self-directed learning to incoming students. I was unsure and sometimes still am of what it all entails. (level One; OEQ)

There is a lot of frustration and anxiety created by self-directed learning (are we learning what we need to learn...enough? not enough?) (Level One; OEQ)

I found I wasted a lot of time going in circles because I had no idea what to do. However when I began to understand exactly what was expected I found my learning greatly improved. (Level One; OEQ)

It expects you to learn it yourself. More guidance could be shown to first year students who are not only struggling with the workload but also with the concept of the university experience. (Level One; OEQ)

Level Two students also made comments about the challenges of the approach, and tended to reflect back to Level One to describe the negative components of the process:

The problem-based approach to learning is difficult to adjust to because it is opposite to what most people are familiar with and have become accustomed to in the traditional academic setting. At times I felt lost but everyone around me in the nursing programme felt the same way, so we all had something in common right away. In Level One you don't really know why you are doing <u>what</u> you are doing. In Level Two it sort of begins to make sense when you finally begin to realize all the things you know. (Level Two, INT)

Sometimes it seems you are floundering and don't know what to do, a lack of structure. Self-direction is fine but there is a limit to how much flexibility we need. Without some direction things are chaotic, a little more direction needed especially in first year. (Level Two; OEQ)

I think it's an excellent program however it was difficult and at times very frustrating to know what was expected in PBL. I found I wasted a lot of time going in circles because I had no idea what to do. However, when I began to understand exactly what was expected, I found my learning greatly improved. (Level Two; OEQ)

It has taken the year to find my own methods for acquiring expected knowledge. This put a great deal of stress on me, reducing the amount of time to actually learn and prepare. (Level Two; OEQ)

Level Three students continued to reflect back to first and sometimes second year, as they described the frustrations they felt about the lack of direction and structure. They commented on the difficulty they experienced in grasping self-directed learning and in knowing when you have learned enough.

In the first two years I was extremely frustrated by the lack of directions and I feel that this hampered my performance and my confidence. (Level Three; OEQ)

I really like the idea of self-directed learning but modules or guidelines on what basic things and skills need to be established so you feel that you have them. (Level Three; OEQ)

First year you work so hard not knowing where you are going! First year should have some more direction. (Level Three; OEQ)

Sometimes the progress in PBL is so slow, that equals decreased motivation and increased frustration. (Level Three; OEQ)

Students in Level Four also reflected back to first year and commented on the need for more direction at that time. They also noted the insecurity they were feeling currently about the level of knowledge they had acquired in the programme. They described their concerns in the following comments:

I remember being in first year and wondering what am I doing in this class and not knowing what the class was all about.....but I think the tutors were very supportive to me. (Level Four, INT)

You need more structure when you enter the programme, in Level One (Level Four; OEQ)

It took a while to feel secure about the amount of work and what were the important things to learn (almost the first year). (Level Four; OEQ)

Prior Post-secondary Education and the Process of Adjustment

Students who entered the programme with all or part of another baccalaureate degree described themselves as adjusting to the process of learning with limited difficulty, but commented about how difficult it is for students directly from secondary school. Whether they were reflecting back on their own issues of adjustment to university, basing their comments on observations of their classmates, or perhaps suggesting their OAC peers were not performing at the same level they were, is not known. In any case, they did raise it as an issue, as demonstrated in the following comments:

Emphasis should be placed on getting high school students integrated into the self-directed learning aspects. It is hard and a big step to take out of high school. Coming from university I found it a little easier but it was still hard to change. (Level One; OEQ)

There are many wonderful opportunities offered here, and I think as a mature student with highly developed personal goals it makes it possible for me to take advantage of them to fulfil my learning needs. I'm not sure if some of the younger students feel the same way. (Level One; OEQ)

Because I've come from university I've had experience with learning at a different level. Those students coming straight from high school probably need a little more direction. (Level One; OEQ)

I wouldn't want to be doing this course right out of high school. I wouldn't have the self-directedness I have now. (Level Three; OEQ)

Group process seminars and theory workshops should be done in first year. A little more structure should be placed in first year. Students coming straight from high school are used to a lot of structure. (Level Four; OEQ)

This (programme) is not for middle of the road people and is difficult to adapt to from high school. (Level Four; OEQ)

It all Comes Together in Fourth Year

Students in Level Four were still reflecting back to the struggles and challenges they had faced in the early years of the programme. However, they also reported that it all does come together by Level Four. The participants spoke of the different responses they encountered from faculty and clinical nursing staff as they moved through the years. They also spoke of the changes in their self-perceptions through the four years. These changes over time are evident in the following comments from Level Four students:

It takes the four years to get all this, this jelling and moving forward.(Level Four; INT)

It all comes together in fourth year, everything comes together. I see all the parts of nursing and what nursing can be. (Level IV; INT)

The first year we needed a lot of guidance and even in second and third year we looked to the tutor... are we doing this right. We didn't seem to have a grasp on what it (PBL) was until we started picking our cases like we did this year.(Level Four; INT)

The first year was really a blur, like what are we doing here, I am not really sure. Second year was better, I really clicked with my tutor and we did learn in that class. It was just a different way coming from high school and being out in a new situation. Fourth year the issues we tackled were excellent. I really enjoyed this year. (Level Four; INT)

Over the four years you learn what your strengths are and what you want to get out of things.(Level Four; INT)

As the years have gone by I have come to learn what self-directed learning is all about. I have learned to work with the programme. (Level Four; INT)

In first year it was very hard to adapt. I was all of a sudden expected to know it, how to be self-directed. It really takes four years to learn it. (Level Four; INT)

People say it finally comes together and in fourth year it did come together. (Level Four; INT)

(Referring to clinical courses) You are treated with kid gloves the first two years, by third year you start to get a personality, they (the nurses) treat you more like staff, ask you to coffee and joke with you. (Level Four; INT)

In summary, a process of development was described by the participants. Students entered a programme they felt had little structure and where the few guidelines they were able to find seemed unclear. The students in Level Four had "arrived", they had learned the process and expressed satisfaction at their achievements. The role of the tutor in that transition from bewilderment to comprehension was evident in the abundance of comments about tutors that are presented below as Category #3.

Category #3: The Roles, Behaviours and Influences of Tutors

The significance of the tutor to the experience of learning in a non-conventional curriculum was immediately apparent in the number of comments about the tutor role. Twelve pages of quotes related to tutors were extracted from the transcripts of interviews. The role and behaviours of tutors were also commented upon frequently in the open-ended questions as among the best, and the worst, things about the programme (Table 10). These myriad comments about tutors fell into four sub-categories, namely: (1) the importance of the tutor; (2) the role of the tutor; (3) effective tutor behaviours; and (4) ineffective behaviours of tutors.

Table 10

Responses to Open-ended Questions:
N(%) Identifying Tutors/Assessment/Outcome

	Level One		Level Two		Level Three		Level Four	
	N	%	N	%	N	%	N	%
Tutors +	17	23	21	26	22	35	16	28
Assessment -	28	38	28	35	48	77	22	39
Outcome +	10	14	6	7	41	66	31	54

Note: + denotes positive comments; - denotes negative comments.

Importance of the Tutor Role

The importance of the tutor role to student perceptions of the programme, and the learning that ensued, was acknowledged repeatedly in the responses of students from all four programme levels. Tutors were mentioned as among the best and the worst things about the programme, demonstrated in the following comments:

> *I think an individual's like or dislike of the programme often depends on their ability to get along with their respective tutors. (Level One; OEQ)*
>
> *Due to an awful clinical tutor my clinical experience was what I dreaded. It is a shame since my other friends will be more prepared for next year. It is one of my worst experiences in year one. (Level One; OEQ)*
>
> *The tutor can have a significant effect on the route the group takes and the attitude of the group.(Level Two, INT)*
>
> *I truly believe the role of the tutor is vital in making a student's learning experience a good one. A good tutor supports you and cares for each student's learning style. (Level Two; OEQ).*
>
> *Experience in the programme varies depending on group composition and tutors (ie., good tutors and good group equals good experience) (Level Three; OEQ)*

It is so tutor dependent. I've had good enthusiastic tutors and no-shows who don't care. (Level Three; OEQ)

The tutor is the key to making the programme work (Level Four, INT)

The tutor is vital in allowing the group process to take place. (Level Four, INT)

It all depends on the tutor you get what sort of skills are developed. (Level Four, INT)

I feel that some tutors are better than others at facilitating my development. Sometimes it has been a struggle while other times I was confident about what I was learning and doing. (Level Four; OEQ)

Role of the Tutor

There was remarkable similarity in the descriptions of the role of the tutor among students and across levels of the programme. Students provided the following role descriptions:

The tutors role is to make sure we didn't miss the big things and to redirect us if we got off topic.(Level Two, INT)

They can stick their noses in whenever we need help, when we are floundering. Most times they come in and give a little bit of suggestion and turn it back on track (Level Two, INT).

From what I have seen the only role, if you go off track she puts you back on track again. To maintain the group. (Level Two, INT)

The tutor's role is to facilitate during the meeting time, to steer us back on track when we are going off into nowhere land and to offer us broader suggestions if we are being too narrow or too specific, to help us see the big picture. (Level Two, INT).

They prefer to be asked for information rather than give it to us. That is okay, you think it through yourself, and they tell you if you are totally off base. (Level Two, INT)

I think the tutors are vital in moving the group and having us cover things that are important because tutors know better than us what is important and what we should be getting out of this. (Level Four, INT)

I think the tutors at Mac are there as a resource and they let you know that. (Level Four, INT)

The tutor's role was certainly that of guidance for the group. They were not there to write everything down, they were there as group members. (Level Four, INT).

Many students expressed the opinion that the role should change over the levels in the programme, evident in the following comments of Level Four students:

I saw the tutor as a very strong role in guiding and learning. They coached and cajoled you, especially in first year. (Level Four, INT)

In the first and second years I saw them being professors while in later years I saw them more as friends and I have come close to a couple of them and that has made me feel good. (Level Four, INT)

I think the tutor needs to change with the years. (Level Four, INT)

The tutor became more of a collaborator with the student. By fourth year the tutor totally backed off, they never told you what to do, it was more what did you do today, and where do you want to go from here? They stepped out and took on more of a mentor role. They helped me to move, from dictator teacher to more of a colleague by fourth year. (Level Four, INT)

In second and third year ..took on leadership roles...in fourth year she was willing to relinquish control she acted like she wanted to be a group member. She was great role model. (Level Four, INT)

Positive Tutor Qualities and Behaviours

There were numerous qualities and behaviours that students identified as supportive to their learning, and again there was consistency among students across the levels of the programme in the behaviours of the tutors that students found helpful and effective. Tutors

were seen as positive based on (1) their knowledge and expertise, including being up to date clinically, and (2) the ways they interacted with students, including being enthusiastic, interested in students and their learning, empathetic and patient, friendly and supportive, standing by to help if there was an issue, approachable, flexible and accommodating, attentive and involved in student learning.

The behaviours that "good" tutors displayed are described in the following quotes from students:

> *She questioned us, would take each student aside and ask about our client and that really helped me to learn how to research a client and know what is important and what is not (Level Two, INT)*
>
> *I think it is good when the tutors don't tell you what to research but you find it out for yourself (Level Two, INT)*
>
> *The tutor said it was her goal to help us come together and I want you to feel free to express yourself and if you get off track maybe we can help you back on, if not, if you are going in the right direction I will encourage you. She was very open. (Level Two, INT)*
>
> *The group was good because the tutor was part of the group but not dominating. She would challenge things. She helped us identify our own issues, if someone was standing back she would help us deal with it. She facilitated. We tried things and if they didn't work we changed things. (Level Two, INT)*
>
> *There is a broad range of tutor performance... the ones I liked most were the ones who challenged me the most. They gave me more directions than others which helped me learn the most. (Level Three; OEQ)*
>
> *In my personal view, when I had tutors who were strict I learned more, obviously (Level Four, INT)*
>
> *The tutors I found most helpful were those who expected more, were very organized, were on the ball and knew exactly what you were doing by keeping an eye on you. (Level Four, INT)*

The traits of a good tutor included being attentive to group needs, being part of the group, involved in all the decisions. We looked to her as a peer. She was aware of what we were doing, we would listen to her and have her involved in all the aspects. (Level Four, INT)

The tutors say things like 'this is really interesting and why don't you go out and find out what you can find and then we can talk about it' and I really appreciated that. (Level Four, INT)

Negative Tutor Qualities and Behaviours

The students described the qualities and behaviours of tutors that they found difficult to deal with and that hindered their learning. Tutor qualities that were described as negative and not supportive of individual and group learning were (1) severity and harshness in student-tutor interactions, including being outspoken, abrupt, critical and/or rigid and (2) demonstrating a lack of sufficient engagement with students, evident in being disorganized, wishy/washy, not punctual, too laid back, uninvolved, inconsistent and subjective.

Such behaviours in PBL groups and in the clinical practice setting were seen as unhelpful and in some cases as detrimental to learning. The situations described below portray the behaviours perceived by students as negative for learning:

Sometimes the tutor took over and I really wanted to do it myself and not have it done for me. More effective would be the tutor is there to ask if I got stuck (Level Two, INT)

It was very threatening, she would tell us we were going to fail out of nursing if we didn't know everything. We were afraid to go to clinical and we spent hours and hours so we could be able to answer every one of her questions. That was one bad experience (Level Two, INT)

She could have been a little more active, it took us so long at get going, she could have given us a few more suggestions. She did give suggestions but I guess we weren't ready to listen. (Level Two, INT)

She is very intense and a lot of 'you don't know this or that', a lot of constructive criticism and not very much that was good. I need to be told I am doing something well also. (Level Two, INT)

We were left to do a lot on our own and not given a lot of incentive to get moving (Level Two, INT)

We were very on edge trying to figure out what she wanted and, 'if I say something is it going to get me in trouble'. We gave feedback a lot and so you would say something and the tutor might say 'no, I don't think so' we would be very unsure and think 'should I say something here or wait'. The group was stressful and the whole atmosphere was very tense. (Level Two, INT)

In third year we had a tutor who was artsy and let us go with it; she could have been a little more directive. We were all bored to death and it would have been helpful if the tutor had stepped in and made some suggestions, just some direction. She let us flounder a little too much and then at evaluation she said you should have done this and done that. (Level Four, INT)

One other thing I don't like is tutors saying "are you sure you want to be in nursing?" I don't think that is appropriate, the student is here why would tutors ask that? (Level Four, INT)

I have been in groups where the tutor was very directive and I have felt it really didn't work. She was directing us .... we ended up doing something we didn't feel was important just because she thought it was important. In that kind of environment we ended up feeling frustrated and dreading the next class. (Level Four, INT)

In summary, the role of the tutor is viewed by students as vital to the learning process. There is general consensus among the students about the role, which is too guide rather than direct learning, although the belief was expressed that there should be more direction early in the programme with less needed in the upper levels. Students identified a number of positive and negative qualities in tutors, and described the behaviours they found helped and hindered learning. which can be summarized in the following comment:

> *You need a happy medium between having high expectations and being flexible.*

Category #4: Student Assessment and Setting Standards

The students commented on issues related to the assessment of their performance in both the clinical and classroom settings, and made many references to the methods and standards of assessment in the interviews and in the responses to the open-ended questions concerning the three worst things about the programme (Table 10). The comments of students can be grouped into three main areas: (1) the lack of testing; (2) the perceived subjectivity of grading; and (3) questions concerning the maintenance of standards in student assessment.

The Lack of Testing

With regards to the issue of testing, students throughout all levels of the programme raised questions and concerns about the lack of testing with an examination using multiple choice and short answer questions. Although students commented that they learned from the existing evaluation methods like the Triple Jumps and the essays they were required to write for each course, they felt they needed more assurance they were on the right track. By Level Four their concerns related to having the required knowledge to pass the registration exams of the Canadian Nurses Testing Service (commonly called the RN exams). The following comments demonstrate concerns related to knowledge acquisition:

> *An individual's like or dislike of this programme often depends on their ability to write essays with their respective tutors. This course does not test what you have learned. (Level One; OEQ)*

I would like to know where I am in it, what did I miss...maybe we could have a test to find if there are areas I am lacking in, give situations with questions so I could know where to study in the summer. (Level Two, INT)

There is a lot of frustration and anxiety created by self-directed learning (ie., are we learning what we need to know....enough/not enough?). (Level Two; OEQ)

I like the idea of being tested. I know that is against what the Mac model is all about but I like it. (Level Two, INT)

The issue of being tested, the security of being tested and knowing you are on the right track...a test would help me get the big picture of things that are loosely in my head.
(Level Two, INT)

I know we did a lot of essays but I would like to see more testing, because I think when you memorize the data although I know you don't want someone to regurgitate it you also remember it. (Level Two, INT)

We have zero experience with the testing format (Multiple choice questions) although that is not what nursing is all about it would be nice to have some preparation so we could pass (the RN exams). (Level Three; OEQ)

I feel I have come through this programme based on my own agenda. I feel I need a course on pharmacology because of the inadequate content here. I don't feel my knowledge is safe. I expected this programme to better prepare me. (Level Three; OEQ)

My biggest problem here is not enough testing, not enough validation of what we know. (Level Four, INT)

I am really worried about the RN exams; maybe it would have been better if we had been tested. (Level Four, INT)

Perceived Subjectivity of Grading

The grading of student classroom performance comes from a combination of essays, classroom presentations, and Triple Jumps. Although students indicated that they learned from these methods, they also felt there was too much subjectivity in their grading, and this

subjectivity related to the quality of the relationship they had with their tutor. These feelings were evident in the following comments:

> *Sometimes my marks have been too subjective because a tutor did not like me. This is a major drawback. (Level One; OEQ)*
>
> *Your own tutor does all the grading in Level Two. I hear students say my tutor didn't like me and that is why I got such and such a grade, subjective. All evaluations should be done blind. (Level Two, INT)*
>
> *If someone doesn't get along with their tutor it is rough because you don't get a good mark. (Level Two, INT)*
>
> *Sometimes I run into difficulties when tutors grade your papers on whether or not they like you, although it is an assumption, there is no proof. (Level Two; OEQ)*
>
> *My marks have sometimes been too subjective because a tutor didn't like me. This is a major drawback. (Level Four; OEQ)*
>
> *I sometimes feel the way we are marked and evaluated is so subjective, if you have personality difference with your tutor or a tutor doesn't like the way you do things or learn or loves the way you learn or likes you it really affects your marks. It is really quite subjective and it is not really indicative of how you are. (Level Four, INT)*
>
> *There is always a discrepancy one tutor saying you're not very good and another saying you should publish...it seemed very subjective. (Level Four, INT)*

Maintenance of Standards in Student Assessment: The Question of "Floaters"

A sense that the assessment process was not sensitive enough to identify poor students was expressed by participants in all four levels of the programme and was identified as one of the worst things about the programme. Students revealed strong emotions about the issue, and indicated concern about how a lack of standards might affect the reputation of the programme as well as have a negative effect on patient care. These feelings are revealed in the following comments:

The fact that just about anyone can get through this programme regardless of their efforts or abilities bothers me. (Level Two; OEQ)

The extrovert with little knowledge can viewed as superior to the introvert with considerable knowledge. (Level Two; OEQ)

Some people still try to do it the easy way, skim articles. I'm not sure if the skimmers could get through. (Level Two, INT)

I see that in this programme students are not pushing themselves, they should be pushing themselves more, maybe they are not as familiar with some of the concepts, they don't have proper background, they are not motivated enough, they are still able to pass. (Level Two, INT)

The real concern with people who float through,as a nurse you should be someone who is motivated, who gets in there and tries. There are some students who I think if I was ever in hospital I wouldn't want them to care for me. How can you ensure the care for patients? (Level Two, INT)

Staff nurses hate Mac nurses; the ones who do little work give others a bad name. (Level Three; OEQ)

Tutors should be aware of floaters, people who just work on essays and assignments. (Level Three; OEQ)

I have seen students who float through the programme. That is one thing that really bothers me. The programme has to make things more difficult to control for those students not to be floating through the programme. They don't show up for class, in the clinical they say things like "I don't feel prepared to do this" or "I just want to observe this time". I learn by doing and I just get in there and if I make a mistake I just do it again. I guess other students do what I say, float through. (Level Four, INT)

I wonder if there is quality assurance, if anyone has the big picture. There are those who skim along and graduate. Does anyone watch over the years? As students we know people who drift along and it is frustrating for students. (Level Four, INT)

You could easily slide through. (Level Four; OEQ)

In my opinion I have seen too many students get away with doing the absolute minimum in all courses by talking their way out of situations. (Level Four; OEQ)

I get the sense that standards are very relaxed and that it would be very hard for you to fail. (Level Four; OEQ)

In summary, the area of student assessment was a source of concern to students, who indicated feelings of insecurity about their own levels of knowledge and feelings of distress that students might "float" through the BScN programme that was perceived by several respondents as having questionable standards. Overall, the methods and process of assessment were seen as problematic.

