

https://dspace.org/

Problem based learning vs traditional curricula: A comparative study of nursing students' self-directed learning readiness

Qamata-Mtshali, Nomawethu Acquilla

2013-04-11
http://hdl.handle.net/10539/12656

Downloaded from a DSpace repository. https://dspace.org/

PROBLEM – BASED LEARNING VS TRADITIONAL CURRICULA: A COMPARATIVE STUDY OF NURSING STUDENTS' SELF- DIRECTED LEARNING READINESS

Nomawethu Acquilla Qamata-Mtshali

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Science in Nursing.

Johannesburg, 2012

DECLARATION

I Nomawethu Acquilla Qamata-Mtshali declare that this report is my own work. It is being submitted for the degree of Master of Science in Nursing, in the University of the Witwatersrand Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature

19th day of October 2012

ABSTRACT

Introduction: Nursing students in a lecture-based learning (LBL) programme, referred to as a traditional curriculum in this study are assumed to be less prepared for self-directed learning (SDL), since little emphasis is placed on (SDL) skill acquisition during their learning process. On the other hand, SDL skills are well described in Problem-Based Learning (PBL), designed to develop students' self-directedness. In this study context, no baseline data exist about students' readiness to take responsibility for their learning with respect to their attitude, abilities and/or behaviours necessary for SDL.

Purpose: The purpose of this study was to compare the SDL readiness of undergraduate nursing students who are prepared through PBL and LBL curricula in two universities in Johannesburg.

Methodology: A descriptive, cross-sectional, comparative design was used to examine and describe the differences between the two groups. Of the total population of 200 nursing students (N=200) 159 responded and comprised the final sample (n=159). A 40-item structured questionnaire, the Self-Directed Learning Readiness Scale (SDLRS) was used to collect data, in the subscales: self-management, desire for learning and self-control.

Results: Both groups reported almost equal and acceptable levels (>150) of readiness for SDL, as indicated by similar mean scores in the combined subscales; the difference in their overall readiness was not significant (p=0.69). Students in the PBL group reported higher scores in self-management than the LBL group in the final year Y4; the difference though, was not statistically significant (p=0.82). Students in both groups were similar in their desire for learning at the beginning of the course (Y1), declining sharply in year two (Y2); the PBL group reported a greater desire to learn than the LBL group, in Y4. This difference was not statistically significant (0.90). The PBL group reported a lesser ability for self-control than their LBL counterparts in the junior years, but showed noticeable educational growth in Y4, exceeding that of the LBL group; the LBL group showed no growth at all. Statistically, this difference was not significant (p=0.82).

Conclusion:

Recommendations were made for the utilization of progressive, less didactic methods in nurse education, based on the SDL readiness levels reported. It was further recommended that future research make use of bigger samples and that practical significance as opposed to statistical significance be used to draw inferences.

DEDICATION

I dedicate this work to

My dearest mother Mrs Novangeli Priscilla Qamata
who persistently encouraged me during my life of studying, saying in my language
“Imfundo sisikhali sobulumko mntanami” meaning
education is the weapon of wisdom my child.

and

My two sons Zwelibanzi and Vuyolwethu
for their unconditional support in my journey of improving my academic life.

ACKNOWLEDGEMENTS

I would like to thank the following people for their invaluable contribution to this study:

Professor J C Bruce, my research supervisor, for always encouraging and believing in me that I can still stretch myself beyond my reach, and for her special powerful gift of perseverance and role modeling of scholarship in the nursing profession.

All the members of the Wits University Nursing education team for their support and encouragement.

The wonderful support from Wits University, Faculty of Health Sciences Post Graduate Hub for statistical assistance.

The excellent support from the Wits Health Sciences Library staff from the first year of my study at Wits University; indeed Wits has given me the Edge.

My sincere gratitude and thanks to Ms Eunice Mutava (nee Matingo) and Dr Petra Gaylard, who both tirelessly supported me with the data analysis with Stata Program, new to most people.

May the Almighty give you more.

TABLE OF CONTENTS

		Page
	Declaration……....	ii
	Abstract……....	iii
	Dedication……....	iv
	Acknowledgements……....	v
	Table of Contents……....	vi
	List of Tables……....	ix
	List of Figures …….....	x
	List of Abbreviations……....	xi
1.	**Chapter ONE: Orientation to the Study.....**	1
1.1	Introduction and Background……....	1
1.2	Problem Statement……....	5
1.3	Purpose of the Study.....	5
1.4	Objectives.....	5
1.5	Definition of Variables.....	6
1.5.1	Self-Directed Learning.....	6
1.5.2	Self-Directed Learning Readiness.....	6
1.5.3	Problem-Based Learning.....	6
1.5.4	Problem-Based Curriculum.....	6
1.5.5	Traditional Curriculum.....	7
1.5.6	Nursing Students.....	7
1.6	Significance of the Study.....	7
1.7	Conclusion.....	7
2.	**Chapter TWO: Literature Review……**	8
2.1	Introduction……....	8
2.2	Problem Based Learning.....	9
2.2.1	PBL Design.....	10
2.2.2	Issues and Challenges that Affect the Introduction of PBL….....	12
2.3	Self-Directed Learning…..……....	15
2.4	Conclusion.....	20
3.	**Chapter THREE: Research Methodology……..**	21
3.1	Introduction……....	21
3.2	Research Design……....	21

		Page
3.3	Research Methods……	22
3.3.1	Population……	22
3.3.2	Sample……	22
3.3.3	Data Collection……	22
3.3.3.1	Procedure……	23
3.3.3.2	Research Setting……	23
3.3.3.3	Data Collection……	25
3.4	Pilot Study……	27
3.4.1	Data Analysis……	28
3.5	Ethical Considerations.....	28
3.6	Conclusion……	30
4.	**Chapter FOUR: Data Analysis and Results……**	31
4.1	Introduction……	31
4.2	Pilot Study……	32
4.3	Approaches to Data Analysis……	32
4.4	Results: Demographic Data……	33
4.4.1	Sample……	33
4.4.2	Age……	33
4.5	Gender……	37
4.6	Prior Studies Completed……	39
4.7	Results: Self-Directed Learning Readiness……	39
4.7.1	Reliability and Validity of the SDLRS……	39
4.7.2	Self Management……	41
4.7.3	Desire for Learning……	43
4.8	Self-Control……	45
4.9	Overall Self-Directed Learning Readiness……	48
4.10	Conclusion……	52
5.	**Chapter FIVE: Discussion, Conclusion, Limitations and Recommendations.....**	53
5.1	Introduction……	53
5.2	Discussion……	54
5.2.1	Self-Directed Learning Readiness Scale Subscales……	55
5.2.2	Self Management……	55
5.2.3	Desire for Learning……	57
5.2.4	Self Control……	61
5.2.5	Self-Directed Learning Readiness……	63
5.3	Limitations……	65

		Page
5.4	Recommendations…….....	65
5.4.1	Nursing Education…….....	65
5.4.2	Future Research…….....	66
5.5	Conclusion…….....	67
6.	**References**……	68
Annexure A	: Questionnaire…….....	73
Annexure B	: Permission to use the Self-Directed Learning Readiness Scale for Nurse Education…….....	78
Annexure C	: Agreement to use the Self-Directed Learning Readiness Scale for Nurse Education…….....	80
Annexure D	: Information Sheet……..	82
Annexure E	: Ethical Clearance……..	84
Annexure F	: Approval from the Head of the School of Therapeutic Sciences……....	86
Annexure G	: Approval from the University of Johannesburg……	88
Annexure H	: Certificate of Registration……	90
Annexure I	: Approval of Title……	92
Annexure J	: Data Analysis Results……..	94

LIST OF TABLES

			Page
Table 2.1	:	Theories Involved in Self-Directed Learning……..	16
Table 3.1	:	Overview of the Research Method used in this Study……..	24
Table 4.1	:	Number of Students by Curriculum Approach and Year of Study……..	33
Table 4.2	:	Mean Age and Standard Deviation of Sample……..	34
Table 4.3	:	Distribution of Sample by Junior and Senior Stages of Study……	36
Table 4.4	:	Gender Composition in both LBL and PBL Groups……..	38
Table 4.5	:	Gender Composition by Year of Study of Sample……	38
Table 4.6	:	Gender Composition by Stage of Study of Sample……..	38
Table 4.7	:	Prior Studies Completed in LBL and PBL Groups……	39
Table 4.8	:	Reliability and Unidimensionality Analysis of SDLRS……..	40
Table 4.9	:	Students' Self-Management Scores in LBL and PBL Programmes……...	41
Table 4.10	:	Desire for Learning Scores in LBL and PBL Groups……	43
Table 4.11	:	Self-Control Scores in LBL and PBL Groups……	46
Table 4.12	:	Comparison between Studies of Mean Scores from Each Subscale Group	48
Table 4.13	:	SDLR Score Response Rate by Year of Study both (LBL and PBL)…….	51
Table 4.14	:	SDLR Score Response Rate by stage of Study both (LBL and PBL)…….	51

LIST OF FIGURES

			Page
Figure 2.1	:	PBL Instructional Model……	11
Figure 4.1	:	Age Distribution of Respondents……..	34
Figure 4.2	:	Graphic Age Distribution by Curriculum (LBL and PBL) …….	35
Figure 4.3	:	Age Distribution of LBL and PBL Groups by Year of Study……	36
Figure 4.4	:	Age Distribution by Stage of Study LBL and PBL Groups……....	37
Figure 4.5	:	Mean Self-Management Scores by Year of Study……..	42
Figure 4.6	:	Mean Self-Management by Stage of Study……..	43
Figure 4.7	:	Desire for Learning by Year of Study……..	44
Figure 4.8	:	Mean Desire for Learning Scores by Stage of Study……...	45
Figure 4.9	:	Mean Self-Control Scores by Year of Study……..	46
Figure 4.10	:	Mean Self-control Scores by Stage of Study……	47
Figure 4.11	:	Mean Self-Directed Learning Readiness Scores of the Sample by Year of Study……	49
Figure 4.12	:	Mean Sample of Self-Directed learning Readiness by Stage of Study…….	50

LIST OF ABBREVIATIONS

LBL - Lecture- Based Learning

PBL - Problem-Based Learning

SDL - Self-Directed Learning

SDLRS - Self- Directed Learning Readiness Scale

SANC - South African Nursing Council

TPE - Tutorial Performance Evaluation

CHAPTER ONE

ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Problem-based learning as an educational strategy has been used in several countries such as the United States, New Mexico, Asia and more recently in South Africa, with successes in medicine and later in other health science related disciplines such as nursing (Achike and Nain, 2005). Problem-based learning (PBL) is an active student-centered learning process, which is implemented differently in different schools of medicine and is said to stimulate student motivation and interest toward learning (Abraham, Vinod, Kamath, Asha, and Ramnarayan, 2007). The involvement of the teacher is that of a guide or facilitator. The learner has to take full responsibility for his/her own learning by identifying specific learning needs, carefully and efficiently locating and accessing a range of relevant resources to address the identified learning needs. The student would then take decisions about various aspects of the learning process, including the extent of self-directedness (Bart, Rothman and Frecker, 2003).

Self-directedness, as described by Knowles (1990), is a process that enables individuals to take the initiative during their own learning, with or without the assistance of others. The individual is enabled to identify his/her learning needs, to formulate learning goals and to identify and choose both human and material resources for learning. This then further enables the individual to take decisive measures to implement appropriate learning and evaluation methods. Given the above, Knowles (1990) argues convincingly that self-directedness is characteristic of persons who are proactive learners rather than reactive ones, who tend to retain information gathered better and use the same in their life-long experiences.

Problem-based learning as a teaching-learning strategy, highlights self-directedness as one of the important attributes acquired by graduates of the PBL programme. However, their readiness for self-directed learning (SDL) is variable. PBL as a small group teaching and learning strategy requires students to identify learning issues in various domains such as cognitive, psychomotor, social and professional, in order to direct their own learning and their access to resources.

This strategy is a learner-centered teaching strategy that directs and facilitates students towards self-directedness within a specific context or specialty based on the belief that all individuals are capable of learning (Knowles, 1990).This premise clearly indicates that PBL is concerned with all the learners, hence any learner in a teaching and learning environment has the potential to learn. A PBL programme is considered as an ongoing process that enables graduates to become lifelong learners over a period of time. It is further confirmed that students do not achieve outcomes through one set of prescribed learning experience in one learning programme, but through a wide range of learning experiences and exposures. The argument above thus changes the main purpose of education from what students are supposed to know or must know to the development of skills of enquiry through active engagement and participation in their own learning (Knowles, 1990).

Learning in a problem-based curriculum enables the students to acquire an essential body of knowledge and equips them to develop the ability to effectively use the same, in order to evaluate patient care whilst developing self-directed learning skills (Barrows and Tamblyn, 2000). Contemporary PBL curricula continue this tradition and develop in graduates important skills and attributes to prevent and solve problems in complex patient care environments. New quality standards in higher education require new learning methodologies in all disciplines. Nursing is no exception and must create new opportunities for nurses to become true professionals in care-giving, with a composite set of skills to provide such care in complex environments.

The development and promotion of enquiry skills, through active participation and involvement of students in their own learning, involves a complex process of motivation and goal direction intrinsic in adult learners, thought to promote lifelong learning in individuals who are self directed (Zabelegui, 2010). Self-directedness is part of such a skill set; that enables nursing students to develop problem-solving skills, and critical thinking skills, for them to reflect such skills in developing self-directedness. Writers such as Moust, van Berkel and Schmidt (2005) believe that nurse educators have a role in facilitating and guiding the learning process of active construction and application of knowledge by the students. The educator also has to nurture and support cooperation within the student groups whilst creating an environment that fosters contextual, cooperative and goal-directed learning.

Facilitation of students' activities through creativity will assist to stimulate the students' changed behaviour towards their own learning experience. The constructivist approach used in

PBL brings about a paradigm shift from the former traditional/ teacher-centered method of instruction, and prepares nursing students for their future employment requirements and or abilities. Problem solving and critical thinking will enable them to assume decision making functions as independent nurse practitioners who are self-directed (Barrows and Tamblyn 2000).

Self-directed learning is said to occur or to exist along a continuum and is present in each person to some degree. It occurs in many different ways and situations, ranging from teacher–centered classroom learning, to self-planned and self-conducted learning projects. It is believed that, in some learning situations SDL will occur, whilst in others it may not, depending on individual personal characteristics such as attitudes, values, and capabilities. These attributes tend to ultimately determine whether self-directed learning will take place or not in a given situation (Alspach, 1991).

Self-directed learners then develop the ability to extend and improve their professional development, keeping up to date with new information and ways to manage problems that they may be faced with in their professional careers. These skills thus, transform learning into a personalized process where important skills such as critical thinking, problem solving, learning to learn and self-directedness are developed.

Students are assisted with the organization of the learning material and resources to enable them to successfully enjoy the learning experience through creativity and self-direction. Problem-based learning assists the learner to build a professional identity through interaction with members of the multidisciplinary team. This is enhanced by stimulation of curiosity that defines the limits of a student's knowledge in building and creating a durable understanding of phenomena grounded in cognitive psychology. This understanding is facilitated through problem-based learning processes by contextualizing learning to practical situations that are integrated across disciplines (Dornan, Scherpbier, King and Boshuizen 2005).

PBL also assists in developing a thinking and problem-solving professional who will be able to participate actively and productively in the work place. According to Hala and Mohamed (2011) quality in nursing practice comes as a result of educational preparation of nursing students to solve problems, think critically and be able to make decisions related to their work situations. The teachers in the classroom, therefore, have the responsibility to constantly improve their own knowledge and skills in order to inculcate the same values in the students who, on the

other hand have to show willingness to learn and be self-directed (Kaptan, Kormaz and Tandogan, 2008).

The PBL approach was also found to be more meaningful in programmes where students have had some form of formal education e.g. diploma or undergraduate studies than in programmes where students were accepted directly from secondary school. It is assumed that these students have been subjected to active participation in their own learning experiences and thus presumed to be matured. The idea is further confirmed by writers such as Kocaman et.al (2009) who says that self-directed learning is a maturational process that occurs over a period of time.

Maturity brings about certainty and motivation about career choices. Research has also shown that the views of what students perceive as appropriate education, differ with age and background. Hence, learners in adult education (andragogy) would reflect better to their world of experiences and work related issues in their approach of learning to learn and becoming self-directed (Wilkinson et.al 2004). The differences between the learning approaches of different age groups, within the student body in relation to the natural processes of psychological development, are highlighted as essential aspects of maturity such as the ability to take responsibility for their own learning and become increasingly self-directed. These can affect the implementation of a PBL curriculum, its success or otherwise.

New developments in education generally put more responsibility on the learners, to take a good deal of initiative in their own learning. Students entering nursing programmes without having learned the skills of self-directedness do experience anxiety, frustration and often failure. It thus becomes important for nurse educators to introduce PBL modules in their teaching programmes in a modified form, whilst retaining some didactic lectures before the implementation of PBL in its entirety (Ghosh, 2007).

In this study, the researcher was interested in finding out if nursing students exposed to different curricula i.e. PBL and LBL would exhibit the characteristics of self-directedness, having exited the basic education program (didactic lectures) in order to pursue their career in nursing. Since almost all nursing students are admitted directly from high school, there are questions raised about their readiness for SDL, regardless of the type of nursing curriculum enrolled in.

1.2 PROBLEM STATEMENT

Problem-based learning (PBL) is regarded not only as a useful learning strategy, but as an important strategy that enables students to become lifelong learners and competent problem-solvers who are self- directed. PBL leads and facilitates students towards self-directedness within a specific context or speciality based on the belief that all individuals are capable of learning.

In a traditional lecture-based learning (LBL) environment where teaching is teacher-directed, little reference is made to the self-directed learning skills and attributes acquired by LBL graduates. It is therefore assumed that these graduates possess the same self-directed learning skills when compared to their PBL counterparts.

SDL skills are well described in, and attributed to PBL. However, little attention is given to the inherent readiness for self-directed learning posited by adult learning theorists. It is therefore hypothesized that self-directed learning readiness, will be the same in PBL students and LBL students enrolled in a nursing programme.

1.3 PURPOSE OF THE STUDY

The purpose of this study was to describe and compare self-directed learning readiness as reported by student nurses who have been exposed to traditional lecture-based learning (LBL) and problem- based learning (PBL) nursing curricula, using the Self-Directed Learning Readiness Scale (SDLRS).

1.4 OBJECTIVES

The study objectives were:

- To determine self-directed learning readiness in respect of attributes, skills and motivational factors, as reported by undergraduate nursing students, embedded in: Self-management, Desire for learning and Self-control.

- To compare these self-reported attributes, skills and factors between students in a PBL curriculum to those in a traditional (LBL) curriculum.

1.5 DEFINITION OF VARIABLES

1.5.1 Self Directed Learning

Self-directed learning (SDL) is defined as a process in which individuals take the initiative, with or without the help of others, “in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes” (Knowles, 1997).

1.5.2 Self-Directed Learning Readiness

In this study, self-directed learning readiness is defined as the motivation and willingness to take action for one’s own learning, through self management skills, the desire to learn and being able to regulate or control oneself.

1.5.3 Problem-Based Learning

Problem-based learning is a learner-centered teaching strategy that directs and facilitates students towards self-directedness within a specific context or specialty. The PBL process directs the students to identify learning issues in all domains “i.e. cognitive, psychomotor, social aspects, community aspects, professional aspects, affective behaviour and or ethical aspects” (Barrows and Tamblyn, 2000).

In this study problem-based learning means the presentation of a problem or trigger first; students then undertake to discuss the key learning issues in their small groups, clarify facts through brainstorming and formulate hypotheses. In their breakaway sessions, students locate and use available resources to gain information related to the problem. The students return to their groups and become involved in a collaborative participative effort in trying to solve the health problem constructively. They review the importance of their findings, whether the new information supports or negates and/or changes the hypothesis. Hypotheses are refined in the light of the new information.

1.5.4 Problem-Based Curriculum

Is the pedagogic structure for the delivery of problem-based learning experiences to nursing students.

1.5.5 **Traditional Curriculum**

Is the pedagogic structure for the delivery of lectures and other didactic strategies to nursing students. For the purpose of this study a traditional curriculum will be referred to as a lecture-based learning (LBL) curriculum.

1.5.6 **Nursing Students**

In this study nursing students are defined as students registered with the respective universities in a four year Bachelor's degree course in nursing as prescribed by the South African Nursing Council (SANC).

1.6 **SIGNIFICANCE OF THE STUDY**

This study was conducted to measure the self reported perceptions of nursing students' attributes as a result of a PBL curriculum in comparison to those who are traditionally trained in a Lecture-based curriculum.

1.7 **CONCLUSION**

Self-directedness in nursing education has become both a requisite and an attribute to be acquired during the training period of a nurse. SDL is needed to keep pace with the rapid changes in health and understanding of the responsibilities facing the healthcare services in the country.

Problem-based learning specifically requires self-directedness, and it can be said that student success will depend on how ready they are at entry level. University education requires students to be responsible for their own learning by showing a strong desire for learning in order to shape their future goals, manage their lives and challenges they are faced with to be in control of their destiny. The extensive review of the literature in the next chapter, shows the strategies used in nursing education and their differences.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Self-directed learning (SDL) has grown to be the most popular learning approach in adults in tertiary institutions. The approach is characterized by autonomy, motivation, independence and learner acceptance of and control over her/his own learning in preparation for lifelong learning. Learning depends on the attitude, abilities and personality traits displayed by the learner. The manner in which a student approaches learning and takes responsibility for it may also be influenced by variances such as age, motivation and as well as readiness to learn (Wilkinson and Beckert, 2007).

