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PERCEPTIONS AND OPINIONS OF NURSING STUDENTS ON THE USE OF COMPUTER TECHNOLOGY FOR TEACHING AND LEARNING

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500209

A RESEARCH REPORT SUBMITTED TO THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE WITWATERSRAND, IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

JOHANNESBURG, MAY 2015

DECLARATION

I, Motselisi Aniciah Lebete-Sehalahala declare that the following research report is solely my own work. It is being submitted for the degree of Master of Science in Nursing: Education at the University of the Witwatersrand, Johannesburg. This work has not previously been submitted for any degree or examination at this or any other university.

_____

SIGNATURE

_____

DATE

DEDICATION

I dedicate this work to my husband,

Motumi.

Thank you for your love and being a pillar of strength

throughout the course of the study!

ACKNOWLEDGEMENTS

I wish to extend my heartfelt gratitude to all people whose efforts and contributions led to the successful completion of this research project. Particularly I would like to thank:

- My husband, MOT, for the financial support, understanding, patience and motivation.
- All children in the family, for their understanding and motivation.
- My supervisor, Professor L Maree, for the guidance, demand for perfection, motivation and encouragement.
- My joint supervisor, Professor D Manning, for her untiring guidance, support and encouragement.
- The Management of Chris Hani Baragwanath Nursing College, for allowing me to conduct the study at the college.
- The Gauteng Department of Health, for granting me permission to conduct the study.
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- My colleagues, for their support, assistance and continuous encouragement throughout the period of the study.
- The participants without whose cooperation the study would not have been successful.

ABSTRACT

The purpose of this study was to explore the perceptions and opinions of nursing students at Chris Hani Baragwanath Nursing College on the use of computer technology by lecturers in the classroom and student nurses' perceptions and opinions on their use of computer technology during self-study. A survey research design was used to answer the research questions. The target population was all students in their final year in 2012 studying towards becoming a registered or enrolled nurse at Chris Hani Baragwanath Nursing College. Self-report data were collected using a self-administered questionnaire. Census sampling was used and of the total population of students (N=320), 176 questionnaires were returned resulting in a response rate of 55%. Descriptive statistics were used to analyse the data. The relationships between variables were determined by using chi-square and Fisher's exact test.

Findings revealed that the use of computer technology by lecturers in the classroom was poor. It also seemed as if the students were not encouraged to use computers and the internet for self-study as there were little learning activities that required students to use computers. Connectivity and accessibility to computer technology and the internet were among the challenges. However, most respondents were positive about using computer technology including the internet, for teaching and learning in a nursing programme.

It is recommended that lecturers be encouraged to use computer technology in the classroom in order to motivate students and stimulate their interest in learning. Students' access to use of computers and internet need to be improved. For instance, lecturers need to create learning activities that encourage students to use computer technology as well as searching for information from the internet to obtain more, updated and reliable information. There is a need to assist the students who lack skills in information and technology so that they may have confidence in the use of computers and the internet and maximize their opportunities for learning. The college may need to avail awareness campaigns, especially during orientation so that all students can be aware of the college computer laboratory. The number of computers need to be increased and the computer laboratory needs to be expanded so that as many students as possible can access the resources at any given time. It is also recommended that the college improve on connectivity and accessibility to computer technology and the internet.

LIST OF ABBREVIATIONS

DMSA	Data Management and Statistical Analysis
PEN	Pupil Enrolled Nursing
SANC	South African Nursing Council

TABLE OF CONTENTS **PAGE**

Declaration……ii

Dedication……iii

Acknowledgements……..iv

Abstract……v

List of abbreviations……..vi

Table of contents……..vii

Appendices……..xi

List of tables……...xii

List of figures……..xiv

CHAPTER ONE: ORIENTATION FOR THE STUDY

1.1 Introduction……....1

1.2 Significance of the study……....2

1.3 Problem statement and research question……..3

1.4 Research question……...3

1.5 Purpose of the study……...3

1.6 Research methods……...3

1.7 Definition of key concepts……4

1.7.1 Perception……4

1.7.2 Opinion……4

1.7.3 Computer technology……..4

1.7.4 Student nurse……...4

1.7.5 Nurse educator……....4

1.7.6 Learning……..4

1.7.7 Assignment…….....5

1.8 Ethical considerations…….5

1.9 Conclusion……..5

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction……....6

2.2 Computer technology in teaching and learning……. 6

2.3 The advantages of computer technology in learning…….…… 7

2.4 Challenges of computer technology…….10

2.5 The role of the nurse educator in computer-based learning…….12

2.6 Student perceptions and opinions on the use of computer technology……15

2.7 Conclusion……...16

CHAPTER THREE: RESEARCH DESIGN AND METHODS

3.1 Introduction…….....17

3.2 Research design……17

3.3 Research methods…….17

3.3.1 Research setting…….17

3.3.2 Study population and sample…….18

3.3.3 Data collection and instrument…….....18

3.3.4 Validity of the instrument……..19

3.3.4.1 Content validity…….....19

3.3.4.2 Face validity……19

3.3.5 Reliability of the instrument…….....20

3.3.6 Data collection……...20

3.3.7 Data analysis…….....20

3.4 Conclusion…….....21

CHAPTER FOUR: RESEARCH FINDINGS

4.1 Introduction……..22

4.2 Findings…….....22

4.2.1 Response rate…….22

4.2.2 Biographical data……...22

4.2.3 Teaching aids / methods used in the classroom…….....23

4.2.3.1 Internet sites used by teachers / lecturers…….....25

4.2.3.2 Other methods used by lecturers in the classroom…….25

4.2.4 Use of computer technology in the classroom or for assignments……26

4.2.4.1 Frequency of computer use in the classroom…….26

4.2.4.2 Frequency of computer / Internet use in assignments…….....27

4.2.5 Use of computer technology by lecturers to enhance learning……28

4.2.5.1 Reasons for responses…….....29

4.2.6 Sources used by students to find nursing / health related information……..31

4.2.6.1 Internet sites used to find nursing / health related information……..32

4.2.6.2 Other sources of information used by students……..32

4.2.7 Sources of information used most and least often by students……..33

4.2.7.1 Reasons why students use the specific sources of information most often…….....34

4.2.7.2 Reasons why students use the specific sources of information least often…….....36

4.2.8 Use of Internet for social and academic purposes…….38

4.2.8.1 Examples of using the Internet for social purposes…….....39

4.2.8.2 Reasons for not using the Internet for academic purposes…….40

4.2.8.3 Examples of using the Internet for academic purposes…….....40

4.2.9 Frequency of access of the Internet……..41

4.2.10 Ease of access of the college computer laboratory……..44

4.2.11 Facilities in the college computer laboratory…….....44

4.2.11.1 How facilities in the college computer laboratory could be improved……45

4.2.12 The Internet as the preferred source of information……45

4.2.12.1 Explanations on the Internet as a preferred source of information……..46

4.2.12.2 Explanations on why the Internet was not a preferred information source……..46

4.2.13 The Internet as a help to learn more about a particular subject…….....47

4.2.13.1 Reasons for feeling the Internet has helped to learn about a particular subject…….....48

4.2.13.2 Reasons for feeling the Internet has not helped to learn about a particular subject…….49

4.2.14 Additional comments on the use of computer technology……..49

4.3 Conclusion……50

CHAPTER FIVE: DISCUSSION, JUSTIFICATION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction……..51

5.2 Discussion of research findings……51

5.2.1 Demographic information……..51

5.2.2 Computer technology use by lecturers in the classroom…….....52

5.2.3 Use of computer technology by students……..55

5.3 Justification of the study…….....59

5.4 Limitations…….....60

5.5 Recommendations……60

5.6 Conclusion……61

REFERENCES……62

APPENDICES

1. Self-administered questionnaire……...71
2. Post Graduate Committee approval letter…….....78
3. Ethical Clearance certificate…….....79
4. Letter of permission from Chris Hani Baragwanath Nursing College…….....80
5. Letter of permission from Gauteng Department of Health…….....81
6. Information sheet / letter for participants…….89

LIST OF TABLES

Table 4.1 Response rate…….22

Table 4.2 A - Biographical data……23

Table 4.2 B - Age groups……...23

Table 4.3 Teaching aids / methods used in the classroom…….24

Table 4.4 Comparison of Comprehensive and Enrolled Nursing on teaching

Methods / aids……...24

Table 4.5 Internet sites used in the classroom…….....25

Table 4.6 Methods used by lecturers in the classroom…….....25

Table 4.7 Frequency of the use of computer technology in the classroom…….....26

Table 4.8 Lecturers' use of computer technology by frequency …….....26

Table 4.9 Frequency of computer / Internet use in assignments…….....27

Table 4.10 Use of computer technology to enhance learning…….....29

Table 4.11 Computer technology has / has not enhanced learning…….....30

Table 4.12 Sources of information used by students…….....31

Table 4.13 Comparison of age category and sources of information……31

Table 4.14 Examples of Internet sites used by students…….....32

Table 4.15 Other sources used to find nursing / health related information……..32

Table 4.16 Sources of information used most and least often by students…….....33

Table 4.17 Comparison of sources of information used most and least and Group……..34

Table 4.18 Comparison of sources of information used most and Age……34

Table 4.19 Reasons for sources of information used most often……..35

Table 4.20 Reasons for sources of information used least often…….....37

Table 4.21 Use of Internet for social and academic purposes…….....38

Table 4.22 Comparison of Internet use and Age……...38

Table 4.23 Examples of using the Internet for social purposes…….....39

Table 4.24 Reasons for not using the Internet for academic purposes……..40

Table 4.25 Examples of using the Internet for academic purposes……41

Table 4.26 Frequency of access of the Internet…….....42

Table 4.27 Control for Internet Use……...42

Table 4.28 Easy access of the college computer laboratory……..44

Table 4.29 Improvement of the facilities in the computer laboratory……...45

Table 4.30 The Internet as the preferred source of information……46

Table 4.31 The Internet as not a preferred source of information…….....47

Table 4.32 A - Internet as a help to learn about a particular subject…….....48

Table 4.32 B - Internet for Social / Academic purposes……...48

Table 4.33 The Internet has helped to learn about a particular subject…….....48

Table 4.34 The Internet has not helped to learn about a particular subject……...49

Table 4.35 Additional comments on the use of computer technology…….....49

LIST OF FIGURES

Figure 4.1 Internet use occasions and age category…….....43

CHAPTER ONE

ORIENTATION FOR THE STUDY

1.1 INTRODUCTION

In South Africa the Nursing Council (SANC) according to the Nursing Act (Act no 33, 2005) has the responsibility to establish, improve and control conditions, standards and quality of nursing education and training. According to SANC (1993) the philosophy and policy of SANC with regard to professional nursing education, describe the purpose of nursing education as being specifically directed at the development of the nursing student as an adult on a personal and professional level. This should lead to cognitive, affective and psychomotor development of the student, as well as the achievement of prescribed programme objectives (SANC, 1993). Although SANC prescribes the minimum educational requirements of all categories of nurses as well as specialist nurses, it does not prescribe the teaching and learning methods and technology that should be used.

Traditional classroom teaching and learning methods do not offer teachers and learners much flexibility as they are limited to specific venues and time. Epper and Bates (2001) have identified the need for more flexible approaches to teaching and learning as technology has brought seismic shifts to the global economy and society. Websites, instructional videos, online assignments and other teaching tools can be integrated to enrich students' learning experience, promote access to resources and maximize flexibility and independence in learning (Lashley, 2005). However, according to Dumort (2002) technology itself does not improve learning automatically nor does it alter the teaching process in fundamental ways. New approaches to the teaching and learning process must be embedded in the thinking of teachers, the education institutions and the curricula.

Computer technology has the power to transform the teaching and learning process, resulting in new roles for nursing colleges and students. Taylor (2007) is of the opinion that effective nurse educators can productively use technology by selecting equipment to be utilized and applying technology to nursing education and training tasks. According to Fewell (2003) computer technology allows educators to easily and quickly tailor templates and exercises to meet specific learning outcomes because it uses knowledge of student learning and technology to design, facilitate and manage the multi-dimensional learning environment. In addition, computer-assisted learning is particularly useful for independent, self-managed learning because students using a computer can use the material at their own pace, and can also refer back to previous sections as need arises. Questions posed by the program can be answered in total privacy, saving a student an embarrassment of having her/his lack of knowledge exposed in front of a group of other students (Quinn & Hughes, 2013). Furthermore, once

tutors have learnt how to use computer tools for classroom management, they find that they have more time to spend on their teaching rather than on paperwork and management tasks assigned to them (Morrison & Lowther, 2002). Meyer and Van Niekerk (2008) outline the following advantages of computers in education:

- Computers never show anger, tiredness, temperament or frustration;
- They have perfect memory, and operate at high speed;
- The programs can assess individual performance and initiate remedial processes;
- More than one learner can use a program at the same time and in different places, working at their own speed and receiving individualized feedback through the use of mainframe computers.

As adult learners, students in nursing and other health-related fields bring to the teaching-learning venture various levels of experience and skill with technology-enhanced learning. Their readiness to learn is framed both by their past experience with computers and by their awareness of the need for the skills necessary to survive in the academic world and in the workforce (Bloom & Hough, 2003). Computer-based education is not simple as according to O'Shea (2003), acquiring the necessary skills is dependent on a student's preference and readiness for self-directed learning and nurse educators' implementation of the concept. The idea of self-directed learning is supported by prominent learning theorists, such as Knowles quoted by Klunklin, Viseskul, Sripusanapan & Turale (2010), who recommended that adult learning experiences should include active learner involvement, collaborative faculty-student relationships, and facilitation of self-directed learning (Klunklin, Viseskul, Sripusanapan & Turale, 2010). According to Bloom and Hough (2003), students' perceptions of technology-enhanced learning integrated into the teaching-learning transaction generally are favourable. Students believe that learning is positively affected by the use of technology-enhanced learning in the classroom, but that its use cannot substitute for a good teacher.

According to Edem and Ofre (2010), students used computers primarily to search for information, followed by writing assignments and term papers, and entertainment. Technological frustrations were noted by students as they were hampered by the slow downloading of visual images, high telephone bills, and lack of face-to-face contact with the instructor and other classmates. Therefore, a combination of classroom and online education facilitated by means of computer-based education was identified by some students as the ideal teaching methodology (Grimes, 2002).

1.2 SIGNIFICANCE OF THE STUDY

There is currently no information available on perceptions and opinions of nursing students registered at Chris Hani Baragwanath Nursing College on the role of computers to enhance teaching and

learning. This study aims to fill this knowledge gap and will provide baseline data to inform teaching and learning and future research.

1.3 PROBLEM STATEMENT

During an informal discussion with some of the student nurses at Chris Hani Baragwanath Nursing College, the researcher formed the impression that some nurse educators use computer technology in teaching while others do not. Students reported that their understanding improves when computers are being used in class and learning is facilitated by means of PowerPoint presentations, images, videos and simulation. Therefore, the researcher is of the opinion that among the important areas that require development, the use of computer technology at Chris Hani Baragwanath Nursing College requires attention. However, there is currently no information available on perceptions and opinions of nursing students on the role of computers to enhance teaching and learning.

1.4 RESEARCH QUESTION

This study will focus on the following research question: What are the perceptions and opinions of student nurses trained at Chris Hani Baragwanath Nursing College on the use of computer technology by lecturers in the classroom and what are the student nurses' perceptions and opinions on their use of computer technology during self-study?

1.5 PURPOSE OF THE STUDY

The purpose of this study was to explore the perceptions and opinions of nursing students at Chris Hani Baragwanath Nursing College on the use of computer technology by lecturers in the classroom and student nurses' perceptions and opinions on their use of computer technology during self-study.

