THE STATUS OF USAGE OF INFORMATION TECHNOLOGY SYSTEMS WITHIN CAMPUSES OF THE KWAZULU-NATAL COLLEGE OF NURSING

Submitted in fulfilment of the requirements
of the degree in Masters of Technology in Nursing in the Faculty
of Health Sciences

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Declaration

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

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Signature of student Date

Approved for final submission

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Prof. T Puckree Date

PhD. Physiotherapy

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PhD. Physiotherapy

Dedication

I dedicate this dissertation to a dear colleague and friend, Mrs S Thakurdin, who was a dedicated nurse, spiritual worker, and a pioneer in the field of nursing.

Acknowledgements

I would like to express my heartfelt gratitude to the following people who contributed to the success of this study:

Firstly to my supervisor Prof.T.Puckree, who provided me with guidance and support throughout the study.

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This would not have been possible without the patience and encouragement of my husband Sudher, and children Mishaan and Arisna.

My mother Mrs D. Rampersad who always believed in education as a liberating factor.

I would like to thank the KwaZulu-Natal Department of Health, The KwaZulu-Natal College of Nursing together with the campuses of the KZNCN, who afforded me the permission to conduct this study.

Abstract

Background

The rapid growth in information and communication technology (ICT) in the 21st century has impacted all spheres of human activity, including the health sector. The change introduced by ICT requires educational institutions to relook at the way in which they develop and implement their education programmes. In contemporary clinical practice environments, ICT skills are providing benefits for nurses as well as for the patients they care for.

Aim

The aim of the study was to investigate the status of usage of ICT by academic staff, students and administrators within campuses of the KwaZulu-Natal College of Nursing which consists of 11 main campuses and 14 sub-campuses.

Methodology

A quantitative, cross sectional study was conducted which included academic staff, administrative staff, and students (R425 and R212) of the KwaZulu-Natal College of Nursing. A random sample of 576 individuals participated in the study consisting of academic staff (176); administrative staff (30) and students (340). Participants completed a questionnaire that established their demographic data and ICT usage.

Results

The questionnaire response rate was academic staff (80%), students (89%) and administrative staff (93%). The findings showed that while respondents were able to manage work related activities; they experienced poor access to computer training with 66% indicating they had access to computer training. The access to computer training for the administrative staff was 50%, with 8% of rural and 1% of urban students having access to training. The majority

of academic staff have access to desktop computers with there still being a divide in terms of rural access as compared to urban access p=0.24. Significantly more administrative staff had access to desktop computers than those who do not p<.0005. The access to desktop computers for students was low, with 22% of respondents in both rural and urban campuses indicating that they have access. Access to the internet was low for all respondent groups with a significant difference between those who have access compared to those who do not have access p=<.0005, for both the academic and student groups. There is a low use of ICT for the purposes of teaching and learning with the majority of respondents (60%) indicating that they do not use ICT for teaching compared to those who do p=.0007. All respondent groups have experienced poor ICT support with the majority indicating that they do not receive ICT support p=<.0005. The usage of the online library was low for all groups, with 61% of academic staff, not accessing the online library for reasons of access, or knowledge about the library, 23% of urban students and 20% of rural students have indicated ever using the online library.

Conclusion

The study highlights the need for the KZNCN to be on par with higher education institutions globally in access to and usage of ICT. Benchmarking with higher education institutions in the health and other sectors is essential, in order for the KZNCN to benefit from the trend in incorporating technology into the teaching and learning process. Strong collaboration is necessary between the KZNCN as an academic institution and clinical health facilities to ensure that the developments in ICT within both sectors are reflected in the teaching and learning process, so that graduating nurses are able to function effectively. Clear policy documents and guidelines are required for the KZNCN which reflect the norms required for both ICT equipment and systems to enable functioning of the institution within an increasingly technological environment.

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CHAPTER 1

INTRODUCTION

1.1 Background

The rapid growth in information and communication technologies (ICT) in the 21st century has impacted all spheres of human activity. The concept of a global village has materialised making education and health care more accessible. Educational institutions use Information Technology (IT) not only for administrative and support functions but also in the core activities of teaching, learning, research and communication with students (Andoh 2012: 136).

Technology has impacted on all areas of functioning with education being no exception (Safavi 2008: 47). In order for universities to function effectively whilst keeping up to the technology trends it is critical that they reprioritise the manner in which they plan and implement educational reforms. The global information society (GIS), is one, where all physical barriers for access to information have been removed by the use of ICT (Singh 2004: 1). This allows for more interaction and access to information, through the use of technology.

In a study by Cassidy, Britsch, Griffin, Manolovitz, Shen and Turney (2011: 382) at the Sam Houston State University in east Texas the use of the internet and ICT devices used by students was analysed. The findings revealed that of the 6,240 students selected to participate in the study about 97% of the respondents had internet access at home. Almost 92% of students owned a laptop, 98.8% reported ownership of a mobile phone with 47,4% using it for web browsing and 56,3% for library related activities.

Developments in higher education have resulted in the entry of technologically capacitated health care professionals into the health care environment. In the current health care practice environment the use of ICT is viewed as beneficial to nurses and their patients (Bemridge, Jones and Jeong 2010: 18). It is therefore essential that there is correlation between the nursing practice area which is increasingly ICT influenced and nurse education programmes.

In order to overhaul the nursing education system there is a need for all stakeholders to be involved with the process, and commit to the changes for it to be successful (Department of Health 2012a). Nurses need to be more computer literate, and computer literacy needs to be included in their curriculum, in order for them to adapt to the changing clinical environment where there is increasing use of computerised systems for patient records and patient care. Fitzpatrick and Fry (2009: 14) observe that due to changes in the healthcare system and due to advances in technology, diagnosis and clinical decisions can be made remotely via an internet link. Maboe and de Villiers (2011: 94) suggest that in order for nurses to be proficient in an environment that is so technologically driven, they need to become accustomed to the technological environment, and have the necessary skills in the use of the relevant technology. Barnard, Nash and O'Brien (2005: 505) support the notion that nurses have to be exposed to relevant technology in their training in order to be able to use it effectively on graduating.

In spite of all the changes taking place in health care delivery Maboe and de Villiers (2011: 93) note that the nursing education system remains under pressure to prepare students adequately to be able to function in an ICT dominated world, which is continually changing. Leaders in nursing education must ensure that the nurse on graduating is suitably equipped to cope in any environment.

Nursing education both in the private and public domain will have to adopt the trends of the general education sector. Education today needs to review the way they practice (Brown, Kirkpatrick, Matthias and Swanson 2009: 153). Nurse training faculties are under pressure to incorporate the new dimensions in education brought about by the use of technology, in order for the 21st century learner to gain the benefit of strategies such as e-learning.

Neuman (2006: 12) argues that nurse educators are no longer only using traditional methods of teaching and are including innovative teaching methods being used by other educational sectors. These technologies include methods such as distance learning programmes, web-based programmes, telemedicine, and online drills and testing in order to prepare graduates to work in a changing health care sector. There is a need according to Jeffries (2005: 03) for nursing education to incorporate the trends in technology together with traditional teaching methods, as highlighted by the distance learning programmes which are being conducted in rural West Virginia (USA) institutions.

According to Button, Harrington and Belan (2013: 2) e-learning is used to deliver nursing curricula in a number of Western countries including Australia, Canada, Greece, Ireland, New Zealand, UK and the USA. The authors further highlight the fact that the move to utilisation of electronic patient records has necessitated the need for the adoption of e-learning practices by nurses. The challenge affecting student nurses in adopting the practices of electronic health records is related to their lack of education in such matters.

An online survey which was conducted by Villanueva, Hardey, Torrent and Ficapal (2010: 133) amongst 13,588 members of the Barcelona nurses association revealed that at least 33% of nurses needed to access the internet at work either every day or at least three to four times a week. The majority of nurses found that the internet was very useful in relation to their professional work, while just over a third found it useful. The study revealed

that the majority (64, 9%) identified that ICT use had a positive impact on their levels of efficiency and increased their productivity. The study found that the internet is a valuable resource for health care practitioners for them to gain current and valid information.

A survey by the Royal College of Nursing in London conducted in 2012 revealed that levels of computer use for personal, work and study purposes were high with 85% of respondents feeling very confident or confident in using ICT. In relation to the types of ICT devices being used, and the reason for their use, 86% of respondents reported daily use of a computer or other form of ICT at work. A total of 60% of respondents said that their level of access to ICT equipment was adequate for their role, with 89% stating that they used ICT to access online evidence, policies, and guidelines. The study further revealed that 70% of students liked being able to work through the e-learning resources independently at their own pace while 87% believed that using e-learning in combination with face to face teaching was a useful strategy (Royal College of Nursing 2012: 4).

The use of ICT to elevate the educational level of nurses worldwide is a vital area needing more analysis and exploration for incorporation into educational institutions. Abott and Coenen (2008: 242) report on a programme in an area where the majority (70%) of the nurses were enrolled nurses and virtual technology was used to upgrade their qualifications in an effort to uplift the health care services. “The African Medical and Research Foundation” has made use of ICT in the form of a “Virtual Nursing College” which currently has 4,000 nurses enrolled at 100 computer-equipped training centres. This study illustrates the benefits ICT provides in the opening up of access to education, and the potential to upgrade the qualifications and knowledge of staff, for the benefit of quality health care services.

According to Fetter (2009: 78) information technology skills are essential for professional development and advancement which will be reflected in

enhanced levels of care, improved access, quality and cost effectiveness. There has been progress made by some nursing programmes who have revised their content to incorporate nursing informatics and the use of technology, but this is however not enough. The findings of Asah (2010: 49) reveal that in the majority of government nursing colleges in Northern KwaZulu-Natal IT training is not part of the existing nursing curricula so IT skills and knowledge is acquired at the student's discretion. Recommendation from participants of the study was for computer training to be incorporated into the nursing curricula so that they are more prepared to work in clinical areas where computers are used (Asah 2010: 92).

The lack of use of ICT at nursing colleges in South Africa is further revealed in a study conducted by Maboe and de Villiers (2011: 96) who found that computer based learning was not well conceptualised at nursing colleges. Although students preferred Computer Assisted Instruction (CAI) to traditional methods of teaching they were challenged by the low levels of access to ICT. The study further highlighted the fact that lack of adequate computer literacy in managing the CAI programmes made it difficult for students to utilise the system. This is further supported by Surry, Daniel, Gray, and James (2011: 133) who have identified the need for a major restructuring of clinical education, in keeping with the changes in the health sector.

This identified gap together with anecdotal feelings of frustration by nursing college stake holders in the province of KwaZulu-Natal prompted this research study into the status of usage of information technology at campuses of nursing in this province.

1.2 Aim of the study

To investigate the status of usage of information technology systems by academic staff, pre-registration and post basic students and administrators within campuses of the KwaZulu-Natal College of Nursing (KZNCN).

1.3 Objectives of the study

i. To determine the level of computer literacy of:
   a. Academic Staff;
   b. Students;
   c. Administrative staff within the campuses of the KZNCN.
ii. To determine the usage of IT systems by:
   a. Academic staff;
   b. Students;
   c. Administrative staff, within the campuses of the KZNCN.
iii. To determine the accessibility of ICT equipment to:
   a. Academic staff;
   b. Students;
   c. Administrative staff, within the campuses of the KZNCN.
iv. To determine the teaching, learning and assessment strategies utilising information technology being used at the KZNCN.
v. To identify the current technological support/systems available to students, staff and administrative staff.

1.4 Hypotheses

The alternative hypothesis was used for the purpose of this study (Hα)

i. Access to Computer Training
   a. A significant proportion of the academic staff have access to computer training
   b. A significant proportion of the administrative staff have access to computer training

c. A significant proportion of the students have access to computer training.

ii. Access to Desk top computers
   a. A significant proportion of the academic staff have access to desk top computers
   b. A significant proportion of the administrative staff have access to desk top computers
   c. A significant proportion of students have access to desk top computers

iii. ICT usage for teaching
   a. A significant percentage of academic staff utilise ICT for teaching purposes.

iv. ICT support in the use of the technology
   a. The academic staff receive significant ICT support in the use of ICT technology
   b. The administrative staff receive significant support in the use of ICT technology
   c. The students receive significant support in the use of ICT technology.

1.5 Significance of the study

By highlighting the current status of usage of ICT by students, academic staff, and learners within the KZNCN, this study could provide policy makers within this institution with the information necessary for possible future policy development, or policy revisions towards keeping abreast of advances in the use of technology in education.

Deficiencies that may exist due to a lack of ICT within the KZNCN will be highlighted with this study. The findings of the study could be used to motivate for the allocation of a budget to improve these systems. Recommendations will therefore be made, using evidence based model. If

changes are made as a result of this study, the 5,000 students studying at this institution will benefit. The changes if accepted, will therefore improve the functional capacity of graduates who have to function in an environment that is becoming very dependent on ICT.

The study will inform decision makers regarding the state of readiness for the implementation of any new ICT related nursing qualifications which may be required.

By determining the status of usage of ICT at the KZNCN, the study will provide the basis for development programmes to ensure that staff and students at the institution function at the same level as their counterparts nationally and internationally.

1.6 Operational definitions

CAMPUS: This is a nursing education institution which functions under the KZNCN, and offers the R425 or R212 nurse training programmes.

CHE: The South African Council on Higher Education is an independent statutory body responsible for advising the Minister of Higher Education and Training on all higher education issues, and for quality assurance in higher education and training.

ICT: An umbrella term that includes any communication device or application. It encompasses hardware, software, cellular phones, computer networks and applications associated with them, such as video conferencing and distance learning.

Internet: The internet is a global network providing a variety of information and communication facilities, consisting of interconnected networks using standardised communication protocols.

Intranet: The intranet is a network based on protocols belonging to an organisation and only accessible by the organisation's members, which, in the case of this study, was the KwaZulu-Natal Department of Health.

KZNCN: KwaZulu-Natal College of Nursing is the accredited public nurse training college in the province of KwaZulu-Natal.

Learning Area Network: is a location where students can access information, obtain online resources and complete activities requiring ICT systems.

Online learning: This refers to the use of the internet and associated web-based applications as the delivery medium for the learning experience.

R425: This is Regulation 425, as determined by the South African Nursing Council, and regulates the training of Professional Nurses within the SANC programme.

R212: This is Regulation 212, as determined by the SANC, and regulates the training of Professional Nurses as specialist nurses within the SANC programme.

SANC: The South African Nursing Council is currently the regulatory body for nurse training in South Africa. All nurse

training, whether private or public sector is regulated by the SANC.

SUB-CAMPUS: This is a nursing education institution which functions under the KZNCN, and offers the South African Nursing Council (SANC) programmes.

Simulations: The imitation of the operation of a real world process or system over time, using computerised models, or computer systems.

Telemedicine: Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance.

1.7 Abbreviations

CHE: South African Council on Higher Education

Hα: Alternative Hypothesis

IT: Information Technology

ICT: Information and communications technology

KZNCN: KwaZulu-Natal College of Nursing

R425: South African Nursing Council Regulation 425

R212: South African Nursing Council Regulation 212

SANC: South African Nursing Council

1.8 Layout of the dissertation

Chapter 1 provides an introduction and background to the study. The significance of the study as well as the aims and objectives are highlighted.

Chapter 2 is a literature review providing background to the study and presents a critical overview of previous research which has been conducted on the use of IT in education as well as in nursing education and nursing practice. The theoretical framework underpinning the study is highlighted.

In Chapter 3 the research methodology used in this study is described and the ethical considerations explained.

Chapter 4 presents the findings of the study. The results are presented according to the aims and objectives through an analysis of the data.

In Chapter 5 the results of the study are discussed in relation to relevant literature and also in relation to the setting.

Chapter 6 provides the conclusions drawn. Limitations to the study are provided and recommendations are made.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a critical review of literature giving a background for the study. The search was conducted by using the following search databases:

- Summon Search: this is a database or library search engine that includes records for books articles, theses and dissertations.
- Cumulative Index to Nursing and Allied Health Literature (CINAHL), which contains citations from nursing journals and journals of allied health disciplines.
- Google Scholar, which is a search engine for scholarly articles.
- Online Library of the KwaZulu-Natal Department of Health, which provides links to a range of databases, providing access to a variety of journals.

The key words that guided the literature search included: information technology in education; information technology in nursing; information technology use globally, in Africa, and in South Africa; online learning; e-learning; information technology in nursing practice; and, nursing administration.

This literature review focuses on the definition of ICT; ICT in education, nursing, higher education and nursing education globally, in Africa, and in South Africa; conceptual frameworks used in IT; and, ICT in performing administrative functions in academic institutions.

2.2 Definition of ICT

ICT is an umbrella term that includes any communication device or application. It encompasses hardware, software, cellular phones, computer networks and applications associated with them, such as video conferencing and distance learning (Ajuwon and Rhinet 2008: 175).

On a global level all sectors of education are under pressure to incorporate innovations with regards to educational technology to aid in the training and application of the knowledge obtained, allowing for independent living, employment, community integration and attaining other forms of post-secondary options in society (Abimbola 2012: 26). Great achievements have been reached by nurses across countries to incorporate technology in the daily practice. Nursing informatics (NI), according to Marin (2005: 857), is defined as a combination of “computer science, information science, and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care”.

According to a report by the European Commission on learning and innovation through ICT at schools (2011: 03), ICT provides a variety of tools that can open up new possibilities in the classroom. These can particularly help tailor the learning process to individual student’s needs, and they can also provide learners with the crucial digital competencies needed in our knowledge based economy.

2.3 ICT Globally

Globalization and ICT continue to change us and the world we live in Abott and Coenen (2008: 238). ICT has played a major role in university and industry partnerships in Europe (Balasubramanian, Okah, Daniel, Ferreira,

Kanwar, Kwan, Lesperance, Mallet, Umar and West 2009: 19). ICT in education is being used for purposes of research, online information and skills development worldwide. However, it has been realised globally that ICT policies in higher education institutions are lacking.

In the absence of these policy frameworks, ICT is seen more as an infrastructure and is not recognised as a tool for strengthening educational systems.

Higher education institutions have utilised ICT in administration since the early seventies. ICT systems include systems for student related functions as well as financial and human resources management. The benefits of universities using ICT can be appreciated in the development and operation of large university structures, an example of which is the United Kingdom Open University with 200,000 students, which functions in a highly efficient and user friendly manner (Balasubramanian *et al*. 2009: 26)

The health sector is facing issues of changing health profiles, and shortages in terms of human resources which require nursing leadership to intervene and take advantage of the opportunities brought about by the enormous growth of ICT and the benefits it can bring to assist with some of these challenges. It is further argued that this has influenced all approaches to education and will have an influence on future leaders (Abott and Coenen 2008: 241). The incorporation of technology in nursing has seen the expansion of distance learning programmes. These programmes in nursing are expanding globally and providing access to individuals in remotely distributed areas. The use of ICT can be a positive step in alleviating a crisis with regards to the nursing workforce and increasing health problems in areas which are underserved by healthcare.

The majority of nurses as cited by McGonigle and Mastrian (2009: 79) have yet to embrace the notion of informatics and understand its meaning and

relevance to their work. Information and communication technology in the clinical care environment has the potential to provide benefits for nurses and health care providers, as well as patients. This then necessitates the future curricula of basic nursing programmes to include the concepts and the role of information technology in supporting clinical care delivery.

A very comprehensive study conducted on 10,000 nurses in Australia, as cited by the Nurses and Information Technology report by the Australian Nursing Federation (2007: 5) highlighted that nurses identified the benefits of adopting more IT skills which, in their view, increased their chances of career progression. The same report highlighted a study undertaken in 2004 on behalf of the Royal College of Nursing in the United Kingdom which concluded that information, consultation and training was not sufficient to ensure proper design of systems. The report further highlighted that there is a need for the undergraduate curriculum to focus on ICT competency (Australian Nursing Federation 2007: 70). The study brings to light the critical issue of ICT access, use and literacy for the nursing profession globally in enhancing their functioning capabilities.

A wide range of literature according to Kowitlawakul (2008: 7), Davis, Bagozzi and Warshaw (1989: 985) and Thompson, Compeau and Higgins (2006: 26), suggests that user acceptance of information systems will determine computer usage. The Technology Acceptance Model (TAM) provides theoretical linkages among users' internal beliefs, attitudes, intention, and usage behaviour, to determine how individuals accept or reject a new technology.