These characteristics of self-directed learning as stated by Fisher, King and Tague (2001) in both undergraduate and post graduate studies show that individuals do possess some form of self-directedness. SDL having originated from the field of adult education (Murane and Levy, 1996) implies that adults are inherently self-directed. Findings from an exploratory study of the relationship between self-directed learning and academic performance in a web-based learning environment, strongly emphasize the benefits of SDL outcomes and its values as a required skill necessary for those who seek employment in the 21st century.

Knowles (1997) in his theory on andragogy mentions crucial assumptions about the characteristics of adult learners, being different from those in basic education, where learning is mostly teacher-centered. He further states that the adult learner possesses qualities of self concept, which develops through maturity and thus moves from being a dependent personality to that of being a self-directed individual.

This theorist further states that readiness to learn becomes more evident as the person matures and is directed toward developmental tasks of one's social or professional role responsibilities. This then further confirms that the need or motivation to learn as individuals mature becomes more for application or immediacy use of gained knowledge. The paradigm shift from subject-centeredness to one of problem-centeredness then results in internal motivation to learn (Knowles, 1999). This ideology is further supported by Baumgartner (2007) in theories and models that affect adult development and learning, where he mentions that

knowledge is constructed, and development depends on the individual's active participation within that environment.

This literature review provides an overview of the theory of SDL and related teaching-learning strategies in nursing education i.e. PBL and LBL. It incorporates a discussion of selected learning concepts and their application to nursing. There was a paucity of South African literature available on the topic, thus research done in Mexico, United States of America (USA), Australia and India formed the basis of the literature review.

2.2 PROBLEM-BASED LEARNING

Barrett, (2005) in his "Handbook of Enquiry and Problem based learning" describes problem-based learning as a set or number of approaches under the category of Enquiry-based learning. The main defining characteristic being the presentation of the problem to the students in small group tutorials, as a start of the learning process before other curriculum inputs. In a PBL programme, the students are expected to define their own learning needs, using explicit integrative educational objectives. The students identify what needs to be researched in order to work on the problem, as well as searching for the appropriate sources of information. The students are to be self-directed and thus organize and manage their own learning activities and needs (Dornan, Scherpbier, King and Boshuizen 2005).

Clarification of facts defining or identifying the problem and brainstorming ideas based on their prior knowledge then take place. Students have break away sessions from the classroom, where they make use of resources such as the library, databases, the web, clinical situations that reflect real-world problems where applicable, resource people and observations. The students are expected to acquire new knowledge and skills in order to resolve the given problems. PBL tutorials are supported by core lectures, resource material and sessions, laboratory results and clinical teaching sessions. In the review session, the nurse educator, peers in class and all those who participated in that group engage in a process of reflection on each person's contribution.

Problem-based Learning (PBL) involves the use of clinical situations reflecting real-world dilemmas, where students are required to acquire new knowledge and skills in order to resolve a problem. Contrary to lecture-based learning which presents new content and then demonstrates its application with a case study, PBL presents a student-centered approach to

instruction and learning. The students are presented with a case study first or a scenario which is representative of a real life situation. They are expected to identify key concepts and explore the possibilities in relation to the presented problem, and formulate a hypothesis to direct their search for information. Group collaboration and active participation becomes crucial for the success of the exercise providing a great insight, which leads to behavioural changes (Garrison, Anderson and Archer, 2010).

A constructivist epistemological approach becomes key to the information gathered in solving the problem/situation given. The two fundamental pedagogical principles that underlie PBL are the following situations: Students learn best in groups rather than alone; and when actively involved in identifying and addressing their own knowledge gaps.

2.2.1 **PBL Design**

The PBL design entails the utilization of various approaches to unpack the components of a problem or scenario such as the four types of moral reflection (Savery and Duffy,1995) i.e.:

- What is the issue or point of conflict?
- Who are the persons involved?
- What are their responsibilities in relation to the problem?
- What results are envisaged as a result of the interventions?

The instructional PBL model in Figure 2.1 demonstrates the sequence to be followed by students in their effort of unpacking the given scenario within their groups. The following steps are followed:

- Problem Identification
- Discussion and organization of ideas/hypothesis formulation
- Definition of terms and clarification of key concepts
- Definition of a problem/issues
- Analysis and generation of hypotheses
- Discussion and organization of ideas/hypotheses
- Decide on learning goals and topics
- Decide on resources human or material, access resources and collect information/evidence
- Summarise information and intergrate the same into the problem

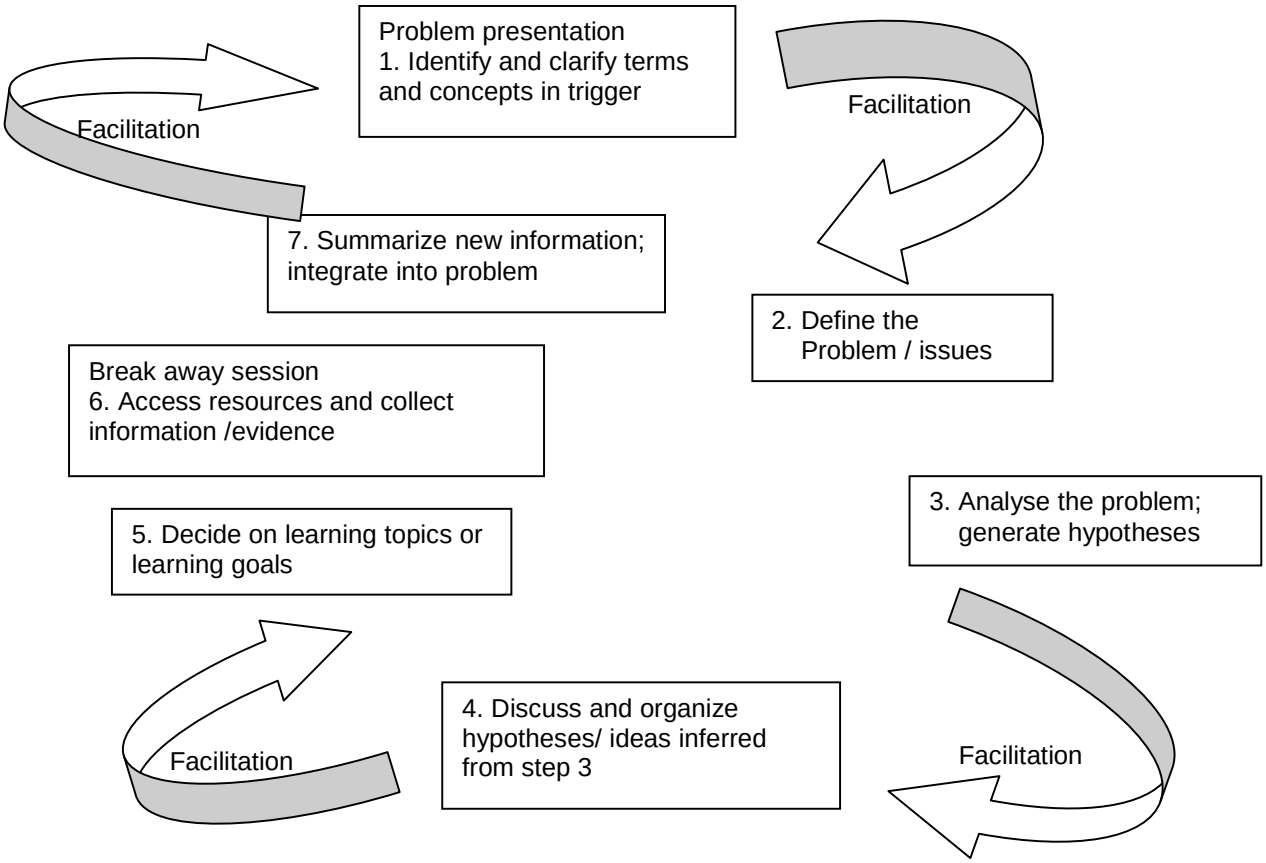


Figure 2.1: PBL Instructional Model

The members in each group, would then condense the information gathered in relation to the given problem or situation. During group discussions, the information is organized, ideas shared amongst members of the same group and critically synthesized, using the illustrated steps in Figure 2.1. Thereafter, interactions between individuals within the groups take place to help create collaborative discussions to formulate a conclusive hypothesis.

Group discussions are based on sound moral reasoning through which, respect for each others opinion is entrenched. Clear group communication strategies are fostered within the constructive critique approach in an endeavour to build good team work.

Decision-making on the generation of learning goals based on inductive and deductive reasoning, involving ethical issues in the practice of science are considered. Behavioural changes in the students' attitudes displayed during their involvement in dealing with patients,

would indicate affective behavior, which is critical in their performance of the required skills as well as the introduction of the Behavioural Policy (Garrison, et.al 2010).

In their breakaway sessions, students are afforded the opportunity to access human and material resources. These could be in the form of libraries, databases, websites, individual experts and even clinical practical situations. The new information is then integrated in the relevant problem for articulation and application of professional decisions with reasoned arguments using self-directedness (Hala and Mohammed, 2011).

The hybrid model of PBL is used by the PBL group in this study in the nursing curriculum. In this model PBL tutorials are supported by core lectures, resource sessions, laboratory and clinical teaching sessions. The goals of the PBL curriculum are expressed in students' application of core (essential) knowledge, clinical reasoning and decision making in the process of performing clinical skills, by displaying professional values, behaviour, ethical cognizance and attitudes. The students should demonstrate reflection and self-directedness through group skill interactions and good communication skills. The attainment of goals is measured by appropriately selected assessment approaches, which focus on process and content presented in an integrated assessment plan.

2.2.2 **Issues and Challenges that Affect the Introduction of PBL**

According to Ghosh (2007) the issues that affect the introduction of problem-based learning are not only due to the problems facing the students alone, but are also due to a number of reasons that also affect the nurse educators, some of which include:

- Nurse educators are unaware of the modes of PBL since they themselves were subjected to teacher-centered passive education.

- Admission criteria are on the basis of merit in the Senior Secondary education and never on the specific competitive nursing education entrance test. Students with an entry age of 17-18 years, had no experience of self-directed learning in their school days and thus needed some amount of formal teaching (didactic) or lecture based learning (LBL).

- Nursing students who enter the nursing profession, came from environments of mixed academic and socioeconomic backgrounds e.g. English medium as well as vernacular medium schools of education where there was a lack of infrastructure, a high student to teacher ratio and insufficient library facilities and or no internet facilities.

- The vernacular medium of instruction for most students in the basic education and Senior secondary schools caused difficulty in understanding presented content in the problem dynamics and or lack of motivation or losing their importance of identity-solving exercises/ activities.

- Finally, there still is resistance from some elderly and experienced faculty members in Nursing Schools, who are not in favor of self-directed learning by students which could be attributed to a number of reasons i.e. lack of proper orientation to the PBL dynamics and or lack of motivation or fear of losing their importance of identity as the knowledge experts.

Amongst the challenges that confront nurse educators is the assessment of learning outcomes that are abstract and therefore less tangible. These require the development of interpersonal skills, leadership, reasoning, including cross-cultural competences within groups. Group skills are particularly important in a PBL context and successful learning outcomes, being dependent on effective tutorial group functioning or tutorial performance (Saure,et al. 2006; Bruce and Lack, 2009).

The attributes and skills necessary for effective functioning within PBL groups may develop over time. It then becomes imperative for the students and the PBL tutor or facilitator to participate in tutorial performance evaluations (TPE) and as such, contribute to formative and summative evaluations (Dornan et al, 2005).This is further confirmed by Bruce and Lack (2009). These writers agree that the scores obtained on self- directed learning readiness were significantly lower in the first year of study for the nursing students and again, were significantly higher at fourth year level of study reinforcing that self-directedness is a maturational process that develops over time.

The PBL design also fosters the development of skills, such as the scientific process e.g. data collection, analysis, interpretation and resource evaluation; facilitation of discussions using a constructive critique approach; application of new knowledge by articulating, defending and critiquing one's professional decisions with reasoned arguments using self-directedness.

Students also indicate that PBL encourages them to synthesize large amounts of information for presentation in their respective groups. The strategy therefore requires the students to critically analyze the relevant research information and apply what they have found in a practical situation.

It may also be noted that as a long-term goal, it is necessary for all the nurse educators to understand that it is no longer realistic to define the purpose of education as transmitting information of what is known, but to focus on the main purpose of education, which is to develop the skills of enquiry to encourage self-directedness and life-long learning.

Knowles' five step Self-direction Model

The five step model by Knowles (1975) of self-direction could be used by nurse educators and learners to do the following:

- Diagnosing and formulation of needs
- Identifying human and material resources for learning
- Choosing and implementing strategies appropriately
- Evaluation of learning outcomes

These will assist the nursing students to take responsibility for their learning and also increase their worldview as to what is entailed in their process of goal attainment.

Nurse educators therefore, have the important task of continuously improving the students' capabilities and motivation for their readiness to learn. In the 20th century, following an extensive literature review, it was noted that studies in basic education focused on PBL models in primary, secondary and higher education (Hewitt-Taylor,2003).

The PBL Instructional model which is well known for allowing learners to become more independent from their teachers, is organized and driven by real life situations. The students are able to solve problems they come across in any area of everyday life. PBL provides students with guided experience in learning through solving complex, real-world problems. These problems are presented as a scenario to intrigue students' curiosity in their small groups, and as a basis for students to improve their problem–solving skills in obtaining knowledge. Problems in a PBL programme are designed to assist students to construct an extensive and flexible knowledge through the use of application of the same in a variety of situations. The application of effective problem-solving skills and the application of appropriate metacognitive and reasoning strategies eventually develops self-directed, lifelong learning

skills for an effective collaborator, who can function in a team, and continue to learn in their whole lifetime. (Tandogan et al, 2006).

2.3 SELF-DIRECTED LEARNING

In this study self-directed learning will be discussed in relation to the theories involved in self-directed learning as illustrated in Table 2.1 and the three subscales used by Fisher et al (2001) in his SDLR scale that measured self-directedness in nursing students. The concept of self-directed learning with its introduction in nursing education prepares nurse graduates for ongoing learning throughout their professional career. Hence, the need for the improvement of students' readiness for SDL being an important goal for nursing education programmes (Biggs, 2007).

Self-directed learners are characterized by being responsible for their own learning needs and identifying and pursuing learning resources. These learners are considered being able to determine their learning objectives and decide on how to evaluate their learning outcomes and strategies involved in the learning process.

Guglielmino (2004) describes self-directed learners' attributes as being influenced by environmental factors such as, a conducive environment, educated family background as well as the influence of educated acquaintances and friends. Learners who are self-directed are believed to possess certain attributes in terms of their attitude towards SDL and abilities to be self-directed in learning. These are considered essential to the SDL process, as attributes ultimately determine whether self-directed learning will take place in a given situation.

Brockett and Hiemstra (2006) also explored the concept of SDL and recommended that SDL is often thought of as an instructional process as well as a personal characteristic that an individual intrinsically possesses. These writers define SDL as the process that enables a learner to assume primary responsibility for planning and implementing, whilst learner self-direction centres/rests on the learner's desire or preference for assuming responsibility for learning. The constructivist approach which involves mental engagement through critical thinking by the learner on surface and deep comprehension of learning activities encourages a state of independency, where the learner self-manages his own learning in various ways.

A self-directed learner, demonstrates willingness to learn, by seeking for information, through use of resources available, re-organizing the information for synthesis purposes and deep comprehension in her desire for learning, along the process of self-direction described by Candy (2006) as an outcome that refers to the learner's autonomy to choose the learning package and capability to conduct one's own education.

Self-directed learning as a method or teaching strategy that ultimately produces self-direction in learners, results in learners taking control of their learning and self-teaching through formal or informal settings in order to reach the set goals or objectives. Learning and teaching in a PBL context has always been supported by sound educational theories as illustrated in Table 2.1 Attributes such as motivation, self-management and self monitoring skills interact to achieve self-directed learning, with the learner's characteristics being central to SDL (Candy, 2006).

Table 2.1: Theories Involved in Self-Directed Learning

Theories	**Characteristics**
Constructivist Theory	Independency Mentally engaged Analytical Surface and Deep comprehension
Transformative Learning Theory	Acquisition of information Re-organisation of information Assimilation of information and reflection
Analytical-mentally engaging Theory	Mental engagement/involvement Analysis of information Critical thinking
Behavioural Theory	Modelling Application Practical experience

A highly self-directed learner is mostly closely related to his/her learning behaviour characterised by independency, mental engagement, critical and analytical thinking, surface and deep comprehension of structures/meanings. The learner also exhibits a great sense of persistence in learning and accepting responsibility for his/her own learning whilst viewing problems as challenges. Through modeling, which comes as a result of behavioural habits, emanates learning, which involves analysis of situations from different angles that can be used in daily operations effectively. The same can be applied in a number of patient situations, whenever similar events occur.

Good and Brophy (2006) in their theory of learning, view learning as the acquisition or reorganization of learned structures/meanings through which humans process and store information. This theory however, differs from the behaviourist theory in that learning becomes the creation and management of meaning and not the mere recognition and manipulation of circumstances.

The constructivist approach strongly emphasizes active involvement of learners in the construction of their knowledge through mental engagement and independence. It further postulates that realization of meaning is personal for the student and that learning will mean new realization on a continuum. The learner has to actively participate in his/her learning process to further formulate a hypothesis based on own experiences to such an extent that a level of new realization occurs.

It is believed therefore that adults are inherently self-directed because of their past experiences motivation, competences, ability and willingness to learn independently (Candy and Guglielmino,2008). In support of individual differences inherent, in adult learners, it has also been found that student nurses with low readiness levels for SDL exposed to SDL will demonstrate high levels of anxiety and frustration. Whereas, students with high levels of readiness for SDL exposed to increased levels of LBL will demonstrate high levels of anxiety (Hala and Mohamed, 2011).

Williams and Williams (2004) in his study that showed the relationship between SDL readiness for structure and teaching preference of student nurses concluded that student nurses who preferred high levels of teaching structure will score low in SDL curriculum and those with low levels of structure subjected to SDL curriculum score high in SDL readiness scale.

Self-directed learning is seen as an important component of learning, in assisting nurses to meet the challenges they are faced with in today's healthcare environment. Nurse educators have an important role to play in assisting student nurses to acquire the skills for self-directed learning. Understanding the concept of self-directed learning on the part of nurse educators will greatly assist facilitation of the same with the nursing students.

Writers such as O'Shea (2003) in his article on "Self-directed learning in nurse education: a review of the literature" discovered that the concept has many benefits. However, the acquisition of the necessary skills depends on the student's preference and readiness for self-

directed learning and the nurse educator's implementation of the concept. In implementing self-directed learning, he further advocates that nurse educators should become facilitators of learning and therefore require ongoing staff development programmes. Not all students are self-directed learners, and thus a variety of teaching strategies should be used within an overarching PBL curriculum context in the creation of a self-directed learner.

Richardson (2009) in evaluating self-directed independent contracts with undergraduate nursing students identified a negative experience resulting from either over-instruction or under-instruction in a lecture-based curriculum. Teachers and students may have different perspectives on self-directed learning, learning styles and readiness to learn hence mature students may be more self-directed than school- leavers. The assessment on readiness to learn should be done when judging the appropriateness of using self-directed learning approaches. Richardson (2009) therefore concluded that because readiness for SDL is individualized, so should be the amount and type of teacher direction. This writer further suggests that where students resent or are uncomfortable with independent learning projects, a more pedagogical type of instruction should be adopted and used for the benefit of the students' advancement in education, or both strategies be used simultaneously (Hybrid Model). He also advocates the need to determine whether a positive correlation exists between self-directed learning readiness and the actual academic performance, when nursing students are subjected to self-directed learning as a teaching strategy.

2.4 LECTURE-BASED LEARNING

The traditional curriculum is considered to vary with geographical and historical background, justified by many philosophies that exist in a particular country or area. The main characteristic being the transmission of skills, facts and standards of behaviour that adults deem to be of value to the next generations' material and social success.

Smedley (2007) in her work on Self-directed learning readiness of first year Bachelor of nursing students, acknowledges the comments described by the educational progressivist John Dewey, when he observed adults as beneficiaries of the traditional type of curriculum themselves "imposed from above and from outside" and who believed that students are expected to be docile, obedient and believe in fixed answers and structures. In such a strategy teachers are believed to be the instruments of delivering the knowledge and standards of behaviour to be enforced upon the students, and is usually associated with elements of coercion which is not acceptable by ethical standards.

Van der Westhuizen (2003) differs from the other philosophers and says convictions, missions, goals, norms, values and value systems, beliefs and hidden curriculum amongst others, determine how teachers behave towards learners in accordance with the convictions that the teachers hold about students.

The LBL method of teaching is believed to focus on rote learning and memorizing of information. Not everyone is in favour of the student-centered and task- oriented approaches to learning as most conservative parents and citizens are still concerned with the maintenance of objective educational standards based on testing of students (Theroux, 2002). In a lecture based learning (LBL) curriculum, teaching is teacher-directed and the emphasis is on examination orientated learning details, thus subjecting students to passive absorption of information than actively acquired knowledge or information and this is usually the background where most nursing students emanate from, with little or no experience of being independent. The effects of PBL on self-directed learning have been scarcely studied (Lycke, Stromso and Grottumt, 2006).