1.6 RESEARCH METHODS

A survey research design (LoBiondo-Wood & Haber, 2010) was used to answer the research questions. The target population consisted of all the students in their final year in 2012 studying towards becoming a registered or enrolled nurse at Chris Hani Baragwanath Nursing College. A census sample (Welman, Kruger & Mitchell, 2005) was used and all final year students (N=320) were invited to participate in the study. Self-report data (LoBiondo-Wood & Haber, 2010) were collected using a self-administered questionnaire adapted from a questionnaire by Gupta, White and Walmsley (2004). The questionnaire contained both closed and open-ended questions (Appendix 1). Of the total of 320 questionnaires, 176 were returned resulting in a response rate of 55%.

Descriptive statistics (Burns & Grove, 2009; 2011; Willemse, 2009) were used to analyse the data and chi-square and Fisher's exact test assessed the relationships between categorical variables. The

Wilcoxon rank sum test was used to assess the relationship between categorical and continuous variables (Grove, Burns & Gray, 2013). Content analysis (LoBiondo-Wood & Haber, 2010) was used to analyze the responses to open-ended questions. Tables were used to count and group similar word responses.

1.7 DEFINITION OF KEY CONCEPTS

1.7.1 Perception

Perception is the ability to interpret and give meaning to sensory information and is a subjective experience (Woodward & Mestecky, 2011). In this study, perception refers to nursing students' own interpretation and meaning on the use of computers for teaching and learning.

1.7.2 Opinion

Hornby (2006) defines opinion as someone's feelings or thoughts about somebody or something, rather than a fact. For the purpose of this study, opinion refers to feelings/thoughts of nursing students on the use of computer technology, including the internet.

1.7.3 Computer Technology

Computer technology refers to the use of electronic devices for searching, storing and processing data, according to instructions given to it in a variable program (Hornby, 2006). Computer technology includes web-enhanced instruction/education (face to face/traditional and online or Web-based teaching) and technology-enhanced learning which refers to information technology forms such as computer-assisted instructional packages, multimedia, and interactive videos used to enhance the teaching-learning process (Horne & Sandmann, 2012; Bloom & Hough, 2003). For the purpose of this study, computer technology would refer to the strategies which require the use of computers by nurse educators in the classroom which include PowerPoint, videos, images, simulation and the Internet; and the use of computer technology or electronic learning by students during self-study.

1.7.4 Student (Learner) Nurse

Learner nurse means a person registered as such in terms of section 32 (Nursing Act no. 33 of 2005). In this study, a student nurse refers to a person in the final year of study to become a registered or enrolled nurse and includes both students in the four year comprehensive diploma programme and the students in the two year Pupil Enrolled Nursing (PEN) programme.

1.7.5 Nurse Educator

Hughes and Quinn (2013) define a nurse lecturer / educator as a nurse registered with the Nursing Midwifery Council who has undertaken a study or is working towards a postgraduate certificate in

nursing education. A nurse educator is a registered nurse with an additional qualification in nursing education, registered with the South African Nursing Council (SANC) as a nurse educator in accordance with Regulation R118 of 23 January 1987.

1.7.6 Learning

In the healthcare professions, learning is a lifelong process of skill and knowledge acquisition and updating them through planned participation in focused reading and structured programmes of study (Gopee, 2011). For the purpose of this study learning refers to knowledge and skills acquired by a person in the final year of study to become a registered or enrolled nurse.

1.7.7 Assignment

Assignment refers to a task or piece of work that someone is given to do, usually as part of their job or studies (Hornby, 2010). For the purpose of this study, assignment refers to any piece of work that requires nursing students to use computers, including the internet.

1.8 ETHICAL CONSIDERATIONS

As described by Polit and Beck (2012), ethics is a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal, and social obligations to the study participants. To meet these criteria, the following ethical aspects were considered:

- The research proposal was submitted to the University of the Witwatersrand Postgraduate Committee for permission to conduct the study. Approval was granted (Appendix 2).
- Application for clearance to conduct research was submitted to Human Research Ethics Committee (Medical) of the University of the Witwatersrand. Approval was granted (Appendix 3).
- A letter of permission to conduct research was obtained from the Principal of Chris Hani Baragwanath Nursing College (Appendix 4).
- A written permission from Gauteng Department of Health was obtained (Appendix 5).
- Participants' names were not used during data collection and reporting to ensure confidentiality and anonymity. Code numbers were used.
- An information sheet/letter was given to participants so as to be fully informed of the purpose of the study before consenting to participate (Appendix 6).
- The participants were informed that returning a completed questionnaire served as consent to participate in this study.

- The participants were informed that their participation was entirely voluntary, and they were free to decline an invitation altogether or to stop at any time during the study without having to give any explanation, and without any consequences.
- Although the researcher was employed at the college, the setting for this study, there had never been any direct involvement either with teaching or assessing these participants.
- Copies of the study results shall be availed to Gauteng Department of Health, the Principal of Chris Hani Baragwanath Nursing College and to the college library for access by the students and college staff.

1.9 CONCLUSION

In this chapter, the orientation and introduction for the study was provided. The significance of the study, problem statement, research question, purpose of the study and research methods were stated. Definitions of key concepts and ethical considerations of the study were presented. The following chapter will describe the literature reviewed regarding the use of computer technology.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

When well incorporated into learning requirements, computer technology including the Internet is a strategy which has the ability to assist students in developing the cognitive processes that are needed to use information technology in an effective way (Chaffin & Maddux, 2004). The components of computer technology include among others web-enhanced education and technology-enhanced learning and there is similarity in the use of these technologies. According to Horne and Sandmann (2012) web-enhanced education is a combination of face-to-face and online delivery of course material. Bloom and Hough (2003) define technology-enhanced learning as the use of various information technology forms to enhance the teaching-learning process. These forms range from simple information technologies, e.g. word processing and instructional technologies to deliver information to learners, to complex technologies which include computer-assisted instructional packages, multimedia, and interactive videos.

2.2 COMPUTER TECHNOLOGY IN TEACHING AND LEARNING

Computer technology in teaching and learning has been described differently by researchers. Applegate (2010) describes computer technology as the use of electronic devices for developing assignments and supplying course materials, administering quizzes and tests and conducting research in the classroom. Simons, Baron, Knicely and Richardson (2001) describe computer technology as a course website which includes links to course information, announcements, lecture materials, group discussion forums and student homepages which allow communication between student and student and student and instructor. According to Berry and Miller (2006) computer technology includes digital video technology which can mimic or represent real-life situations otherwise unavailable to students.

In describing computer technology, Saljo (2010) includes the integration of devices such as portable personal computers and mobile phones that serve as external memories and information sources for educators and students as well as links to the world wherever the educators and/or students are. Through computer technology, most of the interesting information is within reach.

When describing computer technology in teaching and learning of nursing, Cohen and Dacanay as quoted by Leski (2009) highlight that computer technology includes tutorials, interactive video instruction, and computer simulations, as well as presentation graphics, which are used in support of the traditional lecture. According to Medley and Horne (2005), simulation technology, a form of

computer technology, has great potential to nursing programs as students can gain and improve skills in a safe, non-threatening experiential environment that also provides opportunities for critical thinking and decision making. According to Quinn and Hughes (2013) email is another component of computer technology which is particularly useful in nurse education for tutor's comments on draft assignments, facilitating a very quick turnaround of feedback to the student.

The need to integrate computers and/or information technology into nursing education has been recognized and is well documented in the literature. In spite of this, information technology continues to remain a neglected subject in many nursing programmes (Quinn & Hughes, 2013).

2.3 THE ADVANTAGES OF COMPUTER TECHNOLOGY IN LEARNING

The advantages of computer technology over traditional methods of instruction have been identified by various authors. When challenging traditional teaching and learning paradigms, Shovein, Huston, Fox and Damazo (2005) state that the presence of computer technology in the curriculum helps educators relinquish the gatekeeper role and strengthens the role of dialogue as central to the teaching-learning paradigms. Technology moves the teacher into a mediating role; coaching and encouraging students and helping them construct knowledge in an active and personal way. Ajuwon (2003) highlights that computer technology is one of the most important sources of information for students in institutions of learning throughout the world and it has also become a popular medium for delivering educational material. Oberprieler, Masters and Gibbs (2005) in a study conducted in South Africa, indicate that there are benefits for students to be trained in information and computer technology and therefore, health care training in South Africa has to keep up with the demands of the world to remain competitive, relevant and up-to-date, and realize that even limited technology can have a big impact on health care.

In a study by Lockyer, Sargeant, Curran and Fleet (2006) conducted in Canada, it was highlighted that computer technology offers educational advantages such as flexibility to educators because it allows educators the ability to use other media and links to related content. The computer-based programs provide learning objectives and do not usually require the educator, which makes these programs more affordable and allow students the flexibility to access them at any time (Nagle, McHale, Alexander & French, 2009).

Students believe that learning is positively affected by the use of technology-enhanced learning in the classroom, but that its use cannot substitute for a good educator (Bloom & Hough, 2003). According to Frye and Dornisch (2008) educators who use more technology may be evaluated more positively by students because their use of computer technology in the classroom tends to foster the sorts of interactive activities and assignments that students generally prefer. Computer technology saves time

for nurse educators as it allows educators to easily and quickly tailor templates and exercises so that specific learning outcomes can be met (Fewell & Gibbs, 2003).

Web-based teaching is used strategically to supplement classroom instruction. With computer-technology, students and the nurse educator may initiate and respond to each other's inputs just like in a live seminar, but with the advantage of not having to be in the same place at the same time (Quinn & Hughes, 2007). Meedzan and Fisher (2009) highlight that computer technology in teaching and learning provides many opportunities for enhancing communication, discussion and interactivity between the educator and students. Computer technology enables educators and students from any academic discipline to share ideas, experiences and materials (Salyers, 2005).

According to Billings and Kowalski (2007) one of the key advantages of computer technology is an increased opportunity for interaction and dialogue as even students who are at a distance can ask questions and the educator can determine whether the student has grasped key points or not. With large class sizes, it is difficult to obtain educator-student interaction (Meedzan & Fisher, 2009), but with the use of computer technology the educator is able to interact with each student regardless of class size. Computer technology also provides on-the-spot feedback of students' understanding thus leading to clarification and teacher adjustment to instruction. According to Triola, Huwendiek, Levinson and Cook (2012) computer-assisted instruction applications can scale to hundreds or thousands of learners, provide rich interactivity and learner-specific feedback, and provide for both repetition and variation of a topic or problem.

According to Esani (2010) with computer technology, the educator can create interactive learning tools for teaching challenging concepts, which is more interesting and exciting for the students than using still pictures as is the case in a traditional/face-to-face lecture. For instance, with technology nurse educators now need only have students access a Web site and play the sounds through the speakers on the computer instead of having to search for patients with particular abnormal lung or heart sound and hope the patients would allow several students to listen and learn that unique sound (Chaffin and Maddux, 2004). In their study, Gupta et al. (2004) stated that computer-assisted learning offers many advantages over traditional methods of learning as it allows the use of sound, videos and animation to put information across. According to Berry and Miller (2006), students find the use of video technology more interesting and flexible than the traditional lecture method because a video enables them to work at their own pace when learning or reviewing difficult educational content as a video can be slowed down and viewed until students understand exactly what they are watching. Meedzan and Fisher (2009) highlighted that computer technology involve the students to apply knowledge to simulation, enabling practice to take place in a safe environment that facilitates decision

making, without fear of any harmful real-life consequences. Simulation as a form of computer technology allows the students an opportunity to achieve learning outcomes in a controlled environment without risk to the patients (Nagle et al., 2009).

Ali, Hodson-Carlton and Ryan (2004) in a study conducted in Indonesia, state that according to the Constructivist Theory, adult learners should be actively involved in the learning process and provided with various social group opportunities that help stimulate and challenge thinking to reform cognitive abilities; computer technology is especially suitable for developing assignments that require critical thinking based on previous knowledge of learners. Computer technology enables online group work that allows students to log on any time day or night, check the latest comments, think it over, and respond by adding their own thoughts (Chaffin & Maddux, 2004).

According to Jang, Hwang, Park, Kim and Kim (2005) computer-assisted learning may help provide reiterative learning opportunities for students and accommodate different learning styles. Berry and Miller (2006) highlight that videos, a form of computer technology, address multiple learning styles and encourage creativity and critical thinking when used as a class assignment as well as providing consistency by ensuring that students are exposed to standardized information. It is highlighted by Triola et al. (2012) that computer technology features can facilitate teaching techniques not possible using traditional methods, or provide availability of learning resources, for example, interactive media-enhanced Virtual Patients often include authentic video material of real patients, allowing large numbers of students to practice whenever they want. According to Suen (2005) students found that the computer-assisted learning was more flexible, stimulating, creative and personal compared to the traditional classroom lecture. Ajuwon (2003) state that computer-assisted learning is convenient to students as it allows taking a course at a time and a place that fitted student schedules.

Computer-assisted instruction facilitates independent learning, where students guide their own learning according to individual needs, making learning more relevant (Bromley, 2010). Esani (2010) mentioned that the advantages of computer-assisted instruction are that it is convenient, efficient, challenging, fun and rewarding to students. Deltsidou, Gesouli-Voltyraki, Mastrogiannis and Noula (2010) indicated that computer-assisted learning improves access to learning material, as well as to other students and teachers at different times and locations. Students also indicated that the experience of computer-assisted learning was one of active, free, social and new learning (Hsu & Hsieh, 2006).

Meedzan and Fisher (2009) stated that traditional lectures are frequently described as tedious and boring relying on a one-way communication from the educator to student with the specific activity of listening, whereas active learning enhanced with computer technology involves students doing tasks

which inspire their interest in the subject matter. As a result, learning becomes more exciting and the students are encouraged to think for themselves and understand the material. Applegate (2010), in a study conducted in the US, found that through access to the Internet the students can access useful information that is available on Web sites. Furthermore, assignments that require the students to perform small amounts of research during class time can be developed, thereby helping students to develop research skills and promote learning beyond the classroom.

Nurse educators can use computer technology intelligently to keep efficient records of learners' performance, and to analyse, explain and suggest solutions for learners' problems (Meyer & van Niekerk, 2008). The use of computer technology tools such as electronic portfolios that aggregate learner data can also provide a much more complete picture of individual learner performance (Triola et al., 2012). According to Applegate (2010), by using computer technology to collect data on the examinations performed by each student, educators are able to determine areas in which a student is weak as well as which types of examinations are lacking. This information can be used as documentation for making assignments or as feedback to individual learners. Nelson, Meyers, Rizzolo, Rutar, Proto and Newbold (2006) highlight that with computer technology, a comprehensive student management system that tracks each student's educational experience from the application stage through graduation and beyond, is possible. This would include data elements such as course test scores, clinical experiences, hours of class attendance, course content, and student demographics.

Triola et al. (2012) state that computer technology can facilitate assessment and computer-graded assessments can ease the logistic hassle of test administration. According to Tshibalo (2007), the potential benefits of computer technology include objective and consistent standards as computer technology will always obey the scoring rules fed into the program. However, in traditional hand-marked scripts, subjectivity may be a problem.

2.4 CHALLENGES OF COMPUTER TECHNOLOGY

The main barrier for using computer technology is students who cannot use computers and would therefore be seriously disadvantaged (Gupta et al., 2004) as the value of the computer lies in the learners' computer literacy skills and the finding of data without being dependent on another person such as the librarian or nurse educator (Meyer & van Niekerk, 2008). It has been indicated by Eley et al. (2008) that to use the available technology to its potential, provision of access alone is not sufficient; skill or ability must be adequate. Johnston (2008) in a study conducted in the US highlighted that, because of its electronic nature, computer-assisted learning requires students to possess a different skill set. The independent learning nature of the computer technology environment

forces students to assume equal responsibility for their own learning which poses a serious challenge for students who lack readiness and ability to learn independently (Johnston, 2008).