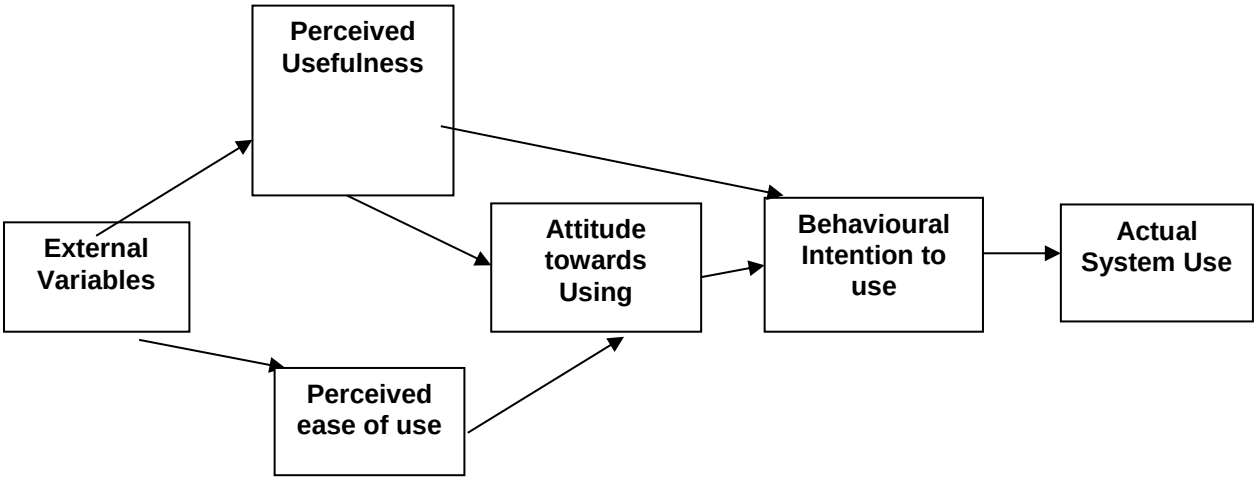

Figure 1:Technology Acceptance Model (TAM) (Davis, Bagozzi and Warshaw.,1989).

The TAM highlight, that there are five constructs in the TAM model, as follows Kowitlawakul (2008: 9):

- perceived usefulness;
- perceived ease of use;
- attitude towards using;
- behavioural intention to use; and
- actual system use(Figure 1).

The key determinants of computer acceptance in TAM are the belief that the computer system will help the individual to improve his/her job performance (perceived usefulness), or that it is easy to use. According to Davis, Bagozzi and Warshaw (1989), perceived ease of use refers to the expectation that technology will simplify the effort of the individual in functioning. The perceived usefulness and the perceived ease of use are influenced by external variables (Kowitlawakul 2008: 12).

For the purpose of this research study, the theoretical framework is based on this model and the relationship of the constructs will be discussed below.

2.3.1 External variables affecting usage

The actual use of ICT is influenced by variables such as availability of computers at the various nursing education institutions which would allow for access, budget allocation for the purpose of provision of computers, knowledge of usage of computers and technological support in utilising computers. These variables have influences on the perceived usefulness because nurses need access, knowledge and skills and support on how to use computers, as supported by the literature highlighted.

Access to ICT has a direct bearing on the perceived usefulness of the technology. If there is no access, or inadequate access, to technology, this will affect rate of usage or ability to use the technology (Asah 2011: 6). Further literature suggests it is important to have access to technology, ongoing technological support, the relevant levels of computer literacy and the correct attitude in order to be able to use ICT effectively (Hassler, Hennessy and Lubasi 2011: 28; Hennessy, Onguko, Harrison, Angondi, Namalefe, Naseem and Wamakote 2010a: 56). Computer literacy is an essential variable, which, in the model, allows for perceived ease of use. If one does not have the knowledge of computer usage then it would affect one's attitude to use, and affect the actual system use (Nkosi, Asah, and Pillay 2011: 880).

It is further argued by Wilmer (2007: 207) that there is an increased use of ICT by health professionals including nurses, in an endeavour to improve the efficiency of patient care. The lack of ICT skills, together with insufficient hardware, and the lack of a comprehensive budget, has reflected on the poor ICT use of student nurses in the clinical areas.

These variables affect both the perceived usefulness, and perceived ease of use, and ultimately affect the attitude of an individual and behavioural intention to use a system. Budget allocation will allow for the initial access

and sustainability of access thereafter. In the event that there is no budget allocation or the budget allocation is insufficient, the ability to use the technology will be negatively affected. In order for a system to be used, it requires that there must be support in the use of the system. Support, in respect of technological support, will influence one positively or negatively in the actual use of the system.

2.3.2 Attitude towards ICT

If technology is viewed as being useful, this will affect the attitude of the individual in a positive way. A positive attitude towards use of ICT is influenced by perceived usefulness and this will further result in a change of an individual's behaviour towards ICT usage which in turn improves the actual system usage. Nkosi, Asah and Pillay (2011: 880) found that although nurses have a positive attitude in wanting to use computers, there are challenges which may hinder their ability to use the technology. Some of the challenges included access, lack of computer skills, lack of time, lack of support, and budgetary constraints, all of which, if not taken into consideration, can alter a positive attitude into a negative attitude and also develop resistance in the usage of computers (Figure 2).

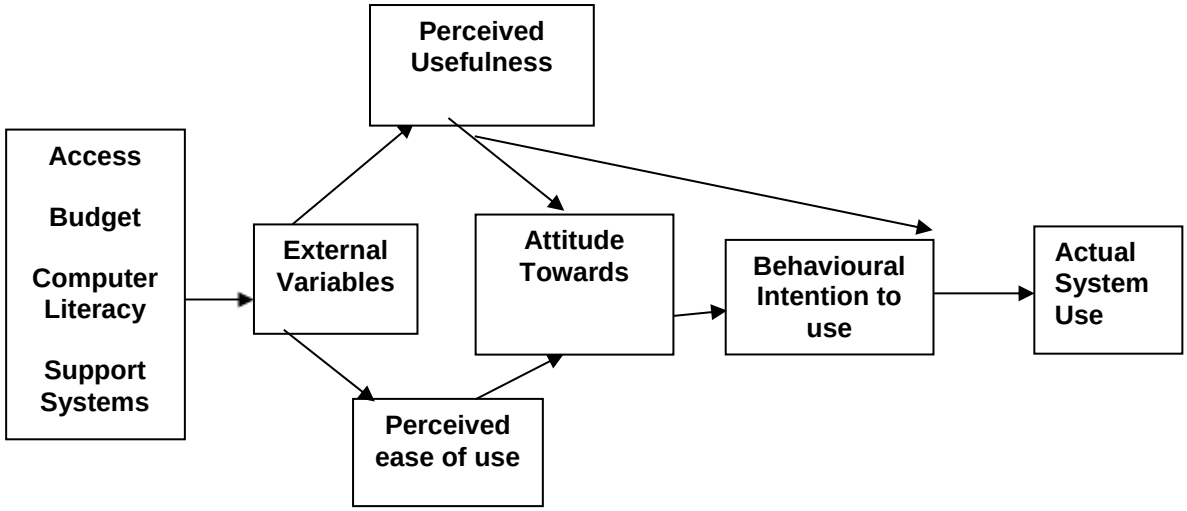

Figure 2: Adapted Technology Acceptance Model highlighting the factors influencing perceived usefulness, and perceived ease of use (Adapted from Davis, Bagozzi and Warshaw.,1989 .

2.4 ICT in Africa

There is paucity of literature on ICT in Africa, especially in nursing education. The advances in technology have restructured university education in the more developed countries, making strategies such as e-learning more available. This is however not the same in African countries, who have still not overcome these challenges (Tagoe 2012: 91). ICT in Africa has its own purposes and challenges in comparison to countries globally. The challenges that prevail will most certainly influence the ability of a country or sector to be able to adopt certain strategies. The uptake of usage of ICT could be hampered in parts of Africa due to the geographical distribution of urban and rural areas and unequal resource allocation. The literature as highlighted by Tagoe (2012: 91), provides good insight into the overall state of ICT use in Africa, which varies, in its degrees of usage.

A survey report by Farrell, Isaacs and Truanco (2007) on ICT and education in Africa highlights in depth the status of ICT usage and development in Africa, including progress and challenges. The report indicates that in Africa

the education sector is prioritised in terms of ICT development and has benefitted the most from the numerous strategies such as the use of the internet and distance education programmes. Throughout the report, the issue of infrastructure, access, cost, and computer literacy is highlighted, highlighting the divide that still exists within the different countries within Africa itself.

Cameroon is a Sub-Saharan African country which has progressed enormously in the use of ICT in the various sectors, including education. Universities, technological and professional training schools are connected to the internet and most of them have media resource centres which are equipped with distance training facilities (Joshe 2007: 80).

In the Democratic Republic of Congo, which is situated in Central Africa, ICT remains largely undeveloped as the country is still unlinked to the SAT3 underwater optic fibre cable (a 15,000 km high performance optic fibre cable linking Europe with South Africa and a number of countries on the West African Coast) and is thus forced to rely entirely on expensive and unstable satellite connectivity.

In the Central African Republic, the plan is to use new and existing technologies to develop connectivity, including internet access, finding appropriate solutions for promoting ICTs adapted to the environment in remote, impoverished, and particularly rural zones, and to find solutions to make access to ICT affordable in regions with low revenue (Fall 2007: 134).

Botswana has very good ICT infrastructure; this is however not well used, with a minority of the population (5%) using internet facilities. A divide in services and access also exists between urban and rural communities. Challenges include high cost of computers, lack of electricity in rural areas, and high cost of internet services. All government tertiary institutions in

Botswana are well equipped with internet enabled computers (Isaacs 2007: 50).

The availability of ICT policies in Algeria may have contributed positively to the availability of ICT resources at all universities. These include ICT facilities for students as well as administrators so these institutions are able to offer open access education by using distance and virtual learning programmes (Hamdy 2007: 14). The challenges in implementing e-learning in Africa include the cost of bandwidth resulting in difficulty in accessing content due to slow connection speed, and non-existence or unreliability of electricity supply. Some of these challenges need to be reviewed in order for e-learning and ICT to be prioritised (Hollow and ICWE 2009: 165).

Developing countries, including those in Africa, have experienced growing student enrolment and increases in the number of academic programmes, along with a declining number of trained lecturers as highlighted in a study conducted by (Edda 2012: 90). The demand for tertiary education in Africa has exceeded the availability of learning resources. These challenges together with the additional challenge of a decrease in the numbers of educators could be alleviated by the expansion of distance learning programmes.

According to Andoh (2012: 47) a study at a university in Ghana revealed that teachers will adopt technology in the classroom if it improves their practice, and does not conflict with their current values and systems. This study is important in understanding the factors which could promote the use of ICT amongst educators in Africa, or even in other areas. Teachers must be given the assurance that technology will enhance their teaching and learning practices, be more enjoyable and add motivation to their students if they are to use it. Providing them with the technology will not influence usage, if they have a negative attitude to the technology.

The dynamic, nature of education necessitates academics and students being able to access the most up to date information in order to be relevant in the academic environment. Access of academics and students to technology is insufficient they require training on how to use the resources. A study conducted at a University in Zimbabwe by Bhukuvhani, Chiparausha and Zuvalinyenga (2012: 21) highlighted the “positive effects of electronic information resources skills training for lecturers on pedagogical practices and research productivity”. The aim of the study was to “investigate the correlation between library information literacy training and increased use of web based resources”. The research results showed a positive correlation between the training and the use of the library as well as an increased rate of publications in journals.

The use of ICT in medical education has increased with the aim of improving the education in this field globally (Williams, Pitchforth and O’Callaghan 2010: 486). A study which has aimed to explore the use of ICT in undergraduate medical education in developing countries clearly indicates that there is still a divide in the ICT infrastructure in Africa. The results of this study provide comprehensive and critical information with regards to the state of ICT use in a health sciences training sector in Africa. The indications are that ICT is being used, and there is enthusiasm for developing this further. The study conducted by Williams, Pitchforth and O’Callaghan (2010: 486) revealed that of the medical schools in Africa (n=53), computer usage in the South African curriculum was amongst the highest. The usage for the preparation of assignments and personal usage was also high, and could be reflected by the higher levels of ownership.

Table 1: ICT usage at medical schools in Africa (Williams, Pitchforth and O'Callaghan 2010).

Region/ Country	Use of ICT for literature search	Teaching computing skills	Owning computers	Use of Public Computers	Use of Computers For Research	Use of computers for assignments
East Africa	81.8%	83.3%	15%	49.4%	60.8%	63.3%
North Africa	46.7%	80.0%	35%	49.4%	47.2%	61.2%
South Africa	100%	100%	45.8%	28%	78.6%	97.9%
West/ Africa Middle	57.9%	47.4%	17.9%	79%	53.8%	40.6%
Total	65.4%	71.7%	27.1%	58.4%	58.1%	60.2%

Table 1 illustrates a divide in the use of ICT at medical schools in Africa, and this can be attributed to amongst other reasons infrastructure challenges, poor download speeds and a lack of the relevant skills base.

Although ICTs are critical in the delivery of educational services, the lack of ICT infrastructure in most African countries remains an obstacle, inhibiting the growth and development of training and educational opportunities (Dzidonu 2010: 17). Regulation has however allowed for major improvements in the last decade or so in the area of ICT. The telecommunication and communications infrastructure of some of these countries is still far from being developed with the rural areas mostly underserved (Dzidonu 2010: 18). It is however noted that the majority of African education institutions have not yet invested in the specialised training of their teachers and staff in the use and of ICT (Dzidonu 2010: 19). The author advises African countries to heed the warning and if skills are neglected in terms of ICT, they will not be able to participate in the benefits brought about by ICT technology in the learning environment.

2.5 ICT in education

ICT if utilised in the correct way has the potential to bring about a positive influence in the teaching and learning environment (Hennessy, Harrison, London and Wamakote 2010b: 40). Governments in Sub-Saharan Africa have identified the role that teacher development can play in uplifting the standard of education and ICT use in the curricula.

Teachers are central to the incorporation of ICT into teaching (Department of Education 2007: 3). The improvement of competency levels of teachers in ICT use must match the need to develop alternative teaching and learning methodologies. Learning occurs through:

a) Learning about ICT, which refers to exploring what can be done with ICT.
b) Learning with ICT, which refers to using ICT to supplement normal teaching processes and resources.
c) Learning through the use of ICT, which refers to utilising ICT to support new ways of teaching and learning.

According to Ndlovu and Lawrence (2012: 06), Du Plessis and Webb (2012: 53) and Hennessy *et al*. (2010a: 47) teachers need to be capacitated to enable them to utilise these skills in their work environment. The literature also suggests that there is a need for on-going training sessions, as well as support in implementation and resources provided from the Department of Education.

Focus must be on giving teachers authentic and relevant experiences with the available tools in their subject teaching contexts, rather than provide them with skills that confine ICT use to the reproduction of old methods that do not develop higher levels of thinking to enhance learning and are no longer relevant in this emerging society (Ndlovu and Lawrence 2012: 21).

According to Ndlovu and Lawrence (2012: 21) and Hennessy *et al.* (2010a: 45) training in the use of the ICT is not enough; one has to ensure that educators are given training that matches the curriculum in order for the learning strategy to be implemented effectively. It is crucial to ensure that together with the development of effective teaching and learning strategies there is the necessary training in the use of the relevant technologies (Department of Education 2007: 03). In order to be effective in the utilisation of ICT in education according to Hennessy *et al*. (2010a: 46), Department of Education (2007: 08) and Hassler, Hennessy and Lubasi (2011: 26), teacher training institutions should review the curriculum of pre-service teachers, in order for them to have reached the knowledge and skills to use a computer and implement the strategies for implementation of ICT in schools. Ongoing skills development and support thereafter is a requirement.

The changes in basic education will therefore pave the way for changes for higher education institutions. The world declaration on higher education sees the potential and the challenge of technology (Berchtold 2012: 42). The rapid breakthrough in new information and communications technologies will further change the way knowledge is developed, acquired and delivered. Higher education institutions in South Africa, according to Jaffer, Ng'ambi and Czerniewicz (2007: 139) and Kinuthia and Rabelani (2008: 625) are under pressure to open up new ways of access for students in order to meet the social transformation goals of education. According to Martey (2004:16) ICT can provide educational resources for people who are not within the proximity of learning institutions, by developing distance learning programmes.

South African universities have made progress as compared to other countries in Africa when it comes to the availability of resources and technology. Kinuthia and Rabelani (2008: 625) state that the top two universities in South Africa making use of technology are the University of South Africa which offers distance education programmes and has

approximately 250,000 enrolled students and the University of Pretoria which has more than 38,000 full time on-campus students, and more than 24,000 off-campus part time and distance learning students. Jaffer, Ng'ambi and Czerniewicz (2007: 140) argue that educational technology can help address teaching and learning concerns in South Africa. This requires leaders in education to be able to redesign educational practices, using technology, according to educational needs.

2.6 ICT in South Africa

South Africa has encouraged the use of ICT innovation and supported this by providing relevant training, and has established appropriate partnerships. The report Isaacs (2007: 47) highlighted the benefits of South Africa having launched the Accelerated and Shared Growth Initiative for South Africa (ASGISA), which represents a concerted effort to accelerate skills development and economic growth. Two priority components of ASGISA are electronic communication as a cornerstone to commercial and social infrastructure development and education and skills development. The report further highlights that the absence of a sound policy promoting ICT use in higher education, may be reflected in the absence of uniformity in South Africa's 24 funded and private institutions in respect to ICT strategies, policies and infrastructure.

South African universities as cited by Naude, Rensleigh and du Toit (2010: 416) are using the web widely and enabling access to the higher education sector allowing high levels of usage amongst academics. The web was identified for its usefulness in being able to access information for both educational and scholarly purposes. The majority of respondents (90%) in their study had access to the web in the past year. The majority of respondents (81%) reported that they found the open web and web search engines useful or indispensable for academic and research purposes. The results of this study highlighted the fact that it is imperative for academics to

have access to up to date information, using a reliable resource, in order for them to be able to function effectively in the academic environment.

The experiences gained by South Africa in their involvement in projects have resulted in at least 22% of computer penetration in all public schools. The state in the schools, college and university sector is also set to expand their access, teacher training and usage (Isaacs 2007: 472).

When assessing the overall situation in South African higher education, however there is still a huge disparity with some institutions having highly advanced ICT systems and learning platforms, and others having no ICT at all (Moll, Adam, Backhouse and Mhlanga 2007: 11). South Africa is, nevertheless, in a better position than others in Sub Saharan Africa, with more access to telecommunication infrastructure.

There is limited literature on the state of infrastructure at South African higher education institutions. Evidence however suggests that the bias based on the inequalities of the past remains in terms of access to computers (Moll *et al.* 2007: 16). The researchers added that the majority of South African students at universities based in the Western Cape still access computers within their faculty of study.

2.7 ICT in nursing in South Africa

The number of studies conducted in the area of nursing and in particular nursing education in South Africa is limited. A survey on IT in education in Africa indicates that South Africa is gradually integrating IT in all aspects of education. This has encouraged significant learning among innovators, practitioners, and policy makers (Asah 2010: 32). Even though nursing is a highly skills driven profession, nurses need to understand the global use of ICT in nursing, and the necessity of adopting its use both in the educational and the clinical setting.

The changes made by computers in the business environment are also impacting on nursing and health care, and health care systems, especially in the way information is used. The internet has made access to information very quick and easy to obtain. Accessing the information via internet and the use of electronic health records has enabled nurses to provide the best possible patient care (McGonigle and Mastrian 2009: 107). Nursing education institutions are expected to change from functioning as per the current status to functioning as higher education institutions as from July 2015 (SANC). All nursing education institutions therefore need to be on par with higher education institutions. The available literature suggests that there are many challenges that nursing education institutions need to overcome in order to reach that level.

According to Maboe and de Villiers (2011: 93), “nurse educators function in a post-industrial, information and communication technology driven world. They are now required to equip student nurses with the skills to provide healthcare services” in an environment which is increasingly incorporating technology. The impact of ICTs is a global phenomenon and the health sector is not an exception (Bembridge, Jones and Jeong 2010: 18). In order to keep up with the trends in education, such as computer assisted instruction and computer based learning, nursing education needs to shift from traditional methods of teaching (Maboe and de Villiers 2011: 96).

Nurse educators have to be mindful of the fact that the students, who are currently in training, will be the future professional nurses who need to master certain skills in order for them to function proficiently. The incorporation of new technology such as simulations would be beneficial to nursing education, as it provides for more opportunities for mastering of skills and provides for realistic learning opportunities, which are learning centred. This strategy may assist nurse educators in providing an innovative approach to the provision of realistic clinical practice opportunities (Jeffries 2006: 164).