Spady (2009) confirmed that if teachers were to change their instruction methods and adopt the new strategies it would involve three main assumptions:

- Learners can successfully learn, but not on the same day and in the same way.
- The more successful the learners become, the more motivated they become to be successful
- Institutions of learning control, the conditions that directly affect successful learning.

The lecture-based curriculum alternatively known as a traditional curriculum refers to the long-established methods of teaching that some societies still recognize as appropriate or the most suitable method of teaching. Traditional methods of instruction focus on teaching and pay very little attention to learning, where most of what is taught in a classroom setting is forgotten, and much of what is remembered is irrelevant (Greenberg et al. 2008).

Greenberg et al. (2008) states that it is also believed that, whatever has been taught in the classroom only a certain amount of it is retained by those taught. Those who have reformed and adopted the progressive education practices, which embrace a more holistic approach that focus on individual student needs and self-expression, advocates that traditional teacher-centered (LBL) methods should be abandoned.

Though not all students benefit from a teacher-centered learning environment, some would prefer a student-centered strategy, which is guided and facilitated by the teacher or a hybrid method combining the two strategies. In this combination, didactic lectures are given for a particular system after which, clearly defined short practical problems related to what was taught in the classroom tutorials are given. The given problems are accompanied with relevant questions in order to streamline the thought processes. The study process is then facilitated by the teacher, whilst students discuss among themselves to derive solutions. At the end of the session, feedback is given and summary of the content is then concluded (Ghosh, 2007). Problem-based learning thus becomes the most appropriate teaching and learning strategy to enhance self-directedness in students.

2.4 **CONCLUSION**

This argument thus concludes that PBL programmes are not meant for everyone and may result in extreme anxiety and frustration in some students. Problem- based curricula focus on the instillation of problem identification and analysis, defining and clarifying key concepts, organization of content and hypotheses formulation. A decision to collect and access resources for information as evidence, in order to summarise the same and make a decision. These are the key skills in the practice of medicine and research including other health related sciences such as nursing.

Problem-based learning puts emphasis on critical analysis, problem solving and self-directed learning. It is therefore assumed that students in problem- based learning curricula have better self-directed learning skills, however, their readiness for SDL and the trend in its growth over a 4-year Bachelors degree in a Nursing curriculum is not known. In the next chapter, the research methods are presented.

CHAPTER THREE

RESEARCH METHODS

3.1 INTRODUCTION

This chapter gives an account of the methods used to meet the research purpose and the objectives. It includes the research design, population, sampling, sample size, methods of data collection, the research setting and the pilot study. The method of research used in this study enabled the researcher to gain more information about the characteristics of self-directed learning within the two groups of nursing students subjected to two different curricula i.e. PBL and LBL respectively. The description of the variables identifying self-directed learning in the subscales: self management, desire for learning and self control assisted in the interpretation of the findings and provided knowledge of the variables and the population that can be explored in future research.

3.2 RESEARCH DESIGN

Within an overarching quantitative approach, a cross-sectional, descriptive, comparative design was used in a natural classroom setting, which was uncontrolled and not manipulated. A descriptive design identifies relationships among variables to gain insight into a phenomenon being examined (self-directed learning readiness) without manipulating the variables.

A comparative study refers to a comparison of two groups of nursing students that occur naturally in a setting by examining and describing the differences in the group variables within their various years and stages of study (cross-sectional) simultaneously (Burns and Grove, 2005). The study was done within the context of two identified universities in Johannesburg offering a Bachelor's degree programme in nursing.

The study was undertaken in two universities that have duly been accredited by the South African Nursing Council as universities that provide both full-time and part-time degree studies. The design examined two student groups: Group A (PBL) and Group B (LBL) respectively in various levels of study i.e. from first, second, third and fourth year. The assumption was that the stages are part of a process that will progress across time, to the level of maturity where they become adults who are self-directed. The same subjects were not followed through the entire process of their course, hence the use of a cross-sectional design.

Nursing students in this study entered the profession after completing grade twelve, at the age of about 18 years and above. Growth patterns and stages of maturation clearly defined the demographic information to develop the criteria for inclusion and exclusion within differentiated groups; hence participants age 18 years were included in this study. Participants were further categorized by level/year, and stage of study (juniors and seniors), and data were collected on the selected variables that describe self-directedness on the three subscales: self-management, desire for learning and self-control at a single point in time respectively.

The design was used to gain more insight about the characteristic attributes in self-directed learning within the PBL and LBL programmes, and the differences or similarities embedded in the selected variables within the subscales of the instrument in the two groups of nursing students.

3.3 RESEARCH METHODS

Research methods refer to the methodological perspectives of the study, including data collection, data analysis, and measures of validity and reliability for trustworthiness of the study. These methodological perspectives are integrated into the discussion in accordance with the two universities involved in this study. The methods are summarized in Table 3.1 at the end of this chapter.

3.3.1 Population

The study population included all nursing students in their first, second, third and fourth year of study in an undergraduate curriculum and who have consented to participate in the study by returning the completed questionnaire (n=159). The total population was 200 students (N=200).

3.3.2 Sample

In this study the sample consisted of two groups, named Group A the PBL group (n=54), and Group B the LBL group (n=105). The total sample being (n=159) as determined by the number of students who returned completed questionnaires.

3.3.3 Data Collection

A self-administered instrument i.e. the Self-Directed Learning Readiness Scale (SDLRS) developed and tested by Fisher et al. (2001) was used to collect data.

3.3.3.1 **Procedure**

The class coordinator in each case explained the rules of filling in the questionnaire, that there would be no communication between the students during the session and that a completed questionnaire would be deposited in the sealed box in front of the classroom.

The students took less than 45 minutes to complete the questionnaire. The sealed box was then collected by the researcher immediately after completion..

3.3.3.2 **Research Setting**

The participants remained in their original classrooms i.e. natural setting, whilst completing the tool. The course coordinator organized the students in the classroom. The participants were to be given the questionnaire to fill in, independently and confidentially by the lecturer/course coordinator. A completed questionnaire was to be deposited in a sealed box at the front of the classroom.

The questionnaire would not be retrieved without opening the box to ensure anonymity and confidentiality of participants. Spoilt questionnaires were also to be placed in the same sealed box. The completed questionnaires would not have any means of personal identification of the respondents.

Table 3.1: Overview of the Research Method used in this Study

Objectives	Sample and Population	Data Collection	Validity and Reliability	Data Analysis
To determine self-directed learning readiness in respect of attributes, skills and motivational factors To compare self-reported attributes, skills and factors between two groups i.e PBL and LBL	Accessible Population: All the participants who returned the completed questionnaire Sample: All who returned and completed the questionnaire -Students in their first, second, third and fourth year of study.	A structured questionnaire (SDLRS) was used Completed questionnaires were deposited in a sealed box placed in front of the classroom. The class coordinator collected the sealed box after the participants had deposited their completed questionnaires in the box. The researcher collected the sealed box from the class coordinator.	Literature review Pilot Study Cronbach's alpha coefficient for homogeneity	Quantitative data analysis Inferential and descriptive statistics. All testing is on the 0.05 level of significance

3.3.3.3 **Data collection**

A 40-item self-administered questionnaire based on a 5-point Likert-Scale: the Self Directed Learning Readiness Scale (SDLRS) (Annexure A), was used to collect data from consenting students. The SDLRS consists of two parts: the first part of the instrument elicited demographic data from the sample. Demographic information required participants to indicate their age group, their gender, any prior completed courses and also their year of study.

The second part is structured around three factors/sub-scales with their respective items as illustrated below.

- **Self-management (n = 13)**
  = I solve problems using a plan
  = I prioritise my work
  = I do not manage my time well
  = I have good management skills
  = I set strict time frames
  = I prefer to plan my own learning
  = I am systematic in my own learning
  = I am confident in my ability to search out information
  = I set specific times for my study
  = I am self disciplined
  = I am disorganised
  = I am methodical
  = I can be trusted to persue my own learning

- **Desire for learning (n = 12)**
  = I have a need to learn
  = I critically evaluate new ideas
  = I learn from my own mistakes
  = When presented with a problem, I cannot solve, I will ask for assistance
  = I like to evaluate what I do
  = I need to know why
  = I do not enjoy studying
  = I want to learn new information
  = I enjoy a challenge
  = I want to learn new information

= I like to gather facts before I make a decision

= I am open to new ideas

- **Self-control (n = 15).**

  = I am able to focus on a problem

  = I evaluate my own performance

  = I am responsible

  = I prefer to set my own learning goals

  = I have high personal standards

  = I have high personal expectations

  = I have high beliefs in my abilities

  = I am aware of my own limitations

  = I am logical

  = I prefer to set my own criteria on which to evaluate my performance

  = I am responsible for my own decisions

  = I can find out information for myself

  = I like to make decisions for myself

  = I am in control of my life

  = I need to be in control of what I learn

Permission was obtained from the instrument developers at the University of Sydney, Australia Fisher, King and Tague (2000) for use in this study. Four items were negatively phrased, participants were asked to indicate the degree to which each item reflected their own characteristics using a 5- point Likert-Scale where a score of 1 indicated Strongly Disagree (SD), and a score of 5 indicated Strongly Agree (SA).

Scores on the following items were reversed to prevent responder bias and reduce the opportunity for respondents to give a similar score to each item. These items were as follows:

Self control:

Item 5 - I do not manage my time well

Item 91 - I am not in control of my life

Desire for learning:

Item 54 - I do not enjoy studying

Self management:

Item 65 - I am disorganised

After reversing the scores for the items listed above, the scores were added for each item to get a total score. The questionnaires were given to the course coordinator who in turn distributed the same to the students for their completion. A deposited questionnaire could not be retrieved without opening the box to ensure anonymity and confidentiality of participants thus protecting their identity. The completed questionnaires did not have any means of personal identification of the respondents.

3.4 PILOT STUDY

The instrument was then pilot-tested on n=20 first year nursing students which was n=10 from each curriculum approach i.e. PBL and LBL, of the total n=39 first year students who consented to participate in the study. The pilot study tested the clarity of the questions and the instructions, the appropriateness of questions to the subscales, the completeness of the response sets and the time required for the completion of the questionnaire. The students took 45 minutes to complete the questionnaire and had no difficulty in following and understanding the questions. The first year student sample consisted of n=39 students from both institutions. The purpose of the pilot study in this study was to:

- Refine the methodology of the proposed study.
- To give the researcher experience with the subjects, setting, methodology and methods of measurement.
- To test the research instrument with the participants, with regard to clarity and understanding of the questions.
- To improve the success rate and effectiveness of the major study using the Self-directed learning readiness scale (SDLRS).

The questionnaire was delivered to the course coordinators in both institutions during the month of October 2010 and the students were invited to seek clarification where necessary by the coordinators. Participants in the pilot study were randomly selected in their classroom setting by the course coordinators and anonymously filled in the questionnaire in 45 minutes and the same were collected immediately thereafter. The students were asked to describe

themselves by indicating on a 5-point Likert Scale the extent to which the item is descriptive of their own characteristics. There were no changes made to the questionnaire used in the pilot study and the results were therefore not different from those in the main study, hence the inclusion of the respondents' results from the pilot study in the main study.

3.4.1 **Data Analysis**

Data were appropriately coded and entered on to a computer using Stata Version 10. Descriptive and inferential statistics were applied. Frequencies and percentages on all the Likert scales and dichotomous items were calculated, as well as the mean and standard deviation on the three subscales. Furthermore, one-way ANOVA testing was done to correlate the results of the three subscales between the two identified student groups. Chapter four provides a detailed description of the data analysis.

3.5 **ETHICAL CONSIDERATIONS**

The research proposal was submitted to the Postgraduate Committee of the Faculty of Health Sciences of the University of the Witwatersrand. Permission was granted to proceed with the study. Application was also made to the University's Human Research Ethics Committee (HREC) for ethical clearance for the protection of the rights of human subjects. Ethical clearance was granted (protocol number M10511; Annexure B).

The Faculty of Health Sciences of the University of Johannesburg granted the researcher, written permission to conduct research in the Department of Nursing Science (Annexure C). The application was submitted to the Head of School of Therapeutic Sciences at the University of the Witwatersrand. Permission was granted to conduct research in the Department of Nursing Education.

The request was forwarded to The University of Sydney in Australia requesting permission to use the Self-Directed Learning Readiness Scale For Nurse Education and the letter of Agreement was signed (Annexure F and G). All directives and copyright issues were observed as per agreement signed by the researcher.

The questionnaire was accompanied by the Participant's Information Sheet (Annexure D), in which the students were assured of confidentiality, anonymity, and their participation on a voluntary basis. The Information sheet was attached to the questionnaire, receipt of a completed questionnaire implied acceptance of participation.

Ethical considerations in this study were based on a number of issues. These were the following:

- **Right to Self Determination**

  In this study, the prospective subjects/participants were treated as autonomous agents within their rights by informing them to voluntarily participate in the study and that they are allowed to withdraw from participating anytime without any penalty. This was based on the principle of respect for persons, which advocates that humans are capable of controlling their own destiny and should thus be treated as autonomous agents, who have the freedom to conduct their lives as they choose, without external control.

- **Violation of the Right to Self Determination**

  Participants were not coerced nor deceived to participate in this study, because data collection was conducted exactly as explained in the protocol i.e. in the natural classroom setting by the class coordinator. The researcher had no contact or teaching experience in both universities where data were collected. There were no threats posed on the students' grades by the lecturer or class coordinator should the participants decide not to participate at any stage. No rewards were offered, for participation in any form in this study.

- **Right to Anonymity and Confidentiality**

  Confidentiality was protected by observing the following:

  Nobody else had access to the completed questionnaires from the participants, besides the researcher and the statistician for analysis of the data.

  All data collected were identified by a code assigned to each participating university. Complete anonymity of the participants was observed by ensuring that the identity of the participants is protected and not linked to the completed questionnaire.

- **Right to Privacy**

  Participants were allowed to fill in the questionnaire independently and no communication was engaged into during the session. The participant's information sheet allowing the participant to withdraw from the study at anytime and also voluntarily participate at his/her own free will was given to each participant.

- **Right to Fair Treatment**

  The population chosen in this study was for the reasons directly related to the problem statement, to examine and determine self directed readiness in nursing students, from their second year of study to the fourth year. The population was not selected on the basis of their easy availability in the classroom as their natural setting.

  The self-administered questionnaires (Annexure A) with an information sheet (Annexure D) were given to prospective participants, for the purpose of obtaining informed consent. Return of a completed questionnaire was taken as consent. Participants were assured of privacy, confidentiality and protection of their right to be autonomous. No form of identification of the participants was required since no name (only numbers) appeared on the instrument, and results would not show who the respondents were, and as such, were assured of anonymity.

  The researcher had no teaching involvement in any way, in these participating universities and their students, and therefore was not in a position of authority over them. Students thus did not feel coerced to participate in the study or feel that they may be disadvantaged or penalized in any way.

3.6 CONCLUSION

This chapter explained the research design and described the research methods. These included the population and accessibility of the sample, data collection, data collection procedure, pilot testing and data analysis. The instrument used in this study was discussed and ethical issues pertaining to the study were considered.

Chapter Four follows with a presentation of the results after data analysis. Graphs are presented on biographical data as well as frequencies and percentages on the Likert-scale data.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

The purpose of this chapter is to report on the results after data analysis was completed. Participants were required to report on their readiness for self-directed learning in an academic context, using the Self-Directed Learning Readiness Scale (SDLRS). The SDLRS comprises 40 items on a 5-point Likert-scale that measures self-directed learning readiness on the following three dimensions:

- Self-management (13 items)
- Desire for learning (12 items)
- Self-control (15 items)

This scale measured the Self-Directed Learning (SDL) readiness of first, second, third and fourth year Bachelor of Nursing students at two universities using different curriculum approaches namely, a problem-based learning (PBL) curriculum, and a traditional, lecture-based learning (LBL) curriculum. These groups were similar with respect to age, gender and prior study. Other possible differences between the two groups of students, which may influence SDL readiness, such as differences in admission criteria between the two universities were not considered.

In addition to data on the dimensions of SDL readiness, the following demographic data were also collected:

- Age,
- Gender; and
- Year of study (first, second, third and fourth year).

No exception was made for students who had failed a year of study, i.e. a student who was repeating third year at the time of completing the questionnaire would be regarded as a third year student, and whether or not other studies had been completed prior to embarking on a nursing career.

This chapter further reports on the pilot study and the reliability scores and construct validity of the Self-Directed Learning Readiness Scale (SDLRS).

4.2 PILOT STUDY

The SDLRS was piloted on first year nursing students (n=20): ten from each curriculum approach. The pilot study ran smoothly, and no changes to the questionnaire were required. The pilot study data were thus included in the main study. The students took approximately 45 minutes to complete the questionnaire and had no difficulty in understanding the questions.

The University of the Witwatersrand's Statistics Consultation Service provided statistical support after all the data were collected.

4.3 APPROACH TO DATA ANALYSIS

Data were entered into a Microsoft Excel spread sheet and data analysis was then carried out in STATISTICA, Version 10, www.statsoft.com. This was done to test for internal reliability, subsection consistency and item unidimensionality; the resulting data were compared with the data obtained in a similar study by Fisher et al. (2001). Data were cleaned to eliminate mistakes and coded as follows:

- Question 3 (Level of study) was re-coded as follows: Y1 = 1, Y2 = 2, Y3 = 3, Y4 = 4.
- Level of study was further coded as a new variable namely: Stage of study: Junior = Y1 and Y2; Senior =Y3 and Y4.
- Items on the Likert-scale were collapsed for easy interpretation of the results. Columns such as " strongly disagree" and "disagree" were combined and were interpreted as "disagree", the " unsure " column remained the same, and columns "agree" and " strongly agree" were interpreted as " agree". The Likert-scale responses were thus in three columns of "disagree", "unsure" and "agree".

The response rate, biographical data, which include the age, sex, level of study and prior studies are reported below, together with participants' responses to the questionnaire items.

All negatively phrased questions were reverse-scored. The scores for the three SDLR dimensions, as well as the total SDLR score, were calculated for each respondent. The record for one student who did not complete the SDLR questions beyond the fourth question, was

deleted. The number of students who completed the questionnaire amounted to 159 (n=159), a response rate of 80%.

4.4 RESULTS: DEMOGRAPHIC DATA

On reporting the results, a 95% confidence level was used throughout, unless specified otherwise. Microsoft Excel graphs and tables were used to enhance the presentation of findings.

4.4.1 The Sample

The total sample comprised 159 students (n=159). The sample of students in each curriculum approach was as follows: the LBL group comprised 105 students (n=105; 66.0%) and the PBL group comprised 54 students (n=54; 34%). In each of Y2 and Y3 there were 44 students in total in the two curricula programmes. These participants accounted for 28% each level and 55.3% of the total sample. Y1 students including the pilot made up (n=39; 24%) and Y4 (n=32; 20%) of the sample, respectively as shown in (Table 4.1).

Table 4.1: Number of Students by Curriculum Approach and Year of Study (n = 159)

Year of Study	Curriculum Approach		
	LBL (%)	**PBL (%)**	**Total (%)**
Y1	19 (18%)	20 (37%)	39 (24%)
Y2	32 (31%)	12 (22%)	44 (28%)
Y3	34 (32%)	10 (19%)	44 (28%)
Y4	20 (19%)	12 (22%)	32 (20%)
Total	**105(100%)**	**54(100%)**	**159(100%)**

4.4.2 Age

Figure 4.1 below illustrates the age distribution of all respondents (n = 159) for both curricula: LBL and PBL. The distribution of student ages for the two groups was fairly similar with the exception of two students (n = 2) in the LBL programme, who were older than 30 years.

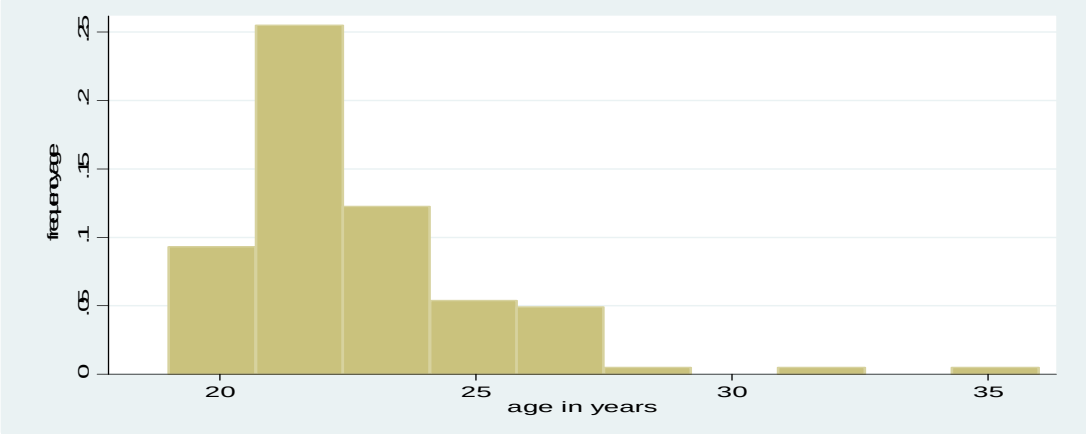


Figure 4.1: Age Distribution of Respondents (n=159)

The average age of students did not differ significantly between the two groups of nursing students admitted to the two institutions. The ages ranged between 18 and 19 years at entry level with a mean age of 22.6 (SD=2.71) for the LBL group and 22.4 (SD=2.01) for the PBL group as shown in Table 4.2 below.