Deltsidou et al. (2010) in a study conducted in Greece found that most nursing students did not have convenient access to computers and computer technology for study purposes whilst Koeniger-Donohue (2008), in a study conducted in Massachusetts highlighted the high financial cost of nursing software as a significant factor that was negatively perceived by students. Some of the main obstacles reported by students to using computer technology included the high cost of internet connections and not owning a computer. The students related the issue of high cost of technology with the slow downloading, especially of visual images in a study by Grimes (2002). According to Yom (2004), technical problems and a lack of time also posed problems to students whilst Leski (2009) found too many assignments, a noisy learning environment, overcrowding, equipment malfunctions and no hands-on experience challenge students.

Students described the lack of a sense of belonging to the class as a whole as another major obstacle. Students indicated that there was a reduction in student/student interaction as well as educator/ student interaction (Grimes, 2002). Esani (2010), in a study conducted in the US highlighted that the connection and feeling of being part of a learning community is somewhat lacking in computer-assisted learning and it is not unusual for a student to feel isolated. Students tend to interact more when they perceive their experience as enjoyable, satisfying, and personally and professionally fulfilling, and such interaction results in enhanced learning (Esani, 2010).

Johnston (2008) highlight that in the setting of the traditional method of instruction; educators can see students, interact with them in real time and gauge effectiveness of teaching whilst with computer technology educators do not have the same opportunity to determine effectiveness of teaching. Shovein et al. (2005) suggest that computers eliminate face-to-face classroom engagement, disrupting the normal development of classroom relationships; leads to less autonomy, less enjoyment of life, and loss of cultural identity. According to Esani (2010) in the face-to-face/traditional setting, educators have regular contact with students and are able to assess students' prior learning and their level of cognitive knowledge because the educators rely on a number of visual cues from the students to enhance their delivery/teaching, for instance, a quick glance by the educator reveals who is attentively taking notes or pondering a difficult question. With computer technology, educators have few, if any, visual cues as they might never really know, for instance, if students are asleep or talking among themselves (Esani, 2010). Applegate (2010) indicate that the downside of computer technology and the Internet include students surfing the Web while a lecture is in progress or checking e-mail during class sessions which could be distracting.

According to Johnson and Mighten (2005) a major challenge for schools of nursing is to design and deliver instruction that will be most effective in helping students pass. For nurse educators, designing computer-assisted courses, interacting with students, and managing the technology require considerable time management and technology skills as well as an infrastructure that supports both the nurse educators and students (Shovein et al., 2005). Comparing the traditional with computer-based instruction, Esani (2010) point out that computer-based courses require more development and design time and the delivery is more labour intensive. According to Meedzan and Fisher (2009) the obstacles observed in the adoption of computer technology by nurse educators would include increased preparation time to develop questions, educator discomfort to employ the use of technical equipment, lack of technology support, and limited incentives for educators to change from traditional instruction. Chaffin and Maddux (2004) highlighted that the nurse educators can be challenged by administrative expectations that demand expertise in computer technology when skill levels are limited. Equipment costs, space requirements and educator preparation time can create significant barriers to implementing and using computer technology as a teaching and learning method (Nagle et al., 2009).

Miller, Shaw-Kokot, Arnold, Boggin, Crowell, Allegri, Blue and Berrier (2005) in a study conducted in the US report issues related to the use of computer technology include information security, lack of a standard platform, finding quality software, and cost of the devices and software required to deliver course material. Triola et al. (2012) highlighted that technological educational advances, for instance, mannequin-based teaching and standardized patients are associated with significant expense. The issue of security was also highlighted by Applegate (2010) who indicated that computer technology poses a threat to confidentiality of student's sensitive information that should not be seen by unauthorized persons, especially where there is no use of password protection. While computer technology and information systems offer exciting possibilities for educators, technology and information systems also create ethical challenges as the appropriate collection and analysis of data is an ethical issue that requires thoughtful discussion accompanied by development of appropriate policies and procedures (Nelson et al., 2006).

In order to ensure that the use of computer technology becomes effective in teaching-learning process, nurse educators have a role to play.

2.5 THE ROLE OF THE NURSE EDUCATOR IN COMPUTER-BASED LEARNING

Nurse educators should have extensive knowledge of adult teaching and learning principles to allow themselves to strategize their teaching in the most effective way possible. This will result in the nurse educators able to face the challenges that include advancement with technology in healthcare (Min, Khin, Razack & Xia, 2014). Knowles stated that effective teaching involves an emphasis on student

learning, with early and repeated integration of problem-solving and learner-focused activities to provide opportunities to apply and test new knowledge (McMillan, 2007). According to Meedzan and Fisher (2009) nurse educators need to strive to promote active involvement of students and create a stimulating learning environment. Although computer technology can promote active student involvement, the nurse educator must determine that technology is appropriate for the educational learning outcomes to be achieved prior to making a decision to use computer technology (Billings & Kowalski, 2007).

Min et al. (2014) stated that nurse educators need to be familiar with common information and computer technology systems and high technological equipment used in local clinical contexts in order to prepare competent nurses that are not only knowledgeable and skilled, but also abreast with the advanced technology. The educator must be familiar with using the software and hardware and adapt instruction for the benefits and limitations of computer technology (Billings & Kowalski, 2007). According to Meedzan and Fisher (2009) the nurse educators need to become familiar and comfortable with computer technology as a worthwhile and beneficial teaching tool through educators development workshops and presentations. The idea of development is also supported by Nelson et al. (2006) who stated that even in their busy schedules, nurse educators must make time to attend meetings and learn how emerging computer technology infrastructures can facilitate or hinder teaching and learning process. Being technologically savvy, a nurse educator could make the teaching and learning more interesting and effective (Min et al., 2014).

Taylor (2007) is of the opinion that effective nurse educators can productively use technology by selecting equipment to be utilized and applying technology to nursing education and training tasks. However, it is important for educators to consider the characteristics of the students which will include recognizing students' learning styles, identifying students' experience and comfort level with technology, and ensuring that required technology is accessed by students (Bloom & Hough, 2003). This idea is supported by Boyd (2010) who highlight that developing academic assignments for students requires an understanding of students' unique characteristics and the willingness to rethink traditional educational methods. Computer technology allows the participation of diverse learners and also allows the educator to use a variety of teaching and learning methods to accommodate the different needs of students (Billings & Kowalski, 2007). Educators should bear in mind that visual and kinaesthetic learners might prefer the use of computer technology over other learning methods (Berry & Miller, 2006), while the students whose learning style is more auditory prefer having the instructor/educator present the information because they enjoy hearing the words (Grimes, 2002).

According to Kuiper (2010), the charge to nurse educators is to prepare nurse graduates in the 21st century to have competence in clinical reasoning skills and computer technology. Min et al. (2014)

indicate that it is important for educators to examine current approaches to nursing education and to incorporate information technology knowledge and skills in all nursing programmes to prepare nurses for the reality of practice. As technology advances, the nurse educators can help the nursing students adjust and desire to participate in developing new technology that emerges in the work world, because if students confidence in using computer technology can be increased during educational experiences, perhaps the life-long self-managed learning habits can also increase as these relate to changes in health care technology (Kuiper, 2010).

When developing learning activities that could usefully employ new technologies, it may be prudent for educators and curriculum developers to harness technologies that are more familiar to students and do this with an understanding that, within a single program, some students are likely to be inexperienced, requiring additional training (Kennedy, Gray & Tse, 2008).

Esani (2010) is of the opinion that the educator who is able to create a climate of social presence, thoughtfully use the creative instructional strategies, and encourage knowledge sharing can effectively manage the demands of computer-based instruction. Educators have a role to carefully develop computer-based activities such as online discussions that can contribute to the student development of higher order cognitive skills such as critical thinking and problem-solving (Bromley, 2010). Chaffin and Maddux (2004) highlight that regarding online group work, as discussion monitors, the nurse educators have a role to allow and guide students to challenge and assist one another. Furthermore, the nurse educators are expected to gently correct inaccurate information, and serve as role models in terms of the level and tone of discussions.

In order for technological educational systems to truly benefit nursing students and nurse educators, nurse educators should take an active role in the selection, design, and implementation of technological information systems (Nelson et al., 2006). It has been stated by Nagle et al. (2009) that integrating the use of computer technology into existing structures requires individual commitment on the part of nurse educators to enhance their own teaching skills, redesign existing programs, or develop new offerings to meet identified learning needs. According to Jeffries (2005), in a study conducted in the United States the first step in designing a computer-based course is defining the learning outcomes or performance behaviours expected after instruction has been provided to the learners. Garrison state that in computer-based learning, students need a structured system of acquiring cognitive knowledge to produce positive learning outcomes, and educators should provide a logical flow of lessons as well as activities that assess and reinforce student learning regularly so that adjustments to instruction can be made in time (Esani, 2010). Meyer and van Niekerk (2008) are of the opinion that when designing a computer-based program, nurse educators should consider the following principles:

- Objectives should be clearly designed,
- Information should be sequenced, and learners should be able to work at their own pace,
- The program should allow immediate feedback to learners,
- The program should also allow learners to do something constructive, and not simply answer questions.

2.6 STUDENT PERCEPTIONS AND OPINIONS ON THE USE OF COMPUTER TECHNOLOGY

Gupta et al. (2004) in a study conducted in the United Kingdom, found that many students want computers and the internet to be used to supplement the undergraduate programme while a few want computers and the internet to replace formal lectures. However, Yom (2004) in a study conducted in South Korea found that students enjoyed the convenience of both the web-based learning and traditional face-to-face learning environment. Similarly, Leski (2009) in a study conducted in the United States found that students suggested the use of computer-assisted learning programs in the classrooms as these programs have a positive characteristic of accommodating different learning styles. In the study by Oberprieler et al. (2005) students rated computer technology skills as important for both their studies and their future careers, and the students also largely approved of the integration of computer technology in the learning programs. Salyers (2005) indicated that the students agreed that it was important for them to have experiences using computer technology as part of their curriculum because students believed that through computer technology, the course learning outcomes were positively facilitated.

According to Koeniger-Donohue (2008) the students perceived that the ability to handle volumes of information with a handheld computer rather than a traditional textbook-based approach, or achieve ready retrieval of new information as useful. Saljo (2010) in a study conducted in Sweden highlight that the authority of the textbooks will often be challenged as alternative versions, for instance computer technology, are available, because in many areas textbook authors have problems with keeping their texts up to date.

Grimes (2002) when investigating students' perceptions of an online terminology course, found that the students enjoyed the flexibility of being able to access the program at any time of the day or night, work at their own pace and be able to continuously review material until they were comfortable with the information. Similarly, Lashley (2005) in a study conducted in the United States found that the students were of the opinion that online assignments enabled them to pace their learning, thereby promoting greater flexibility and independence. Ali et al. (2004), highlight that computer-based learning was perceived as individually paced, autonomous, engaging and motivating to students.

When investigating student satisfaction on Web-enhanced and face-to-face classroom instructional methods, Salyers (2005) found that the students enjoyed the Web-enhanced method due to its greater flexibility in scheduling, less travel time, and independent and self-paced learning.

2.7 CONCLUSION

In this chapter, computer technology in teaching and learning has been described. The advantages of computer technology in learning and the challenges of computer technology for both the students and nurse educators were discussed. The role of the nurse educator in computer-based learning, and the students' perceptions and opinions on the use of computer technology were also discussed. In the next chapter, the research design and methods will be discussed.

CHAPTER THREE

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

In this chapter, the research design and methods will be described. This will include the setting of the study, study population, sample and sampling method, data collection, the instrument including its validity and reliability and analysis of data.

3.2 RESEARCH DESIGN

A research design is the blueprint for conducting a study. The research design maximizes the researcher's control over factors that could interfere with the validity of the findings. As a blueprint, the design is not specific to a particular study but is rather a broad pattern or a guide in planning and implementing the study in a way that is most likely to achieve the intended goal (Burns & Grove, 2009).

In order to accomplish the purpose of the study, a survey design was used. A survey is a research design often used in descriptive studies to gather a broad spectrum of information about beliefs, attitudes, opinions, knowledge, or intentions of the subject (Burns & Grove, 2011). LoBiondo-Wood and Haber (2010) indicate that a survey design collects detailed descriptions of existing variables and uses the data to justify and assess current conditions and practices or to make plans for improving health care practices. According to Babbie (2010) surveys have the benefits of describing the characteristics of a large population and make large samples feasible. Surveys however have the breadth rather than the depth of the subject investigated as the information obtained in a survey tends to be superficial (LoBiondo-Wood & Haber, 2010). However, in this study, a survey design was deemed suitable as it allowed the researcher to gather information on a current condition which could provide the basis for further development of programs and interventions.

3.3 RESEARCH METHODS

According to Polit and Beck (2012) research methods refer to the steps, procedures, and strategies for gathering and analyzing data in a study.

3.3.1Research setting

A research setting is an uncontrolled, real-life place where research is conducted and it includes homes, work sites and schools (Burns & Grove, 2011). The setting for this study was Chris Hani Baragwanath Nursing College, one of nursing colleges in Gauteng Province. Chris Hani Baragwanath Nursing College is situated in Soweto, a large township to the South-west of Johannesburg next to

Chris Hani Baragwanath Academic Hospital. The college offers various nursing programmes including a 4-year diploma leading to registration at the SANC as a nurse (general, psychiatric and community) and midwife as well as a two year learning programme leading to enrolment as a nurse. In 2012, the college had a total number of 1822 students. All the learning programmes are accredited by the SANC and all the students are exposed to both theory and practical teaching and learning as stipulated by the SANC regulations.

The college hosts various teaching venues such as an auditorium, lecture halls and classrooms which are used for teaching theoretical components which are presented in blocks. For practical teaching and learning, the college has simulation laboratories and the students are allocated to hospital wards and clinics.

Chris Hani Baragwanath Nursing College has one computer laboratory equipped with 23 computers. Some of the computers in the laboratory are connected to the Internet while some are not. The lecturers have access to computers and the Internet in their offices although the connectivity is not reliable. The computers in the classrooms and lecturer halls are not connected to the Internet. Lecturers who wish to access the Internet from the classrooms use laptops and modems provided by the college.

3.3.2 Study population and sample

The population, also referred to as the target population, refers to a group of people, institutions, cases or objects investigated by the researcher whilst samples are drawn from populations (Polgar & Thomas, 2008; Willemse, 2009). In this study, the target population (N=320) was all the students in their final year of study in 2012. A census sample was used. According to Welman, Kruger and Mitchell (2005) and Willemse (2009) a census allows researchers to include each member of the population in the study. A census was selected for this study as it allowed the collection of inclusive, credible data (Kish, 1979).

3.3.3 Data collection and instrument

Self-report data, a data collection method commonly used in nursing (LoBiondo-Wood & Haber, 2010), was used to collect the data. The data collection instrument was a self-administered questionnaire adapted from a questionnaire designed by Gupta, White and Walmsley (2004) which was in the public domain (Appendix 1). Using a self-administered questionnaire allowed the researcher to ascertain data in a fast economic manner (Babbie, 2010).The questionnaire contained both open and closed ended questions and consisted of three sections. Section A contained items regarding the biographical data of participants; Section B was divided into two parts. Part 1 elicited information on the use of computer technology in teaching. This part contained items on teaching

methods and aids, the frequency of computer and internet use in the classroom and for assignments and students' opinions on the use of computer technology for teaching. Part 2 elicited information on the use of computer technology by students. Questions focused on learning resources used by students, the use of internet for social and academic purposes, students' access to computers, the quality of the facilities and opinions of students on the value of information sourced from the internet.

The questionnaire was pre-tested using 10 representatives; five of each of the groups targeted in this study. The purpose of the pre-test was to detect any possible flaws in the data collection procedures and to identify unclear or ambiguously formulated items (Welman, Kruger & Mitchell, 2005). The pre-test revealed that it took about 15 minutes for students to complete the questionnaire and no difficulties in completing the questionnaire were reported as all questions were easy to understand. The data for pilot study was not included in the findings of this study.

3.3.4 Validity of the instrument

Validity of a measurement instrument is the extent to which the instrument measures what it is actually intended to measure (Leedy & Ormrod, 2010).