Category #5: Outcomes of the Programme

The learning that resulted from being part of the BScN programme was commented upon repeatedly by students in all levels of the programme. The reported outcomes are grouped into two broad categories: interpersonal skills and abilities, and academic skills and abilities. Changes in outcomes across the levels of the programme were also noted (Table 10), and are described below.

Interpersonal Skills and Abilities

The students talked about the personal growth they had experienced in the programme. They spoke in particular about the development of communication skills, the ability to work effectively with others in groups and a newfound ability to approach people for information. Words like confidence, assertiveness and collaboration were used to describe the personal changes the students attributed to participation in the programme. The following comments highlight these findings:

> *This programme has helped me to develop better interpersonal skills to function collaboratively with team members (Level One, OEQ)*

This programme has helped me in more ways than I can explain. It has helped me get over my shyness, gives me motivation, communication skills. It does this by providing real life experiences. (Level One; OEQ)

I was really shy in high school and this has forced me to come out of my shell and work with others. Lots of personal things, personal achievements. (Level Two, INT)

I have grown a lot more in this year than in my other degree. A lot more confidence to approach people, to talk to people. I know in my last degree I was like a little mouse but now you have to go and participate and be active and you learn to work with people and to work with yourself. (Level Two, INT)

The student who is shy is going to come out, (it is) hard to stay in the background. This is good, very good. (Level Two, INT)

It really stretches you and your growth as a person and your ability to speak in a group, your risk taking, challenging things and to state an opinion that might not be popular in a group. You learn more about yourself and how to interact, not just on the floor and also with the family. (Level Two,INT)

The major thing this programme has done for me is to increase my teamwork skills, and confidence. I feel it certainly teaches students to be assertive, outspoken, critical. (Level Two, OEQ).

I have become a much more outgoing, confident person through the roles I have taken on in small groups. (Level Three, OEQ)

This programme had helped me develop better interpersonal skills to function collaboratively with team members. (Level Three; OEQ)

It is great programme that has help mould me into a self-directed and confident individual. (Level Four; OEQ)

This programme is set up so that students can come to know and understand themselves better. (Level Four; OEQ)

I am really glad I learned how to stand up for myself and I really think it is because I had to learn to do it. It really changes you as a person. (Level Four, INT)

I have learned a lot about myself. I am not naturally assertive and I have learned how to make decisions. (Level Four, INT)

I have learned the dynamics of people working together and how to get along with co-workers, the ups and downs that you run into every day in the work force. (Level Four, INT)

Here I grew because I took on challenges and succeeded. (Level Four, INT)

I found personally I developed into a very independent person. I was aware of what my capacities were, what my weaknesses were, and where I had to work on things. (Level Four, INT)

Academic Skills and Abilities

Students also identified academic skills they had developed through the programme. They talked about increasing their knowledge, learning information search and problem-solving skills, and generally developing their ability to think critically and differently. A variety of comments from students highlight the learning outcomes, with students in Levels One and Two making fewer comments about their academic development than students in upper levels as indicated below:

This programme has helped me develop organizational and problem-solving skills. I have learned how to fill my knowledge deficits. (Level One ; OEQ)

The student is not just listening to an instructor at the front of the room, she is getting more skills in presenting her views. (Level Two, INT)

For the first time in my life I know how to problem-solve and teach myself how to gain goals in my life. This reflects on me scholastically and personally. (Level Two; OEQ)

The programme gave me a good knowledge base, and I learned a lot about problem-solving. (Level Four, INT)

We are not just regurgitating everything, instead we explore every different issue we can and it teaches a different way of thinking. I am always thinking ahead, if I do

these actions now what are they going to produce. My boyfriend is a computer engineer and he thinks linearly and I say no there are other ways. He is very close minded like engineers are black and white. Nursing is black and white too but Mac teaches there aren't always black and white answers. (Level Four, INT)

It makes you more of a critical thinker. You start questioning things and in clinical situations you ask questions, you question doctors, you think... (Level Four, INT)

This programme has challenged me to work on my critical thinking and problem-solving skills. It has been most helpful in increasing my self-awareness and in identification of my strengths and weaknesses. It is a challenging programme that has been helpful in many ways. (Level Four, INT).

You learn to look at things for what they really are and not for how you think they should be. (Level Four, INT)

In summary, students were able to articulate the skills and abilities they acquire through the programme, identifying in particular the personal qualities they developed. While students in all levels mentioned that academic skills were also acquired, these were noted most frequently by Level Four students. Overall, the notions of growth, self-development, assertiveness and confidence were described most frequently as programme outcomes.

QUESTION #2: HOW DO FACULTY EXPERIENCE A CURRICULUM THAT IS DESCRIBED AS PROBLEM-BASED AND SELF-DIRECTED?

The four faculty interviews were transcribed and read to determine categories. The transcriptions were then reread to ensure that all data were accounted for and that the originally defined categories remained true in a second reading. Four categories were identified at the completion of the analysis phase, namely: Educational Philosophy and

Process; Becoming a Small Group, Problem-Based, Self-Directed Tutor; Roles, Influences and Behaviours of Tutors; and Student Assessment and Standard Setting.

Category #1: The Philosophy and Process of the Programme

There was similarity amongst the faculty in their descriptions of the programme philosophy and process. All the faculty commented on the self-directed aspect of the approach, highlighting the intended student outcomes of the SDL approach.

> *Small group, self-directed, lifelong learning are the terms we seem to kick around. Lifelong learning meaning we as faculty are continuing to learn just as students. The philosophy is there is no closure, you have never learned all there is to know about a course content. You really identify what you still need to learn.*

> *Students are responsible for their own learning and the goal is that they will learn how to learn for the rest of their lives, they will be able to deal with the changes that continually happen in health care and that they will be as great as they can be or as they want to be or as great as we can wring out of them....so a part of the philosophy is there are no upper limits (to learning).*

The small group aspect of the philosophy was evident in the comment of another faculty member:

> *It's focus is on self-directed learning and small group learning and there are benefits from peer to peer learning that occur and that students in this programme not only benefit from the content of the programme which is our curriculum but also it's process and those make them into lifelong learners and change their career paths I think...*

The faculty, like the students, expressed their support for the philosophy and spoke of their enjoyment of teaching in the programme.

> *I love working here, I couldn't imagine being in any other environment. I like order but not that much order. There is a sense of freedom. I think both students and faculty would have the sense of not being constrained.*

I think it is a fascinating way to help students learn. I think it is dynamic. I would much rather be in a tutorial group than a lecture hall as a tutor.

The process of implementing the educational philosophy was the subject of faculty comments also:

The students work in as small groups as possible and even with larger groups we keep the philosophy that the students select within guidelines what they would like to learn, and then go and research that and bring it back to the group.

In clinical the students select their own patients. The contract learning I did in the traditional programme was more structured than here. The boundaries of what is and is not permissible within the clinical rotation is different.

Students not only use each other as resources but are also encouraged to use a number of resources...they are encouraged to challenge ideas and they are encouraged to present ideas in a collegial fashion as well as interprofessional. They are encouraged to try to articulate ideas clearly. The learning climate tries to simulate the real world.

In summary, faculty, like the students, articulated the educational philosophy as one that espoused self-directed learning within boundaries established by the curriculum. It is interesting that none of the faculty (and few of the students) used the term problem-based learning or spoke of the process. The perceived benefits of the McMaster approach were identified and faculty expressed their own personal rewards of teaching in an environment that is less structured than most nursing education programmes.

Category #2: Becoming a Tutor in a Small Group Problem-Based, Self-Directed Programme

Faculty reported the challenges of becoming tutors in the programme, as they described their feelings and identified the need for faculty orientation, faculty evaluation and

ongoing development to become proficient in their roles. They also identified the ongoing challenge of striking the balance between too much and too little direction to students.

First, they talked of the transition from learning and teaching in a more traditional programme to the less structured approach of the McMaster programme:

> *If you have not taught here or gone to school here the philosophy can be hard.*
>
> *(The sense of not being constrained) can be a problem at some points in time especially for junior students and faculty. Freedom is hard.*
>
> *When I came here I had a list of five courses I was supposedly teaching and I was 60% time and all would have been a full course together. It was only course numbers and I had no idea about what the curriculum was or anything. I came to the orientation and none of it was on the courses I was supposed to be teaching.*

Faculty spoke of the actions they took to become comfortable in their role, describing themselves as good self-directed learners:

> *I went to the course coordinator who sent me to someone and someone in my office area and listening to people in tutor meetings and thinking I'll try that and trying it and it didn't work. So you say it didn't work and why not? Then you get more confident telling people what happened in your group and then you share more.*
>
> *When I came here we had one or two session on PBL and I attended a general faculty workshop and I have done some reading on my own. I videotape my sessions and I look at them and have others look at them to give me feedback. I try to do something once a year as a continuing education thing in PBL.*
>
> *Being a relatively self-directed person I went out and asked everyone I could ask and also read something about PBL and found out interestingly enough I had been using PBL but just hadn't called it by that name.*

Faculty also went on to describe the need for ongoing evaluation and development to maintain and enhance their abilities as tutors. They described their needs and the formal and informal approaches they had taken:

There has to be some tutor education to help (new tutors) learn and they have to hold that same philosophy themselves..and if they don't they probably won't be good teachers in it.

I think there are faculty development issues, if I don't understand enough about some area at least I know where to go and who to consult and what to read...but faculty need to know where to go and who to consult.

It would be helpful if they (new faculty) could have a preceptor sit in with them a few times, or a mentor, either self-chosen or assigned.

Finally, faculty made a number of comments that described their personal searches for the right balance between giving information and raising questions for students to research, between what might be called process versus content, or what the literature on PBL describes as the debate over expert vs non-expert tutors.

I have trouble with that (ie., when they are discussing an area of my interest). I'd rather be a (group) member. I get involved in clinical discussions and I get in too deep and I have to pull back.

Knowing your limits is hard with students in trouble. Because you have these close relationships with students you can get sucked into almost doing the course for them.

I think often it is a case that I know a lot about and I have to bite my tongue, because I think they have to do the discovery process.

I still believe we should tutor in the area of our expertise and not just think because we are a nurse we can do everything. You can make a topic come alive more if you have an interest in the area and know more about it.

As these comments indicate, faculty experience some of the same feelings as students when they enter the McMaster system. They described being unclear about curriculum, courses and the level of expectations of students. They discovered there were few formal processes in place to assist them with the transition to teaching in a programme considerably less structured than other BScN programmes. They highlighted the ongoing difficulty of

finding the appropriate balance between assisting students to identify the questions and find the answers versus being the expert and giving the information, the balance between directing and guiding. So, in summary, the faculty, like the students, spoke of the need for more orientation and more formal ongoing means of enhancing performance as a small group, problem-based tutor. Students wanted tutors who guided their learning but they were negative in their comments about directive tutors. It is not surprising that tutors also identified this tension around providing the right amount of direction for student learning.

Category #3: Roles, Behaviours and Influence of the Tutor

Faculty spoke of the role they played in both classroom and clinical settings, describing some of the particular strategies they used to encourage student learning and acknowledging the power differential between themselves and the students. Three subcategories emerged which will be discussed, namely, the influence of the tutor, the role of the tutor and the strategies that tutors use.

Influence of the Tutor

The influence of the tutor in the group was acknowledged by faculty. The use of that influence was acknowledged to be the power inherent in the tutor role, described in terms of getting the most from students and of conducting student assessment (ie., making the ultimate decision about success or failure in a course).

The faculty had colourful ways of describing their part in encouraging students to achieve their best. They used these metaphors:

They (the students) are like little robins like bringing these little worms and feeding them and tomorrow they are going to take off...so it is a very positive feeling to be a tutor.

There is no problem with students who do well, you just want to make the ladder higher. That is what I see, the tutor helps the students climb higher.

They also acknowledged the power they had in the student-tutor relationship, since they make the ultimate decision in terms of grading and promotion:

You also can't get away from the fact that you have power in the group. You are the one who makes the final say in terms of evaluation so there is no use pretending that doesn't exist. You set the standards and decide where your power fits.

Role of the Tutor

The faculty viewed the tutor role as that of guide and advocate, there to challenge students to explore ideas in depth, to ensure they develop correct and current information and to set standards of achievement.

The faculty are there to help them (students) decide what they should be looking for, and maybe even expanding their horizons about where they should be going to look for things.

My role is the facilitator role and not information giver. I am not there to fill their heads. I am there to help them develop cues for thinking, to fill their own heads.

A big role of the tutor is to make the environment (the clinical setting) ready for the student, and to be an advocate for the student in that regard.

The role of the tutor is to know what concepts are meant to come out in the course and to make sure those concepts do come out, and are investigated at a level of depth they should be using. If people are skimming the surface and not really prepared or just talking from Family Circle instead of the Canadian Journal of Public Health.

I need to challenge them if they have incorrect information.

The tutor needs to be a standard setter..the students need to know at what minimum level they need to function, and they need to be guided to let them know just how far they can go and not be limited to the lowest common denominator.

Strategies Tutors Use

The strategies tutors used to encourage student learning included acting as a role model, asking questions, providing suggestions and sharing resources.

I act as a role model first if it is about something like teaching birth control. Usually I do that for them and then I have them with help get into the topic. I have a discussion with them before we enter the room and let them know what to expect and their role or job.

I tease out a lot and help them put labels on things so they learn the language. They might say those little white spots and I say you mean milia...probing...and give them positive reinforcement for the observations they make and helping them with labelling it.

Students sometimes have tunnel vision so you have to help them with their hypotheses, not to give the information but to ask questions..what could that mean? Why is that happening?

I tend not to let them flounder. I tend to provide a little more guidance one way or another, just how are we going to do it? You can't be a good tutor just simply sit there and let them do their thing. I think as students you have to let them know you know what you are talking about and then they will respect you as a tutor and a group member.

Category #4: Student Assessment and Standard Setting

Faculty described issues related to setting and maintaining standards, they spoke of the need to clarify expectations among tutors and the importance of communicating the expectations to students, they commented on the strengths and limitations of the methods used currently for student assessment, and they shared concerns about whether the students were learning the content required for nursing.

Student Assessment

The faculty raised issues similar to those identified by students about the methods of assessment. Two of the four faculty members interviewed, like many of the students, felt there should be more formal testing in the programme, and they expressed concerns that the content required to be a nurse was not being covered in the programme. The other two faculty interviewed expressed satisfaction that students were learning what needed to be learned, and felt important skills were being evaluated by the current methods. The comments below illustrate these differing opinions.

> *The students might be disadvantaged by not having a lot to do with multiple choice exams and that is an area that we need to help students with because to practice in their profession they need to write an exam where they are placed in a situation of comparison with students who have lots of opportunities to learn to play the game of multiple choice exams and so I think the students in this programme are disadvantaged in that way.*
>
> *One of the concerns I have being brought up in a more traditional framework is that they don't always cover some of the things I think are necessary for example, in fourth year students I sometimes see fairly major areas that I think as a fourth year tutor are important to address.*
>
> *One thing I always worry about is students may not get all the content they think they should get by the time they finish the programme. I think that is a real concern of students and it is a concern of faculty and I think it is one thing we have to look at as we look at the curriculum.*
>
> *I guess I am a strong believer in exams..I probably won't have a job after this ... by forcing yourself to learn certain things you may not retain more than 20% of it but that is 20% more than you had in the first place so I think you learn a certain amount by studying for an exam that you don't by writing a paper.*
>
> *Some people worry that they are not getting all they need to know but I think the need to know changes so dramatically every year if you look at the literature about what was done five years ago and what is done now it is different so it is more important to learn and how to seek out information than to store it in your head.*

Setting and maintaining standards

Faculty voiced many of the same concerns as student participants about both setting and maintaining standards within the program:

> *I have questions about whether the bottom line is as clear as it could be or how we would like it to be.*
>
> *A part of the philosophy is there are no upper limits. I wonder sometimes if there are no lower limits either.*
>
> *We do need to look at standards across the programme. They don't have to be the same but we need to be clear what they are.*
>
> *The down side is that a student can get through without accomplishing certain things.*

QUESTION 3. WHAT IS THE RELATIONSHIP BETWEEN LENGTH OF TIME IN THE PROGRAMME AND STUDENT PERCEPTION OF THE LEARNING ENVIRONMENT?