Table 4.2: Mean Age and Standard Deviation of Sample (n=159)

Variable = Age					
Institution	**Total**	**Mean**	**Standard Deviation**	**Min**	**Max**
LBL	105	22.63953	2.709082	18	36
PBL	54	22.44118	2.017967	18	26

A nested Analysis of Variance (ANOVA) was used to test whether there were significant differences in age between students in the two curricular approaches and between the year of study within each group. The difference in mean age was not statistically significant [F(1, 151) = 0.58, p = 0.45] despite the big difference in maximum age. The similar standard deviations further confirms this, as it provides a measure of the average deviation of a score from the mean.

Figure 4.2 below shows positive skewness which means that, in both programmes, the largest proportion of students' age was at 22 years and below the mean age. The skewness in the PBL group is not evident graphically, because of the smaller sample size (n=54 compared to n=105) (Burns and Grove, 2005).

There was a significant interaction at the p<0.05 level between the year of study and curriculum approach [F(6,151)=8.49, p<0.001].

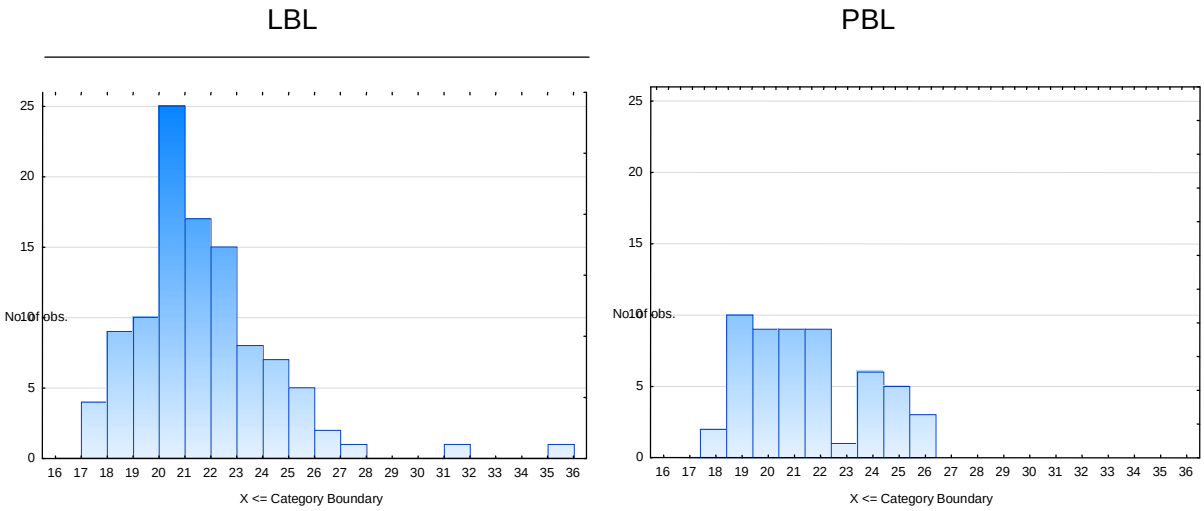


Figure 4.2: Graphic Age Distribution by Curriculum (LBL and PBL) (n=159)

Post hoc comparisons using the Unequal N HSD test (used for unbalanced groups) showed that as we would expect, in the LBL programme, Y3 and Y4 students were significantly older than Y1 students, considering the mean age of 22.6 years in comparison with the maximum age of 36 years at Y4, when compared with the PBL group. Y4 students in the PBL programme were significantly older than Y1 and Y2 students considering the mean age of 22.4 years in comparison with the maximum age of 26 years at Y4 when compared with the LBL group. Current effect: [F(6, 151)=8.4913, p=.00000].

Figure 4.3 shows a graphic age distribution of students by year of study in the two curricula (LBL and PBL).

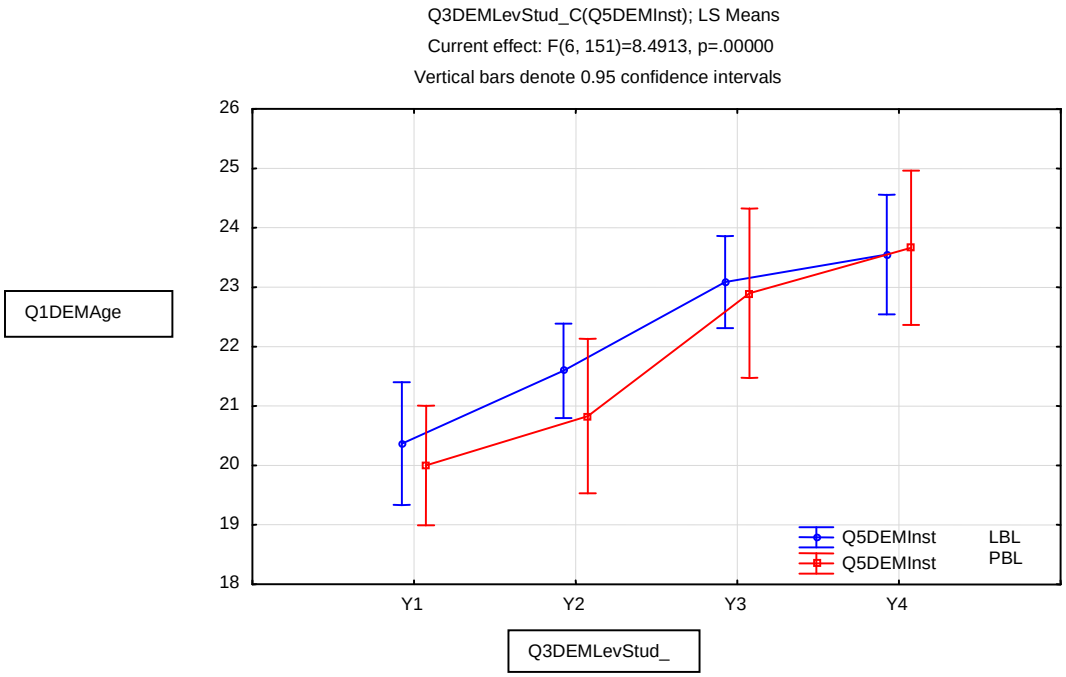


Figure 4.3: Age Distribution of LBL and PBL Groups by Year of Study (n=159)

After piloting the questionnaire and no changes were required, Question 3 (level of study) was further recoded as a new variable namely: Stage of study: junior= Y1 and Y2; Senior=Y3 and Y4. Table 4.3 shows the distribution of the sample by stage of study when grouped as juniors and seniors in their years of study.

Table 4.3:Distribution of Sample by Junior and Senior Stages of Study (n=159)

Stage of study	Curriculum Approach		
	LBL (%)	PBL (%)	Total (%)
Junior (Y1 and Y2)	51 (49%)	32 (59.3%)	83 (52.2%)
Senior (Y3 and Y4)	54 (51%)	22 (40.7%)	76 (47.8%)
Total	**105 (100%)**	**54(100%)**	**159 (100%)**

Similarly, a nested Analysis of Variance (ANOVA) was used to test whether there were significant differences in age between the two curricular programmes and between the stages of study (Junior / Senior) within each group.

The main effect of curriculum approach was not significant [F(1, 155) = 0.97, p = 0.33] which means that the average age of students from the two groups did not differ significantly. There

was a significant interaction at the p<0.05 level between the stage of study and curricular approach [F(2, 155)=22.5, p<0.001].

Figure 4.4 shows the distribution by stage of study ie. juniors and seniors in the two groups.

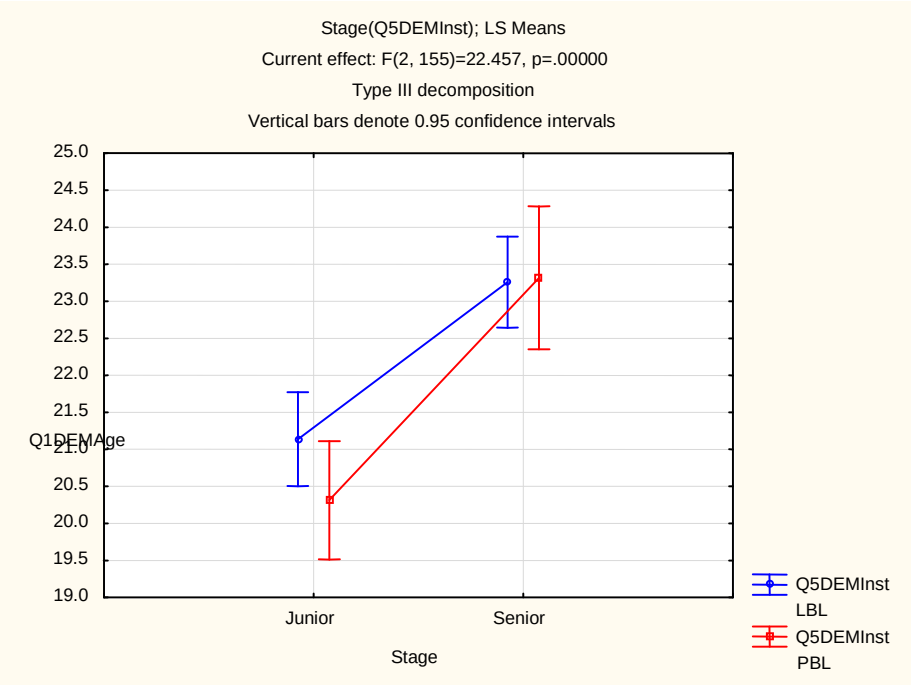


Figure 4.4: Age Distribution by Stage of Study in LBL and PBL Groups (n=159)

Post hoc comparisons using the Unequal N HSD test (used since we have unbalanced groups) showed that, for both LBL and PBL groups, junior students were significantly younger than senior students.

4.5 GENDER

The majority of the respondents 80.5% (n=128) were females; males comprised 19.5% (n=31) of the sample. Table 4.4 illustrates the gender composition in both groups i.e. LBL and PBL. Table 4.5 shows the gender composition by year of study for the two groups respectively.

Table 4.4: Gender Composition in Both LBL and PBL Groups (n=159)

Gender	Curricular Approach		
	LBL (%)	**PBL (%)**	**Totals (%)**
Male	19 (18.1%)	12 (22%)	31 (19.5%)
Female	86 (81.9%)	42 (78%)	128 (80.5%)
Totals	105 (100%)	54 (100%)	159 (100%)

There was no significant difference between the gender composition of the two groups (as determined by Fisher's Exact Test, p = 0.53).

Table 4.5: Gender Composition by Year of Study of Sample (n=159)

Gender	Year of Study				
	Y1	**Y2**	**Y3**	**Y4**	**Totals**
Male	12.8%	20.5%	22.7%	21.9%	19.5%
Female	87.2%	79.6%	77.3%	78.1%	80.5%
Totals	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

There was no significant difference between the gender composition and year of study (as determined by the X^2 test, p = 0.67). Female students made up 83.14% (n=69) and males made up 16.86% (n=14) in the junior years. Whereas at senior stages the females made up 77.6% (n=59) and the males comprised 22.4% (n=17). These results confirm the total number of females in the sample which is 80.5% (n=128) and that of the males being 19.5% (n=31) in the sample. Table 4.6 below shows the composition by stage of study i.e juniors and seniors in the sample.

Chi square test (X^2) was used to determine differences in gender between junior and senior groups. There was no significant difference between the gender composition and the stage of study as determined by (X^2); (n=83) juniors; (n=76) seniors (p= 0.38), respectively.

Table 4.6: Gender Composition by Stage of Study of Sample (n=159)

Gender	Stage of Study		
	Junior (%)	**Senior (%)**	**Total (%)**
Male	14 (16.86%)	17 (22.4%)	31 (19.5%)
Female	69 (83.14%)	59 (77.6%)	128 (80.5%)
Totals	**83 (100%)**	**76 (100%)**	**159 (100%)**

4.6 PRIOR STUDIES COMPLETED

Only two (1.9%) LBL students and one (1.8%) PBL student had obtained previous qualifications. This variable was thus not considered in analysis of the SDLR scores.
Table 4.7 below reflects a negligible proportion of students, who had completed prior studies before entering the nursing profession.

Table 4.7: Prior Studies Completed in LBL and PBL Groups (n=159)

Qualification	Institution		
	LBL	**PBL**	**Totals**
None	98.1%	98.2%	98.1%
Degree	1.0%	1.8%	1.3%
Masters	1.0%	0.0%	0.6%
Totals	**100.0%**	**100.0%**	**100.0%**

4.7 RESULTS: SELF-DIRECTED LEARNING READINESS

4.7.1 Reliability and Validity of the SDLRS

The Cronbach's alpha coefficient values for the three subscales of the SDLRS for the 40-item questions were compared to those reported by Fisher et al (2001) (see Table 4.8). The scores for this study were as follows, self-management, 0.773; desire for learning, 0.765; self-control, 0.736. This means that the Cronbach's alpha values for the three constructs were all above 0.70 which is considered as an acceptable level of internal consistency and that for the overall SDLR scale was well above 0.80. The reliability scores for the instrument were lower than those reported by Fisher et al (2001), as reflected in Table 4.8. This was understandable, since this study was carried out with a smaller sample size and in a different country, where English is not the first language of many respondents.

The scree plot criterion was used for construct validity analysis of the SDLRS, since the eigenvalue criterion in each subscale had large numbers of variables that interrelate to the selection of many factors. This was used, for each of the three constructs, self-management, desire for learning and self- control to disentangle or separate the relationships in order to identify clusters of variables that most closely resemble or link together to describe these constructs. The variables related to a particular construct were loaded onto one factor which develops correlation matrix of scores of all the variables in the factor analysis of the subscales

involved in the SDLRS. This was automatically done by the computer program demonstrating unidimensionality (Burns and Grove, 2005).

According to Fisher et al (2001) in a unidimensional scale each item measures the same construct i.e. SDL. All factor loadings were > 0.30, a low threshold, but used by Fisher et al (2001) with three exceptions: Question 20 (0.07) (desire for learning), Question 21 (0.25) and Question 46 (0.24) (both self-control) which were accepted for use in this study.

Item unidimensionality, a scale to reflect the extent to which each item is measuring the same construct, for the item-total correlations of the 40 questions that are correlations between the items and the sum of the scores (without the item) were tested, using item to sum correlations. An item to sum correlation of greater than 0.3 is often used to indicate that the respective item belongs to the overall scale. In this study, item to sum correlations below 0.3, the cut off used by Fisher et al (2001), were identified.

Although the overall set of questions could be represented by the three factors, these factors did not correspond at all to the constructs given by Fisher et al (2001). So although there are some concerns around the item-response probabilities, as well as the unidimensionality and definition of the constructs, the aim was not to design or refine an instrument but rather to use a published and previously validated instrument. So with this in mind, the researcher proceeded to use the constructs and the SDLRS as presented by Fisher et al (2001).

The results of the reliability and unidimensionality analysis are presented in the Table 4.8 below.

Table 4.8: Reliability and Unidimensional Factor Analysis of SDLRS

Construct	Cronbach's alpha this study	Cronbach's alpha Fisher (2001)	# factors (scree plot)	# factors (eigenvalues > 1)
Self-management	0.773	0.857	1	3
Desire for learning	0.765	0.847	1	3
Self-control	0.736	0.830	1	5
SDL readiness (overall)	0.881	0.924	3	13

4.7.2 Self-Management

Respondents were asked, on a 5-point Likert-scale, to indicate how they manage themselves, with respect to the questions that characterise this subscale. Questions such as, prioritising their work, managing their time in order to attend to their studies, planning their learning activities, being disciplined enough to take responsibility for their own decisions etc, formed part of this section.

These questions would assess students' capabilities as they perceived themselves in order to develop deep learning skills through questioning and analysis of phenomena, whilst developing awareness and control of their own learning, critical thinking values, progressive problem-solving skills and decision making.

For the analysis of each of the three SDL constructs as well as the overall SDLR scores, a nested ANOVA was used within the two groups of students, as the main factor and year of study as the nested factor. Table 4.9 below depicts scores on self-management for all the students in both curricula i.e LBL and PBL.

Table 4.9: Students' Self-Management Scores on LBL and PBL Programmes (n=159)

Curriculum	n	mean	(SD)	95%
LBL	105	49.7	5.8	50.83
PBL	54	50.0	6.7	51.87

The main effect of curriculum approach was not significant [$F(1, 151) = 0.05$, $p = 0.82$] which means that the self-management scores of students from the two curricula did not differ significantly. The interaction between year of study and curriculum was also not significant [$F(6, 151)=1.96$, $p=0.075$] which means that, within each curriculum, there was no significant difference in the self-management scores of the students at different levels or year of study.

Figure 4.5 below represents the mean self-management scores (out of a possible maximum score of 65) for the sample, together with their 95% confidence interval by year of study.

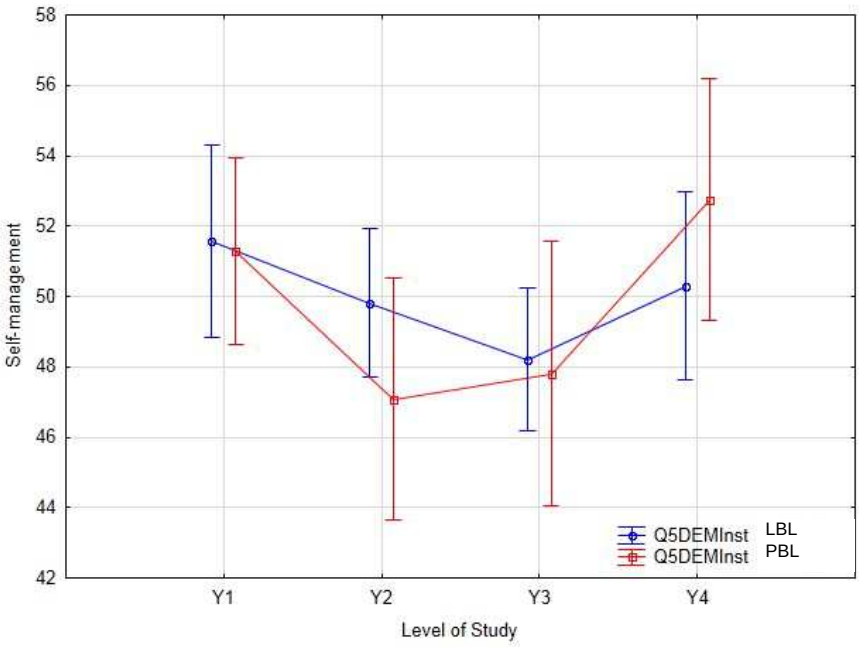


Figure 4.5 Mean Self-Management Scores by Year of Study (n=159)

Considering the stage of study as covariate i.e. whether junior or senior, the PBL group reported an improvement in their self-management ability between Y1 and Y4. The LBL group reported a decline as can be seen in figure 4.6. However, the main effect of curriculum approach was not significant [$F(1, 155) = 0.14$, $p = 0.71$]. This means that the self-management scores of students from the two curriculum groups did not differ significantly. The interaction between stage of study and the curriculum group was also not significant [$F(2, 155)=0.88$, $p=0.42$] which means that, within each group, there was no significant difference in the self-management scores of the students regardless of seniority.

The mean score for self-management for both groups was 49.8 out of a possible score of 65, i.e. 76.6%.

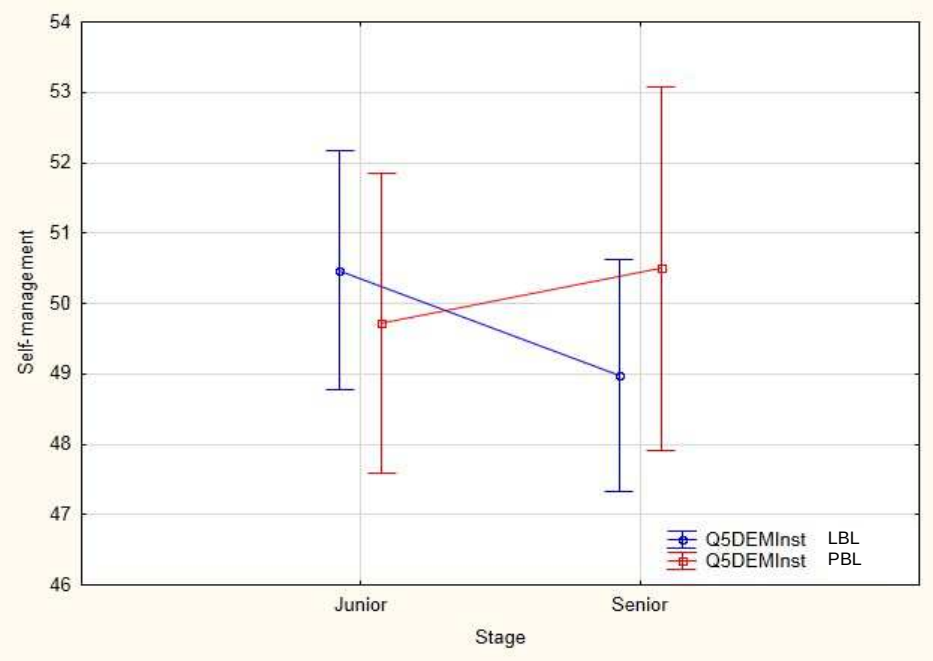


Figure 4.6: Mean Self-Management Scores by Stage of Study (n=159)

4.7.3 Desire for Learning

The desire for learning brings about realistic awareness of personal needs as well as properties of self concept. Desire for learning, helps and assists the individual to realise his or her own strengths and weaknesses in required skills or expectations, in order to develop confidence. Qualities of an inquiring mind are enhanced by seeking and responding to constructive feedback and asking for help when in doubt through effective communication. These questions reflect on the development of effective communication with patients, families and colleagues (Rideout et al, 2002). In Table 4.10 below, the results show that the desire for learning scores of students from the two curriculum groups did not differ significantly, with a mean 49.9 (SD=4.8), and 50.1 (SD=5.1) in LBL and PBL groups respectively [F(1, 151)=0.02, p=0.90].