3.3.4.1 Content validity

According to Brink, van der Walt and van Rensburg (2008), content validity is an assessment of how well the instrument represents all components of the variables to be measured. To enhance the content validity of the instrument, an extensive literature review was conducted in the field of computer technology regarding the role of computers to enhance teaching and learning. The literature reviewed included topics on the attitudes, experiences, perceptions and opinions of students on the use of computer technology in the classroom as well as during students' self-study. The questionnaire was also pre-tested allowing the target population to give comments about clarity of questions.

3.3.4.2 Face validity

Face validity means that the instrument appears to measure what it is supposed to measure and it is based on personal judgement made by experts (Brink et al., 2008). Ten experienced nursing lecturers of Chris Hani Baragwanath Nursing College formed an expert panel to evaluate the instrument and they reached a consensus that the instrument seems to measure what it was supposed to measure.

3.3.5 Reliability of the instrument

Reliability refers to the fact that if a test, model or measurement is consistent, it is reliable, supplying the same answer at different times (Fox & Bayat, 2007). In this study, the target population completed the questionnaire under the same conditions and the data was captured in the same way.

Internal consistency, as a measure of the scale's reliability, was also maintained. Polit and Beck (2010; 2012) defines internal consistency as the degree to which the subparts of a composite scale measures the same dimension. In this study, the subparts of the questionnaire were adapted from a questionnaire by Gupta, White and Walmsley (2004) and measured the same dimension specifically the perceptions and opinions of students on the use of computer technology for teaching and learning.

3.3.6 Data collection

Data were collected during April 2012 when the target population was in their theory block. Students assembled in two venues for the purpose of the data collection. Firstly, the researcher explained the purpose of the study and after being given an opportunity to ask questions or give comments, students were invited to participate in the study. An information letter (Appendix 6) was handed to all the students and the students were requested to read the information letter. After allowing time for reading, the students were reminded that completing the questionnaire will serve as consent to participate. The researcher then left the room.

A colleague of the researcher who was not involved either in the teaching or assessment of the target population distributed the questionnaires which were accompanied by an envelope, to all the students. Students were requested to, should they like to complete the questionnaire, place the questionnaire in the envelope provided, seal the envelope and place it in a sealed box provided on the way out of the classroom. The colleague then left the room and retrieved the box with the questionnaires after 30 minutes.

3.3.7 Data analysis

The data were captured on Microsoft Excel spread sheet using codes as listed in the questionnaire and cleaned. The data were emailed to the statistician from Data Management & Statistical Analysis (DMSA) who analysed the data using SAS, version 9.3. The 95% confidence level was used throughout, unless specified otherwise. Descriptive statistics (Willemse, 2009) were used to reflect the frequency, percentages and means of responses. Tables and graphs were used to present and enhance interpretation of results. Content analysis (LoBiondo-Wood & Haber, 2010) was used to analyse the responses to open-ended questions. Tables were used to count and group similar word responses.

3.4 CONCLUSION

In this chapter, the research design and methods were described. This included the setting of the study, study population, sample and sampling method, data collection, instrument including its validity and reliability and data analysis. Analysis of findings will be discussed in the next chapter.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter presents the findings of the study. The response rate, biographical data, data from teaching methods/aids used in the classroom, use of computer technology in the classroom, use of internet for academic and social purposes, access of the college computer laboratory and improvement of its facilities will be presented. Data on the internet as students' preferred source of information will also be presented.

4.2 FINDINGS

4.2.1 Response rate

Out of the 320 targeted population (N=320), 176 questionnaires were returned (n=176) resulting in a response rate of 55%. The response rate for the Comprehensive Nursing Group was higher than that for Pupil Enrolled Nursing Group. The response rate and a comparison between the two course groups, is shown in table 4.1 below.

Table 4.1: Response rate

	Total number of students	**Number of students returning questionnaires**	**Response rate (%)**
Comprehensive Nursing Group	137	112	35%
Pupil Enrolled Nursing Group	183	64	20%
Total	**320**	**176**	**55%**

4.2.2 Biographical data

The findings showed that 76% (n=134) of the respondents were female, while 23.4% (n=41) were male. One respondent, 0.6% (n=1) did not answer the question. The age groups varied from 20-24 years to 40+ years. The majority of respondents, 58.5% (n=103) were below the age of 30 years. Table 4.2 (A) presents the biographical data and (B) presents the age groups.

Table 4.2 (A): Biographical data (n=176)

	Respondents		Male		Female		No answer	
	n	%	N	%	n	%	n	%
Comprehensive Nursing Group	112	64	26	14.8	85	48	1	0.6
Pupil Enrolled Nursing Group	64	36	15	8.6	49	28	0	0
Total	**176**	**100**	**41**	**23.4**	**134**	**76**	**1**	**0.6**

Table 4.2 (B): Age groups (n=176)

Age groups	Comprehensive Nursing Group		Pupil Enrolled Nursing Group		Total	
	n	%	N	%	n	%
20-24	27	15.3	19	10.8	46	26.1
25-29	48	27.3	9	5.1	57	32.4
30-34	16	9.1	13	7.4	29	16.5
35-39	12	6.8	8	4.5	20	11.4
40+	8	4.5	15	8.6	23	13
No answer	1	0.6	0	0	1	0.6
Total	**112**	**63.6**	**64**	**36.4**	**176**	**100**

4.2.3 Teaching aids / methods used in the classroom

As illustrated in table 4.3 below, discussion groups were most of commonly used (83.5%; n=147) followed by the chalk board (83%; n=146). The use of computer technology was reported by 61.9% (n=109) of respondents, while the use of internet sites was reported by only 10.8% (n=19) of respondents.

Table 4.3: Teaching aids/methods used in the classroom (n=176)

Methods/aids	n	%
Discussion groups	147	83.5
Chalk board	146	83.0
Overhead projector	128	72.7
Computer technology	109	61.9
Tutorials	62	35.2
Internet sites	19	10.8
Other	23	13.1
Total	**634**	**360.2**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

The Fisher's exact test was used to assess the relationship between the two courses in the level of use of the different teaching methods and the findings indicated that there were significant differences between the two courses for the level of use of all the different methods except for the use of internet sites. Students registered for Comprehensive Nursing reported a higher use of discussion groups, chalk board, overhead projector and tutorials, whilst students registered for Enrolled Nursing reported a higher use of computer technology. Table 4.4 illustrates the findings.

Table 4.4: Comparison of Comprehensive and Enrolled Nursing on teaching methods/aids

Methods/aids	Comprehensive Nursing (n=112)		Enrolled Nursing (n=64)		p-value
	n	%	n	%	
Discussion groups	103	92.0	44	68.8	<0.0001
Chalk board	101	90.2	45	70.3	0.0014
Overhead projector	93	83.0	35	54.7	<0.0001
Computer technology	62	55.4	47	73.4	0.024
Tutorials	52	46.4	10	15.6	<0.0001
Internet sites	10	8.9	9	14.1	0.32
Total	**421**	**375.9**	**190**	**296.9**	

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.3.1 Internet sites used by teachers/lecturers

When asking for examples of the internet sites teachers/lecturers use in the classroom most of the respondents (88%; n=155) did not answer the question. Google was reported by 8.5% (n=15), 1.1% (n=2) reported the use of Wikipedia and 4% (n=7) gave irrelevant answers. Table 4.5 illustrates the findings.

Table 4.5: Internet sites used in the classroom (n=176)

Internet site	n	%
Google	15	8.5
Wikipedia	2	1.1
No answer	155	88.0
Irrelevant answers	7	4.0
Total	**179**	**101.6**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.3.2 Other methods used by lecturers in the classroom

When asking about other methods used by lecturers in the classroom, only 16.5% (n=29) of the respondents answered the question; 3.4% (n=6) answering the question responded irrelevantly and 83.5% (n=147) did not answer at all. The use of the library and the prescribed textbooks were reported by 3.4% (n=6) of the respondents, while the use of media, lectures and hand outs and presentations were reported by 2.3% (n=4). Table 4.6 illustrates the findings.

Table 4.6: Methods used by lecturers in the classroom (n=176)

Method	n	%
Library and prescribed textbooks	6	3.4
Media	4	2.3
Lectures and hand-outs	4	2.3
Presentations	4	2.3
Self-activity/research/individual projects	3	1.7
Demonstrations	3	1.7
Role play (drama)	3	1.7
No answer	147	83.5
Irrelevant answers	6	3.4
Total	**180**	**102.3**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.4 Use of computer technology in the classroom or for assignments

4.2.4.1 Frequency of computer use in the classroom

When asking how frequently the computer was used in the classroom, 51.1% (n=90) of the respondents reported daily use, while 14.2% (n=25) reported that computers were never used. The findings are shown in table 4.7 below.

Table 4.7: Frequency of the use of computer technology in the classroom (n=176)

	n	%
Daily	90	51.1
Weekly	28	15.9
Fortnightly	3	1.7
Monthly	3	1.7
Less than once per month	21	11.9
Never	25	14.2
No answer	6	3.5
Total	**176**	**100**

When cross tabulating the respondent numbers to the frequency of computer use in the classroom, there were considerable discrepancies (highlighted in *) between the answers to this question and the answers to computer technology as one of the methods used by lecturers in the classroom as shown below. There was no way to establish which of the two questions had yielded the (more) correct information. Thus the data could not be cleaned and was therefore retained as it is. Table 4.8 illustrates the findings.

Table 4.8: Lecturers' use of computer technology by frequency (n=176)

Lecturers' use	Computer Technology		
	No (n)	Yes (n)	Total (n)
Missing	3	3	6
Never	22	*3	25
Daily	*17	73	90
Weekly	*8	20	28
Fortnightly	*1	2	3
Monthly	*2	1	3
Less than once per month	14	7	21
Total	**67**	**109**	**176**

When converting the frequencies to occasions, the median number of occasions per month in which a computer was used in the classroom was 20 (interquartile range: 0.5-20).

There was a significant difference between the median number of occasions per month in which a computer was used in the classroom and the group ($p<0.0001$). In the Comprehensive Nursing Group, the median number of occasions was 4 (interquartile range: 0.5-20) while in the Enrolled Nursing Group, the median number of occasions was 20 (interquartile range: 20-20). In other words, in the Enrolled Nursing Group, the computer was used in lectures daily, while in the Comprehensive Nursing Group the computer was used in lectures approximately weekly.

4.2.4.2 Frequency of computer / internet use in assignments

When asking respondents whether they had ever received individual or group assignments requiring the use of a computer or assignments requiring the use of the internet, 55% (n=97), 59% (n=104) and 41% (n=72) respectively, denied. Those who confirmed individual or group assignments requiring the use of a computer, did so mostly (26.7%; n=47 and 24.4%; n=43) less than once per month. Similarly, those who confirmed assignments involving the use of the internet, did so mostly (35.2%; n=62) less than once per month. Table 4.9 illustrates the findings.

Table 4.9: Frequency of computer / internet use in assignments (n=176)

	Individual assignments requiring use of computer		**Group assignments requiring use of computer**		**Assignments requiring the use of the Internet**	
	n	**%**	**n**	**%**	**n**	**%**
Daily	5	2.8	11	6.3	12	6.8
Weekly	11	6.3	4	2.3	12	6.8
Fortnightly	4	2.3	2	1.1	2	1.1
Monthly	11	6.3	11	6.3	12	6.8
Less than once per month	47	26.7	43	24.4	62	35.2
Never	97	55.0	104	59.0	72	41.0
No answer	1	0.6	1	0.6	4	2.3
Total	**176**	**100**	**176**	**100**	**176**	**100**

There were significant differences between the median number of occasions per month in which each of these types of assignments was given and the two different groups (all $p<0.0001$). When comparing

the frequency of individual assignments it was found that in the Comprehensive Nursing Group, the median number of occasions was 0.5 (interquartile range: 0-0.5) while in the Enrolled Nursing Group, the median number of occasions was 0 (interquartile range: 0-0). In other words, in the Comprehensive Nursing Group, this type of assignment was given more frequently than in the Enrolled Nursing Group.

For group assignments that allowed the use of computer, the median number of occasions was 0.5 (interquartile range: 0-0.5) for the Comprehensive Nursing Group while in the Enrolled Nursing Group, the median number of occasions was 0 (interquartile range: 0-0). In other words, in the Comprehensive Nursing Group, this type of assignment was given more frequently than in the Enrolled Nursing Group.

For assignments that required the use of internet, the median number of occasions was 0.5 (interquartile range: 0.5-1) for the Comprehensive Nursing Group, while in the Enrolled Nursing Group, the median number of occasions was 0 (interquartile range: 0-0). In other words, in the Comprehensive Nursing Group, this type of assignment was given more frequently than in the Enrolled Nursing Group.

As evidenced by the findings described above, the computer was used more frequently in class in the Enrolled Nursing Group, but computer-related assignments were given less frequently than in the Comprehensive Nursing Group.

4.2.5 Use of computer technology by lecturers to enhance learning

When asking respondents whether the use of computer technology by lecturers had enhanced their learning, 67% (n=118) responded positively, while 29% (n=51) reported that it had not. Of the respondents, 4% (n=7) did not answer the question.

There was a significant, moderate, association between the responses to this question and the group ($p<0.0001$; phi coefficient=0.27). The Enrolled Nursing Group students were more likely to report that the use of computer technology by lecturers had enhanced their learning than the Comprehensive Nursing Group. This ties in with the more frequent use of computer technology in the classroom for the Enrolled Nursing Group (Question 1.2). Table 4.10 illustrates the findings.

Table 4.10: Use of computer technology to enhance learning (n=176)

	Comprehensive Nursing Group		Enrolled Nursing Group		Total	
	n	**%**	**n**	**%**	**n**	**%**
Yes	64	36.0	54	31.0	**118**	**67.0**
No	42	24.0	9	5.0	**51**	**29.0**
No answer	6	3.4	1	0.6	**7**	**4.0**
Total	**112**	**63.4**	**64**	**36.6**	**176**	**100**

4.2.5.1 Reasons for responses

The question whether the use of computer technology by lecturers had enhanced the students' learning or not, was answered by 91% (n=160) of the respondents although 4.6% (n=8) gave irrelevant answers. The respondents gave more than one answer. A quarter (25%; n=44) was of the opinion that using computers provides a variety of more abundant information, 20.5% (n=36) indicated that their learning was enhanced because it was easy to access computer technology and it saved time for teaching and learning, respectively, whilst 14.2% (n=25) reported that their learning was enhanced due to the use of pictures and videos that made learning to be fun and interesting.

On the negative side, 11.4% (n=20) of the respondents were of the opinion that computer technology use by lecturers did not enhance their learning as it is seldom used whilst 6.3% (n=11) indicated that textbooks were most often used. Table 4.11 provides a detailed account of the findings.

Table 4.11: Computer technology has/has not enhanced learning (n=176)

Statements (Positive / Yes)	**n**	**%**
It provides a variety of more abundant information	44	25.0
Accessibility is easy and simple	36	20.5
It is time-saving	36	20.5
Pictures/diagrams/images/videos make learning fun	25	14.2
It broadens one's knowledge	13	7.4
It provides latest/updated/current/recent information	11	6.3
It encourages a sense of independent learning	9	5.1
It shows teacher preparedness and organisation	7	4.0
It is relevant, necessary, effective and trustworthy	7	4.0
There is more visibility	6	3.4
Past notes are retrievable	6	3.4
It increases competence/familiarity in/with computers	3	1.7
No need to carry heavy books	2	1.1
Other reasons	2	1.1
Total	**207**	**117.6**
***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**		
Statements (Negative / No)	**n**	**%**
Computer technology is rarely (seldom) used	20	11.4
Textbooks are used most of the time	11	6.3
Essential information is left out	7	4.0
Lecturers are not computer literate enough	4	2.3
No computer technology was used	4	2.3
We usually do group discussions in class	3	1.7
Most teachers prefer old style of teaching (chalkboard)	2	1.1
Other reasons	8	4.6
Total	**59**	**33.5**

4.2.6 Sources used by students to find nursing/health related information

The most common sources students used to acquire information were textbooks (98%; n=173) and lecture handouts (79%; n=139). The internet was used by (65%; n=114), though on a par with asking lecturers (64%; n=113). The respondents could choose more than one answer. Table 4.12 provides the findings.