South Africa as a country is divided in many aspects including development in the IT world. This to a large extent can influence the manner in which communication as well as education takes place. A study conducted by Asah (2010: 85) highlighted the challenges faced by professional nurses in accessing information technology in healthcare facilities for healthcare delivery in northern KwaZulu-Natal. This study provides very important information in an area where information is very limited, and in a province which has a huge geographical divide. The study found that Northern KwaZulu-Natal is largely rural and is very under-developed with poor infrastructure, high staff turn-over, and lack of access to information. The study further highlighted that IT can be used as a vehicle to enhance health care delivery, and computer literacy is required to be able to use the equipment. The recommendations of the study clearly stated that information technology can play an important and crucial role in enhancing healthcare delivery, particularly in the rural areas where resources are scarce. Therefore, more information technologies (access to computers, internet and intranet services) should be provided to nurses. The study further highlights that nursing college educators are not computer literate and have no access to computers.

Asah (2011: 9) states that “The major transformation taking place in the health-care industry worldwide, as witnessed by the increasing use of information technology, has made being able to use computers critical in nursing”. The traditional methods of rendering nursing care may benefit from the incorporation of ICT in performing certain functions such as patient assessment, health promotion practices, as well as clinical procedures (While and Dewsbury 2011: 1303). South Africa remains challenged regarding adoption of computers in delivering health care, a finding which is in keeping with the development rate in other developing countries. This is even more prevalent in the rural areas. In the province of KwaZulu-Natal factors include lack of access to computers and systems, low levels of computer literacy by

nurses, and inadequate support from management in the use of computers (Asah 2011: 3)

An important study for nursing education was conducted by Nkosi, Asah and Pillay (2011: 879) which examined post-basic nursing student's access to and attitudes toward the use of IT in practice. The study identified that nurse academics and managers need to acknowledge the importance of integrating computer literacy into the nursing curriculum for the purposes of developing adequate skills to function in an environment which is increasing in technology. The study highlighted the factors that hinder use of computers, under five broad headings:

- Lack of computer skills; a lack of computer skills has led to nurses not being able to take advantage of the advancement in IT.
- Lack of access; there is a lack of access to computer equipment, intranet, internet, and passwords, therefore restricting the access.
- Lack of time; there is a shortage of nurses, therefore nurses are overworked and do not have time to use the computer.
- Lack of support; computers are faulty and no support in sorting out these problems.
- Budgetary constraints; cannot buy additional information technology.

In a province such as KwaZulu-Natal, the use of technology in improving access is critical, and the study exploring the use of tele heath, in health sciences education provides information which could impact on educational practices for the future. . Telehealth and telemedicine practices have been made possible through digital technology, providing patients and health care providers with a platform to interact in spite of the physical distance between them. This technology may provide the answer to physical barriers that exist in health care and education. Africa has a health crisis with 24% of the international health burden, but only 3% of health workers (Chipps and Mars 2010: 1). This situation is further compromised by an urban bias in the location of health care providers. A study by Chipps and Mars (2010: 2)

looking at the use of interactive video conferencing as a teaching methodology highlighted the benefits experienced by the educators, as well as the learners in this programme. Educators and learners were satisfied with this teaching methodology, with participants reporting an agreement level of above 75%. This interactive teaching method is set to be utilised in future specialist education training to nurses in rural and remote areas in the area of Advanced Midwifery education in the province of KwaZulu-Natal.

2.8 Reforms affecting nursing education and training in South Africa

The role of nursing students in South Africa has changed immensely. Nursing students primarily were regarded as a service delivery workforce. Their training schedules and allocated training budgets were restricted to service delivery needs, often compromising the nature and quality of education and training (Department of Health 2012a: 21). There is however acknowledgement now that educational and training need is paramount. The primary aim of nursing education is to ensure that the nursing workforce meets the health care needs of the population it serves (Department of Health 2012a: 34).

The Nursing Act 33 of 2005 has established new nursing qualifications which are graded according to the levels as stipulated in the National Qualifications Framework (NQF) of the Department of Higher Education and Training, starting with the lowest at level 5 of the NQF National Qualifications Act 67 of 2008. The SANC, which is a regulatory body for nurses in South Africa has a critical role to play in the training of nurses in the country. The SANC is established by section two of the Nursing Act (Act No. 50. of 1978), and as amended by the Nursing Act 33 of 2005 (Nursing Act, 33 of 2005: 2). Regulations for nurse training programmes are prescribed by the SANC which is also responsible for the accreditation of the nurse training institutions (Nursing Act, 33 of 2005: 30).

According to the Higher Education Act 101 of 1997 and the National Qualifications Act 67 of 2008, nursing education and nursing programmes have to be accredited as higher education institutions to offer education and training. In terms of the amended statutes all qualifications awarded by the NEI's will fall under the jurisdiction of the Department of Higher Education and Training as they are now classified as higher education institutions and must therefore comply with the provisions of the Higher Education Act. One of the criteria, in respect of the higher education qualification criteria for institutional audits, requires that institutions have academic support services e.g. computer support services adequately supporting teaching and learning needs (Department of Health 2012a; Nursing Act 33 of 2005, Higher Education Act 101 of 1997). In keeping with the reforms in higher education, a key priority is to provide access to ICT for students in order to assist them with their learning, and to incorporate ICT competencies into the curricula to improve the competency level of nurses and midwives (Department of Health 2012a: 47).

2.9 Teaching strategies utilising IT

Changes are occurring across education sectors around the world as cited by Barnard Nash and O'Brien (2005: 507). The current formal educational system was first established in the mid-19th century in an industrial society, and was designed to deliver only basic knowledge and skill. The working force the education system targeted needed repetitive knowledge (Papić and Bester 2012: 131). This changed in the 20th century when the quantity of knowledge transferred from education practitioners to learners expanded, but was however still designed according to the principle "one size fits all" (Papić and Bester 2012: 132).

It is becoming more evident today that individuals have more talents, character and interests. This then produces a gap between what is actually provided in terms of education, and the demand. The gap created can be

answered by modern ICT, including social media, which is being used increasingly for educational purposes (Selwyn 2009: 15; Lampe et al. 2011: 331; Aydin 2012: 1097).

The Australian higher education system has been restructured over the last two decades, with some of the changes including curriculum development. Competency in information literacy is preferred by most university graduates. The increased use of digital and online technologies has influenced the university curricula.

The changes that are taking place in healthcare across the globe has made it necessary for nurses in education and clinical practice to become ICT literate (Barnard, Nash and O'Brien 2005: 508). The American Association of Colleges of Nursing, the National League for Nursing, and the Institute of Medicine, all of which form the major forces in professional health care and nursing education in America, advocate the incorporation of technology in nursing education (George, Davidson, Serapiglia, Barla and Thotakura 2010: 371).

Barnard, Nash and O'Brien (2005: 508) say that it is "essential for undergraduate nursing students to develop a sound knowledge of information literacy skills". The benefits in having information literacy skills are however only being recognised now, as important in the development of critical thinking skills. The authors go on to say: "It is essential that the future curricula of basic nursing programmes reflect the concepts of the role of information technology in supporting clinical care delivery". Nursing education needs to be on a par with all other education sectors.

Current learning trends place the student at the centre of the teaching learning process thereby making them active knowledge seekers rather than passive receivers (Zurmehly and Leadingham 2008: 265). This trend is supported by the use of educational and information technology in which the lecturer is displaced to the role of facilitator. Universities have developed their curricula according to the increased technology needs in the workplace

environment, according to Barnard, Nash and O'Brien (2005: 506). It is further argued, that information literacy skills enhance the growth of critical thinking and problem solving whilst providing an important expertise for lifelong learning.

The rapid rate in which technology is developing, together with changes in medical information, has increased the use of web-based teaching and learning during the past decade (Bradshaw and Lowenstein 2007: 279).

In preparing students for the current work environment, there is a need for both students and learners to be able to keep up to date with the latest information, so that they can develop the skills of critical thinkers, and be problem solvers. Web-based instruction provides a variety of educational tools to broaden the scope of learning experiences and prepare students to function optimally in a technologically rich healthcare environment. Being connected through online communication has become a feature of modern life (Bradshaw and Lowenstein 2007: 131). Most institutions of higher education have invested in advanced learning technologies such as learning management systems and simulation technology to advance educational goals and meet the needs of students.

It is further argued by Bradshaw and Lowenstein (2007: 316) that undergraduate nursing students possess various learning styles which can be catered for by using the skills laboratory which can provide a rich learning experience for all types of learners. Whether the student learner is self-directed or takes a more dependent approach, the faculty can individualise instruction based on each student's abilities and learning style. Skills labs must take on a new look that replicates the hospital environment and simulators are utilised in the place of patients. It is further noted in this study that opportunities for learning skills in the clinical environment continue to decrease due to fewer clinical placements available in healthcare institutions. This together with the need for a skilled workforce encourages the

development of skills laboratories for the development of skills ranging from the basic, to the complex. Student nurses need to be equipped with the relevant skills, in order for them to be able to provide safe and efficient patient care, in keeping with the health care demands (Bloomfield and Jones 2013: 1605).

Computer technology, if used effectively, can provide resources for lifelong learning in nurses. The changes and advances in the nursing practice area need to be reflected in the classroom, by adopting the use of technological trends which will be of benefit to the nurse (Jeffries 2005: 3). There is a need for more effective and realistic clinical models of education to be developed. The competition that exists for clinical facilities, together with the need that exists, requires alternative strategies of providing clinical learning opportunities (Jeffries 2006: 161).There is a need to develop nursing education pedagogies by critically examining the teaching strategies available in the light of which is most effective. This is necessary and would involve students as well as teachers in analysing the implementation of new strategies, to check for effectiveness (Brown *et al*. 2009: 154). The competence level of students can be uplifted in preparing them for actual patient care by the use of strategies, such as simulation laboratories (Jeffries 2006: 161).

An important study for nursing education which provides an opportunity for comparison of student experiences while studying the same content over the same index period, with the main difference being the mode of delivery, was conducted by Mgutshini (2013: 63). Fifty-three four year pre-registration baccalaureate nursing programme students all enrolled on a psychiatric nursing course took part in this study. Out of the 53 students who completed the data collection questionnaires, 23 belonged to the campus-based course whilst 30 were registered on the online class. The findings from this study showed that online or e-based learning has comparable academic outcomes to traditional face-to-face alternatives.

Simulation, which is defined as a “near representation of an actual life event”, can be very beneficial in the preparation of nursing students for their role in the clinical field, and in reducing anxiety levels in these students (Khailaila 2014: 252). Simulations can be presented through different methods which may or may not need ICT. The findings of a quantitative study using the methodology of simulations demonstrated reduced anxiety levels, improved self-confidence, caring ability and caring efficacy among nursing students (Khailaila 2014: 257). This reflects positively on the appropriateness of using simulations as a teaching method for nursing students.

2.10 ICT in performing administrative functions of an academic institution

Records management, or records information management, is the professional practice or discipline of controlling and governing what are considered to be the most important records of an organisation throughout the records’ life-cycle (Chinyemba and Ngulube 2005: 2).

Proper record management is an integral part of administration processes of an organisation. The mismanagement of this area will lead to an inadequate flow of information and lead to the inability of an organisation to function effectively. The effect of this could result in unnecessary duplication, or even legal issues all of which have a cost implication (Chinyemba and Ngulube 2005:3). Proper records management protocols are practiced by the University of Kwazulu-Natal which has a system in place for the management of their records, using a framework, which is guided by policies and creates an environment that allows for proper records management.

According to Visser, Van Biljon and Herselman (2013: 1) management information systems are essential in the efficient and effective running of Further Education and Training (FET) colleges. The South African National

Department of Education has committed to the establishment of a standardised business management information system in all public FET colleges that will enable colleges to monitor and account for all their administrative business processes which include student administration, academic administration, financial administration, human resource management and development and asset management.

The eHealth Strategy South Africa (Department of Health 2012b) outlines the need to meet certain principles in order to strengthen e-health in South Africa. There is a need to get the basics right, in terms of infrastructure, connectivity, basic literacy, human resources and affordability planning. The main aim of the e-health strategy is to develop, implement, and strengthen management information systems which will strengthen record management in government institutions, in line with the World Health Organisation recommendations.

2.11 Summary

The literature reviewed clearly illustrates that the uptake of ICT is inconsistent in the different continents and countries. This has led to a digital divide, especially in areas of Africa, where infrastructure appears to be one of the major challenges contributing to the increased cost and low levels of uptake in the usage of ICT.

It is evident that all sectors globally are being influenced by the uptake of ICT. The acceptance of the usage of the technology may be influenced by various factors such as access, computer literacy, budget allocations, and technological support. These factors affect the perceived ease of use, and the perceived usefulness, of the technology, and ultimately determine the individual's usage of the technology.

Education in general is influenced by ICT and the trend is to incorporate this technology into the teaching/learning environment. The benefit of incorporating the use of ICT at school level has been established, through the many studies that have been conducted. The benefits of integrating computer training into undergraduate teaching programmes, is deemed necessary. Many studies have shown that the growing student enrolment in tertiary education, especially in Africa, could benefit from the technology of e-learning systems.

The emerging development of the science of nursing education to document the effectiveness and meaningfulness of reform efforts has promised a dramatic change in how students are educated (Brown *et al*. 2009: 154). In order for nursing education to be more effective, relevant and produce a more competent workforce, there has to be the incorporation of new technology such as simulations of clinical practice, interactive learning; and student centred approaches, to experience realistic clinical experiences.

The area of nursing practice is incorporating more technology into health care, due to the transformation that is taking place. This is however happening at a slower pace in the rural areas of KwaZulu-Natal due to amongst other factors the fact that nurses are sceptical about the use of the technology. There is a need for nursing education to be on par with nursing practice in order for nurses to be able to function adequately in the clinical area.

In the field of nursing education, institutions need to be on par with the general trends in education, and can derive great benefits from the use of information and communication systems. The use of more interactive learning, coupled with realistic simulations of clinical practice could potentially boost the competency levels of the graduate nurse, by allowing for more effective communication and more opportunities to practice their skills in a controlled environment. In South Africa there are changes that are occurring

in the nursing education sector which require all nursing education institutions to function as higher education institutions, requiring changes to be made urgently to be ready for this.

The literature review highlights the potential benefits of usage of ICT systems in order to optimise functioning of educational institutions in all aspects.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter describes the research design, research setting**,** population and sample, instruments including validity and reliability, process of data collection, ethical considerations and data analysis.

3.2 Research design

This research study followed a quantitative approach Burns and Grove (2007: 17) defined quantitative research as the discovery of new meaning, description of what exists, and the frequency with which something occurs. To achieve the aims and objectives of this study a once off cross sectional study was conducted, which is the collection of data during a single period of data collection. The researcher adopted this approach in order to determine what exists, in terms of the usage of ICT at the KZNCN.

3.3 Setting

The setting according to Burns and Grove (2007: 29) is the location in which a study is conducted. The research was conducted in a natural setting in which the researcher did not manipulate or change the environment for the study.

In KwaZulu-Natal the KZNCN is the public training college for nurses in the province (SANC 2005). The College is run by the KwaZulu-Natal Department of Health and has 11 campuses and 14 sub-campuses which are located in nine of the eleven districts of the Province. The location of the institutions varies from urban to deep rural and distributed in the northern and southern regions within the province (Figure 3). The southern region comprises the

more urban areas, while the northern region comprises the more rural areas. For the purposes of ensuring anonymity in this study, the campuses were coded from A-K. The KZNCN is responsible for administering all aspects of the training of these students, including the examination processes, in line with the SANC rules and regulations.

The training of nurses in this province is mandated through the National Health Act, 61 of 2003. The KZNCN is managed by a head office which is situated in Pietermaritzburg, has 11 campuses, and 14 sub-campuses.

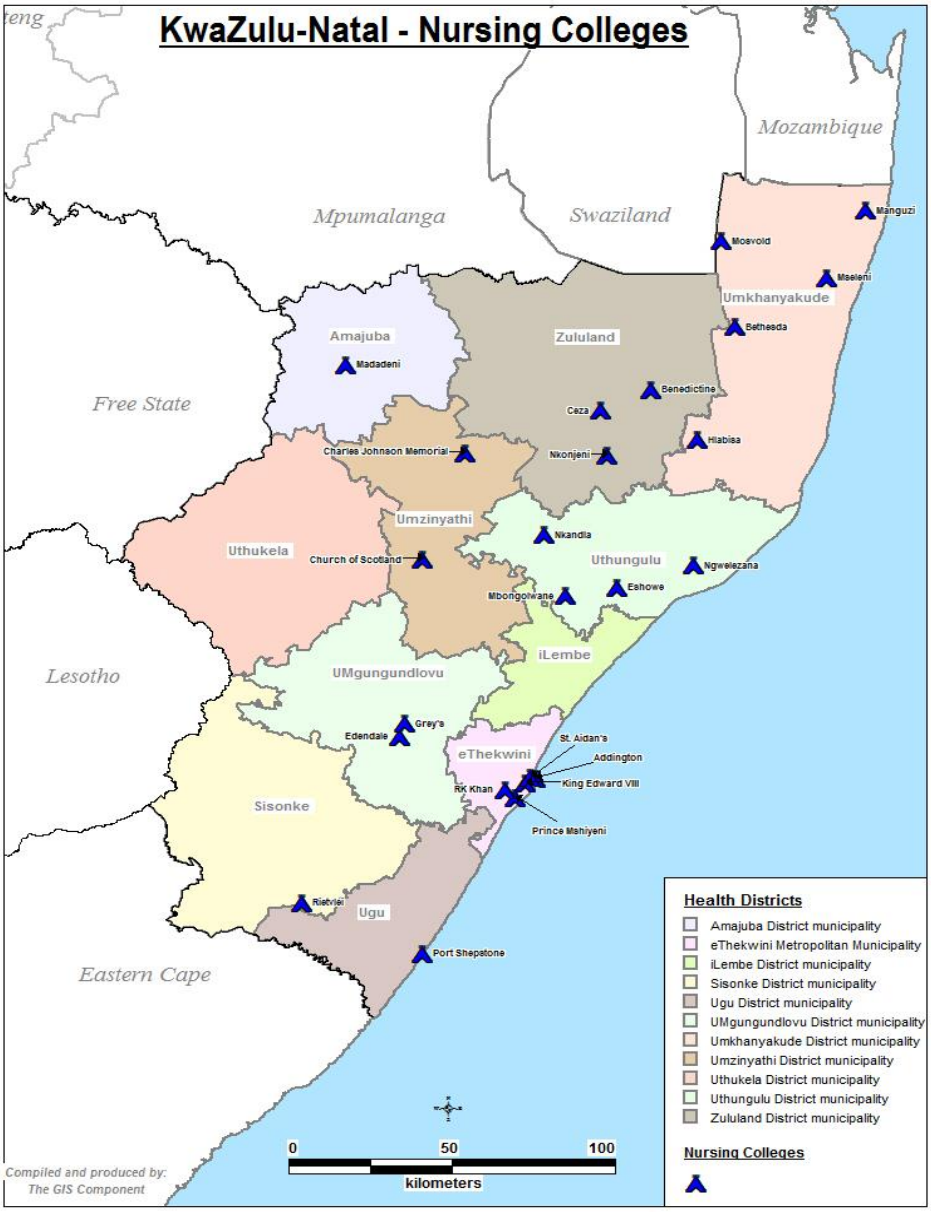

Figure 3: Map indicating location of campuses of the KZNCN (www.kznhealth.gov.za).

The training programmes offered by the KZNCN include the R425 (4 year diploma), the R212 (specialist training programmes) and the South African Nursing Council programme (SANC). The R425 and the R212 programmes are fully managed by the KZNCN, while the training programme and examination system of the SANC programmes and are managed by the South African Nursing Council.

Historically the training of nurses was managed by public hospitals. Nurse training took place in nursing schools, which were attached to hospitals. The hospital Matron, who was responsible for ensuring that patient care was provided, was also the one who took responsibility for nurse training. There has always been the need to balance the priorities between patient care needs, and other areas of need, which included nurse training.

The evolution of nurse training in South Africa in July 1985, and within the KwaZulu-Natal Department of Health in 1986, meant that the campuses and sub-campuses were accredited as the providers of nurse training SANC R425 (1985). This brought about some change, which then enabled the appointed principals to be more in control of the needs for nursing education, within their institutions. Resources that were required for the optimum training of nurses were given more priority than previously within the budget allocations, which were still made from the hospital budget.