Table 4.10: Desire for Learning Scores on LBL and PBL Groups (n=159)

Curriculum	n	mean	(SD)	95.00%
LBL	105	49.9	4.8	50.82
PBL	54	50.1	5.1	51.51

The interaction between year of study and curriculum approach was also not significant [F(6, 151)=1.27, p=0.28] which means that, within each group, there was no significant difference in the desire for learning scores of the students in different years of study.

Although, there was no statistically significant difference between the two groups, the difference is educationally significant. Figure 4.7 shows a decrease in students' desire for learning as early as their first year of study, the PBL group of students started off on a higher level, than the LBL group, with the mean score of 51.5 (54.2%) at 95% confidence interval, but show a sharp decline in their desire to learn at second year, with a mean score of 48.7(51.3%) compared to the LBL group. The PBL group's reported desire to learn, improve in the third and fourth year of study ending with the mean score of 49.9 (53.5%), which still is lower than when they started in their first year. The LBL group scores remain at relatively the same level between first and second year and drop significantly at Y3 with a mean score of 48.7 (50.4%), with a slight or very little difference of improvement at Y4, with a mean score of 49.2 (51.0%) at 95% confidence interval and again show lower scores, compared to their first year of study. Both groups i.e LBL and PBL end up at a level lower for desire to learn than in their first year.

The average desire for learning scores (out of a possible maximum score of 60) for the sample is presented in Figure 4.7 below.

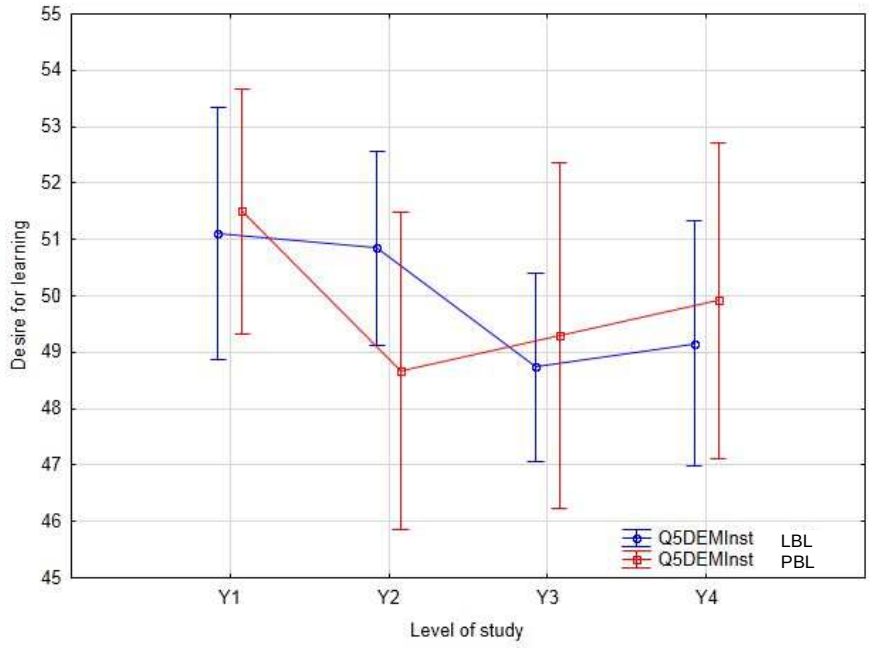


Figure 4.7: Desire for Learning by Year of Study (n=159)

Considering junior and senior stages of study as covariate, the main effect of curriculum approach was not significant [F(1, 155) = 0.02, p = 0.88] which means that the desire for learning among students from the two groups did not differ significantly. The interaction

between the senior and junior stages of study within the group was also not significant [F(2, 155)=2.48, p=0.09], which means that, within each group, there was no statistically significant difference in their desire for learning between junior and senior students.

The junior students in the PBL group show lower scores, compared to the LBL group of students. This is thought to come about as a result of adjustment to the new teaching strategy of problem- based learning. The PBL senior students, i.e third and fourth years, show higher scores in their desire for learning compared to their counterparts in the LBL group.
The desire for learning mean score for both groups was 50.0 of a possible score of 60, i.e. 83.3%. Figure 4.8 shows the stage differences with respect to stage of study.

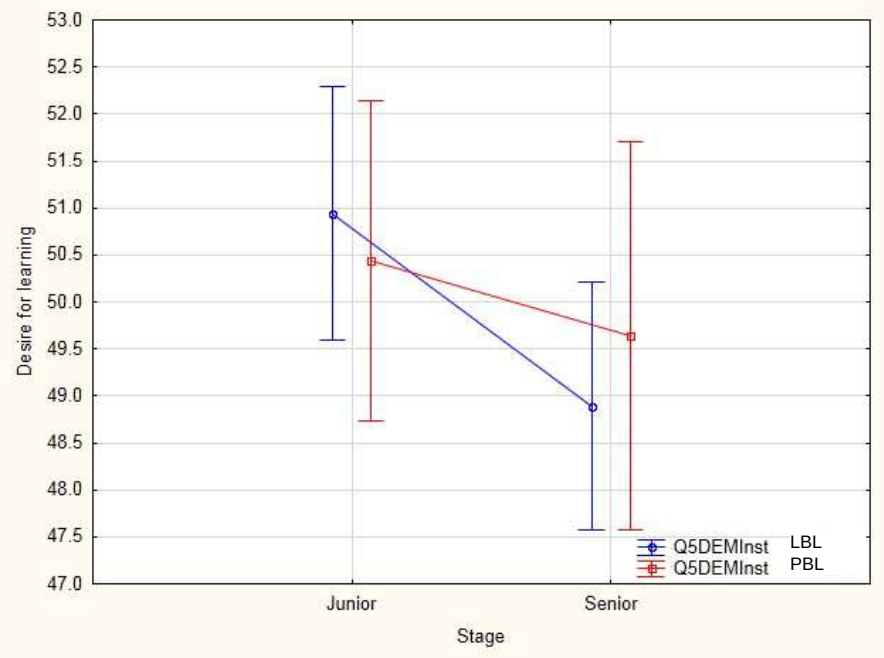


Figure 4.8: Mean Desire for Learning Scores by Stage of Study (n=159)

4.8 SELF-CONTROL

Self-control skills, which enable students to take ownership of their studies by setting goals and strict times for study sessions, are represented by scores for both groups in Table 4.11 below. The self control scores (out of a possible maximum score of 75) for the sample are presented with their 95% confidence interval.

Table 4.11: Self-Control Scores for LBL and PBL Groups (n=159)

Curriculum	n	mean	(SD)	95.00%
LBL	105	64.6	5.0	65.55
PBL	54	63.4	5.4	64.87

The main effect of curriculum approach was not significant [(1, 151) = 1.94, p = 0.17], which means that the self-control scores of students from the two groups did not differ significantly. The interaction between year of study within each group, and within each curriculum approach, was also not significant [F(6, 151)=1.95, p=0.08], which means that, within the two groups, there was no significant difference in the self-control scores of the students in the different years of study.

Figure 4.9 below shows the interaction between students' self-control scores in the two curriculum groups, within each year of study. The scores in Y1, Y2 and Y3 of the PBL group are lower than those in the LBL group. However, in Y4 the PBL group with a mean score of 67.2 (70.0%) at 95% confidence interval exceed those in Y4 (LBL group) with a mean score of 65.7 (67.2%). The overall SDLR mean score for self-control was 64.2 (65.0%) at 95% confidence interval for both groups.

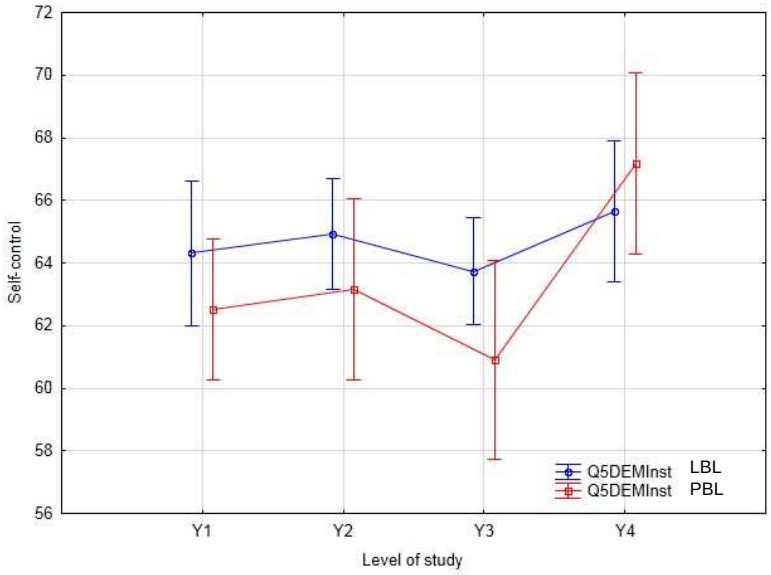


Figure 4.9: Mean Self-Control Scores by Year of Study

Considering the stage of study as covariate, the main effect of curriculum approach was not significant [F(1, 155) = 1.4, p = 0.24], which means that the self-control scores between students in their junior and senior years of study, did not differ significantly. Statistically, the

interaction between the stage of study i.e. whether junior or senior was also not significant [F(2, 155) = 0.63, p = 0.53], which means that within each group and stage of study, there was no statistically significant difference in the self-control scores between junior and senior students.

It is of importance to note, a decline in the levels of self-control/self- reliance scores in the LBL senior students, compared to the PBL senior students who gained substantially in their self-control abilities. The PBL students' active engagement/participation in their own learning encourages and develops their skills in seeking for information to enhance their learning capabilities and thus taking control of their own learning. The LBL group depend on information from the teacher and believe that it's the only way to achieve good marks, if they remember what was taught in class. Figure 4.10 below shows the educational growth in the PBL group, with respect to self control.

The mean score for self-control was 64.2 of a possible score of 75, i.e. 85.6%.

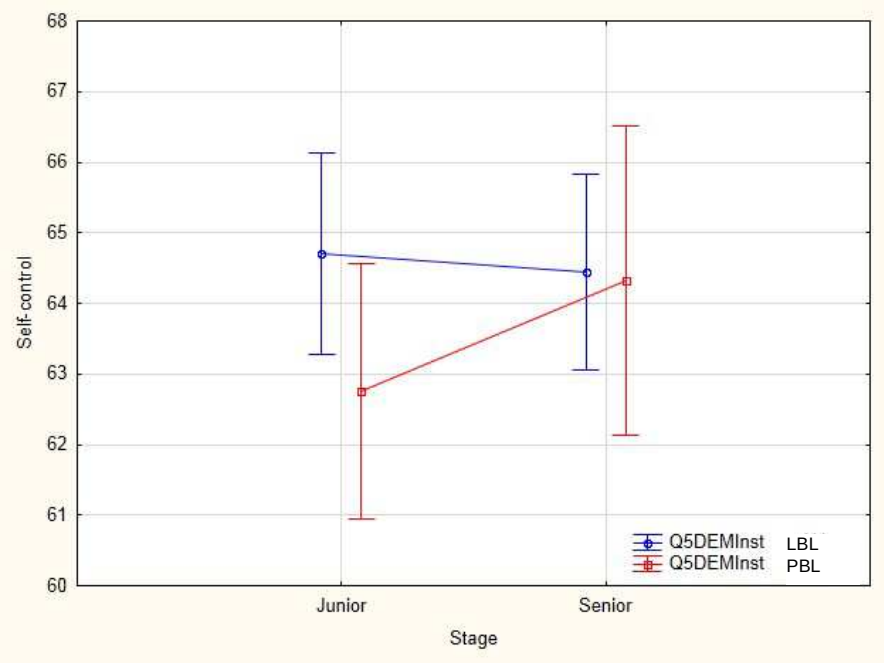


Figure 4.10: Mean Self-Control Scores by Stage of Study (n=159)

The data showed that the students in the two curriculum groups scored least in the self-management subscale, better in the desire for learning subscale and the highest score obtained in self-control subscale. Although all scores are higher than other studies, Smedley (2007) comments that the inability or lack of self- management in particular, could be a major factor in reducing the students' readiness for SDL. Table 4.12 shows a comparison between the three studies.

Table 4.12: Comparison between Studies of Mean Scores from Each Subscale Group (n=159)

Group Subscale with No. of Items	Sum of Students' Scores in this Study		Sum of Students' Scores (Smedley, 2005)		Sum of Pool Scores (Fisher, et al.,2001)	
Scores	**Sum**	**Mean**	**Sum**	**Mean**	**Sum**	**Mean**
Self-management :13	49.8	6.0	44.79	3.45	44.26	3.40
Desire for learning :12	50.0	4.9	47.18	3.93	47.31	3.94
Self-control :15	64.2	5.2	59.12	3.94	58.98	3.93

The overall SDLR mean score for this study was 164 of a possible mean score of 150 (Fisher, et.al.,2001). All calculations are clearly illustrated in Annexure J.

4.9 OVERALL SELF-DIRECTED LEARNING READINESS

Self-directed learning (SDL) has been identified as a learning approach that relies more on the students being responsible and possessing abilities of self-directedness in their own learning, by taking the initiative, with or without the help of others. The learner's readiness to engage in SDL is defined as the degree to which the individual possesses the attitudes, abilities and personality characteristics necessary for self-directed learning (Hala and Mohamed, 2011).

Overall the main effect of curriculum approach was not significant [$F(1, 151) = 0.46$, $p = 0.50$]. This means that the overall SDLR scores of students between the two groups did not differ significantly. The interaction between the years of study and within the two curriculum groups, was also not significant [$F(6, 151)=1.62$, $p=0.15$] which means that, there was no significant difference in the SDLR scores of the students within the two curriculum groups and years of study.

The results show a moderate SDL readiness in Y1 for both LBL and PBL groups, with a steep decline in scores between Y1 and Y2 for the PBL group. This can be attributed to students' adjustment problems at tertiary level and in the PBL group, a shift from a teacher-centered (LBL) teaching strategy to a learner-centered (PBL) programme. Between Y3 and Y4, the PBL group shows more improvement in their SDL readiness when compared to the LBL group

(Figure 4.11). However, considering the stage of study as covariate, the main effect of the curriculum approach was not statistically significant [F(1, 155) = 0.05, p = 0.92]. This means that the difference in SDLR scores between the different years of study,could not be attributed to the curriculum approach. The interaction between the stage of study and curriculum approach was also not significant [F(2, 155)=1.11, p=0.33]. This means that, within each curriculum approach, there was no statistically significant difference in the SDLR scores of junior and senior students (Annexure J.

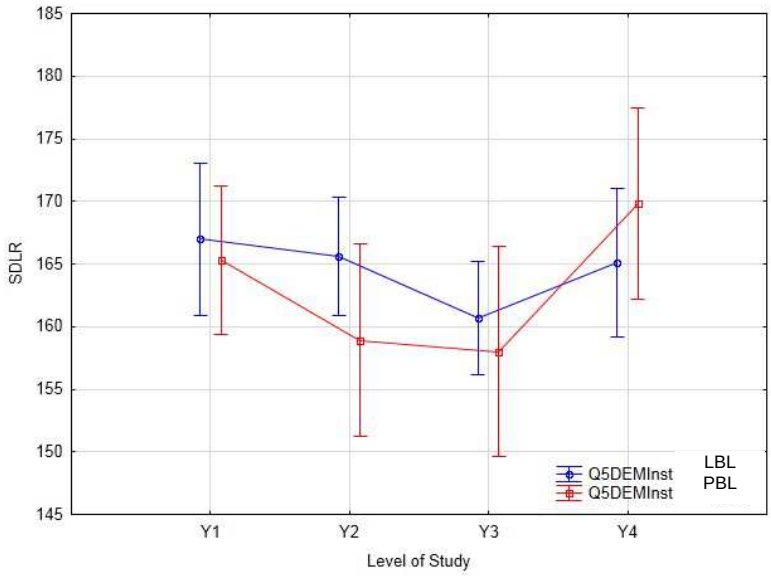


Figure 4.11: Mean self-directed learning readiness scores by year of Study of the sample (n=159)

Figure 4.12 shows self-directed learning readiness (SDLR) scores by stage of study of the sample (n=159); with the overall score 164.1 (LBL) and 163.5 (PBL) in their respective curriculum groups. The overall average mean score for SDLR was 164 of a possible mean score of 150.

Fisher et al (2006) indicate that a total SDLR score of 150 or more indicates readiness for SDL. The average SDLR scores of the students at each level and stage of study in each group were higher than 150.

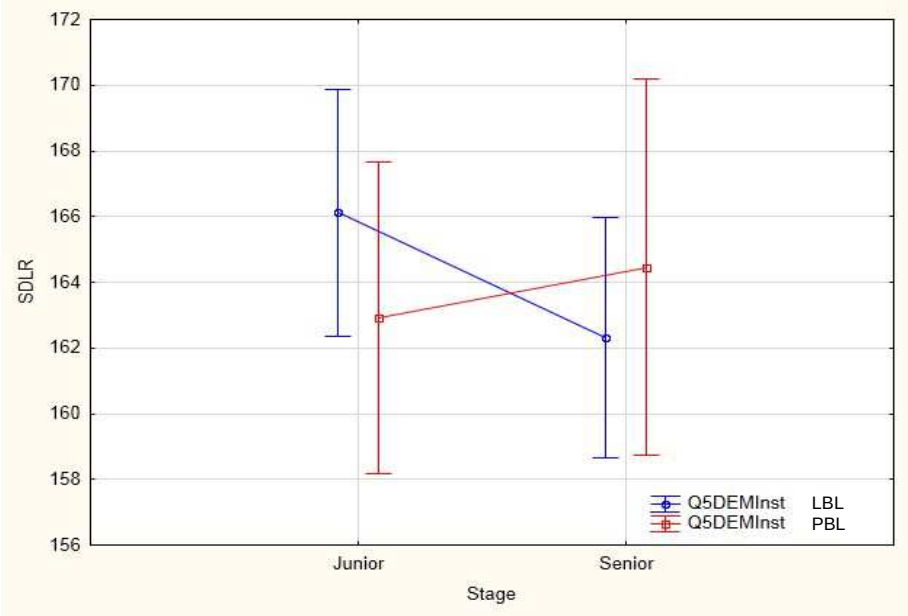


Figure 4.12: Self-Directed Learning Readiness by stage of study of the sample (n=159)

In this study the average SDLR scores of the students at each level and stage of study at each institution (as well as the overall score) were higher than 150. When comparing the two groups of students' self-directed learning readiness mean scores by stage of study, LBL juniors = 166.1 and seniors =162.3 and PBL juniors=162.9 and seniors=164.4.

The difference in scores at both junior and senior levels in both groups (LBL&PBL) were found not to be statistically significant, but educationally significant as an indication of developmental growth of students after being exposed to a PBL learning environment (Annexure J).

The percentage of students in each category at each level of study who had SDLR score response rate of 150 or more is shown in Table 4.13 below and with reference to Annexure J.

Table 4.13: SDLR Score (150) Response Rate by Year of Study of Sample (n159)

Student Group by Year of Study								
	LBL	**PBL**	**LBL**	**%**	**PBL**	**%**	**Total**	**%**
Y1	19	20	n=16	84	n=16	80	n=32	82
Y2	32	12	n=28	88	n=10	83	n=38	86
Y3	34	10	n=27	79	n=7	70	n=34	77
Y4	20	12	n=19	95	n=12	100	n=31	97
Total=	105	54	n=90	86	n=45	83	n=135	85

With reference to their overall readiness for SDL, over 70-80% of students in both groups and at all four levels of study had total SDLR scores of 150 or more, indicating acceptable levels of SDL readiness. When viewed according to stage of study, at both stages and both curricula approaches more than 80% of students had scores of 150 or more, indicating SDL readiness. Table 4.14 below show senior and junior students with their mean SDLR score more than 150 see (Annexure J).

Table 4.14: Mean SDLR Score by Stage of Study for LBL and PBL n=159

Stage of Study	**LBL**	**Mean SDLR**	**PBL**	**Mean SDLR**	**LBL and PBL**	**SDLR 95.00%**
Junior	n=51	166.12	n=32	162.91	LBL-105	166.72
Senior	n=54	162.31	n=22	164.45	PBL-54	167.43
Totals	n=105	164.16	n=54	163.54	Total-159	166.07

When analysed according to the stage of study more than 80% of both junior and senior students in the two curricula approaches, had mean SDLR scores of above 150, indicating an acceptable level of self-directed learning readiness.