Quantitative data from the Course Experience Questionnaire were used to address this question, with Analysis of Variance (ANOVA) used as the statistcal method to compare the responses of participants across levels in the programme. When the ANOVA results indicated statistically significant differences, Tukey's test (Polit, 1996) was used to test differences between all possible pairs of means. The results of these analyses follows.

Overall Level of Satisfaction

Oneway analysis of variance (ANOVA) was conducted to explore the relationship between length of time in the programme, and perceptions of the experience. The response to Item 38 of the Learning Environment Questionnaire was used as the overall measure of

student perception of the learning environment. In this item, respondents are asked to reply, on the five point scale from 1 definitely disagree to 5 *definitely agree*, to the statement: "Overall, I am satisfied with the quality of this programme." The decision was made to use the response to this one question as the dependent variable in the analysis rather than the sum of the 37 items that comprise the questionnaire, since the correlation between the response to this one item and the response to the sum of the 37 items was r=0.56, which achieved statistical significance (p=0.001). Given this significant correlation between the total of the items and the summary item, one can feel confident in using the scores on the summary item in the analysis of overall perception of the programme (Norman & Streiner, 1997). The analysis revealed no significant relationship [F=0.8 (df 3,270); p=.47] between overall satisfaction and level in the programme (Table 11).

Table 11

Relationship Between Level in the Programme and *Overall Satisfaction with the Programme*

Level in Programme	Group Mean and (Range)	Standard Deviation	F	P
Level One	3.78 (1 to 5)	0.78		
Level Two	3.93 (2 to 5)	0.79		
Level Three	3.77 (1 to 5)	0.86		
Level Four	3.96 (3 to 5)	0.59	1.13	0.34

Satisfaction With Factors Within the Programme

To further explore the influence of time in the programme on perceptions of the respondents, ANOVA's were conducted to explore the relationships between time in programme and the six factors identified through factor analysis.

Independence

This 5-item subscale explored perceptions of the amount of independence afforded students to explore the areas of study they wished to pursue in a manner they chose (Table 12). The mean scores on this subscale increased over the time in the programme but the difference did not achieve significance [F=1.5 (df 3,270); p=.22].

Table 12
Relationship Between Level in Programme On *Perception of Independence*
(Possible Range 5 - 25)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	17.0 (6-24)	3.2		
Level Two	17.6 (10-25)	3.7		
Level Three	18.0 (8-25)	3.8		
Level Four	18.2 (8-25)	3.6	1.47	0.22

Tutors

This subscale, consisting of 8 items, explored student attitudes toward tutors. High mean scores were reported in all levels of the programme, indicating positive responses to questions about tutor attributes and behaviours. Although there were small differences in the means across the four levels in the programme, these differences were not significant [F=1.9 df 3,270); p=.14]. Details of this analysis are presented in Table 13..

Table 13
Relationship Between Level in Programme On *Perceptions of Tutors*
(Possible Range 8 - 40)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	31.3 (12-39)	5.1		
Level Two	32.6 (25-40)	3.5		
Level Three	31.3 (18-39)	4.3		
Level Four	31.2 (19-39)	4.2	1.9	0.14

Expectations

The mean scores on the subscale that assessed student perceptions of the clarity and appropriateness of tutor expectations were low across the four programme levels, indicating that respondents found the expectations less than clear and somewhat unrealistic. The differences in mean scores across the levels of the programme were not statistically significant, with the F=0.31 (df 3,270) and p=.8 (Table 14).

Table 14

Relationship Between Level in Programme On *Perceptions of Expectations* (Possible Range 7-35)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	21.9 (12-32)	4.7		
Level Two	22.1 (9-32)	4.8		
Level Three	21.4 (12-30)	4.9		
Level Four	21.8 (9-30)	4.8	0.31	0.81

Assessment

The items in this subscale explored student attitudes about assessment. The 7 items comprising this subscale focussed on assessment by examination, memorization of content and the degree to which tutors were interested in student learning. Lower scores on this subscale indicated that respondents disagreed with these statements, which is congruent with the emphasis in the assessment methods in the BScN programme. The mean scores differed across the four programme levels and the difference was significant [F=4.6 (df3,270); p=.000. The Tukey test was used to determine the group or groups that were significantly

different at the 0.05 level. The Level One respondents differed significantly from their counterparts in the other three levels. These results are reported in Table 15.

Table 15

Relationship Between Level in Programme and Group Means On *Perceptions of Assessment* (Possible Range 6-30)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	12.2 (7-27)	3.8		
Level Two	10.2 (6-19)	3.1		
Level Three	10.9 (6-21)	3.4		
Level Four	10.8 (6-18)	2.9	4.6	0.00

Workload

The items comprising the workload subscale assessed student perceptions of the amount of work required in the programme and the time available to complete it. The higher the score the greater the perceived workload of the programme. The means for the four levels did not differ significantly [F=.32 (df3,270);p=.81] (Table 16).

Table 16

Relationship Between Level in Programme On *Perception of Workload* (Possible Range 5-25)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	14.7 (6-25)	3.5		
Level Two	14.3 (7-24)	3.7		
Level Three	14.5 (6-23)	3.8		
Level Four	14.9 (5-21)	3.7	0.43	0.81

Outcomes

The outcome subscale assessed the level of agreement with statements about outcomes from the programme, such as skills in problem-solving, written and verbal communication, and teamwork. Higher mean scores denote greater belief by respondents that the programme outcomes have been achieved. There were differences in the mean scores across the four levels of the programme and these were significant [F=12.2 (df 3,270); p=.000]. The Tukey test of significant differences in pairs of means revealed that Level One responses were significantly different and lower than the responses of those in other programme levels. (Table 17).

Table 17

Relationship Between Level in Programme On *Perception of Outcomes* (Possible Range 6-30)

Level in Programme	Group Means and (Range)	Standard Deviation	F	P
Level One	24.3 (7-30)	3.7		
Level Two	26.0 (17-30)	3.1		
Level Three	27.0 (20-30)	2.6		
Level Four	27.1 (19-30)	2.5	12.2	0.00

Summary

The length of time in the programme was found to be related significantly to two areas. First, in perceptions aboutassessment, respondents in Level One were significantly more likely than their counterparts in the other levels to agree with statements that student assessment is based on memorization and the testing of content. Secondly, respondents in Levels Two, Three, and Four were significantly more likely than Level One respondents to

agree with statements about the intended outcomes of the programme. Thus students in Level One differ from those in the other levels of the programme in these two areas. There was no significant difference in overall satisfaction with the programme across the four levels.

QUESTION 4. WHAT IS THE RELATIONSHIP AMONG AGE, PREVIOUS EDUCATIONAL BACKGROUND, EMPLOYMENT STATUS AND STUDENT PERCEPTION OF THE LEARNING ENVIRONMENT?

Regression analysis was used to address this question. A hierarchical stepwise regression equation was used to test the relationships among age, previous education, employment status and the seven dependent variables from the Course Experience Questionnaire, namely, overall satisfaction, independence, tutors, expectations,assessment, workload and outcomes. In this approach, the set of independent/ predictor variables is forced into the equation in a predetermined order. Partial F statistics are calculated for each of the three steps where the predictor variables are entered in turn into the equation. These statistics are calculated to determine how much additional variance in the outcome variable can be explained beyond the variance from the previous steps in the regression equation. The overall point of any regression equation is the R value at the final step, which indicates the total variance in the dependent variables explained by the independent or predictor variables.

Overall Level of Satisfaction

In this analysis the amount of explained variance in the outcome variable (Q.38) by the three independent variables was not large enough to achieve statistical significance (Table

18). In this regression analysis, the set of three independent variables explained only one percent of the total explained variance. This lack of explained variance between dependent and independent variables may be explained by the lack of variation in the responses to Item 38, where fifty-eight percent (N=160) of the respondents answered "4" (quite satisfied). The mean standard deviation of 0.76 further indicates the lack of variability in the response to this item.

Table 18

Multiple Regression for Perception of Satisfaction on Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Overall Satisfaction					
Age	0.02	-0.1	0.01	-1.4	0.16
Education	0.06	0.09	0.05	1.4	0.17
Employment	0.02	-0.02	0.1	-0.2	0.8
$R^2 = 0.11$			$\|F = 0.9$ (df 3/264)$\|$	$P = .44$	

Regression on Factors Within the Programme

Regression analysis was conducted to determine the relationship among the six factors from the Course Experience Questionnaire and the predictor factors of age, educational and employment status.

Independence

The model using perceptions of independence as the dependent variable was not statistically significant [F=.98 (3,264);p=.4] and the combined independent variables

accounted for one percent of the variance. None of the independent variables had significant beta weights (Table 19).

Table 19

Multiple Regression for Perception of Independence On Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Independence					
Age	0.09	0.11	0.09	1.5	0.13
Education	-0.03	0	0.04	-0.12	0.9
Employment	-0.37	0.05	0.03	-0.84	0.4
R^2 = .01 [F =.98 (df 3,264)] P = .40					

Tutor

The three independent variables explained 2% of the variance in the respondents perceptions of tutors in the programme [F=2.0 (df3,264); p=.11]. None of the independent variables carried significant beta weights (Table 20).

Table 20

Multiple Regression for Perceptions of Tutors With Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Tutors					
Age	-0.05	-0.05	-0.01	-0.65	0.52
Education	1	0.12	0.08	1.85	0.07
Employment	0.49	0.13	0.1	1.8	0.07
R^2 = .02 [F = 2.0 (df 3, 264)] P = .11					

Expectations

The independent variables accounted for less than one percent of the variance in perceptions of expectations in the programme [F=.42 (df3,264); p=.74]. Again none of the independent variables achieved significant beta weights (Table 21).

Table 21

Multiple Regression for Perceptions of Expectations With Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Expectations					
Age	-0.03	0.06	-0.01	-0.35	0.73
Education	0.53	0.05	0.03	0.80	0.38
Employment	0.23	0.30	0.05	0.76	0.45
R^2 =< .01 [F =.42 (df 3/264)] P = .74					

Assessment

A similar finding is obtained when the dependent variable is the subscale evaluation. Two percent of the variance in assessment is explained by the three independent variables combined [F=1.7 (df 3, 264); p=.18], and none of the three independent variables carried significant beta weights (Table 22).

Table 22

Multiple Regression for Perceptions of Assessment With Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Evaluation					
Age	0.08	0.09	0.05	1.2	0.20
Education	-0.33	-0.11	-0.05	-1.6	0.10
Employment	-0.59	0.08	0.09	1.4	0.17
R^2 = .02 [F = 1.7 (3,264)] P = .18					

Workload

The total explained variance in the dependent variable, perceptions of workload, was one percent and the model did not achieve significance [F=1.1 (df 3,264); p=.34]. None of the independent variables carried significant beta weights (Table 23).

Table 23

Multiple Regression for Perceptions of Workload With Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Workload					
Age	-0.30	0.03	0.02	0.5	0.62
Education	0.40	0.13	0.10	1.8	0.08
Employment	0.30	0.03	0.02	0.6	0.59
R^2 = .01 [F = .1.1 (df 3/264)] P = .34					

Outcome

The regression equation where perception of outcomes of the programme is the dependent variables did not achieve significance [F=1.2 (df 4,263); p=.32], and the model accounted for one percent of the variance in the dependent variable of outcome. None of the independent variables carried significant beta weights (Table 24).

Table 24

Multiple Regression for Perceptions of Outcome With Age, Previous Education and Employment

VARIABLE	β	BETA	PARTIAL CORRELATION	T-VALUE	P
Outcome					
Age	0.09	0.11	0.11	1.7	0.08
Education	-0.08	-0.03	0.03	-0.43	0.67
Employment	0.06	0.01	0.03	0.15	0.88
R^2 = .01 [F = 1.2 (df 3/264)] P = .32					

Summary

These data indicate that the perceptions of the programme are not accounted for by the age, previous education or employment status of the respondents, with one exception. Age of the respondent made a significant contribution to the explanation of variation in perceived level of independence of respondents, although the overall model did not achieve significance and accounted for only two percent of explained variance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND IMPLICATIONS

SUMMARY OF FINDINGS

The purpose of this study was to gain an understanding of the experience of students, and of faculty, as they participated in a nursing curriculum that uses a problem-based, small group and self-directed approach to education. Within this broad purpose, I also explored changes in student perceptions over time in the programme and looked at the similarities and differences in student and faculty descriptions of their experiences. The purposes of this chapter are to discuss the study results, and to recommend ways to make them useful to faculty and students involved in problem-based learning. Although the results were presented in the previous chapter according to the four discrete study questions, they are integrated and discussed here according to the key themes that emerged in the responses to the questions, namely, overall level of satisfaction with the programme, the philosophy and process of the approach, becoming a learner/ tutor, the role of the tutor, student assessment, and the outcomes for students. This chapter will conclude with implications for education and suggestions for further research.

Student Satisfaction with the BScN Programme

Both students and faculty expressed satisfaction with their experiences of learning and teaching in a programme that used the problem-based, small group, self-directed approach. The students' level of satisfaction was expressed by an overall mean of 3.9 on the 5-point

Likert scale of the Course Experience Questionnaire (CEQ). This level of satisfaction was confirmed in the responses to the open-ended questions on the CEQ, and through the personal interviews conducted with a total of eighteen students, wherein students commented in particular on the independence, flexibility, challenge, and peer and faculty collaboration inherent in the approach. These findings support those of the PBL literature, which has shown consistently that students express high levels of satisfaction with the educational approach (Bernstein et al.,1995; Clarke et al.,1984; Ishida, 1995; Khoiny, 1995;Moore-West et al., 1989; Norman & Schmidt, 1992).

There were no significant differences in level of satisfaction across the levels of the programme although students in Level Four were slightly more satisfied than those in lower levels, and all Level Four students were at least somewhat satisfied (3 or more on the 5-point scale), compared to students in levels one, two and three, of whom a minority were somewhat or very dissatisfied (less than 3 on the 5-point scale). This differs from the other reports of PBL satisfaction, which indicated a tendency for students to become less satisfied over years in the programme, becoming more like their counterparts in conventional, non-PBL programmes (Clarke et al., 1984; Moore-West et al., 1989). These researchers postulated that the decline in scores might be due to a disaffection with completing questionnaires designed to evaluate new curricula, changes over time in attitudes towards medical school in general, and/or the increased time spent in clinical settings with a wide variety of clinicians compared to the earlier years of the programme when students had greater and more intense contact with programme faculty. The BScN students also have more independent learning time in their final year, yet they expressed the highest level of satisfaction with the programme.

However, they may also become less satisfied over time compared with students in conventional curricula, which was the situation with medical students. In any case, for the McMaster BScN students, a high level of satisfaction was present throughout the years and it increased slightly, rather than declined, by the final year of the programme.

There were no significant relationships among the factors of age, previous level of education, employment status while in the programme, and level of satisfaction, indicating that level of satisfaction is due to other as yet unexamined factors. This lack of a significant relationship may also be explained by the limited variance among the responses of students to the question of satisfaction with the programme. Perhaps another instrument would be more sensitive to variation in responses and therefore allow the influence of other factors to be more easily identified.

Faculty Satisfaction with the BScN Programme

Faculty also expressed satisfaction with teaching in the BScN programme, and appreciated particularly the flexibility, independence, quality of interaction with students, and uniqueness of the experience, compared to their experiences in more conventional programmes. These findings support those of other researchers (Berstein et al., 1995; Maxwell & Wilkerson, 1990; Vernon, 1995), who also found high levels of satisfaction with teaching in PBL programmes. Positive experiences were reported by all the faculty interviewed, who represented a range of years of teaching at McMaster, a variety of types of appointment, and a diversity of courses taught, suggesting that feelings of satisfaction are related to the teaching experience rather than other possible factors.

Philosophy and Process of PBL

Programme Philosophy

Students and faculty commented extensively on the philosophy and process of education used in the BScN programme, describing the small group, self-directed, problem-based approach as one of the best things about the programme. It is notable that they commented most extensively on the self-directed aspect of the approach, less frequently on the small group nature of the process and least often on the problem-based feature of the method. Faculty, like the students, described the educational approach as the main feature of the McMaster BScN programme and articulated the philosophy as one that espoused self-directed learning within boundaries established by the curriculum. Similar to the student findings, the term problem-based learning was not used by faculty in their descriptions of the educational approach. This deviates from the literature, where the problem-based aspect is seen as the cornerstone to the approach which in turn allows for a self-directed exploration by students, most often within a small group setting (Barrows & Tamblyn, 1980; Barrows, 1996; Schmidt, 1983). It may be that all participants accept the problem-based aspect of the approach, have no difficulties with it and instead focus on the self-directed and small group components, which cause more apprehension, as is evident in the many comments about learning how to be a learner and teacher in the programme.

Process of PBL

The process described by students and faculty was, not surprisingly, just like that outlined by such PBL originators and advocates as Barrows & Tamblyn (1980), Boud &

Felletti (1991), Schmidt (1983) and Walton & Matthews (1989). The participants described the steps of the process as: (1) choosing and reading the problem; (2) generating hunches about what might be the issues; (3) identifying relevant learning issues and the possible approaches to learning more about the issues; (4) doing the research and sharing it within the group; and (5) integrating new knowledge and reaching conclusions about the problem.

Several students commented negatively about the fourth step of the process where information is shared within the group, noting that the typical way of doing this was for students to take turns reading their prepared information. Students noted that other group members often "tuned out", so the tutorial was not an effective learning experience. The preferred method of information sharing (by those who used it) was a group discussion of material on the same issues researched by all group members and shared within the group. It seems this is a more useful approach and should be suggested and encouraged more often by tutors, since students who reported they had suggested such a change but had not been supported by tutors were unsuccessful in changing the process of information sharing.

Becoming a Learner/ Teacher in PBL: Adjusting to self-directed, small group and problem-based learning.