Table 4.12: Sources of information used by students (n=176)

	n	%
Textbooks	173	98.3
Lecture handouts	139	79.0
Internet sites	114	64.8
Ask lecturers	113	64.2
Journals	22	12.5
Other	50	28.4
Total	**611**	**347.2**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

There were significant differences between age category and the level of use of internet sites. The reported use was lower amongst 30y+ students. Table 4.13 illustrates the findings.

Table 4.13: Comparison of age category and sources of information (n=176)

	20-24years		25-29years		30years+		p-value
	n	%	n	%	n	%	
Textbooks	46	100	57	100	73	95.8	0.19
Lecture handouts	37	80.4	41	71.9	63	83.3	0.31
Internet sites	35	76.1	45	79.0	36	47.2	<0.0001
Ask lecturers	29	63.0	38	66.7	49	63.9	0.94
Journals	5	10.8	6	10.5	12	15.3	0.74
Total	152	330.3	187	328.1	233	**305.5**	

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.6.1 Internet sites used to find nursing/health related information

Slightly more than half (51.7%; n=91) of the respondents answered the question on the examples of the internet sites used by students to find nursing/health related information, and 6.8% (n=12) gave irrelevant answers. Google was reported by 41.5% (n=73), Wikipedia by 9.7% (n=17) and Yahoo by 0.6% (n=1). Respondents could list more than one internet site. Table 4.14 illustrates the findings.

Table 4.14: Examples of internet sites used by students (n=176)

Internet site	n	%
Google	73	41.5
Wikipedia	17	9.7
Yahoo	1	0.6
Irrelevant answers	12	6.8
No answer	85	48.3
Total	**188**	**106.9**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.6.2 Other sources of information used by students

When asked which other sources of information respondents use, 35.8% (n=63) gave answers although 6.8% (n=12) were irrelevant. A small percentage (8.5%; n=15) reported they use the registered nurses and doctors in the wards as information source, 8.5% (n=15) said they used the television and 8% (n=14) of the respondents said they used the library. Respondents could list more than one source. Table 4.15 presents the findings.

Table 4.15: Other sources used to find nursing/health related information (n=176)

Information source	n	%
Registered nurses and doctors in the wards	15	8.5
Television	15	8.5
Library	14	8.0
Newspapers	9	5.1
Magazines	6	3.4
Community members	5	2.8
Study group discussions	3	1.7
Pamphlets	2	1.1
Irrelevant answers	12	6.8
No answer	113	64.2
Total	**194**	**110.1**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.7 Sources of information used most and least often by students

When asked which sources of information respondents used most commonly, 72% (n=126) indicated they used their textbooks followed by lecture hand outs and internet sites (12%; n=21). The least used source of information was the internet as indicated by 31% (n=54) of the respondents. Table 4.16 presents the findings.

Table 4.16: Sources of information used most and least often by students (n=176)

Information source	Most often		Least often	
	n	%	n	%
Textbooks	126	71.6	13	7.4
Lecture hand outs	21	11.9	20	11.4
Internet sites	21	11.9	54	30.7
Ask lecturers	0	0	32	18.2
Journals	0	0	30	17.1
Other	0	0	5	2.8
No answer	8	4.6	22	12.4
Total	**176**	**100**	**176**	**100**

There was a significant, moderate, association between the source of information used **most** and the course registered for ($p<0.0001$; phi coefficient=0.33). Students in the Comprehensive Nursing Group were more likely to indicate that they used textbooks the most, than those in the Enrolled Nursing Group. Students in the Enrolled Nursing Group were more likely to indicate that they used lecture hand outs and internet sites the most, compared to students in the Comprehensive Nursing Group.

A significant, moderate, association was found between the source of information used **least** and the course registered for ($p=0.012$; phi coefficient=0.30): Students in Comprehensive Nursing Group were more likely to indicate they used internet sites the least, whilst students in Enrolled Nursing Group were more likely to indicate that they used textbooks the least. Table 4.17 presents the findings.

Table 4.17: Comparison of source of information used most and least and Group (n=176)

	Sources used most				Sources used least			
	Comprehensive Nursing Group		Enrolled Nursing Group		Comprehensive Nursing Group		Enrolled nursing group	
	n	%	n	%	n	%	n	%
Textbooks	96	85.4	34	55.2	5	3.9	12	19.2
Lecture hand outs	8	7.3	15	22.4	13	11.8	11	17.0
Internet sites	8	7.3	15	22.4	47	42.2	15	23.4
Ask lecturers	0	0	0	0	26	23.5	11	17.0
Journals	0	0	0	0	21	18.6	15	23.4
Total	**112**	**100**	**64**	**100**	**112**	**100**	**64**	**100**

There was no significant association between the source of information used **most** and gender (p=0.49) whilst a significant weak association was found with age (p<0.0001; Cramer's V=0.26). Students from the 25-29y age group were more likely to use textbooks compared to hand outs than students from the 30y+ age group, who were less likely to use textbooks than hand outs.

There was no significant association between the source of information used **least** and gender (p=0.31) and age (p=0.080). Table 4.18 presents the findings.

Table 4.18: Comparison of source of information used most and age (n=176)

	Sources used most					
	20-24years		25-29years		30years+	
	n	%	n	%	n	%
Textbooks	35	75.6	47	82.1	51	69.7
Lecture hand outs	5	11.1	1	1.8	15	21.2
Internet sites	6	13.3	9	16.1	7	9.1
Total	**46**	**100**	**57**	**100**	**73**	**100**

4.2.7.1 Reasons why students use the specific sources of information most often

When asking respondents for reasons of using the specific sources of information, most (81.3%; n=143) answered the question although 2.3% (n=4) were irrelevant. The details are presented in Table 4.19.

Table 4.19: Reasons for sources of information used most often (n=176)

	n	%
Reasons for using lecture handouts		
Simple and understandable	9	5.1
Easily available	4	2.3
Relevant to test/exam	3	1.7
Serve as guidelines	2	1.1
Other	5	2.8
Reasons for using textbooks		
Have almost all relevant, required information	35	20.0
They are prescribed	25	14.2
Readily available	23	13.1
They are accessible	18	10.2
Exams and tests are set from textbooks	14	8.0
Internet is expensive	8	4.6
Clearly explained and easily understandable	7	4.0
Learning outcomes' purpose	6	3.4
No access to computers	3	1.7
Internet is not allowed in class	2	1.1
Other	5	2.8
Reasons for consulting journals		
To further cover my academic lessons	1	0.6
Reasons for asking lecturers		
They are accessible	6	3.4
For clarity and explanations	5	2.8
Reasons for using internet sites		
Fast, accurate and cost effective	12	6.8
Accessible at anytime and anywhere	10	5.7
Simple to use and easy to understand	8	4.6
Have lots of information that textbooks do not have	7	4.0
Have updated (recent) information	2	1.1
Other	3	1.7
No answer	33	18.8
Irrelevant	4	2.3
Total	**260**	**147.7**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.7.2 Reasons why students use the specific sources of information least often

When asking the respondents to give reasons for using specific sources of information least often, most (76.7%; n=135) answered the question, but 10.2% (n=18) of the answers were irrelevant. The reasons why specific sources of information were used least often are presented in Table 4.20.

Table 4.20: Reasons for sources of information used least often (n=176)

	n	%
Using lecture hand outs least often		
Information is insufficient (summary)	8	4.6
They are not always available	3	1.7
Some are complicated (not well explained)	3	1.7
I prefer my own books	2	1.1
They limit one's capacity	2	1.1
Information is already in textbooks	2	1.1
Using textbooks least often		
There is too much time needed to understand	4	2.3
They can be very confusing and complicated	2	1.1
Information in textbooks is insufficient	1	0.6
Using journals least often		
Not easily available	5	2.8
Journals are not accessible	3	1.7
They are irrelevant to studies	3	1.7
Other	4	2.3
Asking lecturers least often		
I prefer seeking information on my own	8	4.6
They are not accessible	5	2.8
Lecturers are not always available	4	2.3
I prefer books	4	2.3
I prefer other sources	4	2.3
Lecturers are not preferred for consultation	3	1.7
I prefer asking my colleagues	2	1.1
We spend less time at college	2	1.1
Other	4	2.3
Using internet sites least often		
It is costly (expensive) to surf	17	9.7
No access to computers and internet	16	9.1
Information is same as in books and hand outs	8	4.6
College computers have no internet	7	4.0
Cell phones are not allowed in class	6	3.4
I don't own a computer	6	3.4
Because of lack of computer skills	3	1.7
Information differs from that in the textbook	2	1.1
Other	5	2.8
Irrelevant	18	10.2
No answer	41	23.3
Total	**207**	**117.6**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.8 Use of internet for social and academic purposes

When asking respondents whether they use the internet for social or academic purposes, 68.8% (n=121) indicated they used the internet for social, 79.6% (n=140) for academic, and 62% (n=109) for both. Only 11% (n=19) of respondents did not use the internet for either purpose. Table 4.21 presents the findings.

Table 4.21: Use of internet for social and academic purposes (n=176)

	n	%
Social	121	68.8
Academic	140	79.6
Social and Academic	109	62.0
Social ONLY	13	7.6
Academic ONLY	34	19.3
Neither	19	11.1
No answer	5	2.8
Total	**441**	**250.6**

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

There was no significant association between the use of the internet for social or academic purposes and gender (p=0.13 and 0.35 respectively). However, there was a significant, moderate, association between internet use for social purposes and age category (p<0.0001; phi coefficient=0.45). Likewise, there was a significant, weak, association between internet use for academic purposes and age category (p=0.0037; phi coefficient=0.24). In both cases, the use of the internet decreased with age, particularly social use for the 30y+ age category. Table 4.22 presents the findings.

Table 4.22: Comparison of internet use and age (n=176)

Internet use	20-24years		25-29years		30years+		p-value
	n	%	n	%	n	%	
Social	43	93.5	46	80.7	33	45.1	<0.0001
Academic	44	95.7	46	80.7	53	72.1	0.0037
Total	87	189.2	92	161.4	86	117.2	

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

4.2.8.1 Examples of using the internet for social purposes

More than 40% (45.5%; n=80) of the respondents reported they used Facebook for social purposes; 23.9% (n=42) used WhatsApp and 17.6% (n=31) used Twitter. The internet was used by 26.7% (n=47) to connect with friends; 12.5% (n=22) for recreation; 5.1% (n=9) to communicate with family and 4.6% (n=8) to communicate with their colleagues. The examples of using the internet for social purposes are presented in table 4.23.

Table 4.23: Examples of using the internet for social purposes (n=176)

	n	**%**
Examples of <u>What</u> was used for social purpose		
Facebook	80	45.5
WhatsApp	42	23.9
Twitter	31	17.6
Internet (Google, Email, Skype, YouTube, Yahoo)	25	14.2
Mxit	17	9.7
Black-Berry Messenger (BBM)	11	6.3
Other	4	2.3
Total	**210**	**119.3**
***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**		
Examples of <u>Why</u> the internet was used for social purpose		
Connect (talk) with friends	47	26.7
Recreation (sports, news, music, celebrities, etc.)	22	12.5
Communicate with family	9	5.1
Communicate with colleagues	8	4.6
Information about college events	6	3.4
Meeting new people	4	2.3
Shopping	4	2.3
Other (banking, recipes, fashion, bookings, etc)	9	5.1
No answer	67	38
Total	**176**	**100**

4.2.8.2 Reasons for not using the internet for academic purposes

When asked about the reasons for not using the internet for academic purposes, 17.1% (n=30) of the respondents answered the question. It was found that 5.7% (n=10) of the respondents reported not to have used the internet for academic purposes because they found adequate information in the textbooks; 4.6% (n=8) indicated they were computer illiterate; whilst 2.3% (n=4) reported that the internet was expensive. Table 4.24 presents the reasons for the respondents for not using the internet for academic purposes.

Table 4.24: Reasons for not using the internet for academic purposes (n=176)

Reasons	n	%
There is adequate information in textbooks	10	5.7
I am computer illiterate	8	4.6
Internet is expensive	4	2.3
I don't have access to computer	3	1.7
No internet at the college	2	1.1
It takes long time to find information	2	1.1
I prefer notes from the lecturer	2	1.1
There is no time	2	1.1
Other	6	3.4
No answer	146	82.9
Total	**185**	**105.1**

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

4.2.8.3 Examples of using the internet for academic purposes

Most of the respondents (75%; n=132) answered the question on examples of using the internet for academic purposes. More than a third (34.1%; n=60) of the respondents reported that they used the internet because it had more updated and reliable information, 11.4% (n=20) used the internet to search for definitions of terms, whilst 2.8% (n=5) used the internet to download pictures/images. Table 4.25 presents the findings.

Table 4.25: Examples of using the internet for academic purposes (n=176)

	n	%
Examples of <u>why</u> the internet was used for academic purposes		
For more updated and reliable information	60	34.1
For medical and surgical nursing care	32	18.2
For easily understandable information	26	14.8
Searching for meaning of a term (dictionary.com)	20	11.4
For research purposes	18	10.2
For Community Health assignments (projects)	18	10.2
For psychiatric conditions	6	3.4
Pharmacology	5	2.8
Pictures (images)	5	2.8
Other	3	1.7
Total	**193**	**109.7**
***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**		
Examples of <u>what</u> was used as sources of information		
Google.com	41	23.3
Wikipedia	9	5.1
No answer	126	71.6
Total	**176**	**100**

4.2.9 Frequency of access of the internet

When asking the respondents how often they accessed the internet, 40% (n=70) indicated they used the internet on a daily basis whilst 14% (n=24) reported they never used the internet. Table 4.26 presents the findings.

Table 4.26: Frequency of access of the internet (n=176)

	n	%
Never	24	13.6
Daily	70	39.8
Weekly	36	20.5
Fortnightly	5	2.8
Monthly	21	11.9
Less than once per month	20	11.4
Total	**176**	**100**

There were some discrepancies (highlighted in *) between the answers to this question and questions 2.4 and 2.5 (whether or not the internet was used for social or academic purposes) as shown in the cross-tabulation below. Table 4.27 (A, B and C) presents the findings.

Table 4.27: Control for Internet Use

Table 4.27 (A) Controlling for Internet for Academic purposes = Missing

Social networking	Internet Access						
	Never	**Daily**	**Weekly**	**Fortnightly**	**Monthly**	**Less than once per month**	**Total**
No answer	0	0	0	0	0	0	0
Yes	1	0	0	1	0	0	2
No	2	0	0	0	0	0	2
Total	3	0	0	1	0	0	4

Table 4.27 (B) Controlling for Internet for Academic purposes = Yes

Social networking	Internet Access						
	Never	**Daily**	**Weekly**	**Fortnightly**	**Monthly**	**Less than once per month**	**Total**
No answer	0	0	0	0	1	0	1
Yes	*4	61	21	2	13	5	106
No	*3	3	12	1	6	8	33
Total	7	64	33	3	20	13	140

Table 4.27 (C) Controlling for Internet for Academic purposes = No							
Social networking	**Internet Access**						
	Never	**Daily**	**Weekly**	**Fortnightly**	**Monthly**	**Less than once per month**	**Total**
No answer	0	0	0	0	0	0	0
Yes	0	5	3	1	1	3	13
No	14	*1	0	0	0	*4	19
Total	14	6	3	1	1	7	32

Converting frequencies to occasions, the median number of occasions per month on which the internet was used was 4 (interquartile range: 0.75-20). In other words, the median use of the internet was approximately weekly.

There was no significant difference between the median number of occasions per month on which the internet was used and the course registered for ($p=0.15$) and also not for gender ($p=0.52$). However, there was a significant difference between the median number of occasions per month on which the internet was used and age category ($p<0.0001$): The graph (figure 4.1) below shows the median occasions per month, with the interquartile range denoted as error bars. The decrease in internet use occasions with increasing age can clearly be seen.