There were no significant differences between the SDL readiness scores, on the three sub-scale scores of students from the two groups with respect to the proportion of students in the two curricula approaches and between the scores of students at different years of study (or stage of study) within each group.

There was no significant differences between the two curriculum groups with respect to the proportion of students with SDLR score response rate of 150 or more as determined by the X^2 test p=0.69.

There was no significant difference between curriculum approach in the different years of study with respect to the proportion of students with SDLR score response rate of 150 or more (X^2 test, p=0.45 (LBL) and X^2 test, p=0.28(PBL).

There was no significant difference between junior and senior students with respect to the proportion who had SDLR score response rate of 150 or more in both curriculum groups (X^2 test, p = 0.87 LBL; p = 0.62 PBL).

For complete set of analysed data refer to Annexure J.

4.10 CONCLUSION

There were no significant differences between the SDL readiness scores, or the three subscales of students from the two curricula, or between the scores of students at different years of study (or stages of study) within each group of curriculum approach/institution. The percentage of students in each category and each group, who appeared to be characterised by SDL readiness according to the SDLRS instrument exceeds 70% (80% in most cases).

To conclude, this chapter presented the results of students' readiness for SDL according to their curricular approaches, namely LBL and PBL. Results were presented according to the sample characteristics of age, gender, year and stage of study as well as prior studies completed. Data from the SDLR scale were analysed and presented according to the three domains: self-management, desire for learning and self control.

Chapter five follows with a discussion of the results, limitations, recommendations and conclusion of the study.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Education programmes that prepare nurses for practice as registered nurses have a vital role to play by ensuring that graduates are self-directed in responding to the need for ongoing learning throughout their professional career. In most countries, improving students' readiness for self-directed learning has thus gained increasing recognition and has become an important goal of nurse education programmes.

The majority of nursing students in this study entered the profession directly from basic education at 18 and 19 years of age i.e after successful completion of Grade twelve, or equivalent examinations; most students had not completed any prior studies before entering the nursing degree in both groups, with the exception of the one student in the LBL (1.9%) and one student in the PBL (1.8%) both with previous qualificatios. The students therefore, had no metacognition functioning to draw from, which forms an important part of the learning process. Cognitive skills are required to perform a task, whilst the intelligent functioning, metacognition enables understanding of how and why tasks are performed i.e. critical thinking skills (Regan, 2003).

Students' readiness to learn, with reference to self-directed learning readiness, was then questionable on the basis of their age at entry level, since some authors suggest that there may be a link between age, being an adult and being self-directed (Regan, 2003).The development of interest in self-directedness in learning would bring about radical change in most nursing education policies and probably, uniformity in the processes pertaining to nursing education. The aim of this study was to compare self-directed learning readiness in Bachelor of Nursing students who had been exposed to either a LBL curriculum approach or a PBL curriculum approach during their four year degree programme.

The study focus therefore, was directed towards the attributes attained by nursing students through problem- based learning as opposed to those exposed to a traditional lecture-based curriculum. A cross-sectional, descriptive, comparative design was used, which identified SDL readiness abilities in Self-management, Desire for learning and Self- control. The Self-Directed

Learning Readiness Scale (SDLRS) was used after obtaining permission from its developers (Fisher et al, 2001).

5.2 DISCUSSION

Analysis of the demographic data showed that the respondents (n=159) from the two curricular approaches namely LBL and PBL, were similar in most respects. Of these, 105 students (66%) were exposed to traditional curriculum (LBL) and 54 (34%) to a PBL curriculum. The majority (n=128; 80.5%) were females, whilst 31(19.5%) were males. The mean age of the sample was 22.6 and 22.4 years for LBL and PBL respectively in an age range of 18 - 36 years. The LBL group had an age range of 18-36 whilst the PBL group had an age range of 18-26.

Collectively, there were only two students (3.7%) who entered the nursing programme after having completed prior studies, but not related to the health sciences. There was a slight difference in age between the two groups as two participants (n=2) in the LBL programme were older than 30 years of age. The age range of the sample was between 18 years and 36 years.

A nested ANOVA was used for the analysis of the three SDL constructs, self-management, desire for learning and self-control, as well as the overall SDLR scores. A nested ANOVA examines the differences among two or more groups, by comparing their variability between the groups and within each group; the year and stage of study were the nested factors.

Students were divided within their respective curricula approaches, according to the year and stage of study. Y1 and Y2 were juniors and Y3 and Y4 were seniors. The mean SDLR scores for juniors were 166 and 162 for seniors in the LBL group, and 162.9 for juniors and 164 for seniors in the PBL group. There was an overall mean SDLR score above 160 in each group. There were differences in the years of study which were not statistically significant, but acceptable between the two groups; Y2 and Y3 in the PBL group had lower SDLR scores, which were still acceptable according to Fisher et al. (2001) with a cut of point at 150 as an acceptable level of self-directed learning readiness.

When analysed by stage of study, both junior and senior students in the two curricular groups had SDLR scores of 160 and above indicating an acceptable level of self directed learning readiness (see Table 4.14 and Annexure J).

Smedley (2007) in a study investigating self-directed learning readiness of first year Bachelor of Nursing students, agrees with Fisher et al. (2001) that a total SDLR score of 150 or more from a maximum of 200 indicates readiness for the SDL. The same score was applied in this study.

The findings of student nurses' Self-directed learning readiness will be discussed according to its main constructs ie Self-management, Desire for learning and Self-control under the SDLR subscales.

5.2.1 Self-Directed Learning Readiness Scale (SDLRS) Subscales

5.2.2 Self Management

Self- management refers to the following items:

- I solve problems using a plan
- I prioritise my work
- I do not manage my time well
- I have good management skills
- I set strict time frames
- I prefer to plan my own learning
- I am systematic in my own learning
- I am confident in my ability to search out information
- I set specific times for my study
- I am self-disciplined
- I am disorganised
- I am methodical
- I can be trusted to persue my own learning

Self- management skills enables the nurse to function effectively in the contemporary workplace by assisting him/her to develop confidence and a sense of professionalism. The integration of self-management skills in nursing education programmes is necessary to promote critical thinking and decision-making skills in students (Kearsley and Mostert 2003).

Skills included and tested in this subscale develop independence, self reliance and enable students to manage themselves and their studies, thus transforming them towards becoming life-long learners. The degree of managing themselves is dependent mainly on their attitude,

ability and personal characteristics. The characteristics of this subscale together with the value of the summation of individual items in it, as suggested by Fisher (2001) with a maximum achievable score of 65, would be a measure of students' readiness to work with self-directed learning processes. However, the minimum achievable scores for these subscales were not mentioned, where one would be able to assess the students' readiness for self-directed learning using or against the minimum requirement scores.

The mean self-management score for participants in the LBL group was 49.82 and 50.0 for the PBL group. The curriculum group effect, year of study and stage of study were statistically not significant. The main effect of curriculum approach was not significant ($p = 0.82$) which means that the self-management scores of students from the two curricula approaches did not differ significantly. The interaction between year of study and curriculum approach was also not significant ($p=0.075$) which means that, within each curriculum approach, there was no significant difference in the self-management scores of the students at different levels or year of study.

However, there were educational differences noted with a decrease in self-management scores, from Y2 and Y3 in the LBL group of students with the mean scores of 49.8 and 48.2 respectively, with a rise in Y4 to a mean score of 50.3 (52.50%). The sharp decline in Y1 and Y2 in the PBL group with mean scores of 47.1 (51.43%) and 47.8 (53.38%) respectively was also noted. This decline in scores could be attributed to the introduction to a learner-centered programme, which the students were not familiar with, at high school. The same was identified by Smedley (2007) in her study, where she mentions that most students entering the Bachelor of Nursing (BN) programmes are directly from school after successful completion of Year 12 and therefore have adjustment problems when subjected to a learner-centered curriculum approach.

Smedley (2007) and Fisher et al. (2001) further mention that the faculty staff members identified difficulties in determining the ability of the students' self-directedness, with reference to their degree of willingness to take control of their own learning, which largely depends on their attitudes, ability and personal attributes.

The decline in the PBL group is immediately recovered as early as Y3 with the mean scores of 47.8 (53.38%) and 52.8 (56.56%) in Y4. This shows professional growth by the students in the PBL programme, as they take responsibility for their own learning in their pathway of achieving their goals of self- reliance. Knowles (1990) identified that individuals, learn best when they

are ready to do so, though other writers such as Regan (2003) link the stage of personal development and age to be of considerable influence in a person's self-directedness.

The mean score results on self-management for the LBL group was 49.70 (50.83%) and for the PBL group was 50.04 (51.87%) with the overall mean score of the total sample in self-management being 49.8 of a possible score of 65%, i.e. 77%.

The relative lower scores in self management are not different from the scores obtained by Fisher et al (2001) of 44.26 and Smedley (2007) of 44.79 in their study where the students scored low in the self-management subscale. This indicates that younger students are less ready for SDL than the older ones, who have gone through the entire four year programme and have adjusted to managing their studies on their own.

Fisher (2001) further suggests that an individual's readiness for SDL is increased by life experiences. Students in this study had neither life nor prior study experiences and had a combined mean age of 22 years, which may account for their low scores in self-management. Knowles (1990) further optimates this by saying that learning progresses as the circumstances created in one situation unfolds to become the circumstances in the next logical step. In this situation then, SDL becomes possible when certain occurrences/things come together to form the stimulus and the opportunity for reflection and exploration to bring about meaning occurs.

5.2.3 **Desire for Learning**

This subscale is characterised by personal autonomy with reference to the student's willingness and capability to conduct his/her own education. The students use the resources available at their disposal, which could be in the form of library facilities, e-learning, practical skills as well as human resources. Items identified for this subscale were items such as the following:

- I have a need to learn
- I critically evaluate new ideas
- I learn from my own mistakes
- When presented with a problem, I cannot resolve, I will ask for assistance
- I like to evaluate what I do
- I need to know why
- I do not enjoy studying
- I want to learn new information

- I enjoy a challenge
- I want to learn new information
- I like to gather facts before I make a decision
- I am open to new ideas

The mean desire for learning scores for the LBL group were 49.9 (50.8%) and for the PBL group 50.1 (51.5%) respectively with an overall mean total sample score of 50.0 (50.7%) out of a possible score of 60 (83.3%).

The main effect of the curriculum approach was not significant ($p = 0.09$) which means that the desire for learning scores of students from the two curricular groups could not be attributed to curriculum effect. The interaction between year of study and the curriculum approach was also not significant ($p = 0.28$) which means that, within each curriculum approach, there was no significant difference in the desire for learning scores of LBL and PBL students at different levels of study.

Considering junior and senior stages of study as covariate, the main effect of curriculum approach was not significant ($p=0.88$) which means that the desire for learning among students from the two groups did not differ significantly. The interaction between the senior and junior stages of study within the groups was also not significant ($p=0.09$), which means that, within each group, there was no statistically significant difference in their desire for learning between junior and senior students. Senior students are believed to be more self-directed than their junior counterparts, because of their engagement in self-directed learning activities which involves the following:

- Their innate propensity for self-directed learning
- Their familiarity with the subject matter
- Acquired possession of self-directed learning skills and
- Their motivation for self-directed learning (Donna, Stuart, Plaza et al 2009).

The junior students in the PBL group showed lower scores, compared to the LBL group of students. This is thought to come about as a result of adjustment problems to the new teaching strategy of problem- based learning whilst, the junior students in the LBL group are given information by the experienced teacher, who shows them how much she knows about the content.

The results were considered on the notion that, the introduction of PBL might have come as a learning curve to many since they were used to the lecture-based method at basic education level. Regan (2003) further suggests that assessment of student's readiness for self-directed learning could provide the teaching staff with the information that will assist students in need of additional assistance, to access strategies that will help develop skills necessary for educational purposes or in a workplace setting.

Halstead and Sutherland (2006) does acknowledge that some students may never become self-directed learners and that such students, will need support and encouragement to achieve their learning goals. The creation of a trusting learning relationship between the teacher and the students especially at junior levels, together with constructive feedback would help motivate them to take responsibility, despite their experiences.

Smedley (2007) remarks that neither the curriculum approach nor the students enrolled in the BN course would influence the students' self-directed learning readiness and or abilities. In her study of self-directed learning readiness of first year Bachelor of Nursing students, she identified that the younger students were less ready for the self-directed learning process than the senior students, hence they show lower scores in self-management subscale. She further confirms the ideas by Knowles (1997) that readiness for SDL is increased with the person's maturity, and is associated with increasing orientation to the developmental tasks of one's social roles together with life experiences.

The senior students ie. third and fourth years in both groups show, lower scores in their desire for learning compared to the junior group (Figure 4.8), as the work increases and the responsibilities grow towards the development of purposeful and goal-directed thinking (critical thinking).The PBL group of senior students, show higher scores than their LBL counterparts as an indication of having mastered the skills of seeking for information and managing their learning activities well or better at this stage, and thus taking control of their independence of being self reliant students enhanced by their experiences of searching and interpreting information, locating appropriate resources, human and material as well as engaging in group discussions (Halstead and Sutherland, 2006).

The desire for learning mean score of 50.0 in this study, was slightly higher when compared with those of Fisher et al. (2001) of 47.31 and that of Smedley (2007) of 47.18. The higher scores in this subscale, in this study could be an indication of a positive effect on the part of

nursing education as indicative of the willingness on the part of the students to acquire knowledge. However the researcher has noted with concern that high as the scores might be in this subscale, the senior scores are lower in both groups when compared to their first year scores. There could be other factors that bring about such results as illustrated by Gardner and Lambert (2009).

Gardner and Lambert (2009) believe that the successful introduction and implementation of SDL into components of the curricula, requires both the preparation of students and staff to facilitate learning and that the desire for learning is influenced by a number of factors, such as the following:

- External factors or influences e.g environmental or political pressures.

- Individual factors or differences, motivated persons usually expand their efforts to learn, to achieve their goals and have a positive attitude.

- Outcomes, these encourage individuals to enjoy learning, have a desire to apply, and or implement the learnt skills, to gain experience.

- Individuals become aware of their personal needs known as (self-concept), in realizing their strengths and weaknesses in the skills required in order to develop confidence.

The teacher has to guide and facilitate the realisation of the learner's full potential goals.

This then poses a challenge to the nurse educators to support, nurture and motivate the students towards their desired goals. The implementation of appropriate teaching strategies, in order to promote successful educational outcomes of improved learners' autonomy, independence and ability to manage self-directed learning processes will assist the students in becoming life-long learners (Smith and Reiser 2002).

With the focus in nursing education having evolved from a teacher-centered learning environment to a learner-centered learning environment/situation, a dilemma exists, as to identify areas and, or students who on admission at tertiary education level, would not possess self-directed learning skills. The Academic Development Programme (ADP) initiated in the institution offering the (PBL) curriculum in this study, is one step ahead in the right direction to

assist those students who require additional assistance in order to access resources, to develop skills for use in an educational or workplace setting.

This discussion leads us to the last subscale of self-control also measured in this study.

5.2.4 Self Control

This subscale is characterized by the student's responsibility in taking control of his or her own learning processes. Self control as a component of SDL is not merely a series of learning activities, but a learning process which is influenced by the learner's abilities of self-managing, monitoring and evaluating his/her skills in enhancing self-directedness. Instructional methods on self-directed learning can be given to the student by the instructor to enable facilitation and reinforcement of the student's learning, but the student's motivation to seek more information, participate in a SDL activity and to persist in the activity depends on the individual himself (Caffarella and Barnett 2003).

This subscale consisted of n=15 items that described its characteristics with relevance to self-directed learning as a construct. Items such as the following were included:

- I am able to focus on a problem
- I evaluate my own performance
- I am responsible
- I prefer to set my own learning goals
- I have high personal standards
- I have high personal expectations
- I have high beliefs in my abilities
- I am aware of my own limitations
- I am logical
- I need to be in control of what I learn
- I prefer to set my own criteria on which to evaluate my performance
- I am responsible for my own decisions
- I can find out information for myself
- I like to make decisions for myself
- I am not in control of my life

The mean score for self-control for both groups in this study was 64.2 (out of a possible maximum score of 75) i.e. 85.6%, which was considered high, when compared with that of

Fisher et al (2001) of 58.98 and also that of Smedley, (2007) of 59.12. The LBL group's mean self-control score was 64.6 (65.5%) and the PBL group's mean score was 63.4 (64.9%).

The effect of curriculum approach was not significant (p= 0.17), which means that the self-control scores of students from the two groups did not differ significantly. The interaction between year of study within each group, and within each curriculum approach, was also statistically not significant (p = 0.08], which means that, within the two groups, the results were statistically not significant in the self-control subscale scores of the students in different years of study. When considering the stage of study ie the juniors and seniors as covariate, the effect of curriculum approach was not significant (p = 0.24), which means that the self-control scores between students in their junior and senior years of study, did not differ significantly. Statistically, the interaction between the stage of study i.e whether junior or senior was also not significant (p = 0.53).

When comparing the results on self control subscale mean scores, with those conducted by Fisher et al (2001) of 58.98 and Smedley (2007) of 59.12, and in this study of 64.2 the results show that nursing students scored least in the self-management subscale, better on the desire for learning subscale and the highest score on the self-control subscale.

The decline in the senior group on the mean self-control scores by stage for the LBL group of students with the junior mean score of 64.71 and that of senior mean score of 64.44 (see Annexure J) is a probable indication of the dependency of the students on a structured controlled programme. Students usually feel compelled to reproduce what the teacher has taught them for correctness, without much effort for educational growth. The PBL group which seems to struggle in their junior years, with their self-control skills of a mean score of 62.75 and seniors with a mean score of 64.32, is believed that, the younger students are less ready for the type of learning (PBL). The resultant gradual rise in the same group, at senior stages confirms that readiness for this type of learning increases with life experience (Fisher, 2001). However, it would be interesting to find out the influences that led to the self-control subscale scores being higher than other subscales even with the junior groups who seemed to be the most affected.

Regan (2003) emphasizes that the purpose of teaching is to match the learner's stage of study with suitable learning activities and instruction. These writers highlight that the positive teacher-student relationship, can positively reinforce students' motivation to learn. Therefore, the nurse

educator's role in providing learning support and reinforcement of students' efforts in learning also need to be acknowledged and practiced. The outcomes of which would then be to produce a highly self-directed learner, who is partially and, or totally in control of his/her learning tasks. The student would also on his own consult with the teachers/experts and thus be able and willing to direct his own learning.

The results of this subscale are in congruence with the results in the study by Fisher et al (2001) where the self control subscale is higher than all the other subscales. This further demonstrates the construct of self-directed learning readiness of the learners as they proceed through their four year Bachelors degree course demonstrating, taking responsibility for their own learning.

5.2.5 Self-Directed Learning Readiness

With reference to overall readiness for SDL, the results showed no significant differences between students in the two programmes, with respect to the proportion of students with SDLR scores of 150 or more (p=0.69) as follows: 164.16 (LBL) and 163.54 (PBL) with an overall mean score of 163.95 in their self directed learning readiness.

On analyzing proportions of the total sample of students from both groups, it was identified that there were students who were not ready for SDL. The stage of study was used to identify these students who had SDLR greater or above 150 which shows SDL readiness. In the junior groups i.e. Y1 and Y2, out of a total n= 83 students in the sample, 70 had SDL score of 150 and above, meaning that 13 were not ready for SDL. In the senior group out of a total n=76 students 65 had SDL score of 150 and above, meaning that 11 students were not ready even at senior level for self-directed learning.

Sutherland (2006) confirms this phenomenon by saying that, there are students or learners who might never become self- directed in their lives. He further advocates that those students would always need contact and clear directions from their teachers. This would be supported by lots of encouragement in a trusting learning relationship between the teacher and the student.

Statistically as well, there was no significant difference between the years of study with respect to the proportion of students with SDLR scores of 150 or more in both curricular approaches (p = 0.45) LBL and (p = 0.28) PBL respectively.

Similarly when comparing the differences between the stages of study with respect to the proportion of students with scores of 150 or more in both groups (as determined by the X^2 test, p = 0.87 (LBL) and p = 0.62 (PBL) there were no significant differences noted statistically, but there were educational gains.

The group subjected to the PBL curriculum, showed a positive growth pattern which starts at (Y3–Y4) senior group. Growth in their readiness for SDL provides students with competencies such as self-assessment of learning gaps, self evaluation and that of others within their group, reflection on experiences and management of information using critical thinking skills (Patterson et al, 2002). This writer further advocates that such skills could be encouraged through different learning strategies and assessment processes, in order to motivate students to take control of their own learning as a form of maturational processes. He emphasizes the need for adequate preparation of academic staff, preceptors, mentors and facilitators for the successful implementation of SDL strategies in order to develop skills for lifelong learning.

The attributes and skills described with reference to self-directed learning in the three subscales above reflect the expected educational outcomes of graduates from the tertiary institutions. This then highlights the need to develop graduates who have a range of transferable generic skills, in order to plan their work, work within a team and communicate well in writing and verbally. These graduates will be expected to share and apply their knowledge gained at a tertiary institution to their prospective work environments (Wilcox et al, 2003).