In 2005, nurse training in public colleges in KZN changed completely when the KZNCN was accredited as the public nurse training college for the province of KwaZulu-Natal. The KZNCN being the custodian of nurse training in the province was therefore responsible for ensuring that quality teaching and learning took place in an environment which ensured competent and critical thinking nurses were produced, to be able to provide optimum patient care during and after their training. The nurses graduating from the KZNCN

were competing at the same level as nurses graduating from other higher educational institutions.

In order for nurses to service a health sector which is now being increasingly supported by information technology, their training should equip them with the necessary skills and attributes. Anecdotally, the KZNCN has limited use and access to ICT. This necessitates the need to establish whether the KZNCN has kept up with the changes in the higher education environment in respect of IT usage.

3.4 Population and Sample

Once the population was identified, a multistage sampling was followed for the sampling of campuses, and categories of participants (Agresti and Finlay 2008).

3.5 Population

A population is the entire set of persons (or elements) who (or that) meet the inclusion and exclusion criteria (Burns and Grove 2007:324).

Participants were recruited from all campuses of the KZNCN which offered the R425 and R212 programmes.

At the first level the population of campuses which made up the saturated sample consisted of the 11 campuses of the KZNCN. The participants which included students, academic and administrative staff were then sampled from each of the campuses of KZNCN. The study focused on academic staff and administrative staff who were employees of the KZNCN, and students who were registered as students in the R425 and R212 programmes of the KZNCN.

Table 2 details the population and sample of academic and administrative staff and students from each participating campus of the KZNCN, using the Cochran's formula and indicates the minimum sample required for the study using random sampling.

Table 2: Population and sample size for each category of participant from each of the 11 campuses of KZNCN-(Statistics Kwa-Zulu-Natal College of Nursing 2012).

CAMPUS	No. Academic Staff	Sample Size	No. Admin Staff	Sample Size	No of Student	Sample Size
Au	29	16	3	3	320	38
Bu	24	13	3	2	320	38
Cu	24	13	3	3	200	24
Du	40	22	3	3	320	38
Eu	27	16	3	3	250	30
Fr	39	19	3	3	200	24
Gr	37	20	4	4	320	38
Hr	24	13	2	2	200	24
Ir	30	16	3	3	320	38
Jr	32	17	3	3	200	24
Kr	20	11	2	2	200	24
TOTAL	**326**	**176**	**32**	**31**	**2730**	**340**

The academic staff included the principal, heads of departments, as well as the lecturers, while the administrative staff included the registrar, as well as the general administrative staff of the campuses, and students included the R425 students from 2nd to 4th year as well as the R212 students across all programmes.

3.5.1 Sampling Academic staff

The fish bowl random sampling method was used to sample academic staff members. The technique involved putting the names of all academic staff in a bowl, one campus at a time, and drawing out the required numbers to be sampled.

3.5.2 Sampling of Administrative staff

All administrative staff members who were available at the time of this research were invited to participate. A total of 32 participants were obtained due to the fact that some of these members had either resigned or retired from work.

3.5.3 Sampling of Students

The sampling strategy utilised to sample student, was systematic sampling. The students from the 2nd, 3rd, and 4th year of the R425 programme and the R212 programme were sampled using a sampling frame. Every second student was selected from the list of students per campus, until the required sample was obtained.

3.6 Data collection instruments

Three questionnaires were developed, one for each category of participant, due to the limited previous research related to this topic. The questionnaires were constructed in English. There was no need to translate these, as the population understood the language. Questions were mainly closed-ended with some open- ended questions. Questions were designed according to the specific themes of the aims and objectives of the study.

The questionnaire for academic staff had seven sections (see Appendix H1). The total number of questions was 28. The questionnaire focused on demographics, access, usage, computer literacy, support related to information technology, teaching, learning and communication strategies using information technology and rating of ICT at KZNCN in relation to higher education institutions.

The questionnaire for students had six sections (see Appendix H2). The total number of questions was 28. The questionnaire focused on demographics, access, usage of online library and communication systems, computer literacy, and support related to information technology, teaching, learning and communication systems using information technology and rating of ICT at KZNCN in relation to higher education institutions.

The questionnaire for administrative staff had six sections (see Appendix H3). The total numbers of questions were 23. The questions focused on demographics, access, usage, computer literacy, support related to information technology, communication systems, and rating of ICT at KZNCN in relation to higher education institutions.

The questionnaires of all three groups of participants had certain similar questions, in order to explore how the issues affected the different groups of participants. In comparison to the student questionnaire, the academic and administrative staff questionnaires focused more on usage, as this affects their functioning. The academic and student questionnaire focused on teaching and learning strategies, which was not included in the administrative staff questionnaire. All three questionnaires however included questions on access to ICT, computer literacy, support related to information technology, communication systems, and rating of the KZNCN in relation to higher education institutions.

3.6.1 Validity of the instruments (content validity)

It is common to use a panel of experts to evaluate the content validity of new instruments, comprising at least three experts (Polit and Beck 2012: 337). For the purpose of this study the validation was carried out using an expert group which consisted of four members. The members included two academic staff of the KZNCN, the web administrator of the KwaZulu-Natal Department of Health, and an experienced researcher who has conducted

studies on use of ICT by health care workers. The academic staff completed the questionnaire in order to check for clarity and understanding as well as for any omissions which could affect achievement of the aims and objectives. The role of the web administrator and researcher was to check the clarity in terms of the questions asked in relation to the objectives, and understanding of the participants. A statistician was consulted to ensure the questionnaire measured what it was intended to measure. Written feedback was received from each member of the expert group. The feedback received from the expert group was used to refine the questionnaires. The changes that were made included grammar corrections, correction of age ranges, further expansion of the rating scales to promote a better understanding of what the numerical values meant (see Appendix: A).

3.6.2 Pilot study

A pilot study was conducted to test reliability of the instrument and assist the researcher to identify areas in the questionnaire that were not meeting the objectives, or that needed to be re-structured. All three questionnaires were piloted using a sub-campus of the KZNCN that was not included in the final study. The findings included some grammar errors which were corrected to refine the student questionnaire. Feedback from the groups that participated in the pilot study expressed understanding of the instructions and the questions contained in the questionnaire. The questionnaires were also checked for completeness, to further check if the questions had been understood (see Appendix A).

3.6.3 Reliability

This is a measure of consistency overtime. An instruction sheet and consent form was used by the researcher, which ensured that all the instructions were uniform. No other information was provided to the participants. All

participants were required to fill in a consent form and allowed to fill in the questionnaires in their spare time, to allow for uniformity.

3.6.4 Data collection

The process of data collection only commenced once the researcher had obtained approval to conduct the research from the Durban University of Technology Institutional Research Ethics Committee (Appendix C1). A letter of support to conduct the study was obtained from the principal of the KZNCN (Appendix D) and the principals of all campuses involved in the study (Appendix E1-E11). Gatekeeper permission was obtained from the knowledge and research management component of the KwaZulu-Natal Department of Health (Appendix F)

From an ethical point of view, participants have a right to privacy, the right to anonymity and the right to assume that the data collected will be kept confidential (Burns and Grove 2007: 209). To ensure anonymity the researcher assigned codes for each campus, using the letters A-K. Each questionnaire was numbered, with no personal information of the participant appearing on the questionnaire. The questionnaires were forwarded to the campuses by inter-campus mail or by the researcher as was convenient and necessary since the required sample size was not achieved at all campuses on the first attempt, and more questionnaires were required to be distributed to reach the required sample size. The students undergoing training in these programmes are placed in various areas of the clinical practice except for the period of their theoretical block. The procedure of data collection was explained in a letter to each campus principal (Appendix G). The principals and lecturers at each campus were requested to assist in distributing the questionnaires due to the wide geographical distribution of the campuses.

Informed consent was obtained from all participants (Appendix B2). An individual had a right to voluntarily participate in the study, without any risk of

penalty, and was free to withdraw from the study at any time. Participants were given adequate time to complete the questionnaire. The information provided to the participants contained both the researchers' and the supervisors' contact details, should the participants have any areas that needed clarity (Appendix B1).

Questionnaires were left at the campuses, for a period of three weeks with a weekly follow up from the researcher to check on progress. There were some campuses, where the students were not accessible during this period, and questionnaires had to be left for a longer period, in some instances for up to three months. The completed questionnaires when received were stored in a locked cupboard, with only the researcher having access, for the purpose of capturing the data onto a spread sheet. The data collection took approximately four months.

3.7 Data analysis

The data from the completed questionnaires was captured and analysed using SPSS (Statistical Package for Social Sciences) version 20. Descriptive statistics including means and standard deviations were computed.

The Chi square goodness of fit test was performed, which is a univarite test, used on categorical variables to test whether any of the response options was selected significantly more often, or less often, than others. The Wilcoxon Signed Ranks test was used to test whether the average value for each variable was significantly different from a value of 3 which is the central score for Likert scale questions. A p-value of 0, 05 was used throughout to indicate significance. Data was displayed in the form of tables and graphs. The qualitative questions were reviewed to establish the common trends that were being reported, and these were captured.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter provides the graphic and tabular presentation of the results. The data for academic staff will be presented first followed by those from learners and then the administrative staff. Finally a section will show a comparison of the critical variables between the groups. This arrangement will allow a flow of information.

4.2. Response rate from academic staff

The response rate from the academic staff was 79.6% (176/221). Table 3 shows the response rate from each of the campuses that participated in the study.

Table 3: Response rate from academic staff by campus and setting, gender and age (n=176).

CAMPUS	No. per campus	No. Invited	No. of respondents (%)	Respondents Female (%) Number	Age < 40 Number	Age 41-60 Number
Au	29	20	16 (80)	15 (93.8)	0	16
Bu	19	17	13 (76.4)	11 (84.6)	4	9
Cu	24	17	13 (76.4)	12 (92.3)	1	12
Du	40	25	22 (88)	20 (90.9)	4	18
Eu	27	20	16 (80)	16 (100)	0	16
Fr*	**39**	**25**	**19 (76)**	**18 (94.7)**	**0**	**19**
Gr*	**37**	**25**	**20 (80)**	**20 (100)**	**2**	**18**
Hr*	**24**	**17**	**13 (76.4)**	**12 (92.3)**	**5**	**8**
Ir*	**30**	**20**	**16 (80)**	**16 (100)**	**2**	**14**
Jr*	**32**	**20**	**17 (85)**	**17 (100)**	**0**	**17**
Kr*	**20**	**15**	**11 (73.3)**	**11 (100)**	**2**	**9**
Total rural campus			**96 (54.5)**	**94 (97.9)**	**11**	**85**
TOTAL	**326**	**221**	**176 (79.6)**	**168 (95.5)**	**20 (11.4)**	**156 (88.6)**

***Indicates rural campuses**

More than 50% of the respondents were from rural campuses. Females made up 95.5% of the respondents, and the 88.6% of respondents were between the ages of 41-60.

4.2.1 Frequencies of respondents with different levels of computer literacy

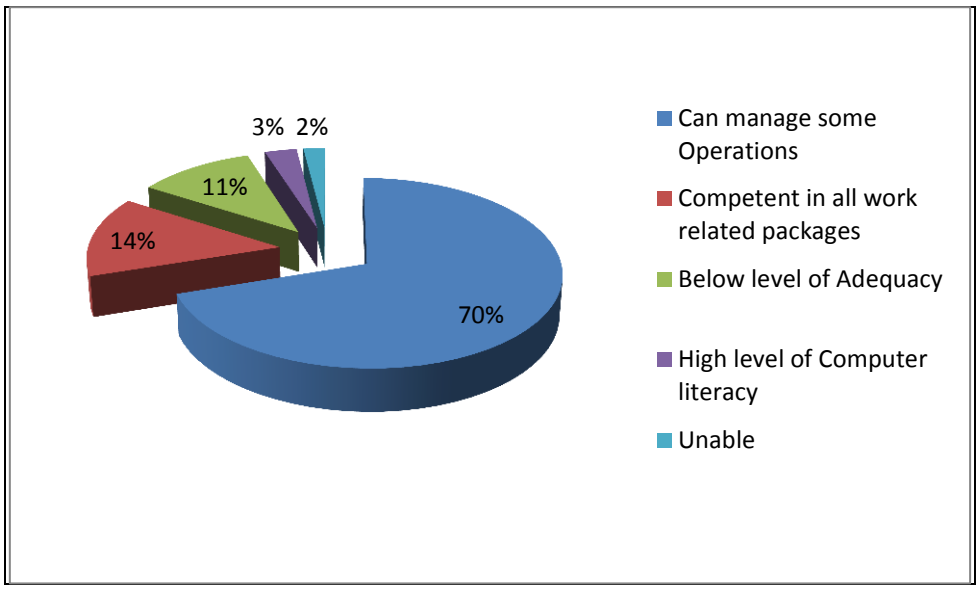

Figure 4: Frequency of academic staff with different levels of computer literacy.

Figure 4 shows the percentages of academic staff with different levels of computer literacy. Three percent of respondents possessed a high degree of competency and 2% no competency at all. Seventy percent of respondents can manage some computer operations. Only 66% of the respondents indicated that they have had access to computer training (p=0.001).

Table 4: Positive responses on access to office devices and services.

Equipment	Urban (%) (n= 80)	Rural (%) (n=96)	P*
Desktop computer	77 (96)	83 (86)	0.024
Laptop computer	28 (35)	16 (17)	<.001
Data projector	40 (50)	24 (25)	<.001
Photocopier	55 (69)	61 (64)	0.47
Scanner‡	45 (56)	28 (29)	<.001
Printer‡	57 (71)	65 (68)	0.61
Electronic library	36 (45)	19 (20)	<.001
On line Access	%	%	
Computer	60 (75)	65 (67.7)	0.29
Laptop	43 (53.8)	35 (41.7)	.110
Cellular phone	32 (40)	35 (41.7)	.288
Tablet	1 (1.3)	8 (9.4)	.020

***p values show differences between urban and rural responses**
‡ devices that work off an ICT system

4.2.2 Access to technological devices academic staff members

Table 4 shows responses with regard to the access of the academic staff to office ICT equipment. The majority of the respondents had access to a desktop computer, photocopying and printing facilities. Most of the staff did not have access to the other necessary office devices. Respondents in urban campuses reported more access to devices that should be routinely available to academic staff. Significantly more respondents in rural campuses had access to online facilities via a tablet. It is interesting to note that online access was poor in all categories and settings.

Table 5: Access to online information – urban versus rural campuses

Information	Urban% (n= 80)	Rural % (n= 96)	Total %
KZNCN Policies	52.5	47.5	50.6
KZNCN Procedures	36.3	41.7	39.2
Student Information	26.3	33.3	30.1
Relevant Updates affecting nurse training	51.3	33.3	41.5
Changes to Course rules and regulation	26.3	31.3	29

Table 5 shows that overall less than 50% of all respondents have access to crucial information that affects the delivery of their programmes. Less than a third of respondents indicated that they have access to changes to course rules and regulations**,** and student information. Significantly more urban academics indicated that they have online access to relevant updates affecting nurse training than rural academics (p =.016).

4.2.3 Access to internal and external search facilities

Sixty two percent reported access to the internal search facilities as compared to those who did not (p=.007), 36% reported access to external search facilities compared to those who did not have access to these facilities (p=.0005) and 14% reported access to off campus search facilities as compared to those who did not (p=.0005). A significantly higher frequency of urban participants 44% have access to external search facilities, compared to 29% in rural campuses.

4.2.4 Frequency of usage of computers

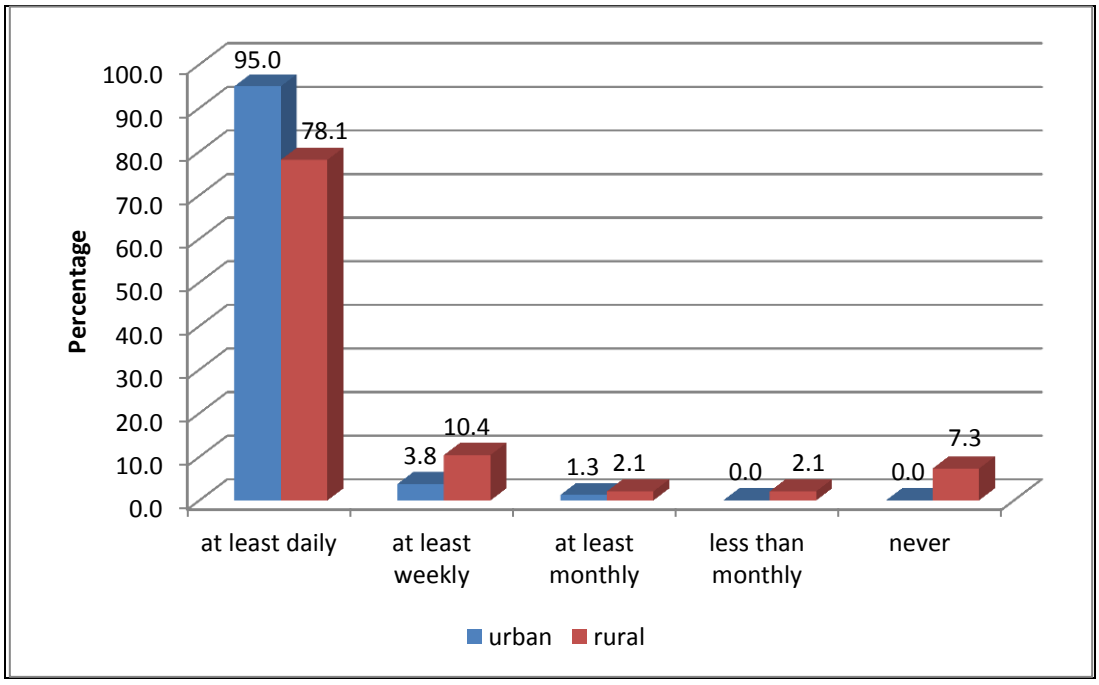

Figure 5: Frequency of usage of computers by academic staff members.

As can be seen from Figure 5 the majority of respondents from the urban and rural campuses use a computer daily at work. About 7% from rural campuses never use a computer at work compared to 0% participants from urban campuses.

4.2.5 Usage of the online library

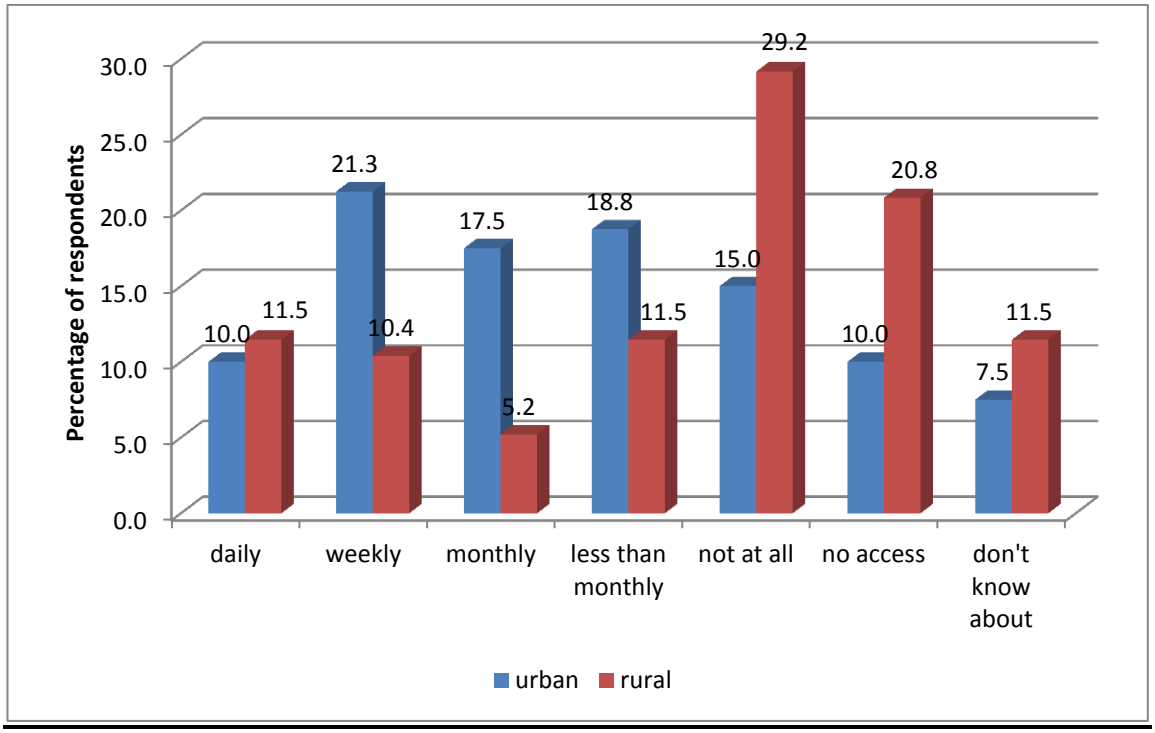

Figure 6: Proportion of respondents using the online library in urban and rural campuses.