Challenges for Learners

Becoming a productive learner in a PBL programme was fraught with challenges. Students described the struggles and demands they faced over the four years, and the sense of achievement and positive feelings they had by the end of the programme. Students in levels one and two used words like confusion, stress and floundering to describe their feelings as

they were introduced to PBL. Not knowing what they needed to know, and not knowing when they knew enough were some of the concerns in relation to the self-directed nature of the programme, which the students viewed as too flexible and lacking in structure. Students in level three were still describing the frustrations they had experienced in the first two years, and continuing to request modules or guidelines that would describe the essential things they needed to know. "It all comes together in fourth year" was the theme of the students in level four, who felt it had taken all four years to understand and appreciate the process.

Issues related to group dynamics also caused concern, with participants indicating that groups needed to function well for learning to occur. Drawbacks to group function included too much or too little direction offered by tutors, and a reluctance to discuss issues openly. The importance of the group to learning is clearly an issue for the students in this study. Although the centrality of the group to learning is acknowledged in the PBL literature (Barrows & Tamblyn, 1980; Wilkerson, 1996), there has been surprisingly little written about PBL group process. Thomas (1997) concurs that issues of group dynamics which influence the PBL process are neglected in the literature, as there is a paucity of research on how best to develop group skills and to what extent the group experience influences learning and satisfaction.

Students noted that their feelings of stress and insecurity in Level One were compounded by the overall transition from secondary school to university. It was noteworthy that students with previous university work felt they adapted to PBL more easily than did their counterparts straight from secondary school, although they also reported frustrations in the early years of the programme. This perceived difference may well be due to the fact that

this group of students had already adapted to university life so had to focus only the transition to a new approach to education.

All the feelings and reactions reported above are not uncommon in PBL curricula. Stinson and Milter (1993) found that students frequently express frustration when they first encounter problem-based learning, where they are expected to take responsibility for their own learning and the teacher does not tell them the "right answer". Statements such as "What am I supposed to do?" "If only you would tell me what you want I would do it." were made frequently, leading the authors to determine a need for coaching and talking them through the process. Walton & Matthews (1989) reached a similar conclusion, noting that the frequent and ususal experience of students new to PBL was one of confusion and a lack of purpose of the new approach. Concern about learning what needed to be learned was a theme in the findings of Ishida (1995) and of vonDoblen (1996), who described her own experience as a student. All these reports are congruent with the comments of the BScN students, who indicate that stress and anxiety occur with this new and different approach to learning.

The Particular Challenges of Self-Directed Learning. The gradual change reported by the participants from feelings of uncertainty and anxiety to feelings of confidence and security with self-directed learning support the SDL literature. Kasworm (1983) describes a similar process, comprised of five components that depict change over time: (1) movement from learner dependence on "authority" to learning independence; (2) from extrinsic to intrinsic motivators for learning; (3) from passive acceptance of information to proactive inquiry and self-evaluation of intellectual development; (4) from authority designated learning structures to learner-selected ones; and (5) from uni-dimensional to

multidimensional strategies for planning and conducting personal and group learning activities. Kasworm also contends that this process requires direction and assistance as the learner develops the actions required for change. The work of Long (1990) is also instructive, as he confirms that, as learners accept increasing control, they determine what they need to accomplish, what they pay attention to, how they use they use the new information and how they respond to learning opportunities. This again suggests a developmental process, wherein learners need assistance early in the process to identify the intended learning outcomes and over time accept increasing authority over their learning. Garrison (1992) describes this process as learning-to-learn, a metacognitive concept that is linked to the learners' assuming responsibility for learning through increasing self-reflection. Furthermore, he states that becoming a self-directed learner requires more than personal responsibility and independence. Providing structure, knowledge validation and support to challenge assumptions are all factors in success. As Garrison states: "It is not contradictory for the learner to assume some responsibility for learning and still rely on an outside person for support, access to information, and guidance". (p.143).

The BScN students reported feeling uncertain about desired and required learning outcomes until the final year of the programme, implying they did not receive the support and guidance early on that new self-directed learners require [and that are part of the tutor role in PBL (Barrows & Tamblyn, 1980; Barrows, 1988)]. We continue to immerse students in the process from the first day of the programme, offering two large group lectures as a way of orientation, one about PBL and the other about self-directed learning. Students are also encouraged to purchase and read books on these topics by Malcolm Knowles (1978) and

Howard Barrows (1988). They then begin to work on a problem in their pre-assigned groups. Tutors in level one receive no particular tutor development to assist students with the transition. The tutor roles of modelling then coaching and eventually fading, which would facilitate self-directed learning, are not reinforced in any way nor, it would appear, applied in a conscious way by all tutors to the experience of tutoring in level one. Determining the most effective way to assist students to become effective and motivated self-directed, PBL learners is an area requiring attention, for although positive feelings about the process result by fourth year and although students give positive ratings and state positive feelings in interviews from the beginning of the programme, there is obviously a great deal of stress and confusion for students that we should seek to alleviate while maintaining the principles and process of education.

Faculty Challenges and Experiences

Faculty also spoke of the transition they faced when they began teaching at McMaster and the ongoing need for faculty development as they looked for the right balance between too much and too little direction to students. They, like the students, learned by doing. The orientation to the programme and educational approach consists of four days, where the various courses are discussed in general terms and one-half day workshops are held on clinical teaching, the PBL process, evaluation and one other topic such as teaching students from other cultures. As well two or three day workshops are held through the Programme for Faculty Development of the Faculty of Health Sciences that some tutors choose to attend. There are three workshops: an introduction to PBL, the role of the tutor, and PBL in clinical

teaching. All three are interdisciplinary, offered in October and April of each year, and have no follow-up, so they provide a one time only overview of the PBL process and its' application. Thus there is limited orientation for new faculty and a dearth of ongoing planned activity to assist tutors.

The importance of faculty development has been noted by numerous authors. For example, DesMarchais and colleagues (1993) identified faculty development as an essential part of the successful change from a traditional to problem-based medical education programme at the University of Sherbrooke, PQ, where a comprehensive system to prepare faculty for the new roles was utilized and a series of sessions to maintain the system are ongoing. Faculty development was also seen as integral to success when the Harvard Medical School changed from a traditional to PBL approach. Wilkerson & Hundert (1991) and Wetzel (1995) describe the programme which consists of four parts: an introductory session where the principles of PBL are presented and discussed; a course orientation where specifics are discussed; weekly tutor meetings where new and experienced tutors meet to discuss any issues within their tutorials; and observation and feedback by an educator from the tutor training programme. Clearly there is a transition from teaching in a conventional curriculum to facilitating student development in the PBL approach, and faculty require assistance to make and maintain such a change.

The Role of The Tutor

The centrality of the tutor role to the educational experience was apparent in the myriad comments by students in all levels of the programme and by all four tutors

interviewed. Descriptions of the influence of the tutor on learning, and examples of positive and negative tutor behaviours, were made repeatedly. Students described the tutor as the key to making the process work and vital to making the learning experience a good one. Tutors also identified the significance of their role, not only in influencing the process of the group but also through their decisions about student assessment. This importance of the tutor role supports the authors about PBL who describe the tutor role as central to the PBL process (Barrows & Tamblyn, 1980; Barrows, 1988; Kalaian & Mullan, 1996; Schmidt, 1983; Tipping, Freeman & Rachlis, 1995; Walton & Matthews, 1989; Wilkerson et al., 1991). The congruence among the comments of students, tutors and the authors demonstrates the vital importance of the tutor role to successful learning outcomes.

Components of the Tutor Role

Issues of Process: There was similarity in responses among students and tutors concerning the components of the tutor role. Facilitating the group sessions by steering the group back on track, asking questions to broaden the scope of investigation of issues and to ensure accuracy of information, helping the group to establish standards, and acting as a resource to the group were all aspects of the role identified by study participants. Tutors described the role as expanding the horizons of the students, creating a safe learning environment, ensuring that students looked at issues in sufficient depth and guiding them to develop critical analysis. These behaviours are comparable to those reported by authors such as Stinson & Milter (1996), who noted the teacher observes, corrects and encourages the performance of students and Gijselaers (1996) who described the role as "a balance between

allowing students to discuss issues and intervening to make sure that critical learning issues are identified" (p.19).

The description of the tutor role as it facilitates student learning is also congruent with the theoretical rationale for PBL provided by the work of Vygotsky, who believed that learning takes place through social interaction with knowledgeable individuals who guide, question and provide feedback to learners. He further believed that any education system must provide the conditions for students to discover and make manifest their creative potential, which is not possible unless the teacher avoids forcing or dictating their will upon the student.

The need for a change in the tutor role over levels in the programme was also noted. Words like coaching, cajoling, guiding were used by students and tutors to describe the desired role in first and second year, while collaborating, relinquishing control and becoming more of a mentor were the role expectations in the final year of the programme. These role descriptions mirror those found in the PBL literature, where Barrows (1988) used similar words to describe the role as it moved through distinct phases, from modelling to coaching to fading.

Issues of curriculum Development: In the literature concerning the role of the tutor, activities related to curriculum formation were also noted, which included defining learning outcomes, identifying essential content and developing the problems that form the stimulus for learning. It is noteworthy that none of the student or faculty participants commented on this role of curriculum development, focussing instead on the actions of tutors within the small group tutorials. As the PBL literature makes very clear, the use of well developed

problems to stimulate relevant learning is an essential aspect of PBL and an important faculty role (Barrows & Tamblyn, 1980; Kalaian & Mullan, 1996). Perhaps the issues of content identification and problem development were not noted by tutors, since the problems used in the programme had not been changed for some time and the tutors interviewed had not actually been involved in those curricular activities. As well, the problem-based aspect of the educational approach in general received few comments from either faculty or students, who focussed instead on the small group and self-directed aspects of the process, implying they accepted the particular structure and problems used in the BScN programme (the content issues) and found the process issues related to facilitating group function and self-directed learning more challenging and problematic.

Positive and Negative Tutor Behaviours

Positive Tutor Behaviours. Students spoke of the importance of having expert tutors, those with current and relevant knowledge who were involved in ongoing clinical practice. Tutors described the importance of "letting students know you know what you are talking about", and "challenging students if they have incorrect information". This is only possible when the tutor possesses the correct information. Thus there is consensus that content expertise has a notable influence on student learning.

Students and faculty also spoke of personal qualities that affected the process within the group, including enthusiasm, concern for students, and flexibility. All these behaviours are similar to those described by the writers who have explored the tutor role. Schmidt and Moust (1995) concluded that the ability of the tutor to communicate with students in an

informal way coupled with an empathic attitude, and the creation of an atmosphere that encouraged the open exchange of ideas, were the personal tutor qualities associated with student achievement and interest. The importance of positive reinforcement and personal involvement by tutors was also noted by DesMarchais et al. (1993), who found students preferred tutors who actively guided the process, asked questions at opportune moments, brought students back on the right track, focussed attention on neglected aspects of problems being discussed, and stimulated discussion.

These findings are congruent with the convincing empirical support for the conclusion that expertise in both process and content are influential in maximizing student learning (Davis et al., 1992; Schmidt et al., 1993; Schmidt, 1994; Schmidt & Moust, 1995). It then follows that tutors need to expand their skills and abilities to assist individuals and groups with their learning, while also maintaining and using their content expertise in their teaching. We tend to assign faculty to teach in the PBL tutorials with little thought of their content expertise, although tutors are assigned to clinical teaching based on their clinical expertise, For example, a tutor whose expertise is in pediatric nursing may be assigned a Level Two PBL group where the problems for study deal with common diseases in adults, including Myocardial Infarction and Cerebrovascular Accident (CVA). This seems to support the "nurse is a nurse" approach rather than a teaching assignment based on expertise.

Negative Tutor Behaviours Students also described tutor behaviours which they perceived as negative and detrimental to learning, among them harsh and uncaring interactions with students and insufficient engagement with the students and their learning. It is noteworthy that no negative behaviours were noted in the data from tutors. These

behaviours are congruent with the those identified in the literature as unhelpful. For example, DesMarchais et al. (1993) reported that students identified tutors who did not intervene and who seemed unconcerned with group process as unhelpful, while Kaufman & Holmes (1996) recounted tutor weaknesses in managing group process, including being too directive, letting the group get off topic, being disrespectful to students and having no sense of humour. These negative behaviours are also those identified in the extensive literature on positive and negative behaviours of nursing faculty in non-PBL programmes (Cust, 1996; Hanson & Smith, 1996; Hughes, 1992; MacLeod, 1995; Wong & Wong, 1987).

Overall the study findings and the related literature point to the fundamental importance of the tutor to effective (and enjoyable) learning outcomes for students, and a sense of achievement by tutors. They also support the conclusion that expertise in both content and process are required for optimal learning by students and satisfaction for tutors.

Student Assessment

Students and faculty raised similar issues about student assessment, including the lack of objective "testing", the reliance on assessment measures where subjectivity is perceived to be a problem, and queries by students about the maintenance of standards within the programme. Students in all four levels commented on the need to be tested in order to receive assurance that the essential knowledge to be a nurse was being attained. Students in the upper levels also acknowledged that this need is driven in part by the necessity to successfully pass the registration examinations developed and administered by the Canadian Nurses Testing Service (the RN exam) in order to be employed as a Registered Nurse.

Faculty also saw value in more testing of students, raising questions about students' knowledge base and their preparedness for RN examinations.

This stated need to receive assurance about knowledge base is supported in the PBL literature (Bernstein et al., 1995; Cust, 1996; Ishida, 1995; MacLeod, 1995). This is balanced by the need to assess self-directed learning, teamwork, critical thinking and clinical decision-making, since these are the abilities required of nurses now and in the future (Bevis & Watson, 1989; Diekelman, 1993; Tanner, 1990; Valiga, 1988). These latter abilities are assessed currently in the BScN programme using measures such as essays, self-assessments, triple jumps and direct observation that are reported by students, and to a lesser extent by faculty, as being open to subjectivity by markers and not truly differentiating students' levels of ability. These measures are also described in the literature as having low levels of reliability and somewhat questionable validity (Palmer & Rideout, 1995; Thompson, 1995; Wakefield, 1985; Westmorland & Parsons, 1995). However, these authors also confirm the importance of such measures in the assessment of learning outcomes other than knowledge acquisition. As Valiga states: "We should employ objective-type tests sparingly, since paper and pencil tests reinforce an emphasis on right answers, concreteness and facts, at the expense of process" (p.196). There is consensus that acceptance of alternate assessment methods can be enhanced by adherence to such general principles as: ((1) clarifying with students and faculty the purpose of the method of assessment; (2) providing clearly stated criteria; (3) ensuring there is a common understanding (interpretation) of the criteria, and (4) including sufficient samples of behaviours to assure a reliable estimate of performance (Norman, 1994; Trigwell & Prosser, 1991). Clearly the area of student assessment is not at

all resolved, questions and concerns are raised by both students and faculty and action to determine an effective student assessment process is a priority. As Thomas (1997) concludes in his review of measurable outcomes of PBL: "An initiative is needed to develop widely accepted and psychometrically validated methods of evaluation" (p. 324).

Outcomes

Students across the programme commented upon the benefits they derived from their participation in the programme. Not surprisingly, students completing their first year rated the benefits less highly than did their upper level counterparts; however, they did conclude that both personal and professional learning occurred. On the personal level, students developed confidence and assertiveness, the ability to negotiate and collaborate with others, and to communicate effectively with a wide variety of people in a multiplicity of situations. Taking on challenges and succeeding was seen as an outcome of Level Four students who were graduating and seeking employment.

Academic skills and abilities were also developed and students spoke of increasing their knowledge, learning information search strategies, developing problem-solving skills, and acquiring the ability to think critically and differently. Level four students spoke of the sense of satisfaction they achieved from defining and meeting their own learning objectives.

These personal and professional outcomes are congruent with those identified in the PBL literature as the desired and acquired effects of the educational approach (Barows & Tamblyn, 1980; Barrows, 1996; Boud & Feletti, 1991; Ishida, 1995; Schmidt et al., 1989). They are also consistent with the rationale for PBL derived for the writings of Barrows

(1996) and Schmidt (1991). For example, the students described developing problem-solving skills and new ways of thinking that are divergent rather convergent, which the students feel set them apart from other learners. This is consistent with one of the foremost aims of PBL. As Dolmans & Schmidt (1995) describe, the purpose of PBL education is to: "train students how to deal with problems in the future, preparing them to be more active, independent learners and problem solvers, rather than more or less passive recipients of information" (p.535).

The development of problem-solving skills is also consistent with the desired outcomes of the transformation curriculum position, as defined by Miller and Seller (1990), who describe the development of problem-solving skills as a particular goal of curricula based on the transaction position. Certainly students frequently used the term problem-solving to describe one of the many positive outcomes they accomplished from the BScN programme.

Students also reported acquiring the ability to be self-directed, to be insightful about their own behaviour and that of others, and to appreciate differences as well as similarities with others. Developing proficiency as a self-directed learner is an intended outcome of PBL, where all phases of the process are practised, from self-assessment to determine learning needs, to identifying and accessing relevant learning resources and applying new learning in familiar and unfamiliar situations (Brandon & Majumdar, 1997; Dolmans & Schmidt, 1995; Walton & Matthews, 1989). Developing these behaviours and attitudes is also consistent with what Miller and Seller (1990) describe as the transformation curriculum position, which in turn provides a useful rationale for PBL.

The personal and professional outcomes described by the students also correspond to the objectives of the curriculum revolution which is promoting new approaches to educating nurses for the future (Bevis & Watson, 1989; Diekelman, 1993; Tanner, 1990). These authors promote the conceptions of learning characterized as understanding, seeing something in a different way and changing as a person. Certainly the students used just these terms to describe their learning. The curriculum revolution also refers to the new roles for nurses and the abilities required to fulfil those roles, including independence, critical thinking, decision-making and the confidence to challenge the status quo. Again the students spoke of acquiring those same abilities as they described their development of communication skills, independence, confidence, assertiveness, the ability to function collaboratively with team members, problem-solving and critical thinking. This congruence between the desired skills and abilities for nursing practice now and in the future, and the learning outcomes described by graduating students is remarkable. The Level Four students indicated they leave the BScN programme with the tools to analyse, discuss, critique, explore alternatives and effect change, and they attribute their development of these abilities to the educational approach in which they participated.

CONCLUSIONS

Students are satisfied with the educational approach.

The majority of students throughout all levels of the programme expressed above average levels of satisfaction, as measured by the fixed choice Course Experience

Questionnaire, and reiterated in the open-ended responses. They described feeling proud to be MAC students, and participants in a unique approach to nursing education.