The results in this study show the qualities of self-directedness developing at Y3-Y4 or senior stages, agreeing with Kocaman et.al (2009), where he said self-directed learning is a maturational process that occurs over a period of time (Bruce and Lack; 2009).

The overall results provides support of the hypothesis proposed for this study, suggesting that there is no difference between the two groups of students in the two curricular approaches, with respect to self-directed learning readiness. Since self-directedness is an individual intrinsic characteristic attribute, experienced by different people at different stages in their lives.

5.3 LIMITATIONS

The study sample was small and of unequal sizes between the two groups; of the total sample, 66% was from the LBL group and 34% was from the PBL group. Y2 and Y3 students from

each group contributed 28% of the sample, while Y1 and Y4 students made up 24% and 20% of the sample respectively. Larger samples may have produced better and statistically significant results. Following on, testing for statistical significance may have been a limitation in this study.

Educational research studies are increasingly using the notion of "practical significance" that looks at whether the differences are large enough to be of value in a practical sense. These results did not show any statistically significant differences between the two groups of students enrolled in the two curricula approaches, but there were noticeable educational gains in the PBL group, which point to the practical value and significance of PBL.

The results are based on self-reported attributes of the students, and as such, the findings were not as a result of direct measurement of self-directed learning. Respondents may have skewed their responses towards what they thought would be acceptable answers.

Equally areas of similarities between the two groups were also not statistically evidently illustrated, and that inferences and comparison had to be made.

The two urban universities used in this study, with many baseline variables to be considered, did impact on the study.

5.4 RECOMMENDATIONS

5.4.1 Nursing Education

Self-management, desire for learning and self-control show positive educational gains for students in the PBL curriculum. Small group strategies such as problem-based learning and tutorials can thus be considered and be recommended to assist nursing students in their personal and professional developmental growth as lifelong scholars.

The majority of students in both curricular groups reported acceptable levels of readiness for SDL. It is well documented that if lecturers expose students who are ready for SDL to traditional, didactic teaching strategies, that these students become frustrated and experience anxiety. It is therefore recommended that *traditional teaching methods* be replaced by *progressive learning methods* that optimize such students' readiness for SDL.

A change in teaching-learning approach recommended above will require radical engagement with nurse educators and regular workshops between institutions for the benefit of the students to encourage and motivate each other regarding SDL processes.

Successful learning outcomes in problem-based learning are dependent on committed facilitators to effectively guide and nurture the learning processes, through effective tutorial group functioning or tutorial performances. Premised on the notion that everybody intrinsically, possess certain attributes and skills necessary for effective functioning within PBL groups hence, these develop over a period of time.

It is therefore further recommended that undergraduate nurse education should adopt a learning paradigm by using strategies other than structured, didactic teaching, to meet the 21st century student's needs and preferences.

5.4.2 **Future Research**

The study may yield different results on a larger scale, it is therefore recommended that the inclusion of all sectors: private and public, may fast track the processes of SDL skills in nursing students.

A multifactoral study on the following: academic achievements, resources, environmental factors and basic education grades at entry level etc could be done to validate the educational gains.

The selection criteria of students who entered into the nursing profession between the two groups were not considered in this study, as well as the course content at different years and stages of study, which might have influenced the differences in the students' responses between the two curricular approaches. Further studies in this regard could benefit the choice of curricular approach at different levels/year of study so as not to disadvantage those students who are not ready yet at entry level for an SDL process.

5.5 **CONCLUSION**

Considering the results in chapter four it became clear that there was no significant difference between the overall SDL readiness of students in a PBL curriculum and those from an LBL

curriculum, but educational gains were noted, within the PBL group at different stages of the students' learning process. These were not measured as they did not form part of this study.

In this study, there was a clear indication that there is a need for changes in the nursing education teaching strategies, without abandoning the traditional methods. This would be done, in order to assist those students who might not be ready to engage initially, in a self-directed learning programme and or activities, immediately from their respective basic education backgrounds. This was evidenced by the 15% of students (n= 24) in this study, who were not ready for SDL.

Teaching strategies may have to change to more interactive and collaborative types within classroom setting according to the reception of the students at the time. In this study, there were no significant statistical differences between the two teaching strategies within the two groups, however there were noticeable educational gains, for students in the PBL curriculum.

It is then concluded that the personal characteristics of the learner including his/her attitude, values and value systems, and abilities ultimately determine whether self-directed learning will take place in a given situation.

REFERENCES

Abraham, R.R., Vinod P., Kamath M.G., Asha K. and Ramnarayan K. (2007) Learning approaches of undergraduate medical students to physiology in a non-PBL and partially PBL-oriented curriculum. Advanced Physiology Education, 32: 35-37

Achike, F.I., and Nain, N (2005): Promoting problem-based learning (PBL) in nursing education: A Malaysian experience; Nurse Education Practice: 5 (5) pp302-311

Alspach, J.G., (1991) The Self-directed learning readiness of baccalaureate nursing students: Dissertation Abstracts International, 38: 6467A

Garrison, D.R., Anderson, L., and Archer, W., (2010) Enhancing students' motivation to learn: Achievement goals in university classrooms. Educational Psychology, 18(2): 205-224).

Baumgartner, L.M., Lee M.Y., Birden, S., Flowers, D., Clearinghouse, E., (2003) Adult learning theories and their Implications for Practice; Journal of Research in Nursing, (15) 92-318

Bart, J., Rothman, A.I., and Frecker, E., (2003) Effect of an undergraduate medical curriculum on students' Self-directed learning. Academic Medicine, 78: 1259-1265

Barrows, H.S., and Tamblyn, R. M., (2000) Problem Based Learning: An approach to Medical Education. Springer Publishers New York, 42(2), 99-107

Barrett, T., Mac-Labhrainn, I., Fallon, H., (2005) Handbook of Enquiry and Problem Based Learning. Galway:CELT, (2)

Biggs, J. B., (2007) Student approaches to learning and studying. Melbourne: The Australian Council for Educational Research. Springer Publishing Company, (11) 52.

Blumberg, P., (2000) Evaluating the evidence that problem-based learners are self-directed learners: a review of the literature. Journal of the International Association of Medical Science Educators, (2) 199-226.

Burns, N., and Grove, S .K., (2005) The Practice of Nursing Research. New Jersey, Lawrence Erlbaum Associates Publishers, (6)

Brookfield, S.D., (2006) Understanding and facilitating adult learning: A comprehensive analysis of principles and effective practices. (13): 99-136

Brockett R.G and Hiemstra R (2005) Self-direction in adult learning: Perspectives on theory, research and practice. London & New York, (6) 1-18

Brockett, R.G., and Hiemstra, R., (2006) Bridging the theory-practice gap in self-directed learning; London & New York, 2 (1) 1-17

Brockett, R.G., and Canipe, J.B., (2003) New perspectives on self-directed learning. Adult Learning, 14(4): 4.

Bruce, J.C., and Lack, M.L (2009) Using Subjective judgement to determine the validity of a Tutorial Performance Evaluation Instrument. Journal of Interdisciplinary Health sciences, 14 (1).

Caffarella, R.S and Barnett, B.G (2003) New directions for Adult and continuing Education; Online Journal vol. (62) 1994 (57) 29-42

Candy, P.C., (2006) Self-direction for Lifelong Learning: A comprehensive guide to theory and practice. Jossey-Bass, (18) 75-87.

Candy, P.C., and Guglielmino, L.M (2008) Exploring first year undergraduate medical students' self-directed learning. An Academic Medical Singapore Journal (37) 580-590.

Clark, C (2008) Team-Based learning in an Undergraduate Nursing Course. Journal of Nursing, (47)111-117

Chien, L.M., and Huang, H (2006) The application of student-centred teaching to nursing education. Journal of Nursing, 53 (6) 59-64.

Dart, B.C., and Clark, J.A (2002) Helping students become better learners: a case study in teacher education. Higher Education (22) 317-335

Dochy, F., Segers, M., Van den Bossche, P, Gijbels D (2003) Effects of problem-based learning: a meta-analysis. Elsevier Science, vol (10): p533-568

Donna, H; Stuart, T.H; Plaza, C.M; Sturpe, D.A., Williams, G., Rodriguez de Bittner, M.A., Roffman, D.S (2009) The Impact of Advanced Pharmacy Practice Experiences on Students' Readiness for Self-directed Learning. American Journal of Pharmaceutical Education, 73 (4) 65.

Dornan, T., Scherpbier, A., King, N., and Boshuizen, P (2005) Clinical teachers and problem-based learning: a phenomenological study. Medical Education, (39) 163-170.

Fisher, M., King, J., and Tague, G (2001) Development of a self-directed learning readiness scale for nursing education. Nurse Education Today 21: 516-525.

Fisher, G (2007) Conceptual frameworks and innovative computational Environments in support of self-directed and lifelong learning. Nurse Education Today, 16 (4) 375-376.

Gardner, R.C and Lambert, W (2009) Teaching and Learning Forum resources for students to access for self-directed learning; (29) 71

Gibbons, M (1994) The self-directed learning sourcebook: Ideas, methods and materials for teaching SDL. Journal of Humanistic Psychology, (20) (2) 41-45.

Ghosh, S (2007) A combination of didactic lectures and case orientated problem based learning Perceptions of students from a conventional medical curriculum. Galway CELT

Good, T.L and Brophy J.E (2006) Conditions of learning and the Theory of instruction, (4th ed.), New York

Guglielmino, LM (2004) Development of self-directed learning readiness scale (SDLRS). International Journal of Self-Directed Learning, 1(1) 214

Guglielmino, L.M and Guglielmino P.J (1991) Expanding your readiness for Self-directed learning. International Journal of Self-Directed Learning, 12 (3) 39-45

Graham, D.H., Greg, R., and Harris, J (2006) Group problems in problem-based learning. Medical Teacher, 25 (6): 609-616.

Greenberg, D (2008) The Role of Experiential Education in Pedagogy and Andragogy-sustainability education and Transformational Change. Association for Experiential Education 19(6) 624-631

Hala, G. and Mohamed, N (2011) Effect of problem-based learning on undergraduate nursing students enrolled in nursing administration course. International Journal of Academic Research, 29: 626-632.

Halstead, A. and Sutherland, S (2006): A new mode of teaching for Self-Directed Learning; UK Pebble learning; 10 (15)

Hammond, M., and Collins, R. (1991) Self-directed learning: Critical practice. Adult Education Quarterly, (43) (4) London.

Harvey, B.J., Rothman, A .I., Fredker, R.C (2006); A confirmatory factor analysis of the ODDI continuing learning inventory (OCLI). Adult Education Quarterly, 56 (3): 188-200.

Hewitt-Taylor, J.B (2001) Self-directed learning: Views of teachers and students. Journal of Advanced Nursing, vol. 36 (4) 496-504.

Hewitt-Taylor, J.B (2002) Teachers' and student' views on self-directed learning: Journal of Advanced Nursing, 17 (1): 33-38.

Hewitt-Taylor, J. (2003): Facilitating distance learning in nurse education; Nurse Education in Practice, 3 (1) 23-29

Hello-Silver, C.E., and Hmelo, C. Lin X (2000) "What and how do students learn": Becoming self-directed learners, strategy development in problem based learning.

Houle, C.O (1961) The inquiring mind: A study of the adult who continue to learn. American Council on Education, Medison University of Wisconsin Press,

Iwasiw, C.L (2009) The role of the teacher in self-directed learning: Nurse Education Today, Nursing Standard, (17): p33-38

Kaptan, F., Kormaz, H., Lambros,H Senoack, F Tandogan, P (2008): Predicting doctor performance outcomes of curriculum interventions: problem- based learning and continuing competence.

Kearsley, E.P., and Mostert, H.F, (2003) Components of a distance Education System. Distance Education Systems 9040. 4 (20)

Kember, D (2000) Misconceptions about the learning approaches, motivation and study practices of Asian students. Higher Education, 40 (1): 99-121.

Kingsbury, M.P and Lymn, J.S (2008) Problem based learning and larger student groups mutually exclusive or compatible concepts: a pilot study. BMC Medical Education, (8): p35.

Kocaman, G., Dicle, A., Ugur, A (2009): Facilitating technology-enhanced Problem Based Learning in assigning Conventional Learning in a PBL Middle School curriculum, Journal of Nursing Education, (1): p133

Khan, H.A., Taqui, M, Muhammad, R.K, Zafar, F (2007) Problem based vs conventional curricula: influence on knowledge and attitudes of medical students towards health research. Journal of Archeological Research,

Kirsten, H.L., Per, G., Helge, I.S (2006) Student learning strategies, mental models and learning outcomes in problem based and traditional curricula in medicine. WebQuest, 3(2):

Knowles, M.S (1975) Informal adult education self-direction and andragogy.

Knowles, M.S (1990) The Adult Learner: A neglected species Houston Gulf Publishing company.

Lycke, K.H., Stromso, H.I., and Grottumt, P (2006): Enhancing Student Learning with Case Based Learning;Journal of Online Learning and Teaching, (3) (4).

Lea, S.J., Stephenson, D.,Troy, J (2003) Higher education students' attitudes to student-centered learning. Higher Education, 28 (3): 321-334.

Lee-Hsieh, J (2003) An educational strategy to enhance caring in nursing students in an associate degree programme. International Journal for Human Caring, 7(1): 27-33

Lizzio, A., and Wilson, K (2005) Self-managed learning groups in higher education: Students' perceptions of processes and outcomes. The British Psychological Society, (75): 373-390

Kingsbury, M.P., and Lynn, J.S (2008) Problem-based learning and larger student groups: mutually exclusive or compatible concepts-a pilot study. Medical Education, (3) (1)

Merriam, S.B., and Caffarella, R.S (2001) Andragogy and self-directed learning: Pillars of adult learning theory. New Directions for Adult and Continuing Education, (89): 3-14.

Moust, J.H.C., van Berkel, H.J.M., Schmidt, H.G (2005) Reflections on three decades of problem-based learning at Maastricht University.Higher Education Springer Publishers Netherlands, (50): p665-683

McPharland, M., Noble, L.M, Livingston, G (2004) The effectiveness of problem-based learning compared to traditional teaching in undergraduate psychiatry.

Nandi, P.I., Chan, J.N., Chan, C.P., Chan L.P (2000) Undergraduate medical education: comparison of problem based learning and conventional teaching. Scribd Publishers, (21): p21-594

Nolan, J., and Nolan, M (1997a) Self-directed and student centered learning in nursing education. British Journal of Nursing, 6 (1): 51-55.

O'Shea, E (2003) Self-directed learning in nurse education: A review of literature. Journal of Advanced Nursing, 43 (1): 62-70.

Patterson, C (2002) A new perspective on competences for self-directed learning. The Journal of Nursing education, 41; 25-31

Pao-Nan, Chou., Wei-Fan., Chen (2009) Exploratory study of Relationship between Self-Directed Learning and Academic Performance in a Web-Based Learning environment.

Regan, J.A (2003) Motivating students towards self-directed learning: Journal Nurse Education Today;23 (8) p 593-599

Ramnarayan, K., and Hande, S (2005). Thoughts on self-directed learning in medical schools: making students more responsible. New Horisons for Learning, Quarterly Journal: (1-8).

Richardson, J.C (2009) A constructivist Approach to Online Learning: The Community of Inquiry, Springfield Academia.edu.

Rideout, E., England, O., Valerie, C., Brown, B., Fothergill- Bourbonnais, F., Ingram, C., Benson, G., Ross, M., Coates, A (2002) A comparison of problem - based and conventional curricula in nursing education. Journal, (7): p3-17

Russel, A.T., Comello, R.J., Lee Wright, D (2007) Teaching strategies promoting active learning in healthcare education. Journal of Education and Human Development, 1(1): 2007.

Savery, J.R., and Duffy, T.M (1995) Problem Based Learning: An Instructional Model and its contructivist framework. Educational Technology (35) 135-150.

Saure, L., Slotte, K.V., Haittunen, M., and Kurki T (2008) Skills and behaviours to support learners: Biomed Central Medical Education, (8) 35

Schmidt, H.G., Janke, C.S., Arends, L.R (2009) Impact of problem based, active learning on graduation rates for 10 generations of Dutch medical students. Medical Education, (43): p211-218

Schmidt , H.G., Janke, C.S, Arends, L.R (2000) Effects of problem based and conventional curricula in an international sample. Medical Education, (34) (9) p 721-728.

Smedley, A (2007) The self-directed learning readiness of beginning Bachelor of Nursing students.Journal of Research in Nursing. 12 (4) p 373-385.

Smith, M.K., and Reiser (2002) Self-directed Learning skills through collaboration between claims and reasons: Canadian Journal of Public Health; 42 (2) 99-107

Spady, W.G (2009) A “Model of School Learning”; Michigan Academician Jan.1. 2009

Tanner, A.C (2010) From Mother Duck to Mother Lode: Clinical Education for Deep Learning; Journal of Nursing Education, 49 (1).

Tandogan, O. A., and Ruhan, O (2006) The Effects of Problem-Based Active Learning in Science Education on Students’ Academic Achievement, Attitude and Concept Learning: Asia Pacific Forum on Science Learning and Teaching, (12) 1 (7)

Theroux, P (2002) Self-directed learning vs a traditional learning : Ann Emergency Med, 40

Tracey, P., Young, L., Groves, M., Haynes, M (2008) An analysis of peer, self, and tutor assessment in problem-based learning tutorials. Medical Teaching, vol (29): p122-132

Van der Westhuizen, L.J (2003) Idea of more student-centered and problem-based learning: (EUA) Bloemfontein, 9300 University of the Free State

Wilcox, S (2010) Self-Directed Learning and culture: A study on Malay Adult Learners; Elsevier Journal, (7) 254-263

Williams, B., and Williams, A (2004) Self-direction in a problem-based learning program. Nurse Education Today, 24 (4): p277-285

Wilkinson, T.J., and Beckert., L (2007) Self-Directed Learning and self-awareness, core features of Problem-based learning: Peer assessment in problem-based learning; Advances in Health Sciences Education, (12) 169-186

Zabalegui, A (2010) Self-Rating Scale of Self-Directed Learning (SRSSDL): preliminary results from the Italian validation process. Journal of Research in Nursing, 16(4): 375-376.

ANNEXURE A

- **QUESTIONNAIRE**

QUESTIONNAIRE

Instructions

Thank you for participating in this study. Please read all the instructions carefully and answer all the questions as honestly as you can, ensuring not to leave any questions unanswered. On completion of the questionnaire, return it in the prepaid envelope attached. Your cooperation is greatly appreciated. All information gathered is anonymous and confidentiality is guaranteed.

SECTION A

Demographic Data:

Please tick the correct answer:

1. Age in years: _____years

2. Gender: Male ☐ Female ☐

3. Level of Study:
Second year ☐ Third year ☐ Fourth year ☐

4. Completed Studies:
None ☐ Diploma ☐ Degree ☐
Advanced/Higher Diploma ☐ Degree ☐ Masters ☐
Other, Specify: _____

SELF-DIRECTED LEARNING READINESS SCALE (for Nurses)

(Fisher, Tague, King, 2000)

The following is a bank of items perceived to reflect the attributes, skills and motivational factors required of self directed learners.

Please evaluate each item regarding **the degree the item measures a characteristic of yourself**. You are required to assess each item using a 5 point Likert scale as follows:

Circle:
1- if you “strongly disagree” that the item measures a characteristic of yourself
2- if you “disagree” that the item measures a characteristic of yourself
3- if you are “unsure” if the item measures a characteristic of yourself
4- if you “agree” that the item measures a characteristic of a yourself
5- if you “strongly agree” that the item measures a characteristic of yourself

(SD = strongly disagree, D = disagree, U = unsure, A = agree, SA = strongly agree)

ITEM	SD D U A SA 1 2 3 4 5
2. I solve problems using a plan	1 2 3 4 5
3. I prioritise my work	1 2 3 4 5
5. I do not manage my time well	1 2 3 4 5
6. I have good management skills	1 2 3 4 5
9. I set strict time frames	1 2 3 4 5
12. I prefer to plan my own learning	1 2 3 4 5
16. I am systematic in my learning	1 2 3 4 5
17. I am able to focus on a problem	1 2 3 4 5
22. I need to know why	1 2 3 4 5
24. I critically evaluate new ideas	1 2 3 4 5

ITEM	SD D U A SA 1 2 3 4 5
25. I prefer to set my own learning goals	1 2 3 4 5
29. I learn from my mistakes	1 2 3 4 5
33. I am open to new ideas	1 2 3 4 5
34. When presented with a problem I cannot resolve, I will ask for assistance	1 2 3 4 5
42. I am responsible	1 2 3 4 5
44. I like to evaluate what I do	1 2 3 4 5
45. I have high personal expectations	1 2 3 4 5
46. I have high personal standards	1 2 3 4 5
47. I have high beliefs in my abilities	1 2 3 4 5
48. I am aware of my own limitations	1 2 3 4 5
52. I am confident in my ability to search out information	1 2 3 4 5
54. I do not enjoy studying	1 2 3 4 5
56. I have a need to learn	1 2 3 4 5
57. I enjoy a challenge	1 2 3 4 5
58. I want to learn new information	1 2 3 4 5
59. I enjoy learning new information	1 2 3 4 5
60. I set specific times for my study	1 2 3 4 5
63. I am self disciplined	1 2 3 4 5
64. I like to gather the facts before I make a decision	1 2 3 4 5
65. I am disorganised	1 2 3 4 5
70. I am logical	1 2 3 4 5
71. I am methodical	1 2 3 4 5
77. I evaluate my own performance	1 2 3 4 5

ITEM	SD D U A SA 1 2 3 4 5
79. I prefer to set my own criteria on which to evaluate my performance	1 2 3 4 5
80. I am responsible for my own decisions/actions	1 2 3 4 5
81. I can be trusted to pursue my own learning	1 2 3 4 5
83. I can find out information for myself	1 2 3 4 5
86. I like to make decisions for myself	1 2 3 4 5
87. I prefer to set my own goals	1 2 3 4 5
91. I am not in control of my life	1 2 3 4 5

Thank you for completing this survey.