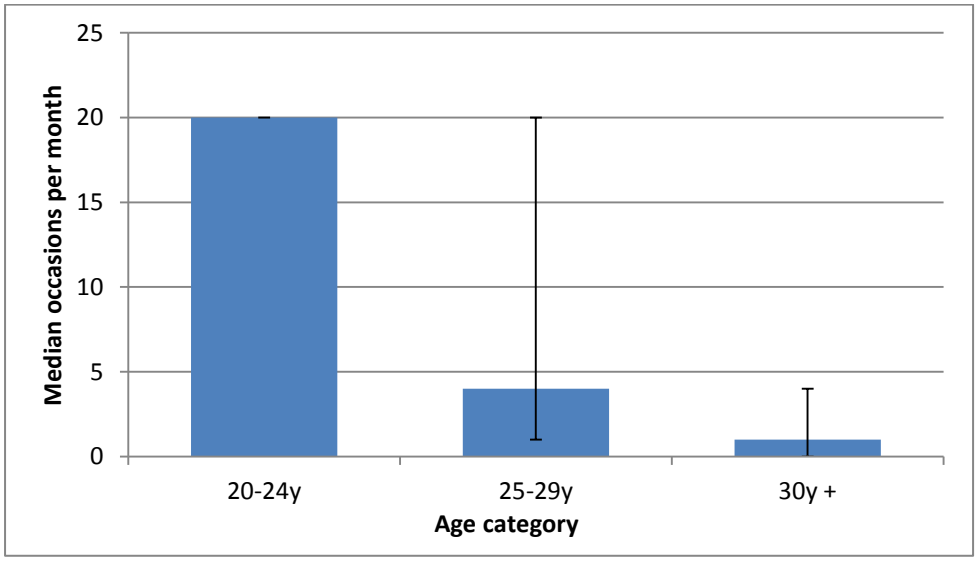


Figure 4.1: Internet use occasions and age category (n=176)

4.2.10 Ease of access of the college computer laboratory

Most of the respondents (75%; n=132) disagreed or strongly disagreed with the statement "I find it easy to access the computer laboratory at the college". Only 11% (n=19) agreed or strongly agreed with the statement. The mean score for this question was 1.9±0.3 (equivalent to 'disagree'). Table 4.28 illustrates the findings.

Table 4.28: Easy access of the college computer laboratory (n=176)

	n	%
Strongly disagree	82	46.6
Disagree	50	28.4
Neutral	23	13.1
Agree	8	4.5
Strongly agree	11	6.3
No answer	2	1.1
Total	**176**	**100**

There was a significant difference between the median score for this question and course students were registered for (p=0.0009). The median score for the Comprehensive Nursing Group was 1 (=strongly disagree) (interquartile range: 1-2), while the median score for the Enrolled Nursing Group was 2 (=disagree) (interquartile range: 1-3). In other words, the Comprehensive Nursing Group found it more difficult to access the computer laboratory than the Enrolled Nursing Group. There was no significant difference between the median score for this question and gender (p=0.063) or age category (p=0.50).

4.2.11 Facilities in the college computer laboratory

When asking respondents whether the facilities in the computer laboratory could be improved, 12.5% (n=22) did not answer the question, 73.3% (n=129) felt that the computer laboratory facilities could be improved, while the remainder of the sample, 14.2% (n=25) responded negatively.

There were no significant differences between the responses to this question and course registered for (p=0.82), gender (p=0.32) or age category (p=0.79).

4.2.11.1 Explanations on how facilities in the computer laboratory could be improved

The majority of the respondents (65.3%; n=115) suggested improvements to the computer laboratory. Making the computer laboratory more accessible to students was reported by 24.4% (n=43), addition of more computers and expansion of the laboratory by 19.3% (n=34), introducing the computer laboratory to students by 13.6% (n=24), whilst 10.8% (n=19) suggested that computer classes/lessons should be offered to students. Table 4.29 presents the findings.

Table 4.29: Improvement of the facilities in the computer laboratory (n=176)

Statements	n	%
Make the computer laboratory more accessible to students	43	24.4
Add more computers and expand the laboratory	34	19.3
Introduce the computer laboratory to students	24	13.6
There should be flexible times to open the computer laboratory	20	11.4
Offer computer classes/lessons to students	19	10.8
Install up to date computers and internet with current software	17	9.7
Computers have to be serviced	4	2.3
Employ experienced people to teach computers	4	2.3
Make computers part of our course (not optional)	3	1.7
Other	2	1.1
No answer	61	34.7
Total	**231**	**131.3**

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

4.2.12 The Internet as the preferred source of information

The majority of the respondents (72%; n=126) felt that the internet was their preferred source of information and 2.3% (n=4) of the respondents did not answer the question.

There were no significant differences between the responses to this question and course registered for (p=0.47), gender (p=1.00) or age category (p=0.11).

There was a significant difference between the responses to this question and frequency of access of the internet (question 2.6) (p=0.0010). Those who said the internet was their preferred source of information had a monthly median internet access of 4 occasions (interquartile range: 1-20), while

those who said the internet was not their preferred source of information had a monthly median internet access of only 1 occasion (interquartile range: 0.5-20).

4.2.12.1 Explanations on the Internet as a preferred source of information

When asked to explain why the internet was a preferred source, 30.2% (n=38) of the respondents indicated that the internet gave broader information, 28.6% (n=36) reported that internet was easy and quicker and 26.2% (n=33) preferred the internet because it could be accessed at anytime and anywhere. Table 4.30 presents the findings.

Table 4.30: The internet as the preferred source of information (n=126)

Statements	n	%
It gives broader information	38	30.2
It is easy and saves time (quicker)	36	28.6
Can be accessed anytime and anywhere	33	26.2
It has the latest (updated) information	18	14.3
It is reliable, relevant and accurate (precise)	16	12.7
It has variety of information	6	4.8
It is less expensive	3	2.4
It broadens one's knowledge	2	1.6
It is more efficient and user-friendly	2	1.6
All answers and solutions are readily available	2	1.6
Other	6	4.8
Total	**162**	**128.6**

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

4.2.12.2 Explanations on why the internet was not a preferred information source

When asked why the internet was not a preferred source of information (50%; n=23) of the respondents preferred their textbooks to the internet, 11% (n=5) reported that the computer was not easily accessible and 6.5% (n=3) reported they had never been exposed to internet. The findings are presented in Table 4.31 below.

Table 4.31: The internet as not a preferred source of information (n=46)

Statements	n	%
I prefer textbooks	23	50
The computer is not easily accessible	5	10.9
I have never been exposed to internet	3	6.5
Information may not be factual/information may be false	3	6.5
It is expensive	3	6.5
I don't use internet	3	6.5
I don't have skill in information technology	2	4.4
Information is not relevant to what I am looking for	2	4.4
Sometimes internet information is not adequate	2	4.4
I prefer my lecturers	2	4.4
Other	4	8.7
Total	**52**	**113**

***Respondents could give more than one answer. Therefore, percentages are higher than 100%.**

4.2.13 The Internet as a help to learn more about a particular subject

When asked about whether they feel the information on the internet has helped them learn more 79% (n=139) of the students responded in the affirmative, 1.1% (n=2) did not answer the question.

There were no significant differences between the responses to this question and course registered for (p=0.23), gender (p=0.66) or age category (p=0.18).

There was a significant difference between the responses to this question and frequency of access of the internet (question 2.6) (p=0.0002). Those who said the internet had helped them learn about a particular subject had a monthly median internet access of 4 occasions (interquartile range: 1-20), while those who said the internet was not their preferred source of information had a monthly median internet access of only 0.5 occasions (interquartile range: 0-20).

There was a significant difference between the responses to this question and use of the internet for social and/or academic purposes (questions 2.4 and 2.5) (p=0.038 and p<0.0001 respectively). Those whom the internet had helped to learn about a particular subject were more likely to use the internet for social and /or academic purposes. Tables 4.32 (A and B) present the findings.

Table 4.32 A: Internet as a help to learn about a particular subject (n=176)

	Helped to learn about a particular subject	
	n	**%**
Yes	139	79.0
No	35	19.9
No answer	2	1.1
Total	**176**	**100**

Table 4.32 B: Internet for Social / Academic purposes (n=176)

	Yes		No	
	n	**%**	**n**	**%**
Social purposes	148	84.3	122	69.2
Academic purposes	159	90.6	66	37.5
Total	**307**	**174.9**	**188**	**106.7**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.13.1 Reasons for feeling that the internet has helped to learn about a particular subject

Of the respondents, 85.2% (n=150) gave reasons as to why they felt the internet had helped them learn about particular subjects. Students felt that the internet had helped them learn more about a particular subject because it had more information than textbooks as indicated by 66.7% (n=100) of the respondents; 10.7% (n=16) indicated that patients' conditions were explained in simplest form and 8% (n=12) reported the internet was straight to the point. Table 4.33 illustrates the findings.

Table 4.33: The Internet has helped to learn about a particular subject (n=150)

Reasons	**n**	**%**
It has more than what is in textbooks	100	66.7
Conditions are explained in simplest form	16	10.7
It is straight to the point	12	8
It has ideas from different authors	9	6
For definition of concepts/terms	7	4.7
It has helped with new (updated) information	6	4
It is easy to access	5	3.3
Pictures make it easy to understand unfamiliar condition	5	3.3
There are a lot of sites	4	2.7
Other	3	2
Total	**167**	**111.3**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.2.13.2 Reasons for feeling that the Internet has not helped to learn about a particular subject

Only 16% (n=28) of the respondents gave reasons why the internet had not helped them to learn about particular subjects. The findings showed that 35.7% (n=10) of the respondents felt the internet had not helped them learn about a particular subject because they relied on their prescribed books, whilst 18% (n=5) seldom used the internet hence they felt it did not help them learn about a particular subject. Table 4.34 shows the findings.

Table 4.34: The Internet has not helped to learn about a particular subject (n=28)

Reasons	n	%
I rely on my prescribed books	10	35.7
I seldom use the internet	5	17.9
I am not using a computer for studying	5	17.9
I have never used the internet	2	7.1
Irrelevant	6	21.4
Total	**28**	**100**

4.2.14 Additional comments on the use of computer technology

When asking about any other information on the use of computer technology, just over a third **(**33.5%; n=59) of the respondents gave additional comments. Table 4.35 presents the findings.

Table 4.35: Additional comments on the use of computer technology (n=59)

Comments	n	%
Install internet for college and enhance access to computer laboratory	18	30.5
Allow students to access internet in class from cell phones/laptops	9	15.3
Introduction of Information Technology is important in our college	8	13.6
Lecturers and students should combine internet and textbooks	6	10.2
Computer studies should be added to our curriculum	6	10.2
The college should have more computers	4	6.8
Lecturers can use computers in class to encourage use by students	3	5.1
Employ people to help those in need	3	5.1
Computers are useful but difficult to us who are computer illiterate	2	3.4
Using internet and computer is expensive	2	3.4
Other	14	23.7
Total	**75**	**127.1**

*Respondents could give more than one answer. Therefore, percentages are higher than 100%.

4.3 CONCLUSION

This chapter reported on research findings. Frequencies were done, medians and percentages were reflected. Tables and graphs were used to present and enhance interpretation of findings.

The research findings will be discussed in the next chapter.

CHAPTER FIVE

DISCUSSION, JUSTIFICATION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

In the previous chapter the findings of this study were presented. This chapter discusses the findings, presents the justification, outlines the study limitations, presents recommendations and concludes the study.

5.2 DISCUSSION OF RESEARCH FINDINGS

5.2.1 Demographic information

The study provided evidence that the majority of the students (76%) were female. This is a common trend as nursing is viewed as a predominantly female-concentrated profession resulting in few males enrolling for programmes in nursing (Clementson, 2008; Meadus & Twomey, 2011; Pham, 2014). In 2012, the nursing college under study had an enrolment of 1 636 (89.8%) female students and 186 (10.2%) male students. The predominance of females both in nurse employment as well as in nurse training seems to be supported by statistics from SANC (2012) which indicate that male nurses are in the minority. There are 227 682 (91.5%) female nurses and 21 054 (8.5%) male nurses employed in South Africa while there are 5 320 (90%) female nurses and 590 (10%) male nurses in training (http://www.sanc.co.za/stats/stat2012/Distribution). A similar trend is seen even in other countries, for instance, the Canadian Nurses Association (2009) reports that approximately 5.8% of the nurse workforce comprise of men in Canada (Meadus & Twomey, 2011). According to Pham (2014) only 6.6% of the licensed nurses in the United States were men in 2008, and in 2010 approximately 11% of the students in nursing programs were men.

The findings of this study showed that none of the students was younger than 20 years. This may be advantageous as the literature in a study conducted in Australia by Kenny, Kidd, Nankervis and Connell (2011) suggests that mature age students (>21 years of age) are important for future workforce planning as they are highly motivated and have the capacity to bring a wealth of experience, skills and knowledge to the nursing profession. This finding has been substantiated by Montgomery et al. (2009) who demonstrated that most mature students have previous experience of working in the caring field and are likely to have dependants, meaning that they are more likely to be familiar with the caring role. It has been indicated by Quinn and Hughes (2007) that the younger students may benefit enormously from the experience and stability of the older students. Pryjmachuk et al. (2008) reported that mature age students are desirable because the students who are older on

entry are more likely to complete the programme than younger students. Education institutions should actively target recruitment at mature candidates in order to improve attrition rates on preregistration nursing programmes (Pryjmachuk et al., 2008).

5.2.2 Computer technology use by lecturers in the classroom

The study provided evidence that discussion groups, chalk board and the overhead projector were the most commonly used teaching strategies, whilst computer technology was fourth on the list. It would seem not easy to compare the findings of the current study with other studies as it includes both the teaching methods/strategies and the teaching aids. However, Maunye, Meyer and van Velden (2009) in a study conducted in South Africa, indicate that writing assignments, learner-led class presentations and discussion groups (group sessions) were the most commonly used teaching strategies at a specific nursing college, whilst case studies were fourth on the list. According to Brown, Kirkpatrick, Greer, Matthias and Swanson (2009), in a study conducted in the United States, evidence-based, lecture and discussion groups were the approaches used most commonly by nurse educators, whilst case studies were fourth on the list. Although different teaching strategies are used in nurse education, discussion groups appear to be amongst the three commonly used teaching strategies used by nurse educators. This is not surprising as the literature indicates that the discussion groups can be an effective strategy in nursing for developing autonomy in the students, by giving them responsibility for their own learning (Quinn & Hughes, 2007). Although discussion groups are universally popular, they are difficult to assess because establishing groups and student allocation together with preparing detailed guidelines is time consuming (Hunt & Hutchings, 2014).

It is not surprising that the current study informs that chalkboards appear to be the most commonly used teaching aid as the literature indicates that chalkboards are universally used in education for their outstanding feature of allowing for spontaneity in the classroom (DeYoung, 2009). The uses include; new ideas or solutions to problems that can be jotted down as they are mentioned, a point can be illustrated on the board if students are suddenly confused about something, an object can be quickly sketched if students cannot visualize it, and chalk boards are especially useful for working out mathematical problems. According to Mellish, Brink and Paton (2009) the chalk board is one of the oldest teaching aids with uses which include the provision of a means of progressing from simple to complex ideas and developing each explanation point by point; ability to add diagrams, symbols, charts and drawings to bring life and meaning to a subject; and a chalk board also provides a space in which students can be asked to illustrate explanations so that the entire class can participate. Some of the drawbacks of the chalk board are the mess made by chalk; while writing, the educator's back is to the class, which may cause loss of contact with students and interfere with their ability to hear

(DeYoung, 2009), and the fact that work should be erased as soon as possible after the lesson (Mellish et al., 2009).