There is congruence between how students and faculty experience the programme.

There was remarkable congruence in the descriptions by students and faculty about strengths and limitations of the programme. Their reports of the philosophy and process of small group, self-directed, problem-based learning were alike. They identified similar areas of strength and those needing attention, and the challenges they faced in becoming a student or teacher were comparable.

The tutor role is vital to the experience of learning and teaching in a PBL programme.

The tutor is pivotal to a successful and satisfying PBL experience. Expertise in both the content of the problems discussed and the process of small group learning contributes to the best results for both students and tutors. Personal qualities of enthusiasm, engagement, and empathy are described by students as positive tutor characteristics, while being uninvolved, lacking concern and being abrupt, critical and rigid are tutor behaviours that are detrimental to student learning.

There are challenges in becoming a student and a teacher in this approach.

As the results have demonstrated, there is stress and anxiety associated with becoming comfortable with the PBL approach. For the students, there are differing challenges across the levels of the programme. Confusion, floundering and insecurity were words used frequently

by students in the first two levels, while students in upper levels were still using these words to describe their early experiences. Knowing when you have learned enough, and knowing enough to graduate and begin practice were still concerns of upper level students, although by the final year it did "come together".

For faculty, finding the right balance between structure and flexibility is the greatest challenge. Avoiding the pitfall of becoming the expert and providing students with answers rather than the resources was a major difficulty for faculty.

Self-direction and how to facilitate it are sources of tension for students and tutors.

The self-directed aspect of the PBL approach is the source of both stress and anxiety, but also contributes to the positive outcomes from the programme. The desire for more structure, the struggles associated with not knowing what to learn or in what depth were expressed poignantly by students. Determining the limits when implementing self-directed learning was voiced as a concern by tutors. For both groups the overriding problem is the setting of clear desired outcomes to be achieved, while guaranteeing latitude and flexibility about how to reach the established goals.

Effective group process is integral to productive learning.

When the group works well, the learning experience is both productive and satisfying. When the group does not achieve cohesion and a shared purpose, there is unhappiness, a sense of failure and learning is compromised. Thus the centrality of the group to the PBL experience is powerful. Students and tutors have responsibility for the group and all

participants need to develop knowledge of group dynamics and receive support to implement them.

Assessment of student learning is an issue for students and faculty.

Both students and faculty expressed dissatisfaction with the methods of assessment used in the programme. The call for more testing, to provide confirmation of the level of knowledge attained, was made by all study participants. Methods used currently are open to subjectivity, and perceived by some to be dependent on the relationship between student and tutor. Concerns that students (termed "floaters") could pass through the programme having done little work were expressed.

There are personal and professional outcomes for learners in the PBL approach.

Personal qualitites of assertiveness, confidence and the ability to work with others are all described as outcomes of the approach to learning. Students also described professional skills and abilities attained that are congruent with the new roles for nurses, including skills of information searching, problem-solving, critical thinking and communication. Although students begin to describe these outcomes in first year, they become more aware of the positive results of the programme as they move through the programme, and are able to articulate their abilities by level four.

IMPLICATIONS FOR EDUCATION

The conclusions from the study highlight many strengths and positive results; at the same time, they point to areas requiring change and these are described below under three headings: student orientation, tutor development, and student assessment.

Student Orientation.

As noted in the results and discussion, the students experience such levels of stress and anxiety in the early years of the programme that they are still commenting upon these feelings as they complete the programme. This emphasizes the necessity of finding and evaluating new ways of assisting students to adapt to PBL, in particular the self-directed aspects of the process. The literature is somewhat instructive on this matter. First, clear, explicit expectations and explanations of the process are central to any orientation (Ishida, 1995). Secondly, assigning tutors with the particular interests and skills to assist beginning students would be useful (Barrows, 1988). Finally, tutors should acknowledge that students are undergoing a transition from home to university, and assist them with this transition.

Faculty Development.

Faculty similarly require orientation and ongoing support to maximise the tutor role, which is so essential to effective PBL. Learning about the process of introducing PBL to a student group, of careful planning of learning activities, of supporting students in their early experiences and letting go as students develop their own skills should be part of every faculty development programme. Central to the tutor role is a new relationship with students, based

on an increased awareness of self and others, and this value must be stressed, along with ways to operationalize it. Again the literature suggests useful procedures to assist tutors at all levels, and in particular at Level One, where, as this case study has confirmed, students have special needs (Evans & Taylor, 1996; Grand'Maison & Des Marchais; 1991; Lucero, Jackson & Galey, 1985; Wetzel, 1995; Wilkerson & Hundert, 1991). Ongoing opportunities to meet and discuss situations should be provided. The core value of the faculty development programme should be balance, and ways to best achieve balance between flexibility and clear expectations should define the programme. In the end, faculty need to feel comfortable with their new role as facilitator of learning and co-learner rather than imparter of knowledge.

Student Assessment

Achieving the process objectives of PBL while still affirming for students (and faculty) that they are learning what they need to know should be the dual goals of student assessment (Blake et al.,1996; Norman, 1994; van der Vleuten & Verwijnen, 1990). At present in the BScN programme the methods used to assess the former are fraught with issues of high subjectivity, low reliability and validity, while there is limited emphasis on assessing knowledge. A critical review of the current assessment system and an exploration of alternate methods is imperative. Student assessment serves many purposes: (1) to determine whether individual students have met the requirements of a course of instruction, from a single course to an entire programme; (2) to provide constructive feedback to students so they can then modify their learning behaviours; (3) to provide feedback to a programme/curriculum, where performance is aggregated over groups rather than individuals;

and (4) as a statement of values, wherein the choice of methods of evaluation is consistent with the values of the programme (Norman, 1994). In the BScN programme we need to keep these purposes in mind as we work systematically to address the limitations of our current system of student assessment.

IMPLICATIONS FOR RESEARCH

Suggestions for further research fall into three categories: (1) research designed to assess the initiatives outlined above; (2) research designed to more clearly articulate the process of PBL; and (3) exploration of the outcomes of PBL within nursing education. Suggestions for investigations into these three areas, alone or in combination, are outlined below.

Research related to student and faculty orientation and student assessment.

1. Studies to evaluate different methods of orienting students to PBL should be undertaken, to determine the most effective methods of assisting students in their adjustment to all the aspects of the learning approach.

2. Tutor development and the relationships between type and length of development and the effectiveness of PBL should be explored. At present we do not know the most effective way to prepare people for the shift in role or the kind of ongoing support needed to maintain the role.

3. Investigations of student assessment methods in terms of their acceptance by students and faculty and their predictive validity are warranted. Finding the best mix of

methods to assess knowledge and process outcomes will require implementation of different methods along with their concurrent evaluation.

Research related to issues of PBL implementation.

4. There are several outstanding issues related to PBL implementation that require exploration.

(a) An evaluation of different methods of information sharing within PBL groups is warranted. At present students generally research different topics and then share the new-found information with their group members. It has been suggested that other methods would be more effective for both learning outcomes and satisfaction with the group.

(b) The influence of group function on learning outcomes is under-explored, although the PBL literature in general and this study in particular identify group function as an important factor in students' perceptions of the learning environment.

(c) There is good evidence from the medical education literature that both content and process expertise influence learning positively. This should be explored within nursing, where content expertise of faculty is not well acknowledged as a factor in student learning outcomes.

Research to compare PBL and conventional curricula in nursing education.

5. A study to compare students from a PBL curriculum with students completing a conventional nursing education programme is imperative. Such a study should compare

graduates on the outcomes required by nurses as they enter new and expanded roles, to include knowledge (assessed by achievement on licensing exams), critical thinking, clinical decision-making and lifelong learning.

EPILOGUE

Since the completion of this study, the results have been communicated to faculty, through academic seminars and presentations to the BScN Executive, the curriculum committee of the programme. The identified strengths have been celebrated. The limitations have been acknowledged, and action taken to respond to these areas of concern. First, a group of faculty has been established to generate a faculty development programme, which will also include a process for evaluating the usefulness of the resulting programme. Secondly, another faculty group has begun to review critically the measures used currently for student assessment, and to search for other measures. The group will work closely with colleagues from other health sciences programmes including medicine, occupational and physical therapy, and midwifery, since those programmes have also identified student assessment as a concern. A third initiative is the development of a research project that will be implemented in March, 1998, where nursing graduates of McMaster University (a PBL programme) will be compared with graduates from the University of Ottawa (which uses a conventional, behavioural approach to nursing education) on the outcomes of clinical functioning, critical thinking, lifelong learning and knowledge. It is expected that this project will make a major contribution to the nursing education literature in particular and the PBL literature in general, as we seek to better understand this approach to education.

In conclusion, the conduct and findings of this study have been invaluable to me as a researcher and educator. The experience has informed my practice in both areas, and I anticipate ongoing learning in both roles as I continue to practice and to investigate this particular educational approach. Certainly I have heard the students' message that, as a tutor, I

have a tremendous impact on their experience and I must be willing to provide guidance early on and to "let go" when the time comes.

REFERENCES

Albanese, MA & Mitchell, S (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. Academic Medicine, 68, 52-81.

Alderson, HJ (1976). Twenty-five Years A-growing: The History of the School of Nursing, McMaster University. Hamilton, ON: McMaster University.

Alivari, C (1995). Problem-based Learning in a Health Sciences Curriculum. London: Routledge.

Allen, DE, Duch, BJ & Groh, SE (1996). The power of problem-based learning in teaching introductory science courses. in Wilkerson, L & Gijselaers, WM (Eds.) Bringing Problem Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Andrews, M & Jones, PR (1996). Problem-based learning in an undergraduate nursing programme: a case study. Journal of Advanced Nursing, 23, 357-365.

Armstrong, EG (1991). A hybrid model of problem-based learning. in Boud, D & Feletti, G (Eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press.

Arnold, L & Willoughby, TL (1990). The quarterly profile test. Academic Medicine, 65, 515-516.

Arthur, H and Baumann, A. (1996). Nursing curriculum content: an innovative decision-making process to define priorities. Nurse Education Today, 16(1), 63-68.

Atkins, S & Murphy, K (1993). Reflection: A review of the literature. Journal of Advanced Nursing, 18, 1188-1192.

Baker, CR (1996). Reflective learning: A teaching strategy for critical thinking. Journal of Nursing Education, 35(1), 19-22.

Barrows, H.S. (1986). A taxonomy of problem-based learning methods. Medical Education, 20, 481-486.

Barrows, HS (1988). The Tutorial Process. Springfield: Southern Illinois University.

Barrows, HS (1996). Problem-based learning in medicine and beyond: A brief overview. in Wilkerson, L & Gijselaers, WM (Eds.) Bringing Problem Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Barrows, HS and Tamblyn, RM (1980). Problem-based Learning: An Approach to Medical Education. New York: Springer Publishing.

Berkson, L (1993). Problem-based learning: Have the expectations been met? Academic Medicine, 68(10), S79-S88.

Bernstein, P, Tipping, J, Bercovitz, K and Skinner, HA (1995). Shifting students and faculty to a PBL curriculum: Attitudes changed and lessons learned. Academic Medicine, 70(3), 245-247.

Bevis, EO (1993). All in all, it was a pretty good funeral. Journal of Nursing Education, 32(3), 101-105.

Bevis, EO & Watson, J (1989). Toward a Caring Curriculum: A New Pedagogy for Nursing. New York: NLN

Blake,J, Johnson, A, Mueller, CB, Norman, G, Keane, D, Cunnington, J, Coates, G & Rosenfeld, J (1994). Progress report of the Personal Progress Index. Pedagogue, 5(2), 1-6.

Blake, JM, Norman, GR, Keane, DR, Mueller, CB, Cunnington, J & Didyk, N (1996). Introducing progress testing in McMaster University's problem-based medical curriculum: psychometric properties and effect on learning. Academic Medicine, 71(9), 1002-1007.

Blumberg, P, & Michael, JA (1992). Development of self-directed learning behaviours in a partially teacher-directed problem-based learning curriculum. Teaching and Learning in Medicine, 4(1), 3-8.

Boshuizen, HPA, van der Vleuten, CPM, Schmidt, HG & Machiels-Bongaerts, M. (1997). Measuring knowledge and clinical reasoning skills in a problem-based curriculum. Medical Education, 31, 115-121.

Boud,D and Feletti, G (1991). The Challenge of Problem-based Learning. New York: St. Martin's Press.

Brandon, JE & Majumdar, B (1997). An introduction and evaluation of problem-based learning in health professions education. Family and Community Health, 20(1), 1-15.

Bruner, JS (1977). The Process of Education. Cambridge, MA: Harvard University Press.

Callin, M & Ciliska, D (1983). Revitalizing problem-solving with triple jump. Canadian Nurse, 79, 41-43.

Chinn, PL (1990). Research innovations: A contradiction of terms. Advances in Nursing Science, 12(3) vi.

Clarke, RM, Feletti, GI and Engel, CE (1984). Student perceptions of the learning environment in a new medical school. Medical Education, 18, 321-325

Cohen, L & Manion, L (1989). Research Methods in Education. New York: Routledge.

Creedy, D, Horsfall, J and Hand, B (1992). Problem-base learning in nursing education: an Australian view. Journal of Advanced Nursing, 17, 727-733.

Cust, J (1996). A relational view of learning: Implications for nurse educators. Nurse Education Today, 16, 256-266.

Davis, SS (1994). Problem-based Learning in Medical Education: A Qualitative Study of Curriculum Design and Students' Experience in an Experimental Program. (Doctoral dissertation, Ohio State University, 1994). Dissertation Abstracts International, 9516978.

Davis, WK, Nairn, R, Paine, ME, Anderson, RM and Oh, MS (1992). Effects of expert and non-expert facilitators on the small-group process and on student performance. Academic Medicine, 67(7), 470-474.

Day, SC, Norcini, JJ, Diserens, D, Cebul, RD, Schwartz, JS, Beck, LH, Webster, GD, Schnabel, TG & Elstein, A (1990). The validity of an essay test of clinical judgement. Academic Medicine, 65, S30-40.

DesMarchais, JE (1991). From traditional to problem-based curriculum: How the switch was made at Sherbrooke, Canada. Lancet, 338, 234-237.

Des Marchais, JE, Dumais, B, Jean, P & Vu (1993). An attempt at measuring student ability to analyze problems in the Sherbrooke problem-based curriculum: A preliminary study. in Bouhuijs, PAJ, Schmidt, HG & Van Berkel, HJM. (Eds.) Problem-Based Learning as an Educational Strategy. Maastricht ND: Network Publishers.

Des Marchais, JE & Vu, NV (1996). Developing and evaluating the student assessment system in the preclinical problem-based curriculum at Sherbrooke. Academic Medicine, 71 (3), 274-283.

Dewey, J (1938). Logic, the Theory of Inquiry. New York: Holt.

Diekelmann, N (1993). Behavioural pedagogy: A Heideggerian hermeneutical analysis of the lived experiences of students and teachers in nursing. Journal of Nursing Education, 32, 245-250.

Dolmans, D, Gijselaers, W, Schmidt, H & van der Meer, S (1993). Problem effectiveness in a course using problem-based learning. Academic Medicine, 68(3), 207-213.

Dolmans, D & Schmidt, H (1996). The advantages of problem-based curricula. Post-graduate Medical Journal, 535-538.

Doring, A, Bramwell-Vial, A & Bingham, B (1994) Staff comfort/ discomfort with problem-based learning: A preliminary study. Nurse Education Today, 263-266.

Drummond-Young, M, Mohide, A, Tew, M, Baumann, A and Byrne, C (1996). A PBL paper problem package for small group learning in nursing programmes: A practical guide from concepts to application. Hamilton, ON: McMaster University School of Nursing.

Eagle, CJ, Harasym, PH and Mandin, H (1992). Effects of tutors with case expertise on problem-based learning issues. Academic Medicine, 67(7), 465-454.

Entwistle, NJ & Ramsden,P (1983). Understanding Student Learning. London: Croom Helm

Erikson, F & Shultz, J (1992). Students' experience of the curriculum. in Jackson, PW (ed.) Handbook of Research on Curriculum. New York: MacMillan

Evans, PA & Taylor, DCM (1996). Staff development of tutor skills for problem-based learning. Medical Education, 30, 365-366.

Firestone, WA (1987). Meaning in method: The rhetoric of quantitative and qualitative research. Educational Researcher, 16(7), 16-21.

Frost, M (1996). An analysis of the scope and value of problem-based learning in the education of health professionals. Journal of Advanced Nursing, 24, 1047-1053.

Garrison, DR (1992). Critical thinking and self-directed learning in adult education: An analysis of responsibility and control issues. Adult Education Quarterly, 42(3), 136-148.

Gijselaers, WM (1996). Connecting problem-based practices with educational theory. in Wilkerson, L & Gijselaers, WM (eds). Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Glaser, BG & Strauss, AL (1967). The Discovery of Grounded Theory: Strategies for Qualitative Research. Chicago: Aldine.

Glen, S (1994). Towards a new model of nursing education. Nurse Education Today, 15, 90-95.

Goetz, P & LeCompte, MD (1984). Ethnography and Qualitative Design in Educational Research. New York: Academic Press.

Grand'Maison, P and Des Marchais, JE (1991). Preparing faculty to teach in a problem-based learning curriculum: the Sherbrooke experience. Canadian Medical Association Journal, 144(5), 557-562.

Hafler, JP (1991).Case writing: case writers' perspectives, in Boud D & Feletti, G (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press.

Handbook, Bachelor of Science in Nursing Programme (1997). School of Nursing, McMaster University, Hamilton, Ontario.

Hanson, LE, & Smith, MJ (1996). Nursing students' perspectives: Experiences of caring and not-so-caring interactions with faculty. Journal of Nursing Education, 35(3), 105-112.

Harden, RW, Stevenson, M, Downie, WW & Wilson, GM. (1975) Assessment of clinical competence using objective structured clinical examination. British Medical Journal, Feb22, 447-451.

Harden, RM, Sowden, S & Dunn, WR (1984) Some educational strategies in curriculum development: The SPICES model. Medical Education, 18, 284-297.

Hay, J (1995). Tutorial Performance. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University

Hebert, R & Bravo, G (1996). Development and validation of an evaluation instrument for medical students in tutorials. Academic Medicine, 71 (5), 488-494.

Heliker, D (1994). Meeting the challenge of the curriculum revolution: Problem-based learning in nursing education. Journal of Nursing Education, 33, 45-47.