As can be seen from Figure 6 a significantly higher number of urban participants (49%) indicated they accessed the online library on a daily, weekly and monthly basis, as compared to rural participants (27%). A significant percentage of the rural participants did not access the online library at all, had no access, or did not know about the facility (61%).

4.2.6 Support for use of technology

A significant majority of respondents reported that they were not supported by the ICT help desk, and or budget for upgrading IT systems at their campus and these did not meet their needs(p= <.0005).

4.2.7 Social media as communication systems

Respondents were requested to indicate the most useful means of communicating with their students. Rural and urban academics found the SMS, followed by emails, and Facebook to be useful as a means of communication. Fifty-eight percent of respondents from rural campuses, and 43% from urban campuses rated having access to SMS as extremely useful. This was followed by 31% of rural respondents, and 43% of urban respondents rating email as an extremely useful communication tool for communicating with students, while 15% of rural respondents and 23% of urban indicated that Facebook was extremely useful. Respondents from both rural and urban campuses did not feel that Twitter and blogging were important communication systems with a combined 16% rating for Twitter and 12% rating for blogging as essential communication tools.

4.2.8 Electronic access for student support functions

Table 6: Positive responses to the availability of electronic access for student support functions.

Online System	Urban (n=80)	Rural (n=96)	Total (n=176)	P
Online submissions of assignments	2 (2%)	1 (1%)	3 (1.7%)	.0005
Online testing of students	0(0%)	1 (1%)	1 (0.6%)	.0005
Application for exam re-marks	8 (8%)	7 (10%)	15 (8.5%)	.0005
Application for special examinations	7 (7%)	8 (10%)	15 (8.5%)	.0005
Announcement of events of the KZNCN	19 (20%)	20 (25%)	39(22.2%)	.0005
Announcements of achievements of the KZNCN	9 (9%)	11 (14%)	20(11.4%)	.0005
Announcement of clinical and educational updates	12 (13%)	18 (23%)	30(18.2%)	.0005
Tracking of academic progress	6 (6%)	8 (10%)	14(8.0%)	.0005

***p values for total access**

Participants were requested to indicate which electronic system they have access to for engaging in student support. As can be seen from Table 6 less than 10% of the respondents had the IT support to perform key subject support functions listed in the table above. However participants rated it important to have access to all the online systems for student support. A high percentage of respondents indicated that they do not have sufficient online systems available to manage student support functions. A total of 92% of respondents indicated that they do not have electronic systems available for the tracking of academic progress of students. About four fifths of the respondents indicated that there is no system available for the announcement of clinical and education updates, which is a critical aspect of any educational programme. There was no significant difference between the responses from rural and urban campuses.

4.2.9 Teaching methods utilised

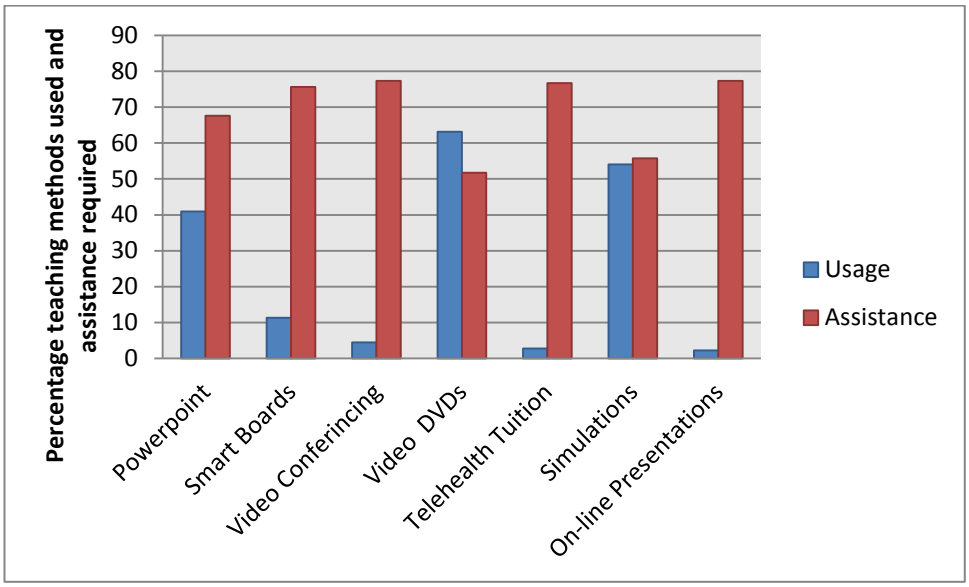

Figure 7: Responses regarding teaching methods utilised at all campuses versus assistance required for utilisation of teaching methods.

Figure 7 shows that the majority of respondents (60%) do not use technology to teach their subjects (p=.007) with there being no significant difference between rural and urban respondents. The majority use of technology was videos, Dvd's and simulations as reported by both rural and urban respondents. About 40% use power point. A significant (p=<.005) majority of respondents stated that they needed assistance in order to be able to utilise the different teaching methodologies using technology compared to those who did not. The use of power point was reported more by urban respondents (47%) compared to 35% of rural respondents.

4.2.10 Qualitative data

Respondents compared the ICT available at the KZNCN in relation to other higher education institutions. A significant 82% of participants felt that the KZNCN lagged behind in terms of ICT. Fifteen percent of respondents indicated that they were not aware of what goes on at other institutions. Respondents further highlighted that they were not well supported in terms of ICT in delivering a highly significant training programme. It was further stated that computer training was vital to them in performing their role effectively as academic staff.

4.3 Student Results

4.3.1 Response rate

The response rate from the students was 89%. Table 7 shows the response from each of the campuses that participated in the study. The majority of the respondents were female (76.5%) and were below the age of 31 years (77%).

Table 7: Response rate by campus and setting (n=340).

Campus	No. of students at campus	No of students invited to participate (%)	No. of respondents (%)	Female (%)	Age <31 No.	Age 31-40 No.	Age 41-60 No.
Au	320	45(14)	38(84)	37(97)	36	2	0
Bu	320	45(14)	38(84)	36(95)	31	7	0
Cu	200	30(15)	24(80)	12(50)	22	2	0
Du	320	45(14)	38(84)	26(68)	32	4	2
Eu	250	33(13)	30(90)	24(80)	6	13	11
Fr*	**200**	**30(15)**	**24(80)**	**17(70)**	**21**	**3**	**0**
Gr*	**320**	**45(14)**	**38(84)**	**28(73)**	**37**	**1**	**0**
Hr*	**200**	**30(15)**	**24(80)**	**19(79)**	**16**	**8**	**0**
Ir*	**320**	**45(14)**	**38(84)**	**28(74)**	**31**	**7**	**0**
Jr*	**200**	**30(15)**	**24(80)**	**15(63)**	**14**	**9**	**1**
Kr*	**200**	**30(15)**	**24(80)**	**18(75)**	**17**	**6**	**1**
Total rural campus	**1440**	**210(15)**	**172 (50. 5%)**	**125 (72.7%)**	**136 (65%)**	**34 (16%)**	**2 (1%)**
Total	**2850**	**378 (13%)**	**340 (89.9%)**	**260 (76.5%)**	**263 (77.3 %)**	**62 (18.2 %)**	**15 (4.4%)**

***indicates rural campuses**

As can be seen from Table 7 about 50.5%, (172/340) of the respondents were from rural campuses with 72.7%, (125/172) being female, and 77,3%, (263/340) of the total respondents less than 30 years of age.

4.3.2 Access to technological devices

Table 8: Positive responses on access to office devices and services by students

Equipment	Urban % (n=168)	Rural % (n=172)	Total % (n=340)
Desktop computer	22	22	22.4
Laptop computer	4	6	5.6
Learning Area Network	19	12	14.7
Photocopier	62	37	47.4
Scanner	14	4	8.2
Printer	37	25	30
Electronic library	25	23	23.8

Data in table 8 shows that the access by students to desktop computers is statistically low (p=<.0005). Twenty-five percent more students from urban campuses have access to photocopying facilities compared to those from the rural areas (p<.0005), and scanning facilities (p=.002).

Table 9: Positive responses to access to online facilities per campus by students.

Access to Online Facilities	**Urban (%) (n=168)**	**Rural (%) (n=172)**	**Total (n=340)**	**P-Value for total access**
Cellular Phone	61	58	59	0.016
Campus Computer	18	21	20	.0005
Personal Computer/Laptop	21	20	21	.0005
Tablet	5	3	4	.0005
Internal search facilities	20	14	17	.0005
External search facilities	19	19	19	.0005
Off campus access	8	6	7	.0005
Online facilities for the following functions:				
Online submission of assignments	2	2	1.8	.0005
Online testing	1	1	0.6	.0005
Application for exam re-marks	13	8	11	.0005
Application for special examinations	17	8	9	.0005

As can be seen from Table 9 a significantly low percentage of students have access to online facilities. The majority have access via a cellular phone. Only 4% of respondents have access to online facilities via a tablet. A significantly large number of respondents have indicated that they do not have access to electronic search facilities, with 5% more students in urban campuses having access to internal search facilities compared to students in the rural campuses. Only 17% of the total students have access to internal search facilities for research purposes, and 19% to external search facilities.

Table 10: Positive response on access to online information – urban/rural comparison.

Online information	Urban % (n=168)	Rural% (n=172)	Total% (n=340)
KZNCN Policies	26,8	25,2	25,9
KZNCN Procedures	26,1	24,3	25
Student Information i.e. Rules and Regulations	26,8	34,7	31,5
Relevant Updates affecting nurse training	23,2	26,2	25
Changes to Course rules and regulations	26,2	25,7	25,9
Exam information/Dates	21,0	27,2	24,7
Examination Results	19,5	24,8	22,6

As can be seen from Table 10 respondents from the urban campuses indicated that they had more access to KZNCN policies, and changes to course rules and regulation compared to their rural counterparts (p=0.005, and p=0.047) respectively.

4.3.3 Usage of the online library– urban/rural comparison

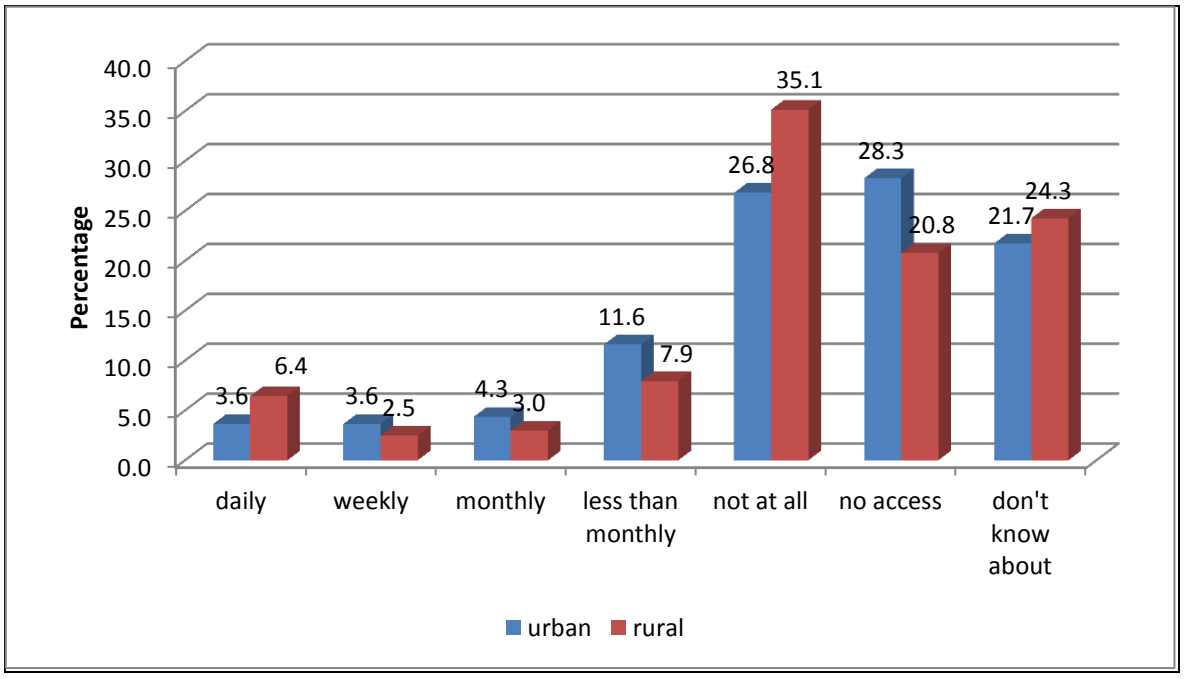

Figure 8: Usage of the online library: Urban and rural responses.

Figure 8 indicates that there was no significant difference in the usage of the online library between urban and rural respondents. The overall usage is low with urban respondents indicated an overall 23% usage, and rural respondents indicated an overall 20% usage. A significantly higher number of respondents in total had no library access, never accessed it or did not know about it (p=0.0005) as compared to those who used the library daily, weekly, monthly or less than monthly.

4.3.4 Computer training for – urban/rural comparison

The majority of the students regardless of setting had no access to computer training. However, significantly more rural students (8%) as compared to urban students (1%)have been offered training than urban students (p=.006).

Table 11: Level of computer literacy of students.

Computer Literacy Level	Urban % (n=168)	Rural % (n=172)	Total % (n=340)
Unable to manage any computer operations	11	18	15
Below level of adequacy	14	22	19
Can manage some operations	54	43	49
Competent in all work related packages	11	7	9
High level of Computer literacy	11	9	10

According to Table 11, 49% of students indicated that they can manage some computer operations relevant to the demands placed on them (p<.0005.) as compared to those who could not.

4.3.5 Support for use of technology

A significantly low number of respondents 9% from all campuses felt that the IT Help Desk met their needs (p<.0005.).

4.3.6 Exposure to teaching methodologies utilised: actual versus preferences

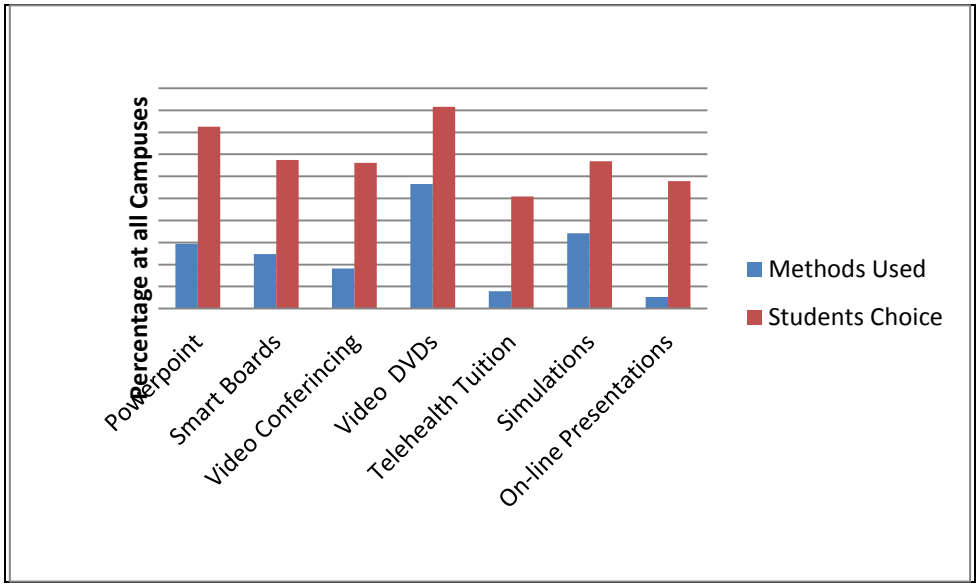

Figure 9: Teaching methods used all campuses versus students' preferred methods.

Figure 9 shows that a significantly low number of respondents indicated that a variety of teaching methods were being used with urban respondents reporting a higher rate of use (36%) compared to 26% from rural respondents. The most frequently used technology was Video and DVD's and remains a preferred choice. Simulations were reported as being used by less than 50% of respondents, and was a preferred choice by the majority of respondents. Power point presentations were reported as being used by 30% of the respondents, with the urban respondents indicating higher use (43%) compared to 16% for rural respondents. The majority of respondents prefer powerpoint as a teaching method. Very few respondents reported teaching methods such as smart boards, video conferencing, telehealth tuition and on-line presentations were being used, the majority of respondents however preferred it as a teaching method.

4.3.7 Communication technology available to students – all campuses

Table 12: Available versus preferred communication systems

Communication method offered to students by the KZNCN	Urban access % (n=168)	Preferred method (n=168)%	Rural access % (n=172)	Preferred method % (n=172)
SMS	4	46%	4	47%
Email	2	21%	0	12%
Twitter	0.3	19%	0	8%
Blogging	0.3	5%	0	4%
Facebook	0.3	36%	0	35%

Table 12 shows that less than 10% of respondents indicated that the KZNCN uses any form of communication system to communicate with them. The preferred methods of communication by respondents is SMS, followed by facebook.

4.3.8 Qualitative Data

Seventy three per cent of respondents indicated that the KZNCN was lagging behind in terms of ICT as compared to other higher education institutions. Students disagreed that they were being prepared adequately for the highly technological nursing practice area and felt that more benchmarking with the changes in the clinical environment should be done. Students agreed that they would be more prepared for their role in the clinical area if computer education was included in their current training. Respondents agreed that more benchmarking with the changes and developments in the higher education sector is required.

4.4 Administrative staff

4.4.1 Responses rate

The response rate was 93%. Fifty six per cent of the respondents were from rural campuses (Table 13). Females made up 56% of the respondents, and the majority of respondents were below the age of 40.

Table 13: Response rate from administrative staff by campus and setting n=30.

Institution: Campuses	**No of administrative staff**	**No of respondents (%)**	**Female** (%)	**Age < 40**	**Age 41-60**
Au	3	2(66.7)	2(100)	1	1
Bu	3	2(66.7)	1(50)	1	1
Cu	3	3(100)	2(66)	2	1
Du	3	3(100)	3(100)	3	0
Eu	3	3(100)	2(66.6)	2	1
Fr*	**3**	**3(100)**	**2(66.6)**	**3**	**0**
Gr*	**4**	**4(100)**	**2(50)**	**0**	**4**
Hr*	**2**	**2(100)**	**1(50)**	**0**	**2**
Ir*	**3**	**3(100)**	**1(33)**	**1**	**2**
Jr*	**3**	**3(100)**	**0(0)**	**2**	**1**
Kr*	**2**	**2(100)**	**1(50)**	**2**	**0**
Total rural campus	**17**	**17 (56.6%)**	**7 (41.2%)**	**8 (47%)**	**9 (69.2%)**
Total	**32**	**30 (93.7%)**	**17 (56.6%)**	**17 (56.6%)**	**13 (43.3%)**

***Indicates rural campuses**

4.4.2 Access to technological devices

Table 14 indicates the percentage access to necessary office equipment between the rural and urban respondents.

Significantly more respondents have access to desktop computers, photocopying facilities, and printing (p<.0005.) than those who do not.

Significantly fewer respondents reported having access to online facilities via a personal computer and tablet (p<.0005.) than those who have access. There were low levels of access to necessary online information for both urban and rural respondents.

Table 14: Responses with regard to access to other necessary office devices, online information, and internet connectivity.

Equipment	Urban % n=13	Rural % n=17	Total % n=30	P-Value for total Access
Desktop computer	100	94	96,7	<.0005
Lap top computer	54	35	43.3	0.465
Data projector	54	47	50	1.0
Photocopier	85	94	90	<.0005
Scanner	69	59	63.3	0.144
Printer	85	82	83.3	<.0005
Electronic library	23	53	40	
Online Access				
Computer	69.2	76.5	73.5	<.0005
Laptop	15.4	17.6	16.7	<.0005
Cellular phone	15.4	58.8	40	0.273
Tablet	0	5.9	3.3	<.0005
Online Information				
KZNCN Policies	46.2	70.6	60	0,273
KZNCN Procedures	46.2	64.7	56.7	0,465
Student Information	23.1	47.1	36.7	0,144
Relevant Updates affecting nurse training	30.8	47.1	40	0,273
Changes to course rules and regulations	23.1	41.2	33.3	0,68

4.4.3 Access to search facilities for research and work purposes

Significantly fewer respondents indicated that they do not have access to the internet off campus (p=.001) compared to those who do have access.