ANNEXURE B

- **PERMISSION TO USE THE SELF-DIRECTED LEARNING READINESS SCALE FOR NURSE EDUCATION**

The University of Sydney

PERMISSION TO USE THE SELF-DIRECTED LEARNING READINESS SCALE FOR NURSE EDUCATION

FROM: Murray Fisher, DipAppSc, BHSc, MHPEd.
Lecturer
Faculty of Nursing
University of Sydney
mfisher@nursing.usyd.edu.au

RE: Use of the **Self-Directed Learning Readiness Scale for Nurse Education**

You are free to use the Self-Directed Learning Readiness Scale for Nurse Education for your research. The instrument is copyrighted (c. 2001, Fisher, King & Tague) and may not be duplicated or copied without first submitting a signed copy of this permission form to M Fisher. Requests for any changes or alterations to the instrument should be made in writing to M Fisher. As with all revisions, the copyright will be retained by Fisher, King & Tague and must appear on the printed copies of the instrument.

By filling in your name, address, phone number, and e-mail address and signing the agreement use below and mailing it to M Fisher, you are hereby given permission to use the Self-Directed Learning Readiness Scale for Nurse Education for your research. The permission is valid only for the study named below.

Fisher, King & Tague requests that you send back the following information:

- your raw data in ASCII format for our reliability and validity bank
- copies of any changes or translations of the scale
- copies of any publications citing the use of the scale

When using the Self-Directed Learning Readiness Scale for Nurse Education you need to use the following reference:

Fisher,M., King, J. & Tague, G. (2001) Development of a self-directed learning readiness scale for nurse education. Nurse Education Today, 21(7): 516-525.

ANNEXURE C

- **AGREEMENT TO USE THE SELF-DIRECTED LEARNING READINESS SCALE FOR NURSE EDUCATION**

AGREEMENT TO USE THE SELF-DIRECTED LEARNING READINESS SCALE FOR NURSE EDUCATION

I agree to the above conditions for using the Self- Directed Learning Readiness Scale For Nurse Education.

Name: Nomawethu Mtshali-Qamata

Title: Mrs

E-mail: Nomawethu.Mtshali-Qamata@wits.ac.za

Address: P O Box 159, De Deur, Johannesburg, 1884

Academic/business affiliation: Department of Nursing Education, University of the Witwatersrand, Johannesburg, South Africa

Phone Number: +27 11 488 4272

Study Title: Problem-based learning and traditional curricula: A comparison of nursing students' self-directed learning readiness.

Brief Description of Study:

Introduction

Nursing students in a lecture-based educational programme (referred to as a traditional curriculum), are assumed to be less prepared for self-directed learning, since little emphasis is placed on self-directed learning (SDL) skill acquisition during their learning processes. On the other hand, SDL skills are well described in a problem based learning (PBL) curriculum and learning processes are designed to develop students' self-directedness. In the universities in this study, no baseline data exist about students' readiness to take responsibility for learning with reference to: attitude and abilities or behaviours necessary for SDL.

Purpose

The purpose of this study is to compare the self-directed learning readiness of undergraduate nursing students who are prepared through PBL and traditional curricula in two universities in Johannesburg, South Africa. A quantitative, cross-sectional, comparative design will be used to examine and describe the differences between the two groups of nursing students. Data will be collected by using the Self-Directed Learning Readiness Scale for Nursing Education (SDLRSNE) developed and validated by Fisher et.al. (2001).

Signature _____ Date 03/09/2009

Please keep a copy of this form in your files.

Mail to:
Murray Fisher
Faculty of Nursing
The University of Sydney
88 Mallett St
Camperdown NSW Australia 2006

ANNEXURE D

- **PARTICIPANT INFORMATION SHEET**

PARTICIPANT INFORMATION SHEET

Dear prospective participant

My name is Nomawethu Mtshali- Qamata. I am a nurse educator and currently studying for a Master's degree in Nursing in the Faculty of Health Sciences of the University of the Witwatersrand. I am required to do a research study as part of my learning programme under the supervision of an experienced researcher. I am interested to find out, how self-directed you are in respect of your nursing studies i.e. what attributes, skills and motivation you think you possess or may need in order to become self-directed in your studies.

I would like to invite you to consider participating in the study. Your participation would be entirely voluntary and you are free to decline the invitation altogether or to stop at any time without having to give any explanation. If you agree to participate you will be required to complete a questionnaire containing 40 items. This should not take more than 20-30 minutes to complete. This questionnaire will be distributed and collected immediately after completion. Your identity will be protected, numbers and codes will be used throughout the study to ensure confidentiality and anonymity.

You will not benefit personally from the study, but future nursing students may benefit depending on the outcomes/results of the intended study. Should you have any comments or concerns regarding this study, please feel free to contact the secretary for the Human Research Ethics Committee (Medical) at the following:
Tel no = 011 717 1234
Fax no =011 717 1265.

Thank you for taking the time to consider participating in the study. Should you need more information feel free to contact me. My contact details are provided below.

Yours sincerely,

Nomawethu Mtshali-Qamata
Nomawethu.Mtshali-Qamata@students.wits.ac.za
082 360 9843

ANNEXURE E

- **ETHICAL CLEARANCE**

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Nomawethu Mtshali-Qamata

CLEARANCE CERTIFICATE	**M10511**
PROJECT	Problem Based VS Traditional Curricula
INVESTIGATORS	Nomawethu Mtshali-Qamata.
DEPARTMENT	Department of Education
DATE CONSIDERED	28/05/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 07/07/2010 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Prof J Bruce

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

ANNEXURE F

- **APPROVAL FROM THE HEAD OF THE SCHOOL OF THERAPEUTIC SCIENCES**

Professor A. Rothberg
Head of School of Therapeutic Science
Faculty of Health Sciences
7 York Road
Parktown
2006

Permission to conduct research in the Department of Nursing Science

Dear Professor Rothberg

My name is Nomawethu Acquilla Mtshali-Qamata. I am a student registered for Masters Degree (Nursing Education) in the Faculty of Health Sciences at the University of the Witwatersrand, as part of the course requirement, I am expected to conduct a research study under supervision. My proposed Research is a comparative study to determine self-derected learning readiness in traditionally trained student nurses compared to the PBL trained nursing students.

The aim of this study is based on the attributes of problem based learning curriculum on self-directed learning readiness. The study will examine, confirm or refute the benefits of a PBL curriculum vs a traditional curriculum. The study will also evaluate the effectiveness of PBL program with regards to self-directed learning readiness in nursing students.

With your permission I will ask the participants to complete a 40-item questionnaire, which will be in the form of check list. I will obtain permission from the degree coordinator in the Department of Nursing Education (Prof. J Bruce) prior to asking the participants to complete the questionnaire. Identification of individuals' names and identifying details will not be used to ensure anonymity and confidentiality.

I am waiting for the proposed study and its procedures to be approved by the Human Research Ethics Committee of the University of the Witwatersrand. The faculty's Postgraduate Committee has approved the study.

Please do not hesitate to contact me should you require any further information.

Yours sincerely

Nomawethu Mtshali-Qamata
nomawethu.mtshali-qamata@stundents.wits.ac.za
082 360 9843

Approved
11/5/2010

ANNEXURE G

- **APPROVAL FROM UNIVERSITY OF JOHANNESBURG**

UNIVERSITY OF JOHANNESBURG

FACULTY OF HEALTH SCIENCES

23 July 2010

Ms N Mtshali-Qamatha
University of the Witwatersrand
JOHANNESBURG

Dear Ms Mtshali-Qamatha,

PERMISSION TO CONDUCT RESEARCH THE THE DEPARTMENT OF NURSING SCIENCE – UNIVERSITY OF JOHANNESBURG

The Faculty Academic Ethics Committee of the Faculty of Health Sciences has scrutinised your research proposal and confirm that it complies with the approved ethical standards of the University of Johannesburg.

Permission is thus hereby given to conduct the research in the Department of Nursing at the University of Johannesburg.

The AEC would like to extend their good wishes to you in your endeavour of your research project

Yours faithfully

Mrs M.E Snyman
Faculty Officer: Health Sciences
Room 7227, John Orr Building, Doornfontein Campus
Tel: (011) 559 6373 Fax: (011) 559 6227
E-mail: rias@uj.ac.za

ANNEXURE H

- **CERTIFICATE OF REGISTRATION**

CERTIFICATE OF REGISTRATION

Surname: MISHALI-QAMATA

First Names: NOMAWETHU ACQUILLA

Student Number: 3972234

was/is registered as a full-time/part-time student

in the **FACULTY OF HEALTH SCIENCES**

for the degree of MSc NURSING EDUCATION

for the academic year from 01 2009 (mm yy) to 01 2009 (mm yy)

Year of Study: ~~2009~~ 1

Avaleen

for registrar

Date: 27/01/09

University of the Witwatersrand
2009 -01- 27
Faculty of Health Sciences
York Road, Parktown 2193
JOHANNESBURG

Faculty Stamp

ANNEXURE I

- **APPROVAL OF TITLE**

Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011) 717-2745

Reference: Ms Tania Van Leeve
E-mail: tania.vanleeve@wits.ac.za
11 November 2009
Person No: 397234
PAG

Mrs NA Mtshali-Qamata
P.O. Box 159
De Deur
1884
South Africa

Dear Mrs Mtshali-Qamata

Master of Science in Nursing: Approval of Title

We have pleasure in advising that your proposal entitled "*Problem based learning vs traditional curricula: A comparative study of nursing students' self directed learning readiness*" has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

ANNEXURE J

- **DATA ANALYSIS RESULTS**

SELF-MANAGEMENT

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	Self-management Mean	Self-management Std.Dev.	Self-management Std.Err	Self-management -95.00%	Self-management 95.00%
Total			159	49.8	6.1	0.48	48.86	50.77
Q5DEMInst	UJ		105	49.7	5.8	0.57	48.58	50.83
Q5DEMInst	WITS		54	50.0	6.7	0.91	48.20	51.87
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y1	19	51.6	6.0	1.37	48.70	54.45
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y2	32	49.8	6.7	1.19	47.39	52.24
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y3	34	48.2	5.2	0.89	46.40	50.01
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y4	20	50.3	4.7	1.05	48.10	52.50
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y1	20	51.3	5.9	1.32	48.54	54.06
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y2	12	47.1	6.8	1.98	42.74	51.43
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y3	10	47.8	7.8	2.47	42.22	53.38
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y4	12	52.8	6.0	1.73	48.94	56.56

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	Self-management SS	Self-management MS	Self-management F	Self-management p
Intercept	1	331414.90	331414.90	9168.47	0.000
Q5DEMInst	1	1.90	1.90	0.05	0.817
Q3DEMLevStud_C(Q5DEMInst)	6	425.50	70.90	1.96	0.075
Error	151	5458.20	36.10		
Total	158	5887.70			

Effect	Descriptive Statistics (SDLR_data.sta)					Descriptive Statistics (SDLR_data.sta)		
	Level of Factor	Level of Factor	N	Self-management Mean	Self-management Std.Dev.	Self-management Std.Err	Self-management -95.00%	Self-management 95.00%
Total			159	49.82	6.10	0.48	48.86	50.77
Q5DEMInst	UJ		105	49.70	5.79	0.57	48.58	50.83
Q5DEMInst	WITS		54	50.04	6.72	0.91	48.20	51.87
Stage(Q5DEMInst)	UJ	Junior	51	50.47	6.45	0.90	48.66	52.28
Stage(Q5DEMInst)	UJ	Senior	54	48.98	5.05	0.69	47.60	50.36
Stage(Q5DEMInst)	WITS	Junior	32	49.72	6.50	1.15	47.38	52.06
Stage(Q5DEMInst)	WITS	Senior	22	50.50	7.16	1.53	47.32	53.68

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	Self-management SS	Self-management MS	Self-management F	Self-management p
Intercept	1	347192.6	347192.6	9250.263	0
Q5DEMInst	1	5.1	5.1	0.136	0.71241
Stage(Q5DEMInst)	2	66.1	33.1	0.881	0.416522
Error	155	5817.7	37.5		
Total	158	5887.7			

DESIRE FOR LEARNING

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	Desire for learning Mean	Desire for learning Std.Dev.	Desire for learning Std.Err	Desire for learning -95.00%	Desire for learning 95.00%
Total			159	50.0	4.9	0.4	49.2	50.7
Q5DEMInst	UJ		105	49.9	4.8	0.5	48.9	50.8
Q5DEMInst	WITS		54	50.1	5.1	0.7	48.7	51.5
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y1	19	51.1	4.7	1.1	48.9	53.4
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y2	32	50.8	5.4	1.0	48.9	52.8
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y3	34	48.7	4.7	0.8	47.1	50.4
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y4	20	49.2	3.9	0.9	47.3	51.0
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y1	20	51.5	5.8	1.3	48.8	54.2
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y2	12	48.7	4.1	1.2	46.1	51.3
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y3	10	49.3	4.2	1.3	46.3	52.3
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y4	12	49.9	5.6	1.6	46.4	53.5

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition			Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition	
	Degr. of Freedom	Desire for learning SS	Desire for learning MS	Desire for learning F	Desire for learning p
Intercept	1	332058.300	332058.300	13730.210	0.000
Q5DEMInst	1	0.400	0.400	0.020	0.895
Q3DEMLevStud_C(Q5DEMInst)	6	184.100	30.700	1.270	0.275
Error	151	3651.900	24.200		
Total	158	3837.800			

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	Desire for learning Mean	Desire for learning Std.Dev.	Desire for learning Std.Err	Desire for learning -95.00%	Desire for learning 95.00%
Total			159	49.96	4.93	0.39	49.19	50.73
Q5DEMInst	UJ		105	49.89	4.84	0.47	48.95	50.82
Q5DEMInst	WITS		54	50.11	5.13	0.70	48.71	51.51
Stage(Q5DEMInst)	UJ	Junior	51	50.94	5.11	0.72	49.50	52.38
Stage(Q5DEMInst)	UJ	Senior	54	48.89	4.40	0.60	47.69	50.09
Stage(Q5DEMInst)	WITS	Junior	32	50.44	5.33	0.94	48.51	52.36
Stage(Q5DEMInst)	WITS	Senior	22	49.64	4.90	1.05	47.46	51.81

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	Desire for learning SS	Desire for learning MS	Desire for learning F	Desire for learning p
Intercept	1	348003.7	348003.7	14511.38	0
Q5DEMInst	1	0.5	0.5	0.02	0.883391
Stage(Q5DEMInst)	2	118.8	59.4	2.48	0.087253
Error	155	3717.1	24		
Total	158	3837.8			

SELF-CONTROL

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	Self-control Mean	Self-control Std.Dev.	Self-control Std.Err	Self-control -95.00%	Self-control 95.00%
Total			159	64.2	5.2	0.4	63.4	65.0
Q5DEMInst	UJ		105	64.6	5.0	0.5	63.6	65.5
Q5DEMInst	WITS		54	63.4	5.4	0.7	61.9	64.9
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y1	19	64.3	5.6	1.3	61.6	67.0
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y2	32	64.9	4.4	0.8	63.3	66.5
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y3	34	63.7	6.1	1.0	61.6	65.9
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y4	20	65.7	3.2	0.7	64.1	67.2
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y1	20	62.5	5.6	1.3	59.9	65.1
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y2	12	63.2	3.7	1.1	60.8	65.5
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y3	10	60.9	6.1	1.9	56.5	65.3
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y4	12	67.2	4.5	1.3	64.3	70.0

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	Self-control SS	Self-control MS	Self-control F	Self-control p
Intercept	1	546972.6	546972.6	21153.89	0.000
Q5DEMInst	1	50.1	50.1	1.94	0.166
Q3DEMLevStud_C(Q5DEMInst)	6	302.2	50.4	1.95	0.077
Error	151	3904.4	25.9		
Total	158	4256.4			

Effect	Descriptive Statistics (SDLR_data.sta)							Descriptive Statistics (SDLR_data.sta)
	Level of Factor	Level of Factor	N	Self-control Mean	Self-control Std.Dev.	Self-control Std.Err	Self-control -95.00%	Self-control 95.00%
Total			159	64.17	5.19	0.41	63.36	64.98
Q5DEMInst	UJ		105	64.57	5.04	0.49	63.60	65.55
Q5DEMInst	WITS		54	63.39	5.44	0.74	61.90	64.87
Stage(Q5DEMInst)	UJ	Junior	51	64.71	4.85	0.68	63.34	66.07
Stage(Q5DEMInst)	UJ	Senior	54	64.44	5.25	0.71	63.01	65.88
Stage(Q5DEMInst)	WITS	Junior	32	62.75	4.95	0.88	60.96	64.54
Stage(Q5DEMInst)	WITS	Senior	22	64.32	6.08	1.30	61.62	67.01

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	Self-control SS	Self-control MS	Self-control F	Self-control p
Intercept	1	571692.1	571692.1	21236.23	0
Q5DEMInst	1	37.8	37.8	1.4	0.238132
Stage(Q5DEMInst)	2	33.9	16.9	0.63	0.534606
Error	155	4172.7	26.9		
Total	158	4256.4			

SDLR

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	SDLR Mean	SDLR Std.Dev.	SDLR Std.Err	SDLR -95.00%	SDLR 95.00%
Total			159	163.9	13.5	1.1	161.8	166.1
Q5DEMInst	UJ		105	164.2	13.2	1.3	161.6	166.7
Q5DEMInst	WITS		54	163.5	14.3	1.9	159.6	167.4
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y1	19	167.0	14.4	3.3	160.1	173.9
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y2	32	165.6	14.0	2.5	160.5	170.6
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y3	34	160.7	13.6	2.3	155.9	165.4
Q3DEMLevStud_C(Q5DEMInst)	UJ	Y4	20	165.1	9.3	2.1	160.7	169.5
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y1	20	165.3	14.3	3.2	158.6	172.0
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y2	12	158.9	11.9	3.4	151.3	166.5
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y3	10	158.0	15.6	4.9	146.8	169.2
Q3DEMLevStud_C(Q5DEMInst)	WITS	Y4	12	169.8	13.5	3.9	161.2	178.4

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	SDLR SS	SDLR MS	SDLR F	SDLR p
Intercept	1	3577800	3577800	19834.53	0.000
Q5DEMInst	1	83	83	0.46	0.498
Q3DEMLevStud_C(Q5DEMInst)	6	1750	292	1.62	0.146
Error	151	27238	180		
Total	158	29002			

Effect	Descriptive Statistics (SDLR_data.sta)							
	Level of Factor	Level of Factor	N	SDLR Mean	SDLR Std.Dev.	SDLR Std.Err	SDLR -95.00%	SDLR 95.00%
Total			159	163.95	13.55	1.07	161.83	166.07
Q5DEMInst	UJ		105	164.16	13.23	1.29	161.60	166.72
Q5DEMInst	WITS		54	163.54	14.26	1.94	159.64	167.43
Stage(Q5DEMInst)	UJ	Junior	51	166.12	14.03	1.96	162.17	170.06
Stage(Q5DEMInst)	UJ	Senior	54	162.31	12.27	1.67	158.97	165.66
Stage(Q5DEMInst)	WITS	Junior	32	162.91	13.65	2.41	157.98	167.83
Stage(Q5DEMInst)	WITS	Senior	22	164.45	15.39	3.28	157.63	171.28

Effect	Univariate Results for Each DV (SDLR_data.sta) Over-parameterized model Type III decomposition				
	Degr. of Freedom	SDLR SS	SDLR MS	SDLR F	SDLR p
Intercept	1	3745201	3745201	20313.67	0
Q5DEMInst	1	10	10	0.05	0.816139
Stage(Q5DEMInst)	2	411	205	1.11	0.331047
Error	155	28577	184		
Total	158	29002			

PROPORTION OF STUDENTS WITH SDLR >= 150

SDLR > 150	UJ	WITS	Total
Y1	16	16	32
Y2	28	10	38
Y3	27	7	34
Y4	19	12	31
Totals	90	45	135

SDLR > 150	UJ	WITS	Total
Junior	44	26	70
Senior	46	19	65
Totals	90	45	135

All	UJ	WITS	Total
Y1	19	20	39
Y2	32	12	44
Y3	34	10	44
Y4	20	12	32
Totals	105	54	159

SDLR > 150	UJ	WITS	Total
Junior	51	32	83
Senior	54	22	76
Totals	105	54	159

% with SDLR > 150	UJ	WITS	Total
Y1	84	80	82
Y2	88	83	86
Y3	79	70	77
Y4	95	100	97
Totals	86	83	85

SDLR > 150	UJ	WITS	Total
Junior	86	81	84
Senior	85	86	86
Totals	86	83	85