Holmes, DB & Kaufman, DM (1994). Tutoring in problem-based learning: A teacher development process. Medical Education, 28, 275-283.

Hughes, L (1992). Faculty-student interactions and the student perceived climate for caring. Advances in Nursing Science, 14(3), 60-71.

Irvine, LMC (1995). Can concept mapping be used to promote meaningful learning in nurse education? Journal of Advanced Nursing, 21, 1175-1179.

Ishida, DN (1995). Learning preferences among ethnically diverse nursing students exposed to a variety of collaborative learning approaches including problem-based learning. (Doctoral

dissertation, University of Hawaii, 1995) Dissertation Abstracts International, University Microfilms No. 3135.

Jones, PR (1995). Hindsight bias in reflective practice: an empirical investigation. Journal of Advanced Nursing, 21, 783-799.

Kalain, HA & Mullen, PB (1996). Exploratory factor analysis of students' ratings of a problem-based learning curriculum. Academic Medicine, 71(4), 390-392.

Kasworm, C (1983). Self-directed learning and lifespan development. International Journal of Lifelong Education, 2(1), 29-46.

Kaufman, DM & Holmes, DB (1996). Tutoring in problem-based learning: perceptions of teachers and students. Medical Education, 30, 371-377.

Kaufman, DM & Mann, KV (1997). Basic science in problem-based learning and conventional curricula: Students attitudes. Medical Education, 31, 177-180.

Khoiny, FE (1995). The Effectiveness of Problem-based Learning in Nurse Practitioner Education. (Doctoral dissertation, University of Southern California, 1995). Dissertation Abstracts International, 9614036.

Kim, J & Meuller, CW (1978). Factor Analysis: Statistical Methods and Practical Issues. Beverly Hills, CA: Sage.

Kingsland, AJ (1996). Time expenditure, workload, and student satisfaction in problem-based learning. in Wilkerson, L & Gijselaers, WM (eds). Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Knowles, MS (1978). The Adult Learner: A Neglected Species. (2nd ed.) Houston: Gulf.

Knox, JDE (1989). What is...a modified essay question? Medical Teacher, 11, 51-57.

Lilienfeld, DE & Stolley, PD (1994). Foundations of Epidemiology. New York: Oxford University Press.

Lincoln, YS & Guba, EG (1985). Naturalistic Inquiry. Newbury Park, CA: Sage

Lindemann, C (1989). Clinical teaching: Paradoxes and paradigms. in Curriculum Revolution: Reconceptualizing Nursing Education. New York: NLN

Little, P & Ryan, G (1988). Educational change through problem-based learning. Australian Journal of Advanced Nursing, 5(4), 31-35.

Long, HB (1990). Psychological control in self-directed learning. International Journal of Lifelong Learning, 9(4), 331-338.

Lucero, SM, Jackson, R & Galey, WR (1985). Tutorial groups in problem-based learning. in Kaufman, A (ed.) Implementing Problem-Based Medical Education. New York: Springer.

MacDonald, PJ, Chong, JP, Chongtrakul,P, Neufeld, VR, Tugwell, P, Chambers, LW, Pickering, RJ and Oates, MJ (1989). Setting educational priorities for learning the concepts of population health. Medical Education, 23, 429-439.

MacLeod, MLP (1995). What does it mean to be well taught? A hermeneutic course evaluation. Journal of Nursing Education, 34(4), 197-203.

Mac Leod, MLP & Farrell, P (1994). The need for significant reform: A practice-driven approach to curriculum. Journal of Nursing Education, 33(5), 208-214.

Maxwell, JA and Wilkerson, L (1990). A study of non-volunteer faculty in a problem-based curriculum. Academic Medicine, 65(9), S13-S14.

McKnight, J, Rideout, E, Brown, B, Ciliska, D, Patton, D, Rankin, J & Woodward, C (1987). The Objective Structured Clinical Examination (OSCE): An alternate approach to assessing student clinical performance. Journal of Nursing Education, 26(1), 39-42.

McMillan, MA & Dwyer, J (1989). Changing times, changing paradigm: the MacArthur experience. Nurse Education Today, 9, 93-99.

Merriam, SB (1988). Case Study Research in Education: A Qualitative Approach. San Francisco: Jossey-Bass

Miller, J & Seller, W (1990). Curriculum: Perspectives and Practice. Mississauga, ON: Clark Pittman

Moore-West, M, Harrington, DL, Mennin, SP, Kaufman, A & Skipper, BJ (1989). Distress and attitudes toward the learning environment: Effects of a curriculum innovation. Teaching and Learning in Medicine, 1(3), 151-157.

Moran, JJ (1997). Assessing Student Learning: A Guide for Practitioners. Malabor, Fl: Kreiger

Morse, J (1991). Approaches to qualitative-quantitative methodological triangulation. Nursing Research, 40, 120-123.

Naylor, M (1993). An overview of the objective structured clinical examination. Physiotherapy Canada, 45, 171-178.

Neufeld, V (1985). Education for capability: An example of curriculum change from medical education. Journal for Education and Training Technology, 21(4), 262-267.

Neufeld, V & Barrows, H (1974). The 'McMaster' philosophy: An approach to medical education. Journal of Medical Education, 49)11), 1040-1050.

Neufeld, V & Sibley, JC (1989). Evaluation of health sciences education programs: Program and (student) assessment at McMaster University. in Schmidt, H., Lipkin, M, deVries, MW & Greep, JM. (eds). New Directions for Medical Education: Problem-based and Community Oriented Medical Education. New York: Springer-Verlag.

Neville, AJ & Norman, GR (1993). Effect of problem structure on learning objectives of students. Unpublished manuscript, McMaster University, Hamilton, ON.

Newble, DI & Swanson, DB (1988). Psychometric characteristics of the objective structured clinical examination. Medical Education, 22, 325-334.

Newman, MG (1995). A Comparison of Nursing Students in Problem-Based and the Lecture Method. Unpublished master's thesis, University of Alberta, Edmonton, Alberta.

Nichols, EG & Miller, GK (1984). Interreader agreement on comprehensive essay examinations. Journal of Nursing Education, 23(2), 64-69.

Norman, GR (1991). What should be assessed? in Boud, D & Feletti, G (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press.

Norman, G (1994). Why evaluate? Pedagogue, 5(1), 1-6.

Norman, GR & Schmidt, HG (1992). The psychological basis of problem-based learning: A review of the evidence. Academic Medicine, 67(9), 557-565.

Norman, GR & Streiner, DL (1997).PDQ Statistics. St. Louis: Mosby.

Norman, G, Wakefield, J & Shannon, S (1995). Overview. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University

Olsen, JO (1987). The McMaster philosophy: A student's perspective on implementation. Medical Education, 21, 293-296.

Palmer, D & Rideout, E (1995). Essays. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University.

Polit, DF (1996). Data Analysis and Statistics for Nursing Research. Stamford: Appleton and Lange.

Rangachari, PK (1996). Twenty-up: Problem-based learning with a large group. in Wilkerson, L & Gijselaers, WM (eds). Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Rankin, JA (1992). Problem-based medical education: effect on library use. Bulletin of the Medical Library Association, 80(1), 36-43.

Reznick, RK, Baumber, JS, Cohen, R, Rothman, A, Blackmore, d & Berard, M (1993). Guidelines for estimating the real cost of an objective structured clinical examination. Academic Medicine, 68, 513-517.

Roberts, J & Brown, B (1990) Testing the OSCE: a reliable measure of clinical nursing skills. Canadian Journal of Nursing Research, 22, 51-59.

Roberts, J & Norman, GR (1990). Reliability and learning from the OSCE. in Bender, W, Hiemstra, RJ, Scherpbeir, AJJA,& Zwierstra, RP (eds.) Teaching and Assessing Clinical Competence. Groningen, ND: Stichting TICTAC

Ross, B (1991). Toward a framework for problem-based curricula. in Boud, D & Feletti, G (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press.

Ryan, G & Little, P (1991). Innovations in a nursing curriculum. in Boud, D & Feletti, G (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press.

Salvatori, P & Brown, B (1995). Objective Structured Clinical Examination. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University.

Saunders, K, Northrup, DE & Mennin, SP (1985). The library in a problem-based curriculum. in Kaufman, A (ed.) Implementing Problem-Based Medical Education. New York: Springer.

Saylor, CR (1990). Reflection and professional education: Art, science, and competency. Nurse Educator, 15(2), 8-11

Schmidt, HG (1983). Problem-based learning: rationale and description. Medical Education, 17, 11-16.

Schmidt, HG (1993). Foundations of problem-based learning: Some explanatory notes. Medical Education, 27, 422-432.

Schmidt, HG, Lipkin, M, deVries, MW and Greep, JM (1989). New Directions for Medical Education: Problem-based Learning and Community-oriented Medical Education. New York: Springer-Verlag.

Schmidt, HG, van der Arend, A, Moust, JH, Kox, I and Boon, L (1993). Influence of subject-matter expertise on student effort and achievement in problem-based learning. Academic Medicine, 68, 784-791.

Schmidt, HG and Moust, JHC (1995). What makes a tutor effective? A structural-equations modelling approach to learning in problem-based curricula. Academic Medicine, 70(8), 708-714.

Seltzer, S, Hilbert, S, Maceli, J, Robinson, E & Schwartz, D (1996). An active approach to calculus. in Wilkerson, L & Gijselaers, WM (eds). Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Shin, J, Haynes, R & Johnson, ME (1993). Effect of problem-based, self-directed undergraduate education on lifelong learning. Canadian Medical Association Journal, 148, 79-88.

Silver, M and Wilkerson, L (1991). Effects of tutors with subject expertise on the problem-based tutorial process. Academic Medicine, 66(5), 298-300.

Smith, RM (1993). The triple-jump examination as an assessment tool in the problem-based medical curriculum at the University of Hawaii. Academic Medicine, 68(5), 365-372.

Spaulding, WB & Cochran, J (1991). Revitalizing medical education: McMaster Medical School, the early years, 1965-1974. Hamilton, ON: BC Decker.

Stake, RE (1994). Case Studies. In NK Denzin & YS Lincoln (Eds.) Handbook of Qualitative Research. Thousand Oaks, CA: Sage

Stenhouse, L (1975). An Introduction to Curriculum Research and Development. London: Heinemann.

Stern, P. (1995). Case-based learning in Occupational Therapy: A Case Study of Student Perceptions. (Doctoral dissertation, University of Virginia, 1995). Dissertation Abstracts International, 9525035.

Stevens, B & Brown, B (1989). A User's Manual for Evaluation of Clinical Nursing Skills. Hamilton, ON: McMaster University School of Nursing.

Stinson, JE & Milter, RG. (1996). Problem-based learning in business education. in Wilkerson, L & Gijselaers, WH (eds.) Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Stratford, PW, Thompson, MA, Sanford, J, Saarinen, H, Dilworth, P, Nixon, P, Fraser-MacDougall, V & Pierce-Fenn, H (1990) Effect of station examination item sampling on generalizability of student performance. Physical Therapy, 1, 31-36.

Stratford, P & Smeda, J (1995). Modified essay questions. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University.

Swanson, DB. Norman, GR & Linn, RL (1995). Performance-based assessment: Lessons from the health professions. Educational Researcher, 24(5), 5-11.

Swanson, DB, Case, SM & van der Vleuten, CPM (1991). Strategies for student assessment, in Boud, D & Feletti, G. (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press

Tanner, C (1990). Reflections on the curriculum revolution. Journal of Nursing Education, 29, 295-299.

Taylor, SJ & Bogdan, R (1984). Introduction to Qualitative Research Methods: The Search for Meanings. New York: Wiley.

Thomas, RE (1997). Problem-based learning: Measurable outcomes. Medical Education, 31, 320-329.

Thompson, M (1995). Direct observation. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University.

Tiberius, RG (1990). Small Group Teaching: A Trouble Shooting Guide. Toronto: Ontario Institute for Studies in Education.

Tipping, J, Freeman, RF & Rachlis, AR (1995). Using faculty and student perceptions of group dynamics to develop recommendations for PBL training. Academic Medicine, 70(11), 1050-1052.

Towle, A & Cottrell, D (1996). Self directed learning. Archives of Diseases in Children, 74, 357-359.

Townsend, J (1990a). Problem-based learning. Nursing Times, 86(14), 61-62.

Townsend, J (1990b). Teaching/learning strategies. Nursing Times, 86(23), 66-68.

Trigwell, K & Prosser, M (1991). Improving the quality of student learning: The influence of learning context and student approaches to learning on outcomes. Higher Education, 22(3), 251-266.

Tyler, RW (1949). Basic Principles of Curriculum and Instruction. Chicago: University of Chicago Press.

Valiga, TM (1988). Curriculum outcomes and cognitive development: New perspectives for nursing education. in Curriculum Revolution: Mandate for Change. New York: National Leagie for Nursing.

van der Vleuten, C & Verwijnen, M (1990). A system for student assessment. in van der Vleuten, C & Wijen, W (eds.) Problem-based Learning: Perspectives from the Maastricht Experience. Amsterdam: Thesis Publishers.

Vernon, DTA & Blake, RL (1993). Does problem-based learning work? A meta-analysis of evaluative research. Academic Medicine, 68, 550-563.

Vernon, DTA (1995). Attitudes and opinions of faculty tutors about problem-based learning. Academic Medicine, 70(3), 216-223.

Von Dobeln, G (1996). Four years of problem-based learning: A students' perspective. Postgraduate Medical Journal, 72, 95-98.

Vygotsky, LS (1978). Mind in Society: The development of Higher Psychological Processes. (Eds. Cole, M, John-Steiner, V, Scribner, S & Souberman, E). Cambridge, MA: Harvard University Press.

Vygotsky, LS (1987). The Collected Works of LS Vygotsky. (Eds. Rieber, RW & Carton, AS). New York: Plenum.

Wakefield, JG (1985). Direct observation. in Neufeld, VR & Norman, GR (eds.) Assessing Clinical Competence. New York: Springer.

Wallis, B & Mitchell, K (1985). The teaching of group process skills as a basis for problem-based learning in small task-oriented groups. in Boud, D. (ed.) Problem-based Learning in Education for the Professions. Sydney: HERDSA.

Walton, HJ & Matthews, MB (1989). Essentials of problem-based learning. Medical Education, 23, 542-558.

Westmorland, M & Parsons, M (1995). Triple jump exercise. in Evaluation Methods: A Resource Handbook. Hamilton, ON: Programme for Educational Development, McMaster University.

Wetzel, MS (1996). Developing the role of tutor/ facilitator. Post-graduate Medical Journal, 474-477.

Wilkerson, L (1996). Tutors and small groups in problem-based learning: Lessons from the literature. in Wilkerson, L & Gijselaers, WH (eds.) Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Wilkerson, L & Hundert, EM (1991). Becoming a problem-based tutor: Increasing self-awareness through faculty development. in Boud, D & Feletti, G. (eds.) The Challenge of Problem-Based Learning. New York: St. Martin's Press

Wilkerson, L, Hafler, J and Liu, P (1991). A case study of student-directed discussion in four problem-based tutorial groups. Academic Medicine, 66(9), S79-S81.

Williams, R, Saarinen-Rahikka, H & Norman, GR (1995). Self-directed learning in problem-based health sciences education. Academic Medicine, 70(2), 161-163.

Wolf, FM (1993). Problem-based learning and meta-analysis: Can we see the forest for the trees? Academic Medicine, 68(7), 542-544.

Wong, J & Wong, S (1987). Towards effective clinical teaching in nursing. Journal of Advanced Nursing, 12 (4), 505-513.

Woods, D (1996). Problem-based learning for large classes in chemical engineering. in Wilkerson, L & Gijselaers, WM (eds). Bringing Problem-Based Learning to Higher Education: Theory and Practice. San Francisco: Jossey-Bass.

Yin, RK (1989). Case Study Research: Design and Methods. Beverly Hills, CA: Sage.

APPENDIX A

BscN PROBLEM-BASED LEARNING HEALTH CARE PAPER PROBLEM	**Nursing Concepts in Health & Illness**

Jeanette LaLonde - Scenario I

Jeanette LaLonde is a 32-year old woman who began an exercise class in October. About mid-October she noticed a lump in the upper outer quadrant of her left breast. She consulted her family physician about the lump. The family physician palpated the lump and ordered a mammogram The mammogram indicated an abnormality. At this point Mrs. LaLonde was referred to a surgeon.

You are the nurse assigned to Mrs. LaLonde when she comes for her first visit with the surgeon. You will be conducting the initial assessment.

Jeanette LaLonde - Scenario II

The surgeon performed a needle aspirate.

The pathology report showed infiltrating duct carcinoma. The physician discussed various treatments with Jeanette. After consideration of treatment effectiveness and the implications of treatment on her ability to care for her family and farm duties, she decided to have a lumpectomy. Surgery was scheduled for the following week.

As the nurse in the surgical clinic you will be involved in Mrs. LaLonde's preparation for surgery.

Jeanette LaLonde - Scenario III

Mrs. LaLonde visited the outpatient regional cancer centre one week following discharge from hospital, to begin her chemotherapy. Her regime is as follows:

Cycles of treatment for 5-6 months
14 days on and 14 days off.
Cyclophosphamide 150 mgm. p.o. daily with breakfast for 14 consecutive days.
Methotrexate 52mgm. And 5-FU 780 mgm. IV weekly
Stemetil 10 mgm. p.o. and Decadron 8 mgm. p.o. prior to each infusion
Push fluids for 48 hours after each infusion.

You are the primary nurse for Mrs. LaLonde in the cancer centre.

Scenario I

JEANETTE LALONDE

NURSING ASSESSMENT DATA
formatted according to the McMaster University
School of Nursing
Nursing Model

CONTEXT

Life Context

Physical Environment
Lives on a market gardening farm outside of a large urban centre.. She does a lot of work on the farm which grows mainly vegetables and some fruit. Her family physician's office is located approximately 12 kms. from her home.

Culture
French background, raised in a small town in a rural area. Moved here with her husband 12 years ago. Her children are bussed to a French school in the city. It is very important to her that they maintain their French language, although they speak both English and French at home.

Social
Married with husband and four children - three boys, aged nine and seven and a half and six; and one girl, aged five. She was adopted and has two step brothers ages 44 and 52. Both step parents are dead. Her husband is thirty-three years old and works on the farm and as a truck driver. Mr. Lalonde is often on the road. Mrs. Lalonde carries the major responsibility for their children and their education, housework and the farm chores.