The study provided evidence that the use of computer technology by lecturers was reported by a high number (62%) of students. This was a positive finding although not a true reflection given the disappointing frequency and what computer technology was used for. Finding that such a small percentage of students (11%) reported the use of internet sites by lecturers was disappointing. Finding that only Google and Wikipedia, a non-scientific website was used as reported by 8.5% and 1.1% of students respectively added to the disappointment. A study by Jeffries (2005) suggests the educational shift in nursing education which will incorporate information technology in order to increase student learning opportunities, create innovative teaching practices and promote information retrieval systems that are current and accurate. Although the introduction of technology and the Internet into classrooms have been the most important change in the field of education in the past years (Bassendowski, 2007), it does not seem as if nurse educators implicated in the current study have moved with time. As indicated by DeYoung (2009) nurse educators need some technological proficiency and a comfort level with computer technology in order to use technology to enhance teaching and learning. A study conducted in the United States by Twenge (2009) indicates that students learning can be facilitated by educators who incorporate technology into their teaching as this strategy is preferred by most Today's students (Generation Me) because these students like doing things themselves better than sitting and listening to a lecture.

If nurse educators do not move with time, there will be some knowledge deficit as according to DeYoung (2009) nurses use the computer as a tool for patient care management hence today's nursing students need to have some experience and the skills in using computers as part of information system. Computing and information literacy skills are rapidly becoming required for all nurses whether working directly with patients, teaching or any of the other positions currently held by nurses (Zerwekh & Garneau, 2012). According to Min, Khin, Razack and Xia (2014) nurse educators should examine new approaches to nursing education and incorporate information technology knowledge and skills in all nursing programmes to prepare nurses for the reality of practice.

The reason why nurse educators included in the current study did not use computer technology to a large extent is not clear as it has not been investigated. However, according to Gupta, White and Walmsley (2004) lecturers are aware of the benefits of computer-assisted learning, but are not willing to accept it as they are concerned that the internet cannot provide the same standard of teaching if it replaces traditional methods of teaching. DeYoung (2009) is of the view that the problems that exist in using computers and the Web as well as teaching others to use it are related to difficulty in finding the Websites relevant to the learning outcomes and the quality/lack of quality of many Websites.

Meedzan and Fisher (2009) identified increased preparation time, educators' discomfort in the use of technical equipment, lack of technology support, and limited incentives for educators to change from the traditional teaching methods as obstacles. Lack of information technology infrastructure, restricted access to computers, deficits regarding the technical and management support and lack of relevant software were obstacles and challenges to computer usage identified by Asah (2013). Mellish et al. (2009) identified lack of flexibility, the computers' effectiveness depending on the software available and the educator's skill as some barriers to computer usage. As the current study does not provide answers as to why the lecturers did not use computers and the internet in their teaching, it can therefore not be concluded that these barriers applied to them and should be investigated before a definite conclusion can be made.

It was interesting to find that more than half of the respondents (51%) reported that lecturers used the computer daily in the classroom whilst the median number of occasions was found to be 20 per month. Although the daily and the median do correlate, nearly half of the respondents (49%) did not agree. It is not clear as to why this discrepancy exists, however, this is not uncommon because according to Polit and Beck (2012) the validity and accuracy of self-reports is the most serious issue as the researchers often have no alternative but to assume that the respondents have been frank. The tendency of the respondents to provide socially acceptable answers (Brink, van der Walt & van Rensburg, 2008) which may conflict with the truth (Polit & Beck, 2012) has been identified as one of the weaknesses of self-reports. It seems as if these factors could have influenced the findings of the current study.

The study provided evidence that computer technology in terms of the mere use of a computer and the Internet did not play an important role in allocating group or individual assignments to students. A similar trend is seen in a study by Spiste Bond, Lewis and Joy (2009) who indicate that socialization into the profession is an important part of nurse education, yet the nursing students are currently not socialized into a professional role where they are encouraged to use computers or to consider their use to be a key nursing task. This is unfortunate as it seems as though not using computer technology, can hamper the development of nursing students. Maunye, Meyer and van Velden (2009) advise lecturers to structure learning packages that encourage students to search for literature online and to submit typed assignments or projects. Chaffin and Maddux (2004) support this statement and add that lecturers who incorporate computer technology into learning requirements are aiding students in developing the cognitive processes needed to effectively use information technology. Kuiper (2010) and Flood, Gasiewicz and Delpier (2010) also argue that to prepare nursing students to practice in a technology-rich environment, it is meaningful to educate them with technology.

Although it is not clear how frequently computer technology was used in the classroom, the majority of respondents (67%) reported that the use of computer technology by lecturers enhanced their learning. Berry and Miller (2006), in a study conducted in the United States, support this finding and state that by incorporating computer technology in teaching, educators can supplement course material and enhance student learning. According to Lorenzetti (2005), innovative computer-assisted instruction is capable of formatting the information in an interactive and inventive manner to enhance learning. Considering how participants in the current study reported computer technology use, it can hardly be said that it was innovative and interactive. The extent to which computer technology enhanced the learning of the respondents is therefore debatable.

By comparing the students' responses regarding the use of computer technology to enhance learning, the minority of respondents (29%) reported that the use of computer technology by lecturers did not enhance their learning. It became evident that some lecturers use computers in class, but seemingly not in a manner effective to enhance students' learning. In a study by Bloom and Hough (2003) the negative comments by students were directly related to the use of technology by nurse educators who were either not using it appropriately or not well-versed in the use of technology. A study conducted in the United States indicates that the students are often more sophisticated in the use of computer technology than educators (Smith & Rosenkoetter, 2009). The current study did not explore whether this was applicable or not, however, a study conducted by Roberson (2009) also in the United States, revealed the biggest student complaint was when the educators who are unfamiliar with computer technology attempted to use it. Similar findings were also noted in the study by Draude and Brace (1999) where it was reported that the effectiveness of technology-enhanced learning is directly related to the teacher's ability to use it. It was assumed by Meedzan and Fisher (2009) that technology does not in itself cause changes in learning, rather it is how the technology is used that matters.

5.2.3 Use of computer technology by students

Considering the poor, ineffective use of computer technology in the classroom, it comes as no surprise that textbooks and lecture hand outs served as the most common sources of information to students. Gupta, White and Walmsley (2004) found a similar trend and report that most students prefer to use lecture hand outs and textbooks as sources of information due to relevance and availability. DeYoung (2009) reports that students find textbooks to be valuable because of the examples given; introductions to chapters that give an overview of content; end of chapter summaries and study questions. According to Mellish et al. (2009) textbooks are economical as they can be used and re-used, and although their costs have escalated, textbooks are still far cheaper than similar information such as charts, slides, films and other visual aids, which are in any case not readily available. Whether the preference given to textbooks by students in the current study originates from the poor use of

computer technology in the classroom is quite possible as Twenge (2009) noted that only a few of the current students, enjoy sitting quietly with a textbook and reading, instead, students of Today attempt to multi-task, doing homework while surfing the Web and exchanging instant messages with friends. This is supported by Min et al. (2014) who state that students entering nursing are less reliant on textbooks for information, are internet savvy and use lots of electronic gadgets and like to multitask. Qayumi, Kurihara, Imai, Pachev, Seo et al. (2004) demonstrated that the gains of the computer-assisted and computer-assisted plus textbook-based learning are significantly greater than the gains of the text-based learning alone.

Students using the internet were of the opinion that it provided them with more, up to date and reliable information which was not available in their textbooks and allowed them to search for definitions of terms. This finding was supported by other researchers who concluded that the most important purpose for using the internet among students was searching for information and the students expressed confidence in the quality of information found on the internet (Edem & Ofre, 2010). According to Shovein, Huston, Fox and Damazo (2005) the internet provides learners with incredible access to information without a gatekeeper because the student has the option to explore limitless links to websites that offer high quality, current information on any topic. Chaffin and Maddux (2004) and Ali, Hodson-Carlton and Ryan (2004) point out that benefits to students who prefer the internet for learning include convenience, flexibility and vast databases for any topic of interest. In addition, high flexibility in time, low limitation in space, greater learning choice and diverse content were reported to be the strengths of the internet (Yu & Yang, 2006).

The study provided evidence that the internet was used by the majority (65%) of the students. However, more than 60% used it for social, academic or both these purposes. This trend was also noted in a study conducted in Australia by Kennedy, Gray and Tse (2008), who found that computers, mobile phones and the internet are technologies used by students in their daily lives both for study and for recreation to search, browse, play games, store digital content and for communication.

The literature indicates that students use the internet as a source of information because it is easy to access even from their homes (Gupta et al., 2004 and Grimes, 2002) and Yu and Yang (2006) state that the internet as a learning model has certain strengths such as flexibility in time and space. In a study by Suen (2005) students indicated that the internet was more flexible, stimulating, creative and personal, compared to traditional sources of information.

It was interesting to note that less than a fifth (13%) of the students reported they use the internet for social activities only, meaning that they most commonly use the internet for academic purposes. Strange as it may seem, Edem and Ofre (2010), in a study conducted in Nigeria support these findings

and state that students use the internet less for entertainment objectives and more to obtain academic information.

Students who used the internet seldom reported lack of time, lack of computers and the internet in the college, and no skills/insufficient skills in using a computer. These findings are similar to the findings of the previous studies which indicated that lack of access to a computer or internet, lack of computer skills and time constraints were amongst the main reasons given by students for not having used the internet at all or having used it least often (Deltsidou, Gesouli-Voltyraki, Mastrogiannis & Noula, 2010, Miller, Graves, Jones & Sievert, 2010 & Ajuwon, 2003). The findings of the current study also indicate that students wanted a computer course to be added to their curriculum because as much as the students were aware that computer technology was useful, it was difficult for those who were computer illiterate. The students even commented that the college should employ people to assist those in need of computer skills. These statements concur with Gupta et al. (2004) who are of the opinion that a supervisor should be present at all times to assist the students who struggle to use computers and the internet as according to Min et al. (2014) there is always that group of learners who are unfamiliar with technology and find themselves lost in technological environments. In addition, Eley, Fallon, Soar, Buikstra and Hegney (2008) support the suggestion that computer skills should be built into the undergraduate nursing curricula as in order to use technology, provision of access alone is not sufficient; skills or ability must be adequate. Oberprieler, Masters and Gibbs (2005) in a study conducted in South Africa emphasize that Today's students, need to be equipped with both the skills and confidence to engage with the rapid technological changes they will encounter in their future working environments.

A small percentage of students (13.1%) reported that the internet was not their preferred source of information because they preferred using their textbooks. The respondents also reported that they did not use the internet because it was expensive and it took them long time to find information they were searching for. Literature reveals that the expense of a technology-based learning may strain the budget of students with limited funds (Chaffin & Maddux, 2004) and the internet may be difficult to use and could be time-consuming (Gupta et al., 2004). Wittmann-Price, Kennedy and Godwin (2012) in a study conducted in the United States, report a similar trend as the students who opted not to use technology and the internet felt that the internet was cost prohibitive and it was difficult to use technology. The high cost was also mentioned among the obstacles to using the internet by nursing students in a study by Deltsidou et al. (2010).

The current study provided evidence that respondents younger than 30 years reported a higher use of the internet than their older class mates. Roberson (2009) ascribe this situation to the fact that younger college students are comfortable with and frequently use technology to communicate, study, and

enhance their learning. Maag (2006) however showed that younger students (≤21 years old) displayed a significantly lower mean score in "liking to use technology" whilst Wittmann-Price et al. (2012) however, found that the students who did not use technology were approximately the same age as those who used technology and therefore lack of use cannot be contributed to a generational issue.

Google, a search engine, was the website most commonly used by students (41.5%) whilst less than 1% used the search engine Yahoo. Wikipedia, a popular website, was also used by a small percentage of students. This is consistent with the findings of the study conducted in Saudi Arabia by Aldebasi and Ahmed (2013) where Google was found to be the most commonly used search engine by students. In another study by Werts (2010) conducted in the United States, Google was also found to be the most commonly used search engine. Younger (2005) is of the opinion that the clear interface and easy-to-use style has allowed Google to become the leader amongst other search engines.

The finding of the current study is different to the findings of a study by Ajuwon (2003) where Yahoo was the most popular search engine used as indicated by 93.8% of student nurses, while Google was least used as it was indicated by only 3.1% of the participants. Seemingly, whether students use a certain specific search engine or not may be of less significance as according to Zerwekh and Garneau (2012), there is a concern about the quality of information obtained and used from the internet as not all Web-based information is accurate. The current study does not provide answers as to the kind of information the students looked for as this was not explored. It can therefore not be concluded that these search engines were used to access course related scientific information.

According to Ciesielka (2008), despite the criticisms that Wikipedia is considered to be a site with inconsistent quality of information, Wikipedia is becoming an increasingly popular means of disseminating information across disciplines. The literature suggests that although students who use Wikipedia often do not receive positive feedback from their lecturers, the information presented is generally trustworthy. The rationale for this is that contributors to health and nursing-related Wikipedia entries are familiar with topics of their own discipline (Haigh, 2011).

With reference to the frequency of access of the internet, the current study found that less than half (40%) of the respondents indicated daily use, while a small percentage (14%) reported that they never used the internet. This finding differs from that of a study by Gupta et al. (2004) conducted in the United Kingdom which revealed that most (70%) students reported accessing the internet on a daily basis. The differences in ease of internet access between countries may be an important factor in determining the frequency in which the students access the internet (Edem & Ofre, 2010). Considering the number of computers available at the college under study, it comes as no surprise that less than half of the students reported daily access.

There were some discrepancies between the responses to the frequency of access of the internet and the previous questions which asked whether or not the internet was used for academic or social purposes. Whether the students indeed used the internet on a daily basis is therefore debatable. The study provided evidence that the majority of the students (75%) were unhappy with the ease of access to the college computer laboratory whilst only a small percentage (11%) agreed or strongly agreed that they found it easy to access the computer laboratory at the college. It was interesting to note that although small, some (13%) of students did not answer the question on whether they felt the facilities in the computer laboratory could be improved. It is not clear what the exact reason for this could be. However, it might be quite possible that these students never went to the computer laboratory as the teaching methods used by lecturers did not facilitate or require computer based learning. In a study by Frye and Dornisch (2008) conducted in the United States, it was indicated that encouraging the use of computer technology within classrooms may improve student perceptions of the course and their educator. The ultimate result could be an improvement on students' motivation and performance together with an increase in students' knowledge regarding possible roles of technology. Finding that the majority of respondents (73%) felt that the computer laboratory facilities could be improved was at least positive. The reasons mentioned by students included expanding the computer laboratory, buying more computers and improving connectivity as well as ensuring that students know about the computer laboratory during orientation. Edem and Ofre (2010) emphasize adequate awareness of the variety of existing information resources and services available to students, a deficit identified by a small percentage of students.

Nine respondents (5.1%) suggested that the students should be allowed to access information from the internet in class from their cell phones or laptops. Despite the fact that this looks ideal, it does not seem possible at the moment due to connectivity challenges. DeYoung (2009) stated that hand-held wireless computers and laptop computers are being used in classrooms as they help keep students actively involved during a lecture. Literature indicates that college students use cellular phones, iPods and personal computers to obtain information (Smith & Rosenkoetter, 2009). In addition, devices including smartphones, tablets and notebooks were identified by Min et al. (2014) as advances in technology that promote portability of teaching and learning tools. It has been stated that the students' familiarity with hand-held computers and cell phones may make these devices beneficial in the enhancement of teaching and learning (Applegate, 2010).

5.3 JUSTIFICATION OF THE STUDY

The study is a contribution to the body of knowledge in nursing education for the following reasons:

- The use of computer technology, including the internet, is important in education and training of nurses. Computers are nowadays being used by nurses for effective quality patient care in the clinical nursing environment, but the teaching strategies used in the nursing college in the study do not seem to encourage the use of computer technology by students.
- The perceptions and opinions of student nurses on the use of computer technology by lecturers in the classroom and the student nurses' perceptions and opinions on their use of computer technology during self-study were explored. This is the first time this study is done at this particular nursing college.