Table 15: Positive responses to access to internal, external and off campus search facilities

Access to search facility	Urban Access% n=13	Rural Access% n=17	Total Access % n=30
Access to intranet searches	77	58.8	66.6
Access to internet	46	23.5	33.3
Access to internet off-campus	38	5.8	20

4.4.4 Usage of online library

Table 16: Frequency of usage of the online library

Frequency	Urban Usage% n=13	Rural Usage% n=17	Total Usage% n=30
Daily	7.6	30	16.7
Weekly	23	18	20.0
Monthly	0	6	3.3
Less than Monthly	31	17.6	23.3
Not at all	23	11.7	16.7
Do not have access	23	11.7	16.7
Do not know about	0	5.8	3.3

According to Table 16, 60% of respondents used the online library less than monthly, ‘not at all’, ‘do not have access’, or ‘do not know about it’. More rural respondents use the online library on a daily basis compared to the urban respondents, and have a higher rate of access.

4.4.5 Frequency of computer usage for work related purposes

The majority of respondents (97%) indicate that they use the computer at least daily for work related purposes.

4.4.6 Computer literacy

According to Figure 10 the majority of respondents indicated that either they can manage some computer operations relevant to work demand or they are competent in all packages in the department compared to those who were unable to use a computer or are highly computer literate (p=0.015). About the same number of respondents stated that they had been offered computer training, as those who stated that they had not.

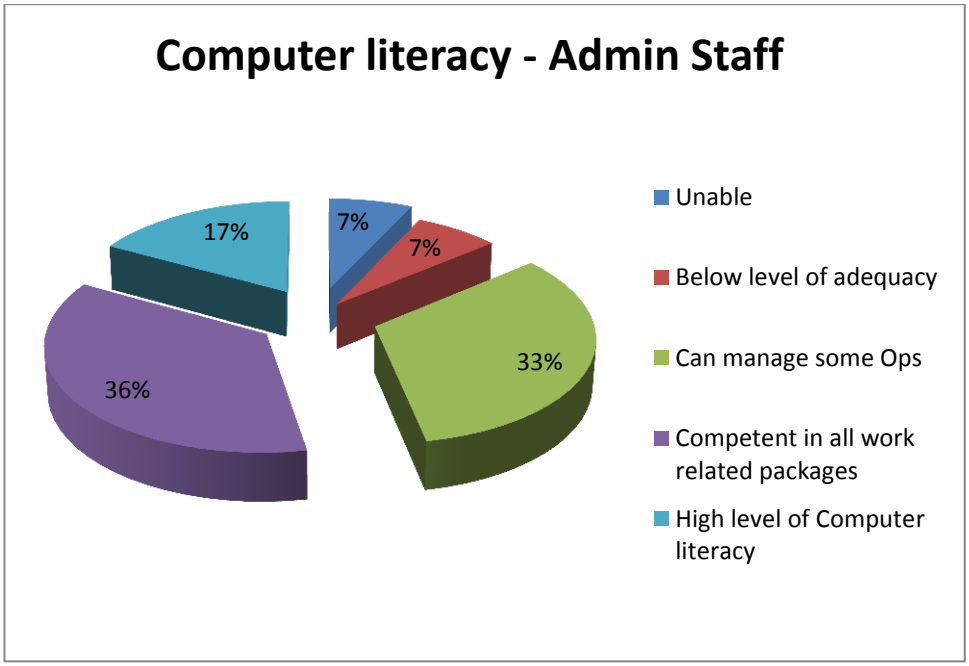

Figure 10: Breakdown of the levels of computer literacy

4.4.7 Support for use of technology

Sixty three percent of respondents from all campuses felt that the Information Technology Help Desk did not meet their needs, and 77% of respondents

indicated that the budget for upgrading IT systems at their campus did not meet their needs.

4.4.8 Communication and information systems

Respondents indicated a lack of communication systems for communication within the KZNCN, with email communication being the most common. It was further indicated that there is a lack of a necessary system for the tracking of academic progress of students (Table 17).

Table 17: Communication and information systems at the KZNCN.

Communication or Information System	**Urban% n=13**	**Rural% n=17**	**Total% n=30**	**p-Value for total access**
SMS	0	11.7	6.7	.0005
Email	100	82	90	.0005
Twitter	0	5.8	3.3	.0005
Blogging	0	5.8	3.3	.0005
Facebook	0	5.8	3.3	.0005
Electronic Support Systems				
Announcement of events	38	53	46.7	.715.
Necessary contact details	53	53	53.3	.715.
Announcement of Achievements	23	35	30	.028.
Announcement of updates	23	35	30	.028.
Tracking of academic progress	23	35	233	.0005.

4.4.9 Qualitative data

Sixty percent of respondents were of the view that the KZNCN lagged behind other higher education institutions in respect of ICT. Respondents from all campuses indicated that it would be useful to have a data base system for the management of student registrations, academic records, including application for special examinations, recording of student disciplinary cases, and management of the human resources and financial affairs of the KZNCN.

4.5 Comparison of ICT usage by the academics, students and administrative staff

Access to computer training is limited for academic staff, students, and administrative staff of the KZNCN. This is however more prevalent in the student group. A very low rate of access to desktop computers is available to the students with a significantly higher number of desktop computers available to the urban academic staff than the rural academic staff.

Access to vital equipment which is required in an educational institution is very limited, and there is a divide between rural and urban respondents, with more access available to urban participants in all groups. Access to search facilities, especially external (internet), is very limited for all respondent groups, with students having the lowest level of access. Online information which affects the delivery of training programmes is not available to the majority of participants from all groups. The online library of the Department is very poorly accessed, especially amongst the student group.

Support for the use of technology appears to be highly deficient for all participants in this study, with the budget provided being not sufficient for upgrading ICT. Electronic systems to support key student administrative functions appears to be lacking, with a major deficiency existing in terms of a system for tracking of the academic progress of students.

Teaching methods being utilised are not in keeping with the latest technology, and both academic staff and students have expressed the need to change this to incorporate more use of technology in teaching methods. All participant groups have indicated that the KZNCN is lagging behind other higher education institutions with regards to ICT. Students also expressed the need for computer training to be included in their curriculum and the need for the KZNCN to benchmark with clinical areas and other higher education institutions, in respect of the ICT systems.

CHAPTER 5

DISCUSSION

5.1 Introduction

This study investigated the usage of ICT at campuses within the KZNCN. This chapter discusses the findings of the study in relation to the aim and objectives of the study and related literature. The major categories of discussion will include access to computer training, levels of computer literacy, access to desktop computers, access to ICT devices and equipment, access to internal and external search facilities, available electronic information, frequency of usage of ICT, budget and support systems available, social media and communication systems and teaching and assessment strategies being utilised.

Eleven campuses comprising six rural and five urban took part in the study which provided a representation of ICT usage at KZNCN campuses throughout the province of KwaZulu-Natal. Respondents from all campuses included academic staff, students and administrative staff. The response rate from the different categories was high. The ages of respondents were in categories, and not in actual numbers, which did not allow for the mean and standard deviations per category to be reported on. The students from the 2nd, 3rd and 4th year of the R425 programme and R212 programme participated equally in the study. There was an even distribution of urban and rural participants in all respondent groups.

The academic and student respondents have a preponderance of female participants, in keeping with the fact that nursing is a female dominated profession. The majority of participants in the academic group were middle aged to close to retirement. The administrative group of respondents consisted of a marginal majority of female and young respondents.

5.2 Academic

5.2.1 Access to desktop computers

The finding of good access to desktop computers by academic staff regardless of setting may suggest that there has been progress by the KZNCN towards increasing the use of computers by that staff. The findings of this study, builds on the study by Asah (2011: 10) which found that the KZNCN does not have good access to computers. The divide in the access between urban and rural campuses as indicated in Table 4 may reflect on the usage of computers by these academics as indicated in Figure 5.

Evidence provided by Asah (2010: 85), Hassler, Hennessy and Lubasi (2011: 17) and Hennessy *et al*. (2010a: 41) indicates that access to ICT has a direct bearing on the perceived usefulness of the technology. If there is no access or inadequate access, this will affect the ability to use the technology. The inadequacy of access to computers by academics employed in rural campuses of the KZNCN may have negatively affected their ability to utilise the technology, resulting in lower levels of usage, as per Table 4. This finding is supported by Tagoe (2012: 91) and Fall (2007: 134) who argue that the divide between access in the rural as compared to the urban areas can affect usability.

The alternative Hα of a significant proportion of academic staff having access to desk top computers is accepted.

5.2.2 Access to computer training

The low levels of access of academic staff (Figure 4) to computer training may reflect on the electronic teaching and learning strategies (Figure 7) utilised. Several investigators in this area (Barnard, Nash and O'Brien 2005: 508; George *et al*. 2010: 371; Bradshaw and Lowenstein 2007: 279) are of the view that it is important to promote computer literacy and incorporate the

use of technology in nursing education to ensure conformity with other education sectors.

Nursing academics need to be updated in terms of the latest technology and computer techniques in order for them to be able to incorporate this into the learning/teaching environment. Nkosi, Asah and Pillay (2011: 880) found that computer literacy is an essential variable which allows for ease of use of learning and teaching technologies. Ignorance on developments in educational technology would affect one's attitude to use and affect the actual use of such technologies. The changing landscape of healthcare makes the inclusion of electronic technologies in education very important (Dzidonu 2010: 4). Dzidonu's (2010: 19) findings that the majority of African educational institutions have not invested in the training of their staff, or in developing and delivering teaching electronically are consistent with the findings in this study.

Asah (2010: 32) and Bemridge, Jones and Jeong (2010: 18) concluded that nursing and health care are not exempt from the information technology explosion globally. This necessitates that nurse educators incorporate information technology in their teaching, in order for this to impact positively on healthcare; thus making computer literacy a vital skill in order for them to be able to carry this through.

Fetter (2009: 78) supports the fact that information technology skills are vital for professional development and advancement in nursing and this will translate into improved care, access, quality and cost effectiveness. In order to be able to keep up with these changes and developments, nurse educators, including those at the KZNCN, will have to be at the forefront of developments in education related ICT.

The Hα of a significant proportion of academic staff having access to computer training is rejected.

5.2.3 Level of computer literacy

The fact that the majority of respondents in the academic group can manage only some computer operations relates to their poor utilisation of electronic and information technology in teaching (Figure 6), and the need for specialised training in the usage of this technology. Ndlovu and Lawrence (2012: 21) and Hennessy *et al*. (2010a: 45) concur with this finding and maintain that training in ICT must match the strategies to be utilised in order for it to be effective. This should be supported by ongoing training based on developments in the field and continuously reinforced by support (Du Plessis and Webb 2012: 53; Hennessy *et al*. 2010b: 47). Globally nurse educators are embracing the use of technology in their learning environments and integrating various technologies on an increasing basis to promote learning. Techniques such as e-learning and simulations are some teaching strategies being used which require specialised knowledge and skills to support application (Button Harrington and Belan 2013: 2 and Jeffries and Pamela 2005: 3).

This trend of an increasing use of ICT in their environment is reported by the Australian Nursing Federation (2007) and the Royal College of Nursing (2012: 4), highlighting the shift taking place in nursing and nursing education. In order for the academic staff of the KZNCN to be on par with academics in other higher education settings with regards to the use of ICT's, it is important for them to receive training that will enhance their skills and knowledge in this area. Surry *et al*. (2011: 88) emphasise the importance of facilities to develop faculty members to keep up with the trend in higher education pedagogies.

5.2.4 Access to necessary office equipment

The lack of access of academic staff to necessary office equipment linked to an ICT system (Table 4) may reflect on the findings of low usage of the online facilities for example the library (Figure 6) and e-learning (Figure 7). This is consistent with policy makers in the health sector who have also realised that the basic tools necessary for learning, teaching and administration in nursing educational institutions are lacking, and there is a need to strengthen this (Department of Health 2012b: 8). Surry *et al*. (2011: 97) have identified that the need for proper planning to identify the technology needs of individual institutions to ensure optimal learning. This may reflect on the need for a policy to regulate the ICT needs of the KZNCN, which could assist in the uniformity and availability of equipment.

Globally, most higher education institutions utilise online libraries (Eke 2010: 274). Academic staff in the current study either did not know about or rarely accessed the library. It is clear that access precedes and is a necessary prerequisite for usage (Asah 2010: 85; Hassler, Hennessy and Lubasi 2011: 17; Hennessy *et al*. 2010a: 41; Bhukuvhani, Chiparausha and Zuvalinyenga 2012: 21) found a positive correlation between library information, literacy training and the increased use of web resources.

5.2.5 Access to intranet and internet facilities

The low levels of access to communication and search facilities by academic staff may have had an effect on the academic staff accessing the online library system of the Department of Health (Figure 6). The limited access to external search facilities may have an effect on the academic staff being able to research and retrieve relevant information for research and teaching purposes. Lupiáñez-Villanueva *et al.* (2010: 133) found that the internet is a vital resource, with 65% of the nurses in their study reporting that access to the internet was beneficial to them in terms of patient care. Casal (2007: 06)

concurs that the spread of information through different means such as online training or online discussions for sharing current medical information, new approaches in medical information and patient care, and current medical research, can be useful for students and researchers.

The importance of access to up to date and relevant information has been recognised by higher education institutions globally, and in South Africa. This has necessitated academic staff having access to the internet, in order for them to be able to have access to information and to promote research within their institutions (Moll *et al*. 2007: 16; Balasubramanian 2009: 5). The usefulness of the web has also been by recognised by Naude, Rensleigh and Du Toit (2010: 416) whose study has revealed that over 90% of their respondents used the web at least weekly for academic and research purposes. The majority of respondents found the web indispensable for academic and research purposes.

5.2.6 Support for use of technology

The lack of support received by the academic staff of the KZNCN may reflect on their ability to adopt the latest trends in respect of teaching (Figure 7) and assessment strategies (Table 6) that are being adopted at higher education institutions. This is in line with Wilmer (2007: 207) who reports that there is a need for continued support linked to the rapid development and use of ICT for educational and health care purposes. The need for technical support is recognised by Casal (2007: 03) who highlights the fact that barriers still hinder the spread of ICTs usage in Africa. These problems are associated with the adoption of new technologies and are often connected with the scarce technical capabilities of users. Findings of this study are in contrast with higher education institutions that are using technology to change the traditional way that assessments are conducted and are making use of computer adaptive tests which are deemed to be more effective (Surry *et al*. 2011: 224).

The Hα of the academic staff receiving significant support in the use of ICT is rejected.

5.2.7 Social media and communication systems

This study has revealed that the majority of respondents from the academic staff of the KZNCN would prefer SMS as a means of communication with their students. This finding is consistent with statistics on cellular phone ownership by university students in South Africa and in America, which makes using this technology a viable option for students. Reports by Cassidy *et al*. (2011: 385) indicated that cellular phone ownership at the Sam Houston University in East Texas was 98.8%. Moll et *al*. (2007: 35) note that in South Africa while only 10% of university students had internet access, more than 90% had cellular phones. This made cellular phone communication amongst university students in South Africa high. These findings support the use of SMS as a means of communication between students and higher education institutions, for both academic and administrative purposes. This trend if adopted by the KZNCN could benefit the academic staff of the KNCN in communicating with their students.

5.2.8 Electronic systems of the KZNCN for student support functions

Electronic systems to support key student functions, which include the tracking of academic progress of students, are deficient according to the academic respondents (Table 6).This finding is in keeping with Merzuki and Latif (2009: 103) and Kyobe (2009: 03) who recognised that “it is time for the higher education institutions to focus on systematic handling of information to support academic staff advancement programmes”, which should be designed to take into account the entire record and information life cycle starting from the inputs until the archive stages. Electronic management systems, according to Kemoni (2009: 208), are absent in most public sector

organisations in Africa. The findings are however contrary to Kyobe (2009: 13) who found that South Africa has much better systems in place in the public sector than the rest of Africa. Mavadza and Ngulube (2012: 500) recognise that it is important for students and academics to manage electronic records effectively, as this could lead to inefficiency and prevent growth of that the institution.

5.2.9 Teaching methods

The use of technology in teaching is lacking at the KZNCN (Figure 7). This may reflect on the level of exposure of the graduates of the KZNCN to alternative teaching methods using technology. The findings of this study are consistent with Zurmerhly (2008: 265) who indicates that the didactic lecture format remains one of the primary means for presenting information to large groups. Weston (2005) as cited by Surry *et al*. (2011: 60) further supports this finding, reporting that instructors were not able to integrate technology into their courses due to the fact that their own skills were not strong enough to integrate technologies effectively.

The findings of this study indicating a lack of technology use in teaching is contrary to studies by Brown *et al.* (2009: 153) and Bloomfield (2013: 1605) which support that there is a need to relook at teaching strategies in order to prepare nurses to render safe patient care. This is further supported by Surry *et al*. (2011: 133) who indicate that “clinical education needs a major overhaul” and has not kept up with the pace of changing health expectations. There should be a focus on improving quality, or new technologies should be used.

The assistance that is requested by academics (Figure 7) to utilise teaching methods using technology, is positive, as this could indicate that they are keen to incorporate these methods into their teaching. This finding is supported by Robinson and Dearmon (2013: 207), Jeffries (2006: 161),

Skiba, Connors and Jeffreis (2008: 226) and Khalaila (2014: 257) who recognise the benefits of using technology in enhancing teaching. Simulations are viewed as an appropriate method for meeting the training needs of nursing students at the KZNCN. The changes may be reflected in the clinical environment which is becoming more technologically advanced, and also needs the graduating nurse to be able to function in this environment. Anecdotal evidence of this is the Inkosi Albert Luthuli Central Hospital in Durban, in KwaZulu-Natal, which functions as a paperless environment and uses technology on a very advanced level in order to maintain this paperless environment. This requires nurses functioning at this institution to be competent in the use of these technologies (www.kznhealth.gov.za: 2014). The pace of development in using technology is increasing so rapidly, and can be seen in the developments at Rietvlei hospital, a deep rural hospital in KwaZulu-Natal, which is also developing a paperless hospital system (www.kznhealth.gov.za: 2014). This suggests that academic institutions responsible for the training of nurses must ensure that their training programmes are relevant to the needs of the health care system.

The Hα of a significant proportion of academic staff utilising ICT for teaching purposes is rejected.

5.3 Students

5.3.1Access to computer training

The level of computer literacy of students (Table 11) in the programme is affected by their limited access to training. This finding is contrary to literature which indicates that the current trend in higher education is for graduates to be literate in the use of technological devices, and opportunities for developing these skills which should be provided during their training (Surry

et al. 2011: 38; Moll *et al*. 2007: 3; Royal College of Nursing 2012: 16). Several investigators namely, Wilkinson, While and Roberts (2008: 770), Bembridge *et al*. (2010: 21) and Surry *et al*. (2011: 38), highlight the impact of a lack of competency standards for computer training within nurse training programmes which may result in a lack of consistency in terms of nursing graduate skill. This is in keeping with the findings of this study, which indicates that there is inconsistency in respect of computer training for students. This finding may need the KZNCN to regulate the need for computer training, in nurse training so that there is equal access to all students according to the need.

The Hα of a significant proportion of students having access to computer training is rejected.

5.3.2 Level of computer literacy

The majority of respondents in the student group indicate that they can manage some computer operations (Table 11) which is highly significant. Bemridge, Jones and Jeong (2010: 23), Rafiq and Merrell (2005: 34) and Fetter (2009: 78) concur that due to the transformation in health care and the use of technology in health care environments, the graduating nurse should be able to cope in a technological environment. Student respondents in the current study identified the need for computer training to be included in their curriculum. Fetter (2010: 94), Nkosi, Asah and Pillay (2011: 880) and Jones *et al*. (2009: 615) concluded that there is a need for the integration of information technology in the curriculum, which would expose the nurse to a technologically advanced clinical environment and increase the confidence and competence levels of the students in the use of ICT.

5.3.3 Access to desktop computers and necessary equipment

Poor access to desktop computers and necessary equipment by students (Table 8) correlates with the usage of online systems such as the online library (Figure 8) and relevant online information (Figure 9) by the students. Asah (2010: 85), Hassler, Hennessy and Lubasi (2011: 17) and Hennessy *et al*. (2010a: 41) indicate that access to ICT influences its use. If there is no access or inadequate access, this will affect the ability to use the technology. The current trend at higher education institutions is to promote the use of online libraries which is extremely useful when students are off campus (Casal 2007: 6). In contrast to practices by students at the KZNCN, the use of online libraries has increased globally (Eke 2010: 274). The University of Pretoria has also prioritised access for its students, with 62% of students utilising laboratories for internet facilities (Niemand 2010: 410). Singh (2004: 6) and Lupiáñez-Villanueva *et al*. (2010: 80) further highlight the need for students to have access to the internet in order to be able to access relevant information.