Good relationship with husband, they respect and love each other. Good relationship with step-brothers. The wife of Mrs. Lalonde's younger step-brother is supportive, although her health is "not good" since a colectomy some years ago. Another step-brother is also supportive. Both step-brothers live in nearby towns. The neighbours on the surrounding farms are good friends. The neighbouring farmers have a philosophy of helping one another out in times of trouble or need. This applies to farm-related and personal difficulties.

Economic
The economic base of the large urban area and the region are changing. Unemployment is high. Recently Mr. Lalonde has lost some of his usual hauling customers. He has managed to keep working full time, although he has to be more flexible about the hours he works and

is working longer hours since he has to travel further from home. The income from the farm has become more important. Over the last year, the income from the farm has dropped.

Since Mr. Lalonde is self employed, they have no extra insurance coverage for medications and the like. Mrs. Lalonde does the day-to-day chores on the farm, as well as the majority of the child care since her husband is on the road a good deal of the time. Any absence from the farm on her part will mean that work will not get done because they are unable to afford to hire extra help. The Lalondes consider themselves to be financially viable as a family so long as Mr. Lalonde has trucking work and Mrs. Lalonde is able to do the farm chores. They do not have money for extras, such as vacations, but "can't complain".

Political
Government is democratic and they have always lived in a democratic society. Their farm exists in a regional government area. Neither of the Lalondes' take an active part in political life. They do not belong to a particular political party. They have expressed some frustration about paying taxes for services in the urban areas which are not readily available to them.

Values and Beliefs
Feels life is basically fair and good. Believes people are to be trusted and are generally more good than bad. Working hard has its rewards and feels the need to be responsible and not expect others to do one's work.

Growth & Development
Thirty-two year old married mother of four healthy children.

Health Services Context
The Lalondes' family physician is English speaking and is located 12 kms from their home. They have been cared for by this physician for six years. The public health nurse visited Jeanette after the birth of her first child but she has not had any direct contact with a public health nurse since. The children are familiar with the public health nurse through school.

II DIALOGUE (relationship/interpersonal)

1. Verbal

Tends to take responsible action when a problem is perceived. Does not drink. Did smoke for twelve years, but gave it up when she learned of its implication for lung cancer. Usual childhood illnesses including chicken pox. Immunizations up-to-date. Her major health problems relate to

reproductive system. Menstrual irregularity. She was on hormonal therapy to regulate her menstrual cycle after the birth of her first child, but this led to headaches and weight gain. She decided to have a tubal ligation 4-1/2 years ago to limit the family size to four.

Eats a well balanced diet as described; however, when under pressure, tension, she tends to "treat" herself to desserts, sweets. She gains weight easily and then finds it depressing to be "out of shape, pudgy".

Normal urinary elimination, no stress incontinence. Two incidents of cystitis related to pregnancies, cleared quickly with antibiotics, fluids. Normal b.m. daily after breakfast.

Used to swim, play basketball, bicycle, but has not continued these activities since having her children. Recent weight gain, so feeling sluggish. She entered YWCA exercise class "To get into my clothes, be comfortable and look better". It was while showering after class that she discovered the lump - wonders if excessive exercise precipitated it.

Completely independent in self care.

No problems with sleeping. Tries to get a nap in afternoon with five year old but not always successful. Often tired from heavy work on farm, long days of care for house and children.

Describes self as very concrete learner and a good student. Likes to experience things she reads about, to know best how to carry out task. Does not like tapes but likes to view some films.

Sees herself as outgoing, friendly, athletic and attractive when younger. Now much less time and limited contact with friends because of heavy work commitments. She feels that she has lost some of her attractiveness, is overweight and somewhat out of shape.

Happy with her marriage although Mr. Lalonde is often away on overnight trucking jobs. Mrs. Lalonde reports that she and her husband have an active sexual relationship. She does not want to discuss this "most private matter" stating that she and her husband never have discussions about their sexual relationship. Normal reproductive function except for menstrual irregularity.

Tends to control situations by limiting information sharing; does not involve the family "unnecessarily" when she feels in distress. Eats in response to stress, "accepts" information given from authority figures and does not ask for additional explanations. Compliant, generally, with what doctors tell her to do, but wants to manage on her own. Did not discuss future plans during the health assessment.

Attitude toward current health complaint: She is concerned that it might be cancer. She is hoping it is not, but is unsure of what else it could be. Wondering whether she will need any

follow-up which will take her away from home and is very concerned about the impact of this on her family: Who will take care of her children and who will do her farm and home chores?

2. Non-verbal

Alert and oriented during interview. Grasped ideas and questions. Maintained eye contact for most of the interview but did not appear to hear some of what was said; seemed preoccupied. Fists were clenched for most of interview, restless. Mrs. Lalonde looks her age, is pale, slightly overweight (165 cm 69 kg) but in no apparent physical distress.

She tends to limit information given to others about her needs, and health problems to "protect them. I can handle it".

3. EMBODIED MESSAGES (lab values, physical assessment)

General appearance, grooming, hygiene - Neat, clean, pale, slightly overweight

Oral mucous membranes (colour, moistness, lesions) - clear

Teeth - dentures - 0; Cavities - 2 filled: Missing - 0

Hears whisper? - Normal

Reads newsprint? - Yes. Glasses? - No

Pulse rate - 70; Rhythm - regular

Respirations - 16; Depth - normal; Rhythm - normal; Breath Sounds - normal

Blood pressure - 125/80

Hand grip - firm; Can pick up pencil? - Yes

Range of motion: Joints - normal; Muscle firmness - Slightly flabby

Skin: Bony prominences - 0; Lesions - None; Colour changes - no;
Breasts - lump, L upper quadrant in left breast, sore to touch, approximately 2 cm in diameter;
Abdomen - normal; Perineum - normal
Multipara

Gait- normal; Posture - normal; Absent body part - none

Intravenous; drainage, suction etc. (specify) - none

Increased 4.5 kg. in past 3 months

Height - 165 cm

Temperature - 36.5°C

During history and examination:

Voice and speech pattern - normal; Vocabulary - correct usage

4. MIND, BODY; SYMBOLIC MEANING OR SPIRITUAL

Mrs. Lalonde believes in a higher being and describes herself as a god-fearing individual. She attends Mass every week and tries to get to confession when time permits.

Mrs. Lalonde believes that one's state of mind influences how one feels physically and vice versa.

Scenario I

JEANETTE LALONDE

CHART DATA: MEDICAL HISTORY AND PHYSICAL EXAM

HISTORY OF PRESENTING COMPLAINT:

Began exercise class. While showering after exercise, patient noticed that she had a throbbing pain in her left breast. She felt a lump in the upper outer portion of her left breast. She found that the lump would sting and she had "pain" around the overlying skin. As well, she complained of a weakness in her left arm and left neck lasting 10 to 20 minutes in association with the pain.

Jeanette states that she has not injured herself. There is no history of discharge from her nipples.

PAST MEDICAL HISTORY:

1. Was placed on a hormonal therapy following the birth of her first child because she was amenorrheic. She experienced substantial weight gain and headaches, therefore discontinued its use.
2. Tubal ligation four and a half years ago.
3. Menstrual cycle irregular over the last 3 months, both in interval and duration of blood. LNMP 4 months ago. Expecting menstrual flow within a few days.
4. Not on any medication.
5. Has not smoked for 12 years.
6. Does not drink alcohol.

FAMILY HISTORY:

She is adopted and has two step-brothers, ages 44 and 52. Both step-parents are dead.

SOCIAL HISTORY:

She is married and has a three sons: one aged nine, a second son aged seven and a half, and a third aged six years old. Mrs. Lalonde also has a five year old daughter.

Her husband is 33 years old and works as a farmer and truck driver. They live on a farm outside of a large urban centre. She does many of the chores on the farm on a day-to-day basis.

Husband and children all get along well. Family relationships are good.

EXAMINATION:

Pleasant 32-year-old woman who is neatly dressed, and in no apparent distress. BP 125/80; P 70 reg; R16; T36.5°C; Weight 69 kg (up 4.5 kg. over last 3 months). Except for breast abnormality described below, all other body systems were normal.

BREASTS:

Breasts are symmetrical. There is no abnormal puckering around either nipple. Both nipples appear normal. Examination of the right breast does not reveal any abnormality. Examination of the left breast indicate a mass in the left upper outer quadrant. It was palpated as about 2 cm. in diameter. Not attached to the skin or the underlying structures, but feels irregular. There was one small palpable lymph node in the left axilla.

IMPRESSIONS:

32-year-old female, mother of 4 children, with a tender lump in the upper outer quadrant of the left breast, one month duration, otherwise asymptomatic. No known contributing family history, as the patient does not have any information about her birth parents.

PLAN OF ACTION:

Needle aspirate of mass in left breast.
If positive for malignant cells, book for surgery.

BScN PROBLEM-BASED LEARNING **Nursing Concepts**
HEALTH CARE PAPER PROBLEM **in Health & Illness**
TUTOR PAPER PROBLEM PACKAGE GUIDE

JEANETTE LALONDE

NURSING PROCESS

A. Assessment: analysis and validation: shared meaning

B. Nursing Diagnosis

Identification of problems/issues requiring nursing intervention:

Examples of Suggestions:

Scenario I

- Fear and anxiety related to unknown etiology of lump and anticipatory fear of possible diagnosis of cancer
- Possible alternation of family processes and coping related to need for hospitalization or treatment which will interfere with Jeanette's ability to care for children and do farm chores
- Lowered self-esteem related to feeling overweight and being out-of-shape
- Ineffective coping related to tension reduction by eating high fat/calorie foods
- Health maintenance altered related to reduction in physical activity and feelings of sluggishness

Scenario III

- Impaired physical mobility of arm on operative side related to pain and discomfort at incisional site, musculoskeletal impairment caused by removal of pectoral fascia and muscles
- Comfort altered related to pain associated with surgery and possible metastases to spine
- Body image disturbance related to disfigurement from mastectomy
- Fluid volume excess related to node dissection
- Potential for infection related to inadequate primary defences caused by surgical incision
- Potential for inadequate coping related to diagnosis and role demands
- Altered family dynamics related to difficulty meeting role expectations
- Increased anxiety related to uncertainty of future
- Knowledge deficit related to post operative treatment, prognosis and self care

C. Nursing Care Options (Interventions)
The considerations for nursing intervention have been formatted according to the McMaster Model of Nursing.
Nursing Intervention (NI = nursing care + caring)
Caring = scientific + humanistic caring

i) Scientific Caring

a. Nursing Theories/McMaster model
Body image/self concept
Loss/grieving
Communication
Sexuality

b. Health Care System (standards of nursing practice, multidisciplinary practice, role of nurse and other team members, health care policies eg. Health Disciplines Act, principles of primary health care, community resources versus institution)

Epidemiology of breast cancer, morbidity & mortality
Primary prevention of breast cancer
Role of clinic nurse, ward nurse, oncology nurse, public health nurse
Hospital, regional cancer centre, community agencies
Support systems for family, individual
Discharge planning
Community resources

c. Biological impact - pathophysiology of breast cancer

Adenocarcinoma, metastases
Treatment options - surgery, chemotherapy, radiotherapy, biological response modifiers
Secondary prevention, eg, tamoxifen in high risk individuals

d. Family dynamics - family theory

Family coping
Family process
Support systems

e. Patient teaching

Breast self Examination
Pre and post operative care
Post mastectomy care and exercises
Coping
Mammography

f. Comfort measures/pain management

g. Alternative therapies for complementary therapies - eg therapeutic touch, macrobiotic diet,

ii) **Humanistic Caring**

a. Social support - family and individual
quality of life impact of breast cancer
self-help groups
community agencies, eg Cancer Society

b. Decision-making patterns, choices

iii) **Nursing Care** - nursing procedures

e.g. surgical asepsis such as dressings, catheterization; comfort measures; pain management; alternative therapies; patient education; preoperative and post-masectomy care.

D. Evaluation

Scenario II

JEANETTE LALONDE

The factors which influenced Jeanette's decision to have a mastectomy were: feeling more confident about having her entire breast removed in order to remove all the tumour; and not wanting to have adjuvant therapy unless it was necessary. She felt that the latter would be too time consuming, given her responsibilities on the farm and for child care.

APPENDIX B

BscN Programme, McMaster University

Double Jump Exercise

Problem L - Wanda Gibson

PROBLEM L

Presenting Situation:

Wanda Gibson is a 46 year old physician who is married, has a family, and has a busy family practice. She discovered a lump in her breast one week ago. She was admitted to the surgical unit today, for surgery tomorrow. You are the nurse caring for Dr. Gibson.

Problem L - Wanda Gibson

TUTOR PACKAGE

Hypotheses and Nursing Issues

- Anxiety related to uncertainty about the future.
- Altered family dynamics related to uncertainty about the future.
- Potential for inadequate coping related to diagnosis and role demands.
- Potential for infection related surgical incision.
- Fears/concerns related to outcome of surgery and to beginning chemotherapy.
- Grieving related to perceived effects of cancer on lifestyle.
- Potential for altered growth and developmental processes related to cancer prognosis.
- Knowledge deficit related to treatments following surgery.

Problem List - Examples

- Impaired mobility of arm on operative side related to pain/discomfort at incision site.
- Pain (altered comfort) associated with mastectomy.
- Anxiety/fear associated with decision to have simple mastectomy - was it the best decision?
- Body image disturbance related to mastectomy and body changes associated with chemotherapy (e.g. hair loss).
- Grieving related to loss of breast and change in appearance.
- High risk for self-concept disturbance related to surgery and chemotherapy treatments.
- Anxiety/fear associated with unknown prognosis of disease.
- Altered family processes related to fears associated with cancer diagnosis and disruptions to family life and work associated with chemotherapy treatments.

DATA SEARCH GUIDE

HISTORY:

History of Present Illness:

- Dr. Gibson was working at her computer, she reached sideways, and experienced a sharp discomfort in her left breast. She later examined it to find a small lump in the outer, upper quadrant. She booked an appointment with the surgeon for the following day. A needle biopsy indicated the presence of malignancy.

Past History

- ▸ childhood
  - Dr. Gibson has always been well.
  - Had chickenpox as a child.
- ▸ adult
  - Hospitalized for births of her three children.
  - No surgery, no accidents, no injuries.

Family History

- Maternal aunt died of breast cancer aged 52.
- Father recently diagnosed with cancer of the prostate.
- Mother A&W. One sister and one brother A&W.

Psychosocial / Family Status and Support System

- ▸ family status
  - Dr. Gibson has been married for 25 years - her husband is an oncologist in the city. They have a busy but supportive relationship.
  - Their children (all boys) are 15, 12 and 10 years of age and are active in school, music, sports.
- ▸ support system
  - Dr. Gibson moved here to attend medical school. No relatives here but several close female friends.
- ▸ work
  - Active practice - loves her work.
- ▸ tobacco
  - Smokes 20 cigarettes/day - finds them an important stress release.
- ▸ alcohol
  - Drinks wine (1-2 glasses) with dinner.
- ▸ religion
  - Active in the Anglican Church - all the family attend.

	DATA SEARCH GUIDE	
Response to Illness	-	• Dr. Gibson is shocked by her diagnosis - although she knows about risk factors, she felt it would not happen to her, because she leads a healthy life (with the exception of smoking) and has a positive attitude to life. Feels it will not alter her lifestyle.
Systemic Review		
▸ general		• Dr. Gibson is 5'6", weighs 150 lbs. - neat, attractive.
▸ skin		• Occasional skin blemish - treated with Tetracycline.
▸ H.E.E.N.T.		• Wears glasses for reading - no other problems.
▸ neck		• No problem.
▸ respiratory		• Occasionally SOB on running up stairs. Does not like the idea of having any reduction in physical activity.
▸ cardiovascular		• Occasional palpitations - along with the SOB - on exertion.
• gastrointestinal - nutrition		• Egg and toast for breakfast - sandwich at lunch (often on the run) - dinner with family - Θ desserts.
- elimination		• No problems with digestion, elimination.
▸ genitourinary		
▸ neurological		
▸ behavioural/ attitude		• Feels rushed a lot of the time, but loves to be active and involved. • Seen as an optimistic person.
- sleep		• Sleeps 6-7 hours per night.
• musculoskeletal		• Occasional pain in (R) knee - thinks it must be the beginning of arthritis.

		• Works 5 days/week.
▸ Activities of Daily Living	DATA SEARCH GUIDE	• Weekends with children/church/likes to hike, ski.
PHYSICAL:		
▸ vital signs		• BP - 130/85 P - 82 R - 20
▸ general affect		• Friendly, but expresses fear of the outcome of disease - children are so young - she has so much to live for.
▸ skin		
▸ eyes		• (N) No bruises, lesions.
▸ nose		• Glasses for reading.
▸ ears		• (N)
▸ mouth		• (N) hearing
▸ throat		• (N)
▸ neck		• (N)
▸ chest		• (N) • Good A/E. No adventitious sounds. • Breasts symmetrical, exam of left breast revealed 2 cm mass in upper, outer quadrant, one palpable lymph node in left axilla.
▸ heart		• (N) S_1S_2. No irregularities noted, no murmurs, no extra sounds.
▸ abdomen		
▸ rectal		• Soft, no tenderness.
▸ genitalia		• Not done. • Not done. Has not experienced menopause - uterus/ovaries intact.
▸ lymphatic - blood vessels - locomotor		• (N) • (N)
▸ extremities		• No impairment - Pulse (N), color pink, warm.
▸ neurological		• Alert, oriented. Cranial nerves (N).

▸ extremities	• No impairment - Pulse (N), color pink, warm.
▸ neurological	• Alert, oriented. Cranial nerves (N).