The purpose of this study was to explore the perceptions and opinions of nursing students at Chris Hani Baragwanath Nursing College on the use of computer technology by lecturers in the classroom and student nurses' perceptions and opinions on their use of computer technology during self-study. In chapter one, the orientation for the study which outlined the background to the problem was provided and the key concepts of the study were defined. Chapter two dealt with the literature reviewed on computer technology in teaching and learning. In chapter three the research design and methods were discussed. Chapter four presented the findings in terms of the perceptions and opinions of student nurses on the use of computer technology by lecturers in the classroom and perceptions and opinions of student nurses on their use of computer technology during self-study.
In chapter five the findings were discussed in the format of the questionnaire. Therefore, it can be stated that the study is justified as the purpose was fulfilled.

5.4 LIMITATIONS

This study has the following limitations:

- The study explored the perceptions and opinions of only two groups of final year students studying at the specific nursing college hence the findings might not be applicable to students in the other courses offered by the same college and also not to students in other nursing colleges.

- Results could have also been influenced by the amount of missing data.

- There was no opportunity to ask the respondents to expand and clarify their answers due to the quantitative nature of the study which led to restrictions in terms of the responses the participants could give.
- Social acceptability could have also influenced the findings as the respondents might have had a tendency to think they must give only the "right" answers. However, the researcher believes the findings of the study can serve as baseline and inform future research.

5.5 RECOMMENDATIONS

The recommendations are made for nursing education, college management and future research as follows:

Nursing education:

- It is recommended that lecturers be encouraged to use computer technology and the internet in the classroom in order to motivate students and stimulate their interest in learning.
- The researcher recommends that lecturers improve students' access to use of computers and internet. For instance, lecturers can create learning activities that encourage students to use computer technology as well as searching for information from the internet to obtain more, updated and reliable information.
- There is a need to assist the students who lack skills in information and technology so that they may have confidence in the use of computers and the internet and maximize their opportunities for learning.

College management:

- There is a need to ensure that lecturers who are not computer literate are upgraded.
- The researcher recommends that awareness campaigns be available, especially during orientation so that all students can be aware of the college computer laboratory.
- It is recommended that the number of computers be increased and the computer laboratory be expanded so that as many students as possible can access the resources at any given time.
- There is a need to improve connectivity to the internet. To be in sync with modern teaching technologies, a wireless internet system should be considered.

Future research:

- It is recommended that the experiences, perceptions and opinions of nurse educators on the use of computer technology for teaching and learning be explored so that interventions can be developed to enhance computer-based learning.

5.6 CONCLUSION

This study explored the perceptions and opinions of nursing students on the use of computer technology by lecturers in the classroom and student nurses' perceptions and opinions on their use of computer technology during self-study. The reported use of computer technology by lecturers in the classroom was poor. It seems as if the students were not encouraged to use computers and the internet for self-study as there were little learning activities that required students to use computers. However, most students were positive about using computer technology including the internet, for teaching and learning.

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APPENDIX 1

QUESTIONNAIRE[1] FOR PEN 2 & GNS 300 STUDENTS

Thank you for taking the time to complete this questionnaire anonymously.
The questions below aim to provide an understanding of students' experiences and opinions on the use of computer technology, including the internet, for teaching and learning.

A. BIOGRAPHICAL DATA

Please place an **X** in the most appropriate box.

1.GROUP	**PEN 2**		**GNS 300**	

2. SEX	**Female**		**Male**	

3. AGE	**‹20**		**20-24**		**25-29**		**30-34**		**35-39**		**40+**	

B. EXPERIENCES AND OPINIONS ON THE USE OF COMPUTER TECHNOLOGY INCLUDING THE INTERNET FOR TEACHING AND LEARNING

For each of the following questions/statements circle the letter of the response that is **most appropriate** to you:

PART 1
USE OF COMPUTER TECHNOLOGY IN TEACHING

During the current academic year:

1.1 Which of the following methods have your teachers/lecturers used in the classroom: (Please circle **all** those that apply).

A. Chalk board
B. Overhead projector
C. Discussion groups
D. Tutorials
E. Computer technology (for example, PowerPoint)
F. Internet sites (please give examples)

_____

_____

[1] This questionnaire includes questions adapted from Gupta, B., White, D. A. & Walmsley, A. D. 2004. The attitudes of undergraduate students and staff to the use of electronic learning. In: British Dental Journal, vol. 196, no. 8, pp. 487-492.

G. Other methods (please specify)

_____

_____

1.2 How often have your teachers/lecturers used a computer in the classroom?

A. Never
B. Daily
C. Weekly
D. Fortnightly
E. Monthly
F. Less than once per month

1.3 How often have your teachers/lecturers created individual assignments that require you (the student) to use the computer?

A. Never
B. Daily
C. Weekly
D. Fortnightly
E. Monthly
F. Less than once per month

1.4 How often have your teachers/lecturers created assignments that allow you (the students) to use computer technology to work with others on projects, and to communicate with others?

A. Never
B. Daily
C. Weekly
D. Fortnightly
E. Monthly
F. Less than once per month

1.5 How often have your teachers/lecturers created assignments that require you (the students) to use the Internet to collect information?

A. Never
B. Daily
C. Weekly
D. Fortnightly
E. Monthly
F. Less than once per month

1.6 Do you feel the use of computer technology by the teachers/lecturers has enhanced your learning?

A. Yes
B. No

Please give reasons for your answer.

_____

_____

_____

_____

_____

_____

1.7 Any other comments?

_____

_____

_____

_____

_____

_____

PART 2
USE OF COMPUTER TECHNOLOGY BY STUDENTS

During the current academic year:

2.1 Which of the following sources have you used to find nursing/health related information?

(Please circle **all** those that apply).

A. Lecture handouts
B. Textbooks
C. Journals
D. Ask lecturers
E. Internet sites (please give examples)

_____

_____

F. Other sources (please specify)

_____

_____

2.2 Which of the above have you used **most** often?

Please explain why.

_____
_____
_____
_____
_____

2.3 Which of the above have you used **least** often?

Please explain why.

_____
_____
_____
_____
_____

2.4 Do you use the Internet for <u>social purposes</u>?

A. Yes
B. No

If **YES**, please give examples.

_____
_____
_____
_____
_____

2.5 Do you use the Internet for <u>academic purposes</u>?

A. Yes
B. No

If **NO**, please give reasons why you don't use it.

_____
_____
_____

_____

_____

_____

If **YES**, please give examples.

_____

_____

_____

_____

_____

2.6 How often have you accessed the Internet in the last year?

A. Never
B. Daily
C. Weekly
D. Fortnightly
E. Monthly
F. Less than once per month

2.7 How do you feel about the following statement? 'I find it easy to access the computer laboratory at the college.'

A. Strongly agree
B. Agree
C. Neutral
D. Disagree
E. Strongly disagree

2.8 Do you feel the facilities in the computer laboratory can be improved?

A. Yes
B. No

If **YES**, please explain how.

_____

_____

_____

_____

_____

2.9 Is the Internet your preferred source of information?

A. Yes
B. No
Please explain your answer

_____
_____
_____
_____
_____

2.10 Do you feel that the information on the Internet has helped you learn more about a particular subject?

A. Yes
B. No
Please give reasons for your answer

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2.11 Any other comments?

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PLEASE USE THE REVERSE OF THE PAGE IF YOU NEED MORE SPACE.

THANK YOU FOR TAKING TIME TO COMPLETE THIS QUESTIONNAIRE.

APPENDIX 2

Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011) 717-2076

Reference: Ms Salamina Segole
E-mail: salamina.segole@wits.ac.za
30 March 2012
Person No: 500209
PAG

Mrs MA Lebete-Sehalahala
P.O. Box 9349
Maseru
100
0000
Lesotho

Dear Mrs Lebete-Sehalahala

Master of Science in Nursing: Approval of Title

We have pleasure in advising that your proposal entitled "*Experiences and opinions of nursing students on the use of computer technology for teaching and learning*" 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

APPENDIX 3

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

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Mrs Motselisi A Lebete-Sehalahala

CLEARANCE CERTIFICATE	M110475
PROJECT	Experiences and Opinions of Nusing Students on the Use of Computer Technology for Teaching and Learning (revised title)
INVESTIGATORS	Mrs Motselisi A Lebete-Sehalahala.
DEPARTMENT	Department of Nursing Education
DATE CONSIDERED	06/05/2011
M1104750DECISION OF THE COMMITTEE*	Approved unconditionally

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

DATE 25/02/2012 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Professor D Manning

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...

APPENDIX 4

health and social development
Department: Health and Social Development
GAUTENG PROVINCE

CHRIS HANI BARAGWANATH NURSING COLLEGE

Private Bag X 05
Bertsham
2013

Tel: (011) 983-3000
Fax: (011) 983-3091

05/04/2012

From: Mrs S Peters
Principal: Chris Hani Baragwanath Nursing College
Private Bag X 05
BERTSHAM
2013

For Attention: Mrs M Lebete-Sehalahala
Level 3: Lecturer
Chris Hani Baragwanath Nursing College

SUBJECT: PERMISSION TO CONDUCT RESEARCH AT CHRIS HANI BARAGWANATH NURSING COLLEGE

Correspondence dated 04/04/2012 is hereby acknowledged.

Permission is hereby granted to conduct research at the institution. I still have reservations of the institution being identified. However, I trust that the anonymity of the participants will be protected.

I wish you success with your project.

Kind regards,

.....
Mrs S Peters
(College Principal)

Chris Hani Baragwanath
Nursing College
Private Bag x05
Bertsham
2013

cc: Chairperson: Research Committee

APPENDIX 5

Sehalahala, Motselisi (gphealth)

From: Twala, Siyabonga (gphealth)
Sent: Friday, June 29, 2012 12:58 PM
To: Sehalahala, Motselisi (gphealth)
Subject: Approved protocol
Attachments: evaluation form.pdf; conditions of approval.pdf

Dear MA Lebete-Sehalahala

Your research protocol has been approved.

Kindly receive the attached Evaluation Form and Conditions of approval. Please sign page 3 of the conditions where it says "name and surname of principal researcher" then scan and email back to me
(only page 3).

Kind Regards,

Siyabonga Twala
Gauteng Dep of Health and Social Development
Research & Epidemiology Unit
Tel: +27 355 3477
siyabonga.twala@gauteng.gov.za

1

RESEARCH PROPOSAL EVALUATION FORM

FOR APPROVAL BY DIRECTOR: POLICY, PLANNING AND RESEARCH

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

POLICY, PLANNING AND RESEARCH (PPR) DIRECTORATE

Enquiries: Sue le Roux or Likibi Mupata Lelwi

Tel: +2711 355 3583/3134

Fax: +2711 355 3675

Email: Sue.LeRoux@gauteng.gov.za/ MupataL@gpg.gov.za

SECTION A

Researcher/Principal Investigators Name	MA Lebete-Sehalahala
Physical Address	Chris Hani Baragwanath Nursing college
Postal Address	Private Bag X05, Bertsham 2013
Contacts	Not mentioned
Email Address	Motselisi.Sehalahala@gauteng.gov.za
Institution	Department of Nursing education, Baragwanath
Research Topic	Experiences and Opinions of Nursing Students on the use of computer technology for teaching and learning
Date Received by the PPR Directorate	25-04-2012
Reviewer	Dr M L Likibi
Date received by reviewer	May 2012
Final Review Date	13-06-2012
Date Submitted to PPR Director	14-06-2012
Research Site(s)	Nursing college at CH Baragwanath
Type of research	Non trial
Supervisor	Diane Manning

SECTION B: PROPOSAL REVIEW

	YES	NO	Comments
• Is this research project within the scope of the Department of Health key policy priorities/directives?	√		
• Content of Research:	√		
• Original work			
• New facts, ideas	√		
• Confirmation of uncertain data		√	
• Repetition of known data and consequently of limited importance		√	
• Insufficient research information		√	
• Confusion of topics/questions		√	
• Is the title of the research project suitable?	√		
• Are the objectives of the research project adequate?	√		
• Could the objectives be limited to better focus on the project's main objective?		√	

	YES	NO	Comments
• Writing style			
• The text of the proposal is clear	√		Very clean, readable and well written proposal.
• The nomenclature used is correct	√		
• The references used are relevant, comprehensive and accurate (corrected)	v		
• The spelling and grammar are correct	√		
• The language needs improvement		√	
• The research proposal needs restyling and rewriting		√	
• Are the research methods appropriate to the study	√		Yes but to give power to the findings, a focus group meeting would be complementary the in-depth interviews.
• Does the study have ethical approval? If yes, name the ethics committee	v		Wits University research committee
• Is data collection method in line with study design?	√		
• Is time frame of the proposal adequate to meet the objectives?	√		
• Is it stated in the proposal the method of dissemination of the results of the research project?	√		A report of findings will be made available to GDHSD
• Is the possible conflict of interests clarified?	√		
• Are financial implications and financial support transparent?	√		There is no financial implication for GDHSD nor the sites which will be used

SECTION C - SUMMARY OF THE RESEARCH PROPOSAL

Purpose of the study: This is a student study project for a master degree in nursing education.

Topic: Experiences and Opinions of Nursing Students on the use of computer technology for the purpose of learning and teaching.

Aim and objectives of the study: To describe the experiences and Opinions of nursing students about using computer technology for didactic purpose. The process wil consist of:

- Defining the existing methods and aids used currently by lecturers
- Determining the frequency of computer uses in the classroom and for assignments
- Assessing students' needs for didactic achievements
- Discussing with student on a way forward looking at defining a more conducive learning environment in line with the use of modern equipment for learning and teaching

Study Design: Cross sectional study using Descriptive quantitative and qualitative method designs. A research questionnaire will be administered. Use of a statistician for analysis of data was rightfully mentioned.

Study site: Main Campus of CH Baragwanath nursing college

Study population: Enrolled and registered nurse students? Random sample of 100 enrolled and 75 registered nurse students.

Benefit of the study:
This study sets a path for new method of teaching and learning for nursing profession. It might bring new insight for new pupils to pursue this so dedicated carrier.

Ethics clearance certificate from The University of Witwatersrand ethics committee was provided and is hereby attached.

There is no mention of any **financial assistance** request to the Department of Health.

For now we have no objection to recommend this study to take place in our Province.

SECTION D – RECOMMENDATION AND APPROVAL

Reviewed and recommended or not recommended for approval by:

Dr ML Likibi

Manager Medical services 2

Date: 18/06/2012.

Approved by:

Ms Sue le Roux

Director, Policy, Planning and Research

Date: 27/06/2012

APPENDIX 6

INFORMATION SHEET

STUDY NUMBER: M110475

STUDY TITLE: Experiences and Opinions of Nursing Students on the Use of Computer Technology for Teaching and Learning

Dear Student

I am Motselisi Aniciah Lebete-Sehalahala and I work as a lecturer in Level 3 Department at Chris Hani Baragwanath Nursing College, main campus. Currently, I am studying towards a Master of Science in Nursing Education at the University of the Witwatersrand, in the Department of Nursing Education. As part of my learning programme, I am required to conduct a research under guidance of an experienced researcher. My goal in this study is to explore your experiences and opinions on the use of computer technology, including the Internet, for teaching and learning.

I invite you to participate in this study by completing a short questionnaire which will be collected. Your participation will be entirely voluntary, and you are free to decline an invitation altogether or to stop at any time without having to give any explanation, and without any penalty. You will not benefit personally in any way from volunteering but other nursing students may benefit depending on the results of the study. There will be no risks if you decide to participate. Privacy will be maintained by not using your names or any means of identifying you in the study records.

The questionnaire consists of multiple choice questions and it also provides the possibility for your free responses in the form of open-ended questions.

Thank you for taking time to consider participation. Should you have any additional information or concerns feel free to contact me at the numbers and address given below:

Motselisi Aniciah Lebete-Sehalahala

011 983 3118 (w)

072 224 7851 (c)

tshidi.motshidisi8@gmail.com or Motselisi.Sehalahala@gauteng.gov.za