The Hα of a significant proportion of students having access to desktop computers is rejected.

5.3.5 Support for use of technology

The inadequate budget and support for upgrading technology may reflect on the existence and usage of online facilities (Figure 8) within the KZNCN Hassler, Hennessy and Lubasi (2011: 17) and Hennessy *et al*. (2010b: 41) suggest that the lack of support in the use of technology affects the attitude of the individual to use the technology. The need for technical support is recognised by Casal (2007: 03) and Wilmer (2007: 207) who highlight the fact that barriers still hinder the spread of ICT usage in Africa. These problems are associated with the adoption of new technologies and are often

linked with the scarce technical capabilities of users, making the need for continued support a priority.

The Hα of students receiving significant support in the use of ICT is rejected.

5.3.4 Social media and communication systems

The absence of access to means of electronic communication with students of the KZNCN (Table 12) may impact on the ability of the students to communicate with academic and administrative staff and other students. Cassidy *et al*. (2011: 385). Moll *et al*. (2007: 35) and Balasubramanian *et al.* (2009: 3) viewed the high levels of ownership of mobile phones by university students as an opportunity to develop effective communication between students and college staff. Utulu and Alonge (2012: 15) concluded that mobile phones have the potential to become very reliable instructional communication tools, and reduce the effects of the digital divide.

The majority of students would prefer to have access to Facebook as a social media platform by which they could communicate with College staff (Table 12). The benefits of Facebook for sharing of information and providing students the opportunity to be able to share information with fellow students has been acknowledged by (Selwyn 2009: 15; Lampe *et al*. 2011: 331; Aydin 2012: 1097). The opportunities provided by a generation of young people who are very digitally inclined and technologically savvy should be exploited to optimise pedagogic communication. The adoption of social media such as Facebook by the KZNCN would bring this institution in line with higher education institutions globally who are utilising this and other communication platforms as educational tools.

5.3.5 Electronic systems for student support functions

ICT to support key student functions were reported by participating students as deficient (Table 6). The KZNCN has not developed sufficiently in ICT to

support significant teaching, learning, assessment and management functions. Therefore delivery of the nursing programme to optimise learning is limited. In contrast, training in other health disciplines is increasingly utilising ICT. The increased use of computers and technology in health care training ensures that students have sufficient access as required. This has resulted in higher proportions of medical students using computers for producing assignments. The benefits of electronic assignment submission has also been highlighted by Bridge and Appleyard (2008: 644) who found that electronic assignment submission benefitted students in terms of time, cost and faster feedback mechanisms.

5.3.6 Teaching methods

The preference of the students to have more technology used in teaching and learning at the KZNCN (Figure 9) reflects their awareness on the need to be in line with other institutions of higher learning. This finding is consistent with Surry *et al*. (2011: 133) who emphasise the need to include technology in education in order to improve the quality. The majority of respondents chose simulations as a preferred teaching method to be used at the KZNCN. This choice as a learning method for health care students, including nurses, is widely supported by Robinson and Dearmon (2013: 207), Jeffries (2006: 161), Skiba, Connors and Jeffries (2008: 226) and Khalaila (2014: 257) whose studies proved that increasing the use of technology with an increased focus on simulations could see an improved level of confidence and competence of the nurses graduating. These studies have highlighted the fact that the opportunities for clinical practice for students may be diminishing and simulations provide a learning opportunity for students to attain both competency and confidence, which will benefit the patients they will work with.

5.4 Administrative staff

5.4.1 Access to desktop computers

Adequate access to desktop computers by respondents regardless of setting may suggest that this has positively affected the usage, with a large majority stating that they use the computer on a daily basis. This finding is in keeping with Asah (2010: 85), Hassler, Hennessy and Lubasi (2011: 17), and Hennessy *et al*. (2010a: 41) who are of the view that access to ICT has a direct bearing on the perceived usefulness of the technology. If there is no access or inadequate access, this will affect the ability to use the technology. The findings of this study show a positive correlation between access and usage.

The Hα of a significant proportion of administrative staff having access to desktop computers is accepted.

5.4.2 Access to computer training

The low levels of access of administrative staff (Figure 10) to computer training may impede their development, competence and usage to manage some operations. If one is ignorant about computers, then it would affect one's attitude to and actual use of the tools (Nkosi, Asah and Pillay. 2011: 880). The changing landscape of healthcare makes ICT in education very important (Dzidonu 2010: 4). In order for the KZNCN to develop and adopt more effective administrative processes, adequate exposure and training is necessary

The Hα that a significant proportion of administrative staff receive access to computer training is rejected.

5.4.3 Access to intranet and internet facilities

The lack of access of administrative staff to search facilities i.e. intranet and internet (Table 15) impedes their usage of the online library (Table 16) as well as to engage in searching the internet for research and work purposes. Naude, Rensleigh and Du Toit (2010: 416), Bothma and Bergenholtz (2013: 29) and Niemand (2010: 421) emphasise the importance of providing administrative staff access to information which is relevant, up to date, and easily accessible .Access is a prerequisite to usage as reported by Asah (2010: 85), Hassler, Hennessy and Lubasi (2011: 17), and Hennessy *et al*. (2010a:41). The low level of access to the intranet affects the usage of the online library. Surry *et al*. (2011:97) and the e-Health Strategy South Africa (2012b: 8) support the fact that access to technology supports higher education institutions and enhances the functioning ability. This should be based on proper planning based on the needs of each individual institution. The finding in this study that access to necessary technology is lacking, for administrative purposes suggests that this is inconsistent with the current trends in higher education as highlighted in the literature. The KZNCN needs to address issues of access to ICT for the administrative staff in order for them to improve efficiency and effectiveness in supporting the academic endeavour of the college. Surry *et al*. (2011: 336) agree that higher education institutions are not planning sufficiently to keep up with the pace of developments in ICT.

5.4.4 Support for use of technology

Inadequate IT support (help desk) and budget for upgrading technology may indicate the need to upgrade the technological systems at the KZNCN. The lack of adequate budget to upgrade technological systems within the KZNCN is inconsistent with the other universities in South Africa. Moll *et al*. (2007: 23) concede that ICT is critical in the functioning of universities in South

Africa, and have developed policies to promote the upgrading of this resource. The need for technical ongoing support is recognised by Casal (2007: 03) who highlights the fact that barriers still impede the spread of ICTs usage in Africa. These problems are associated with the adoption of new technologies which are not in line with the scarce technical capabilities of users. This further highlights the need for ICT policies, at the KZNCN, which would ensure that the short, medium and long term needs of the College are met.

The Hα that administrative staff receive significant support in the use of ICT technology is rejected.

5.4.5 Social media, communication and electronic systems to render student support functions

This study has revealed a lack of communication and electronic systems available to administrative staff of the KZNCN to support student administration (Table 16).To ensure the quality and integrity of admission, registration and examination processes in a higher education system, the ICT system should be integrated and accessible to academic and administrative staff as well as students to meet their specific requirements. Universities around the world and nationally are increasingly utilising mobile phone technology to communicate with students for both academic and administrative purposes (Cassidy *et al*. 2011: 385; Moll *et al*. 2007: 35). The development of management and information systems for accounting and monitoring of administrative processes at higher education institutions is increasingly important. These processes are necessary to ensure accountability and ensure monitoring of administrative functions (Merzuki and Latif 2009: 94; Visser *et al*. 2013: 531). The KZNCN has not as yet prioritised these systems to support administrative functions in line with other institutions of higher learning.

5.5 Summary of findings from all categories

The low rate of access to computer training revealed in this study could impact on the functioning of academic and administrative staff as well as students in developing essential skills necessary for functioning in a specialised environment such as a nursing education institution and clinical setting. This is revealed in the low levels of technology use in teaching and learning, and may reflect on the level of the graduate nurse skills in coping in a health care environment which is developing technologically. The need for nurses to be more developed in ICT skills is supported by While and Dewsbury (2011: 1302) whose study identified that changes in health care is inevitable and nurses need to engage more fully with ICT in order to contribute to the development of the health care sector.

The low level of exposure of staff and students to ICT devices and facilities, with students being most affected, may reflect on their ability to develop confidence in the utilisation of this equipment. This could challenge both staff and students in their ability to engage with the latest trends and information available in both the health and education sector. This is consistent with Wilmer (2007: 207) who found that one of the reasons for student nurses being challenged in the use of ICT may be due to their poor ICT skills.

The lack of communication systems for students and staff, as well as the absence of social media networks may present a challenge to communication within the KZNCN, for staff and students, and for students amongst themselves. Utulu and Alonge (2012: 15) conclude that mobile phone usage could reduce the digital divide and be useful as instructional and communication tools. This strategy if implemented by the KZNCN could be beneficial and help bridge the geographical divide between the rural and urban campuses.

Support in ICT use and adequate budget allocation are necessary for staff and students to develop the necessary confidence in the use of the equipment. This would also allow for upgrading of ICT systems which are lacking according to the respondents in all categories in both rural and urban settings. The need for technical support is recognised by Hassler, Hennessy and Lubasi (2011: 17) and Hennessy *et al*. (2010b: 41) who reveal that ICT support is an essential factor to promote the use of ICT. This support if not increased may provide a challenge in incorporating and increasing the use of ICT within the KZNCN in the future.

The findings that have emanated from the study, highlights the need for the formulation of an ICT policy for the KZNCN. The policy would allow for the regulation of ICT issues at the campuses of the KZNCN. It is recommended that the policy addresses the issues surrounding the access, training, and usage of ICT in order to ensure uniformity within the campuses of the KZNCN. The findings of the study suggest that there is a need for the KZNCN, to benchmark vigorously with the higher education institutions both in nursing and in other sectors, in order to establish norms and standards which would allow for the use of ICT at this institution. The critical areas that need to be incorporated into the policy include access to computers, office and teaching equipment, as well as search facilities which may improve the functioning ability of the campuses.

Training strategies need to be developed for all respondent groups with a view to identify specific skills needed by each respondent group, to enable use of ICT systems according to their area of need. The request for assistance in terms of usage for the various teaching methodologies could provide a baseline of training needs, which if addressed may reflect in the more effective utilisation of ICT in teaching and learning at the KZNCN. The need for the incorporation of computer training in the training of nurses is an area that requires further exploration, to ensure that the most appropriate training is identified and included. The ICT support systems for all respondent

groups need to be addressed in the policy, to enable staff and students to develop their confidence and technical skill in the use of this technology. The development of an ICT policy may positively affect the ICT usage at the KZNCN, as the issues that affect usage as identified by the Technology Acceptance Model may be addressed through this strategy.

CHAPTER 6

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS.

6.1 Conclusion

This chapter describes an overall conclusion arising from the findings of this study on the status of usage of ICT amongst academic staff, administrative staff and students at the KZNCN. Much has been reported about the benefits of ICT in education and clinical nursing practice. This study has however revealed that the KZNCN as a nursing college has been challenged in incorporating ICT into the functioning of this institution in order to be on par with education in all other sectors.

ICT can be a tool that is utilised to raise standards of staff and students, but this requires significant access to and sustained training processes. All categories in this study demonstrated satisfactory levels of computer literacy but reported poor access to computer training. Students in rural settings however reported having had more training than those in the urban settings. The need to be on par with graduates in other sectors including the health sector and in line with the clinical environment is reflected by the students demonstrating the need to include computer literacy in the nurse training programmes of the KZNCN.

Numerous reports reflect the positive aspects of access to online information but this appeared to be a challenge for the staff and students of the KZNCN. There was poor access to online facilities such as internet, intranet and the online library which affected the ability of all groups in accessing information. Access to basic equipment such as desktop computers was good for academic and administrative staff. Students however reported very poor access to desktop computers, in both urban and rural settings.

ICT has the potential to transform the teaching and learning environment significantly, with the prospect of contributing to positive learning outcomes. This study discovered that there is very poor utilisation of ICT for teaching and learning purposes at the KZNCN in both rural and urban settings, which has also affected administrative staff as they assist with the coordinating process in all activities of teaching and learning. The integration of technology in the education of nurses at the KZNCN is lacking significantly and has resulted in this College lagging behind institutions in the higher education sector.

Students of today need to be connected, and have access to communication platforms or systems. The opportunity for student communication and collaboration at the KZNCN is very limited, due to there being little access to these systems. The benefits of the numerous social media opportunities available have yet to be explored by the KZNCN

Academic and administrative staff generally used computers on a daily basis for work related purposes. All categories however reported poor usage of the online library facility. This is may be attributed to the low level of access to these facilities, with the students being the worst affected group in terms of access. This challenges the access to sound knowledge platforms and information access.

Technical faults with ICT may lead to lower levels of usage. The technical support required to utilise ICT was reported as very poor, by all categories of respondents, and affected participants in both the rural and urban settings alike. The budget for the upgrading of ICT infrastructure is insufficient according to the staff respondents and may be the reason for the inadequate upgrading and access to the relevant ICT systems.

The usage of ICT devices at the KZNCN has been affected by factors such as decreased access to devices and systems, lack of relevant and sustained

computer training practices, and decreased levels of ICT support from a technical and a budgetary point of view. The establishment of norms in terms of ICT provision, training, and support at the KZNCN, may reflect in higher levels of usage at this institution. The benefits of having an ICT policy has been established at higher education institutions, and may produce more uniformity and regulation in respect of ICT activities at the KZNCN. This with the need to establish itself as a higher education institution requires the KZNCN to urgently review their current position, practices and policies with regards to the availability and usage of ICT in the 21st century

6.2 Limitations

Access to students presented a challenge, due to the rotation of students and work schedules. The level of skills development in terms of ICT: participants were not asked about their exposure or training in respect of ICT especially administrative staff, as this could influence their level of computer literacy.

6.3 Recommendations

Further studies could focus on the incorporation of nursing informatics (NI) into the undergraduate nursing curricula of the KZNCN. The specific teaching and learning needs of nurse educators need to be established by further studies. Further studies on the influence of support and access to computers in relation to usage should be conducted.

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Appendixes

Appendix A

Mrs. S Maharaj Student number 21237180 IREC 65/12The Chair: DUT IREC

Re: Finalisation of Data Collection Questionnaire

The three questionnaires that were compiled for the purpose of this research study, has been tested by two methods:

1. Specialist groups which consisted of Nurse Educators, The KwaZulu-Natal Department of Health Web administrator, who is currently also overseeing the Provincial library, and a researcher specializing in the field of Information technology in Health systems, and especially in nursing.
2. A pilot study completed at Iris Marwick Sub-Campus of the KwaZulu-Natal College of Nursing, which allowed all three questionnaires, ie: the Academic, Student, and Administrative staff questionnaires, to be piloted.

Findings:

The questionnaire was well received, by all the groups involved. It was easy to understand all the instructions. The questionnaire takes approximately half hour to complete. There were some minor adjustments that were made to the questionnaire, in respect of grammar.

- The age ranges were corrected, on all questionnaires as there was some duplication.
- Question 4 on the academic and administrative questionnaire had some grammar corrections, to ensure that the answers relates to exactly what is available at their work stations.
- All questions were categorized into sections.
- All rating scales were further expanded on, to gain a better understanding of the expectation.
- No. 21 on the academic questionnaire was corrected, as it gave two options instead of one.

- All questions were answered by both groups.

REQUEST:

It is therefore requested that approval be granted for data collection to commence, using the three questionnaires designed for this study. There will be no further amendments made to the questionnaire, except for formatting changes, as deemed necessary.

Thank You

Mrs S Maharaj

Appendix B1

Appendix A

LETTER OF INFORMATION
Title of the Research Study: The status of usage of information technology systems within campuses of the KwaZulu-Natal College of Nursing

Principal Investigator/s/researcher: Sangeetha Maharaj
Co-Investigator/s/supervisor/s: Supervisor:Professor T Puckree, Co Supervisor: Dr N Mshuqane

Brief Introduction:
Dear Participant
Warm greetings to you. You are being invited to take part in a research study. It is important for you to participate in this study, but also important that you understand why the research is being done and what it will involve. Please take time to read the following information carefully, and ask the researcher if there is anything you need more information about.

The KwaZulu-Natal College of Nursing (KZNCN) is a Public Training College of nurses in the Province of KZN, which was accredited in 2005 by the South African Nursing Council. The KZNCN is managed by a Head Office, which is situated in Pietermaritzburg, has 11 Campuses and 14 Sub-Campuses located in nine of the eleven districts of the Province all reporting directly to the KZNCN. The total learner population of the KZNCN, is 5363 as of 31 March 2012.Nursing education faces challenges in preparing students to live and work in a technology driven world Maboe and De Villiers (2011). Changes and advances in the area of nursing practice, necessitates the incorporation of new technologies in the classroom Jeffries (2005). The current South African Nursing Council Quality assurance visits in the province , highlighted the need for all nursing education institutions to be on par with other institutions of higher learning. It is therefore necessary for a study to be conducted which provides an in depth analysis of the use of information technology systems within the KZNCN.

Purpose of the Study: The purpose of this research is to determine the current usage of information technology systems by students, academic and administrative staff of the KwaZulu-Natal College of Nursing, in order to highlight any deficiencies that may exist.

Outline of the Procedures:
Consultation has been done with a statistician regarding the sample size, data collection tool and analysis of data. A questionnaire has been developed for the three categories participating in the study; namely students, administrative staff and academic staff. Data will be collected from all the campuses i.e. Addington, Benedicine, Charles Johnson Memorial, Edendale, Greys, Madadeni, Ngwelezane, Port Shepstone, Prince Mshiyeni Memorial, RK Khan, King-Edward Campuses . Data collection will be take place using a questionnaire at the site of work or study of the participant, and will take approximately 30 minutes to answer. Data will be analyzed using the Statistical Package for Social Sciences version 20.

Inclusion criteria
- All campuses of the KZNCN
- Academic staff and administrative staff

- Students of the R425 (Diploma), and R212 (Post Basic) students of the campuses of the KZNCN

Exclusion criteria.

- Students registered in the SANC programmes

Risks or Discomforts to the Participant:
There will be no risks to the participants who participate in the study

Benefits:
The aim of the study is to identify if any shortcomings and challenges in the use of Information Technology Systems, at the KwaZulu-Natal College of Nursing exists. The study will inform decision makers of the need for more research, in this area, or inputs into policy decisions. The findings of this study will be published in an accredited journal. The results of the findings will have a positive impact, in training nurses to meet the advances in a technologically advanced environment. The completion of the research could result in the researcher obtaining an MTech degree.

Reason/s why the Participant May Be Withdrawn from the Study:
The participants have the right to refuse to partake in the research at any stage of the research.

Remuneration:
There will be no remuneration for the participant or the researcher during or on conclusion of the study.
Costs of the Study:
The participants will not be expected to cover any costs of the study

Confidentiality:
You will be expected to fill in a consent form. Your anonymity will be guaranteed and you are not required to write your name on the questionnaires. All documents will be stored in a lock up cupboard, and data input will be done by the researcher.
Research-related Injury:
I do not foresee any injuries occurring during the study.

Persons to Contact in the Event of Any Problems or Queries:
Please contact the researcher: Sangeetha Maharaj (tel no. 033 2647806)
Supervisor: Prof T Puckree (tel no. 031 37327404)
Executive Dean Health Sciences

Co Supervisor: Dr N Mshuqane (tel no. 031 3732400)
Lecturer Health Sciences
or the
Institutional Research Ethics administrator on 031 373 2900.

Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.
General:
It must be noted that participation is voluntary. There are approximately 340 students, 180 academic staff, and 33 administrative staff participating in this study.

Appendix B2

DUT DURBAN UNIVERSITY OF TECHNOLOGY

INSTITUTIONAL RESEARCH ETHICS COMMITTEE

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, **Mrs S Maharaj** , about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **65/12**,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant Thumbprint	**Date**	**Time**	**Signature / Right**

I, **Sangeetha Maharaj** (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Sangeetha Maharaj Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix C1

DURBAN UNIVERSITY of TECHNOLOGY

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC)

31 January 2013

IREC Reference Number: **REC 65/12**

Mrs S Maharaj
54 Brixham Road
Orient Heights
Pietermaritzburg
3201

Dear Mrs Maharaj

The status of usage of Information Technology Systems within campuses of the KwaZulu-Natal College of Nursing

I am pleased to inform you that Full Approval has been granted to your proposal REC 65/12.

The Proposal has been allocated the following Ethical Clearance number IREC 001/13. Please use this number in all communication with this office.