OTHER INVESTIGATIONS:

▸ M.D.'s Orders	• For simple mastectomy in a.m. Discharge next day and begin chemotherapy in one week.
▸ Meds	
▸ Lab Work	• Hgb 146 g/L • Hct 0.41 • WCB 11.8 x 10^9 /L

Date: _____ Student: _____

Tutor: _____

N2N03 DOUBLE JUMP EXERCISE
EVALUATION FORM - APRIL 1998

STEP I

PART A: Assessment, Problem Identification & Issue Generation

1. HYPOTHESES AND ISSUE GENERATION

STATEMENT I	STATEMENT II
Unable to generate relevant issues in the client situation. Major gaps in the hypotheses that are generated.	Identifies relevant issues in the client situation. Generates accurate and appropriate initial hypotheses related to the main features of the client situation. Includes physical, psychological and social concepts.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

2. DATA GATHERING

STATEMENT I	STATEMENT II
Unsystematic data collection. Data gathered is insufficient and is not relevant to the client situation.	Systematic collection of data. Data is sufficient and is relevant client situation.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

3. DATA GATHERING - RATIONALE

STATEMENT I				STATEMENT II
Is not able to state rationale for seeking specific data.				Able to state rationale for seeking specific data.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

4. DATA GATHERING - CLINICAL REASONING

STATEMENT I				STATEMENT II
Does not recognize knowledge gaps. Unable to think through unfamiliar concepts.				Demonstrates clinical reasoning in data collection by generating further relevant questions based on data obtained.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

5. INTERIM PROBLEM FORMULATION - INDIVIDUALIZED

STATEMENT I				STATEMENT II
Inaccurate or imprecise statement of main client problem(s). Problems identified are not supported by data; data is insufficient or is not relevant to the problems.				Accurate and precise outline of main client problem(s). Problems are supported by relevant data.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

6. INTERIM PROBLEM FORMULATION - HOLISTIC

STATEMENT I				STATEMENT II
Problem list is limited to one domain of the client situation.				Problem list includes psychological, physical, social, cultural and spiritual context of the client situation.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

7. INTERIM PROBLEM FORMULATION - RANKED; RATIONALE

STATEMENT I	STATEMENT II
Does not rank problems or use concepts, theories, nursing models to formulate client problems.	States appropriate scientific rationale for ranking of the identified problems; uses concepts, theories, nursing models in the formulation of client problems.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

STEP I

PART B: Self Assessment and Plan for Meeting Learning Needs

8. SELF-ASSESSMENT OF LEARNING NEEDS

STATEMENT I	STATEMENT II
Unable to identify lack of knowledge or data to analyze the client situation. Assessment is inaccurate, unclear and irrelevant.	Identifies lack of knowledge and data to analyze the client situation. Self assessment is accurate, clear and relevant. Good ideas for further improvement.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

9. PLAN OF ACTION FOR STEP II

STATEMENT I	STATEMENT II
Unable to identify plan of action or resources and strategies to meet learning needs during Step II.	Able to identify clear, specific, realistic plan of action with appropriate resources and strategies for Step II.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

STEP II **PART A: Revision of Problem List and Care Planning**

10. FINAL PROBLEM FORMULATION: INCORPORATION OF NEW INFORMATION

STATEMENT I				STATEMENT II
Final/revised problem list shows no evidence of revisions based on new data or additional information.				Final/revised problem list shows evidence of revision based on new data or additional information.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

11. REVISED PROBLEM FORMULATION: CLIENT SPECIFIC

STATEMENT I				STATEMENT II
Final/revised problem list shows no evidence of incorporating client data. Client problems are not stated precisely or accurately.				Final/revised problem list is individualized, and is relevant to the client situation. Client problems are stated accurately and precisely.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

12. REVISED PROBLEMS FORMULATION - COMPREHENSIVENESS (i.e., Holistic)

STATEMENT I				STATEMENT II
Problem list is incomplete and does not include holistic (ie biopsychosociocultural and spiritual) contexts of client situation.				Revised problem list is comprehensive (ie holistic including biopsychosocio cultural and spiritual contexts of client situation.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

13. REVISED PROBLEM FORMULATION - SCIENTIFIC RATIONALE FOR PROBLEMS SELECTED

STATEMENT I				STATEMENT II
No evidence of scientific rationale or clinical reasoning in support of revised problem list.				The problems selected are supported by scientific rationale and clinical reasoning.
Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

14. REVISED PROBLEM FORMULATION - SCIENTIFIC RATIONALE FOR RANKING PROBLEMS

STATEMENT I	STATEMENT II
Unable to rank problems in order of priority; unable to support ranking of client problems with scientific rationale. No evidence of clinical reasoning.	Ranks client problems in order of priority; uses scientific rationale and clinical reasoning to support prioritization of client problems.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

15. PLAN OF CARE - GOALS FOR MAJOR CLIENT PROBLEM

STATEMENT I	STATEMENT II
Goals are nonexistent, unspecific, unmeasurable, unrealistic, with no indication of time to be accomplished. Are not client focused nor relevant to the major client problem selected or to nursing.	Goals are specific, measurable, achievable, time limited, and are client-focused and relevant to the major client problem selected and to nursing.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

16. INTERVENTIONS - RELATIONSHIP TO CLIENT PROBLEM AND GOALS

STATEMENT I	STATEMENT II
Interventions are not client-focused nor related to the problem formulation, goals, and context.	Interventions are client-focused and relate to client problem, goals, and context.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

17. INTERVENTIONS - INDIVIDUALIZED

STATEMENT I	STATEMENT II
No evidence of individualization of interventions. Interventions are generalized and reflect textbook rather than the individual client situation or context. Interventions do not show evidence of new information.	Clear description of individualized interventions, selected for their relevance to the client and the situation (context); interventions incorporate new information gained during Step II.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

18. EXPECTED Client OUTCOMES - COMPREHENSIVE

STATEMENT I	STATEMENT II
Expected Client Outcomes are general, not relevant, unmeasurable. Criteria do not reflect problem formulation and goals.	Expected Client Outcomes are specific, relevant, measurable, comprehensive, and reflect problem formulation and goals.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

19. INTERVENTIONS AND EXPECTED Client OUTCOMES - RATIONALE

STATEMENT I	STATEMENT II
No evidence of scientific rationale is used to support selected interventions and/or expected client outcomes.	Provides scientific rationale for selected interventions and expected client outcomes.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

20. REFERENCES

STATEMENT I	STATEMENT II
Does not provide references for scientific rationale provided.	Provides detailed, specific references for scientific rationale. References are relevant, appropriate and current (states author, title and year).

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

STEP II **PART B: Self-Assessment Ability**

21. USE AND MANAGEMENT OF RESOURCES

STATEMENT I	STATEMENT II
Unable to evaluate usefulness of resources used. Unable to evaluate time management in respect to resource use.	Evaluates the usefulness of the resources used during Step II. Comments on the use of resources within the time allotted.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

22. SELF-ASSESSMENT ABILITY - PERFORMANCE

STATEMENT I	STATEMENT II
Unwilling or unable to assess own performance; statements are imprecise, vague or irrelevant.	Clear and systematic assessment of performance. Balances strong and weak points. Good ideas about methods for self improvement.

Essentially Like I	More Like I than II	Between I and II	More Like II than I	Essentially Like II

APPENDIX C

QUESTIONNAIRE STUDENT I.D. _____

PART A: ***Please complete the following questions about your educational background as well as some details about who you are by circling the number that corresponds to the correct response or providing the information requested.***

1. ***What level of education did you achieve <u>prior</u> to enroling in the BScN program?***
(Circle all that apply.)

1 High school diploma (General Level)
2 High school diploma (OAC Level)
3 One year or less of university credits
4 Two or three years of university credits
5 Baccalaureate degree
6 Masters degree
7 Other (Specify) .....

2. ***Did you work in a different career before entering nursing?***
1 Yes
2 No

If yes, please specify .....

3. ***In what level of the program are you enroled?***
1 Level I
2 Level II
3 Level III
4 Level IV

4. ***What is your enrollment status?***
1 Full time
2 Part time

5. ***Are you employed while you are attending university?***
1 Yes
2 No

If yes, how many hours per week do you work? .....

Is your work in the health care field (eg., as a nurses' aid or nursing assistant, as a personal care attendant, etc.)
1 Yes
2 No

Please specify the setting and type of work you do: .....

5. ***What is your age?*** .....

6. ***What is your sex?***
1 Female
2 Male

7. ***What is your marital status?***
1 Single
2 Married or living together
3 Separated or divorced
4 Widowed

8. ***Do you have any children?***
1 Yes
2 No

If yes, how many children do you have? .....

What are their ages? .....

Part B

In answering this questionnaire, please think about the nursing courses and the nursing department as a whole rather than identifying specific courses, topics or faculty. The questions are based on comments that students have often made about their experiences of being students.

On a scale of 1 to 5, where 1 means "definitely disagree" and 5 means "definitely agree", circle your responses to the following statements.

1. It's always easy here to know the standard of work expected.	1	2	3	4	5
2. This program has helped me to develop my problem-solving skills.	1	2	3	4	5
3. There are few opportunities to choose the particular areas you want to study.	1	2	3	4	5
4. The tutors in this program motivate students to do their best work.	1	2	3	4	5
5. The workload is too heavy.	1	2	3	4	5
6. This program has sharpened my analytic skills.	1	2	3	4	5
7. Tutors here frequently give the impression that they've nothing to learn from students.	1	2	3	4	5
8.You usually have a clear idea of where you're going and what is expected of you in this program.	1	2	3	4	5
9. Tutors here put a lot of time into commenting on student's work.	1	2	3	4	5
10.To do well in this program all you really need is a good memory.	1	2	3	4	5
11.This program has helped develop my ability to work as a team member.	1	2	3	4	5
12.As a result of doing this program, I feel more confident about tackling unfamiliar problems.	1	2	3	4	5
13.This program has improved my written communication skills.	1	2	3	4	5
14.It seems to me that the courses try to cover too many topics.	1	2	3	4	5
15.The program has encouraged me to develop my own academic interests as far as possible.	1	2	3	4	5
16.Students have a great deal of choice over how they are going to learn in this program.	1	2	3	4	5

On a scale of 1 to 5, where 1 means "definitely disagree" and 5 means "definitely agree", circle your responses to the following statements.

17.Tutors seem more interested in testing what you've memorized than what you've understood.	1	2	3	4	5
18.I t's often hard to discover what's expected of you in this program.	1	2	3	4	5
19.We are generally given enough time to understand the things we have to learn.	1	2	3	4	5
20.The tutors make a real effort to understand difficulties students may be having with their work.	1	2	3	4	5
21.The program is overly theoretical and abstract.	1	2	3	4	5
22.Students here are given a lot of choice in the work they have to do.	1	2	3	4	5
23.Tutors here normally give helpful feedback on how you are doing.	1	2	3	4	5
24.Our tutors are extremely good at explaining things to us.	1	2	3	4	5
25.The aims and objectives of this program are NOT made very clear.	1	2	3	4	5
26.Tutors here work hard to make their subjects interesting.	1	2	3	4	5
27.Too many tutors ask us questions just about facts.	1	2	3	4	5
28.There's a lot of pressure on you as a student here.	1	2	3	4	5
29.This program has helped me develop the ability to plan my own work.	1	2	3	4	5
30.Feedback on student work is usually provided ONLY in the form of marks and grades.	1	2	3	4	5
31.We often discuss with our tutors how we are going to learn in this course.	1	2	3	4	5
32.Tutors here show no real interest in what students have to say.	1	2	3	4	5
33.It would be possible to get through this program just by working hard on essays and at exam time.	1	2	3	4	5
34.This program really tries to get the best out of all its students.	1	2	3	4	5
35.There's very little choice in this program in the ways you are assessed.	1	2	3	4	5

On a scale of 1 to 5, where 1 means "definitely disagree" and 5 means "definitely agree", circle your responses to the following statements.

36.The tutors here make it clear right from the start what they expect from students.	1	2	3	4	5
37.The sheer volume of work to be got through in this program means you can't comprehend it thoroughly.	1	2	3	4	5
38.Overall, I am satisfied with the quality of this program.	1	2	3	4	5

Name three things you like **best** about the program.

Name three areas that you like **least** about the program.

Please add any additional comments that will help me understand your experience in this program.

APPENDIX D

CONSENT FORM

The Experience of Learning and Teaching in a
Non-Conventional Nursing Curriculum

I agree to participate in this study of students' experiences in the nursing program at McMaster University School of Nursing. The purpose of the study is to learn about what it is like to be student in a program that uses a problem-based, self-directed approach.

I understand that participation in the study will involve filling out a questionnaire that should take about fifteen minutes to complete.

I understand that participation in the study is entirely voluntary. Should I choose, I may decide not to answer any particular questions. As well, I understand that refusal to participate will not affect my education in any way.

I understand the information will be confidential, and that no individual responses will be identifiable.

If I have any questions or concerns about the study, I may at any time contact the investigator, Elizabeth Rideout, at 525-9140, ext. 22383.

_____ _____

Signature Date

_____

Please print name

APPENDIX E

Factor Analysis of Course Experience Questionnaire

Complete Dimension and Item #	Factor Loadings						Communality
	F1	F2	F3	F4	F5	F6	
Role of Tutors							
4 Motivate	**.65**	.15	.19	-.07	-.06	-.03	.50
9 Comment	**.54**	.19	.20	-.15	.20	.09	.44
20 Understand	**.69**	.01	.12	-.18	.08	-.17	.56
23 Feedback	**.63**	.06	.19	-.29	.16	.06	.55
24 Explain	**.69**	.18	-.02	-.02	.03	-.04	.52
26 Interesting	**.51**	.23	.13	-.05	.13	.13	.37
31 Discuss	**.45**	.04	.12	-.15	.38	-.02	.38
32 No Interest	**.43**	.02	-.02	.42	-.15	.16	.41
Clarity of Expectations							
1 Standard	.23	**.72**	.07	.05	.02	-.02	.59
8 Clear Idea	.16	**.74**	.12	.15	.06	-.12	.64
18 Hard to discover	-.10	**-.75**	-.04	.09	-.10	.17	.62
21 Theoretical	.03	**.38**	-.22	.15	-.15	.27	.31
25 Not clear	-.11	**-.64**	-.09	.22	-.08	.21	.53
34 Gets the best	.33	**.36**	.25	-.23	.22	-.11	.41
36 Clear	.47	**.52**	.10	. 02	.00	-.11	.52
Outcomes of Programme							
2 Problem-solving	.11	.18	**.68**	-.28	.01	.10	.60
6 Analytic skills	.11	.13	**.69**	-.13	.07	.21	.58
11 Team member	.16	.04	**.67**	-.20	.13	-.11	.54
12 Tackle problems	.16	.12	**.76**	-.03	.05	-.11	.64
13 Communication	.13	.09	**.39**	.07	.32	-.03	.29
29 Plan work	.17	.00	**.54**	.02	.33	-.13	.45

Complete Dimension and Item #	Factor Loadings						Communality
	F1	F2	F3	F4	F5	F6	
Assessment							
4 Nothing to learn	-.28	.19	.02	**.43**	-.04	.06	.31
10 Memory	.01	.02	-.23	**.59**	.13	.11	.44
17 Memorized	-.18	.11	-.09	**.62**	.10	.18	.48
27 Just facts	-.12	-.04	-.07	**.68**	-.08	.07	.50
30 Marks	-.26	-.11	-.09	**.62**	-.13	-.04	.49
33 Essays and exams	-.07	-.32	-.12	**.35**	-.02	-.28	.32
Independence							
3 Few opportunities	.13	-.10	.02	.43	**-.58**	.00	.54
15 Academic interests	-.04	.11	.31	.13	**.68**	-.05	.59
16 Great deal of choice	.20	.08	.16	.16	**.61**	-.17	.48
22 Lot of choice	.19	-.00	.10	.10	**.74**	-.15	.62
35 Few opportunities	-.25	-.14	.03	.28	**-.54**	.18	.49
Workload							
5 Too heavy	-.05	-.03	-.07	.14	-.15	**.72**	.57
14 Too many topics	.16	-.10	-.15	.29	-.19	**.52**	.45
19 Enough time	.20	.24	.13	.11	.01	**-.50**	.42
28 Pressure	-.05	-.03	.14	.06	-.02	**.68**	.49
37 Volume of work	.06	-.24	.04	.06	-.13	**.67**	.53
Eigen Values	7.86	2.7	2.4	2.1	1.7	1.4	
% of Variance Explained	21.2	7.2	6.5	5.7	4.6	3.7	

APPENDIX F

SUB-SCALES OF THE COURSE EXPERIENCE QUESTIONNAIRE

Item #

Sub-Scale: Role of Tutors (8 items)

4 The tutors in this programme motivate students to do their best work.
9 Tutors here put a lot into commenting on a student's work.
20 Tutors make a real effort to understand difficulties students may be having with their work.
23 Tutors here normally give helpful feedback on how you are doing.
24 Our tutors are extremely good at explaining things to us.
26 Tutors here make a real effort to make their subject interesting.
31 We often discuss with tutors how we are going to learn in this course.
32 Tutors here show no real interest in what students have to say.

Sub-scale: Clarity of Expectations (7 items)

1 It's easy here to know the standard of work expected.
8 You usually have a clear idea of where you're going and what is expected of you in this programme.
18 It's often hard to discover what's expected of you in this programme.
21 The programme is overly theoretical and abstract.
25 The aims and objectives of this programme are NOT made clear.
34 This programme really tries to get the best out of its' students.
36 Tutors here make it clear right from the start what they expect of students.

Sub-scale: Outcomes of the Programme (6 items)

2 The programme has helped me to develop my problem-solving skills.
6 This programme has helped me develop my analytic skills.
11 This programme has helped me develop my ability to work as a team member.
12 As a result of this programme I feel more comfortable about tackling unfamiliar problems.
13 This programme has improved my written communication skills.
29 The programme has helped me develop the ability to plan my own work.

Item#

Sub-scale: Student Assessment (7 items)

7 Tutors here frequently give the impression that they've nothing to learn from students.
10 To do well in this programme all you need is a good memory.
17 Tutors seem more interested in testing what you've memorized than what you've understood.
27 Too many faculty ask us questions just about facts.
30 Feedback on student work is usually provided ONLY in the form of marks.
33 It would be possible to get through this programme just by working hard on essays and at exam time.

Sub-scale: Level of Independence (5 items)

3 There are few opportunities to choose the particular topics you want to study.
15 The programme has encouraged me to develop my own academic interests as far as possible.
16 Students have a great deal of choice over how they are going to learn in this programme.
22 Students here are given a lot of choice in the work they have to do.
35 There are few opportunities to choose the particular topics you want to study.

Sub-scale: Workload in the Programme (5 items)

5 The workload is too heavy.
14 It seems to me the courses try to cover too many topics.
19 We are generally given enough time to understand the things we have to learn.
28 There's a lot of pressure on you as a student here.
37 The sheer volume of work to be got through in this programme means you can't comprehend it properly.