Approval has been granted for a period of one year, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's. In addition, you will be responsible to ensure gatekeeper permission.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Please note that you may continue with validity testing and piloting of the questionnaire. Research on the proposed project may not proceed until IREC reviews and approves the final questionnaire.

Yours Sincerely

[redacted]

Dr D F Naude
Chairperson: IREC

Appendix C2

DURBAN UNIVERSITY of TECHNOLOGY

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC)

10 April 2013

IREC Reference Number: **REC 65/12**

Mrs S Maharaj
54 Brixham Road
Orient Heights
Pietermaritzburg
3201

Dear Mrs Maharaj

The status of usage of Information Technology Systems within campuses of the KwaZulu-Natal College of Nursing

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the questionnaire has been APPROVED; you may now proceed with data collection on the proposed project.

Yours Sincerely

[redacted]

Dr D. F. Naude
Chairperson: IREC

Appendix D

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KWAZULU- NATAL COLLEGE OF NURSING
P/Bag X9089, Pietermaritzburg, 3200
Tel.: (033) 264 7810, Fax: (033) 394 7238
e-mail: joan.makhathini@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Ms JT Makhathini
Telephone: 033 – 264 7810
Date: 06 February 2013

Principal Investigator:
Mrs. S. Maharaj
Student Number: 21237180
Durban University of Technology

Dear Madam

RE: PERMISSION TO CONDUCT RESEARCH AT THE KWAZULU-NATAL COLLEGE OF NURSING

TITLE: THE STATUS OF USAGE OF INFORMATION TECHNOLOGY SYSTEMS WITHIN THE CAMPUSES OF THE KWAZULU-NATAL COLLEGE OF NURSING

I have pleasure in informing you that permission has been granted to you by the Principal of the KwaZulu-Natal College of Nursing to conduct research on the above title at the Campuses of the KZNCN, and the pilot study at Iris Marwick Sub -Campus.

The data needed for the above research will have to be collected at the identified Campuses of the KwaZulu-Natal College of Nursing.

Please note the following:

1.1 Ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
1.2 This Research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
1.3 Please ensure this office is informed before you commence your research.
1.4 The KwaZulu-Natal College and the identified institutions for this research will not provide any resources for this research.
1.5 You will be expected to provide feedback on your findings to the Principal of the KwaZulu-Natal College of Nursing.

Thanking You

[redacted]

Acting Principal : Ms JT Makhathini
KwaZulu-Natal College of Nursing

Appendix E1

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: Addington Campus
Telephone: 031 327 2999 **Fax**: 031 327 2756

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs. M. Sissing
	Addington Campus
Re	Permission to conduct a research study at **Addington Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]

Mrs. M Sissing
Principal: Addington Campus

15/03/2013
Date

Appendix E2

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: Benedictine Campus
Telephone: 035 831 7107 **Fax**: 035 831 0760

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs. M Zibani
	Benedictine Campus
Re	Permission to conduct a research study at **Benedictine Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]

Mrs. M Zibani
Principal: Benedictine Campus

2013/03/15
Date

Appendix E3

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: CJM Campus
Telephone: 034 271 6528/6531 **Fax**: 034 271 0094

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs N ndlovu
	C.J.M Campus
Re	Permission to conduct a research study at **C.J.M Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]
Mrs N Ndlovu
Principal: C.J.M Campus

15.03.2013
Date

Appendix E4

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KWAZULU NATAL COLLEGE OF NURSING
EDENDALE NURSING CAMPUS S 2013
Private Bag X 9099 Pietermaritzburg.3200
29 Havelock Road. Pietermaritzburg.3201
Tel.:, 033-3456810/3927566 Fax.:0333459477/0865743522
Email.:ntombizakhona.majola@kznhealth.gov.za
www.kznhealth.gov.za

23 April 2013

Mrs. S. Maharaj (21237180)
54 Brixham Road
Orient Heights
Pietermaritzburg

Dear Mrs S. Maharaj

REQUEST TO CONDUCT RESEARCH AT EDENDALE NURSING CAMPUS

Protocol: "The status of usage of information technology systems within the campuses of the Kwazulu-Natal College of nursing"

Your letter dated 07.02.13 refers.

We are pleased to inform you that the permission is granted provided:

- Confidentiality is maintained at all times
- Your research does not interfere with smooth running of the Campus
- Proper consent is obtained from the participants

Thank you
Yours sincerely

[redacted]

Dr N.V. Mkhize
(Chairperson Research committee)

[redacted]

Mrs N.C. Majola
(Campus principal)

EDENDALE NURSING CAMPUS S2013 PRINCIPAL 29 HAVELOCK ROAD

Appendix E5

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: Greys Campus
Telephone: 033 897 3508 **Fax**: 033 8973500

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs E Hlongwa
	Greys Campus
Re	Permission to conduct a research study at Greys Campus

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]
Ms. E Hlongwa
Principal: Greys Campus

2013/03/14
Date

Appendix E6

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: King Edward VIII Campus
Telephone: 031 360 3110 **Fax**: 031 206 1222

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs. M. Nkabinde
	King Edward VIII Campus
Re	Permission to conduct a research study at **King Edward VIII Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]

Mrs. M Nkabinde
Principal: King Edward VIII Campus

2013/03/15
Date

Appendix E7

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: Madadeni Campus
Telephone: 0343144617 **Fax**: 034 3144618

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Ms SV Hlatshwayo
	Madadeni Campus
Re	Permission to conduct a research study at Madadeni **Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]
Mrs SV Hlatshwayo
Principal: Madadeni Campus

15-03-2013
Date

Appendix E8

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: Ngwelezana Campus
Telephone: 035 794 2570 **Fax**: 035 907 7010

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Dr. T. Matsane
	Ngwelezana Campus
Re	Permission to conduct a research study at **Ngwelezana Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]

Dr T Matsane
Principal: Ngwelezana Campus

15/03/2013
Date

Appendix E9

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

PORT SHEPSTONE NURSING CAMPUS
Postal Address: Private bag x719
Port Shepstone 4240
Physical Address: Lot 107 Marine drive
Shelly Beach 4265
Tel.:039 315 5322/3, Fax: 039 315 5325

Date: 5 March 2013

Attention: Mrs S. Maharaj

54 Brixham Road
Orient Heights
PIETERMARITZBURG
3201

Dear Mrs Maharaj

RE: REQUEST FOR PERMISSION TO CONDUCT STUDY

Your letter dated 7 February 2013 is hereby acknowledged and refers:

Permission is hereby granted for you to conduct your study at Port Shepstone Nursing Campus. Please take note of the conditions as stated by the KwaZuluNatal College of Nursing.

Best wishes

[redacted]

MR N.B. GWALA
CAMPUS PRINCIPAL
PORT SHEPSTONE NURSING CAMPUS

Appendix E10

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing
Prince Mshiyeni Campus
Private Bag X10, Mobeni, 4060
Mangosuthu Highway, Umlazi
Tel: 0319078313 Fax: 0319067772
E-mail: sindisiwe.mthembu3@kznhealth.gov.za
Web-site: www.kznhealth.gov.za

Date: 21/02/2013

Dear Mrs Maharaj,

Re: Permission to Conduct a Research Study at Prince Mshiyeni Campus

I have pleasure in informing you that the permission to conduct research at this Campus has been granted. The title of the study is: "The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing". It has been noticed that you already have the permission from the HEI and KZNCN, and as KZNCN indicated in their correspondence, it is required that you obtain the Provincial Department of Health's permissions before commencement of this project.

Please make sure that you:
- Adhere to the Department of Health policies, procedures and guidelines.
- Do not disturb the functioning of the campus or academic activities when collecting data.
- Make prior arrangements with the relevant staff members, group coordinator(s) and students.

The campus wishes you all the best of luck in your studies. It will be appreciated that you share the findings or provide feedback on your findings.

Thank you,

Dr SZ Mthembu
Campus Principal

Appendix E11

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KwaZulu-Natal College of Nursing

Enquiries: RK Khan Campus
Telephone: 031 459 6069 **Fax**: 031 401 5229

Attention	Mrs. S Maharaj
	Vice Principal : KZN College of Nursing
From	Mrs. J Reddy
	RK Khan Campus
Re	Permission to conduct a research study at **J Reddy Campus**

Dear Mrs. S Maharaj

I have a pleasure informing you that the permission to conduct research at this Campus has been granted. The title of the study is **"The status of usage of information technology systems within the campuses of the KwaZulu-Natal College of Nursing".**

It has been noted that you have already obtained permission from the Durban University of Technology Ethics Committee and the KwaZulu-Natal College of Nursing. Please note that as per the KwaZulu-Natal College of Nursing's guidelines for granting permission to conduct research in any of its NEIs the document clearly states that before you commencement your research you are required to obtain the Provincial Department of Health's permission first.

Please make sure that you:

- ✓ Adhere to the KZN Department of Health policies, procedures and guidelines
- ✓ Do not disturb the functioning of the campus or academic activities when collecting data
- ✓ Make prior arrangements with the staff members or group coordinators and students

The campus wishes you all the best of luck in your studies. It will be appreciated that you share your findings or provide feedback on your findings.

Thank You

[redacted]

Mrs J Reddy
Principal: RK Khan Campus

Date 2013/03/15.

Appendix F

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 024/13
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Mrs S. Maharaj

Subject: Approval of a Research Proposal

1. The research proposal titled **'The status of usage of Information Technology (ICT) systems within campuses of the KwaZulu Natal College of Nursing (KZNCN)'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at Nursing campuses of the KZN College of Nursing.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

[redacted]

Dr E Lutge
Chairperson, Health Research Committee
Date: 15/04/2013

Appendix G

INFORMATION LETTER TO PRINCIPALS

Research topic: The status of usage of Information Technology Systems with campuses of the KwaZulu-Natal College of Nursing

Dear Principal

I, Sangeetha Maharaj (Student number 21237180) registered as a Masters Student, at the Durban University of Technology, will be conducting a research analysing the status of usage of Information Technology Systems within selected campuses of the KwaZulu-Natal College of Nursing.

The study is targeted at Academic staff, Students and Administrative staff of the KwaZulu-Natal College of Nursing. Your assistance as the Principal of the Campus is being sought, to distribute, and collect all research questionnaires, in order to be able to reach all intended participants in this research study.

The Principal of the Campus is requested to distribute the questionnaires as follows:

- All administrative support staff
- Lecturers will be sampled according to simple random sampling.
- Students from the second, third and fourth of the R425 Programme. Every second student on the register can be used as the sample, ensuring that all questionnaires are handed out.

All questionnaires can be completed in the spare time of the participants.

All participants are requested to complete the informed consent that is included in the package.

The Principal is requested to return all questionnaires back to the researcher, in the envelope provided with the questionnaire within a maximum of three weeks. This will give all participants an opportunity to be able to gain access to the questionnaire.

Thank You,

_____

Mrs S Maharaj
Work: 033 2647800
Cell 0747236048

Appendix H 1

QUESTIONAIRE: ACADEMIC STAFF -KWAZULU-NATAL COLLEGE OF NURSING

USE OF INFORMATION TECHNOLOGY SYSTEMS IN THE KWAZULU-NATAL COLLEGE OF NURSING

Dear Colleague, thank you in advance for taking part in this research study.

Please note that all information will be treated confidentially, and anonymity of all participants will be ensured.

Instructions:

- Please complete all questions.
- Place a cross next to your selected response
- The questionnaire should take you approximately half hour to complete

1.	Date: / /

Demographic Data

2.	Gender	Male	Female

3.	Age Range	20-30	31-40	41-50	51-60

ACCESS:

4. As a lecturer of the KZNCN, which of the following equipment do you have access to in your office?

		YES	NO
4.1	Desk- Top Computer		
4.2	Lap-Top Computer		
4.3	Data Projector		
4.4	Photocopying facilities		
4.5	Scanning facilities		
4.6	Printing		
4.7	Electronic Library Resource		

5. Do you have access to online facilities via:

		YES	NO
5.1	Cell Phone		
5.2	Campus Computer		
5.3	Personal Computer/Laptop		
5.4	Tablet		

6. Is there on-line information accessible to academic staff members of the KZNCN on the following:

		YES	NO
6.1	KZNCN Policies		
6.2	KZNCN Procedures		
6.3	Student Information i.e.: (Rules and Regulations, Course Notes etc.		
6.4	Relevant Updates affecting nurse training		
6.5	Changes to Course rules and regulations		

7. Rate each of the items below on a scale from 1 to 5 (**1 = not at all useful** and **5 = extremely useful**) to indicate how useful it would be to have on-line access to the following information:

		Rating
7.1	KZNCN Policies	
7.2	KZNCN Procedures	
7.3	Student Information i.e.: (Rules and Regulations, Course Notes etc.	
7.4	Relevant Updates affecting nurse training	
7.5	Changes to Course rules and regulations	

8. Please select the option which best answers your situation for each of the following:

		YES	NO
8.1	Does the KZNCN offer academic staff access to on line internal (i.e. intranet) search facilities, for research purposes?		
8.2	Does the KZNCN offer academic staff access to on line external (i.e. internet) search facilities, for research purposes?		
8.3	Does the KZNCN offer you off campus access to electronic search facilities?		

9. Indicate your agreement with the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
9.1	It is important for me to have access to on-line internal (i.e. intranet) search facilities, for improving myself in respect of my teaching function					
9.2	It is important for me to have access to on-line external (i.e. internet) search facilities, for improving myself in respect of my teaching function					
9.3	I think that the on-line library resources meets the needs of the academic staff of the KZNCN					
9.4	I think it is important for me to have access to on-line search facilities, for					

	assisting me in my professional development, in respect of my personal and professional studies					
9.5	It is essential for me to have access to off campus electronic search facilities					

Usage

10. Indicate the frequency with which you have accessed the on-line library of the KZNDOH (KwaZulu-Natal Department of Health).**Select ONE option only.**

On a daily basis	
On a weekly basis	
On a monthly basis	
Less often than monthly	
Not at all	
I do not have access to on-line library	
I do not know about on-line library	

11. How often do you use a computer for work related purposes? **Select ONE option only.**

At least once a day	
At least once a week	
At least once a month	
Less often that once a month	
Never	

Computer Literacy

12. Does the KZN College /Campus, offer you any form of computer training?

Yes	No

13. Indicate your agreement with the following statements:

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
13.1	I know how to send/receive emails					
13.2	I know how to use the internet					
13.3	I know how to use WORD					
13.4	I know how to use EXCEL					
13.5	I know how to use POWER POINT					
13.6	I think including computer training as part of my continuous skills development will be of value to me in my current work environment					
13.7	I am able to use a computer to prepare lecture notes/handouts					
13.8	I am able to use a computer to prepare tests and assignments					
13.9	I am able to use a computer to capture students' academic records					
13.10	I am able to use a computer for internal and external written communication(e.g.: memorandums, letters)					

14.Select <u>ONE</u> of the options below that best describes your level of computer literacy:

I am unable to operate any computer package	
I am below the level of being able to function adequately, on a computer	
I can manage some computer operations, relevant to work demand	
I am competent in all packages available in the Department	
I am highly computer literate enabling functioning at a high level of computer literacy	

Support

15. Please indicate by selecting yes or no for the following questions, regarding the support you receive regarding information technology systems

		YES	NO
15.1	Does the KZN College /Campus offer you, as an academic staff member, any Information Technology support /Help Desk?		
15.2	Does the KZNCN provide a budget to your Campus for the purpose of upgrading your Information technology systems on an annual basis?		

Teaching, Learning and Assessment, communication

16. Indicate your agreement (where applicable) to the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
16.1	I find the Information Technology support /Help Desk adequate for my needs						
16.2	The budget for upgrading IT systems on campus is adequate						

17. Does the KZN College of Nursing use any of the following Information Communication Technology tools to communicate with you as an academic staff member?

		YES	NO
17.1	SMS		
17.2	Email		
17.3	Twitter		
17.4	Blogging		
17.5	Face book		

18.Do you use any of the following Information Communication Technology tools to communicate with your students?

		YES	NO
18.1	SMS		
18.2	Email		
18.3	Twitter		
18.4	Blogging		
18.5	Face book		

19. For each of the following means of communication, indicate, by giving a rating score between 1 and 5, how useful you consider each of them to be, when communicating with your students. **1 = not at all useful,** and **5 = extremely useful**)

		Rating score
19.1	SMS	
19.2	Email	
19.3	Twitter	
19.4	Blogging	
19.5	Face book	

20. Does the KZNCN offer students electronic access to allow for the following:

		YES	NO
20.1	On-line submission of assignments		
20.2	On- line testing of students		
20.3	Application for exam re-marks		
20.4	Application for special examinations		

21. Nursing students are undertaking the clinical practical requirements of the course away from the campus, for a large percentage of their training.

For each of the following items, indicate, with a score of 1 to 5, how beneficial the electronic application would be for your students.
1 = Not at all beneficial, 5 = Essential

21.1	On-line submission of assignments	
21.2	On- line testing of students	
21.3	Application for exam re-marks	
21.4	Application for special examinations	

22. Do you, as a lecturer of the KZNCN, utilise a variety of teaching methods using information technology systems?

Yes	No

23. Which of the following teaching methods, utilising information technology, do you use in your teaching environment?

		YES	**NO**
23.1	Power point presentations		
23.2	Smart Boards		
23.3	video conferencing		
23.4	Videos/DVDs		
23.5	Tele-health tuition		
23.6	Simulations		
23.7	On-line Presentations (e.g. You Tube)		

24. With which of the following teaching methods, utilising information technology do you require more assistance from the KZNCN, in order to utilise it in your teaching environment?

		YES	NO
24.1	Power point presentations		
24.2	Smart Boards		
24.3	video conferencing		
24.4	Videos/DVDs		
24.5	Tele-health tuition		
24.6	Simulations		
24.7	On-line Presentations (e.g. You Tube)		

25. Does the KZNCN have an on-line system to assist student with regard to the following?

		YES	NO
25.1	Announcement of events of the KZNCN		
25.2	Necessary contact details		
25.3	Announcement of achievements		
25.4	Announcement of clinical and educational updates		
25.5	Tracking of academic progress		

26. For each of the following items, indicate, by giving a score between 1 and 5, how necessary you think it is to have the item on line, to assist students:

1 = Not at all necessary , 5-Essential

		Rating score
26.1	Announcement of events of the KZNCN	
26.2	Necessary contact details	
26.3	Announcement of achievements	
26.4	Announcement of clinical and educational updates	
26.5	Tracking of academic progress	

27. In your view, as a lecturer of the KZNCN, how does the current information Technology system being used at the KZNCN compare to those being used in other Higher Education Institutions in South Africa? **Select ONE option only.**

Lagging behind	
On a par	
More advanced	
I am unaware	

28. Indicate your level of agreement with the following statements:

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
28.1	I think my students are being prepared adequately for the highly technological nursing practice area					
28.2	The students would be better prepared if there was a restructuring of the current training curriculum to ensure that computer education is adequately covered					

28.3	The students would be better prepared if more access to web based searches for continuous development was encouraged					
28.4	The students would be better prepared if there was benchmarking with changes and developments in the clinical area, with respect to Information Technology to ensure that nursing education is on par with these developments					
28.5	The students would be better prepared if there was benchmarking with changes and developments in the Higher education sector, with respect to Information Technology to ensure that nursing education is on par with these developments					

Additional Comments and suggestions you may have:

_____
_____
_____
_____
_____
_____
_____

THANK YOU FOR YOUR TIME AND EFFORT IN FILLING OUT THIS RESEARCH QUESTIONAIRE

Appendix H2

QUESTIONAIRE: STUDENTS-KWAZULU-NATAL COLLEGE OF NURSING

USE OF INFORMATION TECHNOLOGY SYSTEMS IN THE KWAZULU-NATAL COLLEGE OF NURSING

Thanking you in advance for taking part in this research study.

Please note that all information will be treated confidentially, and anonymity of all participants will be ensured.

Instructions:

- Please complete all questions.
- Place a cross next to your selected response
- The questionnaire should take you approximately half an hour to complete

1. **Date**: / /

Demographic Data

2.

Gender	Male	Female

3.

Age	Below 31	31 - 40	41 - 50	Over 50

4.

Training Program	R425	R212

ACCESS:

5. As a student of the KZNCN, do you have access to the following at your campus?

		YES	**NO**
5.1	Computer-Desk/Lap Top		
5.2	Lap-Top Computer		
5.3	Learning area Network		
5.4	Photocopying facilities		
5.5	Scanning facilities		

5.6	Printing		
5.7	Electronic Library Resource		

6. Do you have access to online facilities via the following?

		YES	**NO**
6.1	Cell Phone		
6.2	Campus Computer		
6.3	Personal Computer/Laptop		
6.4	Tablet		

7. Is there on-line information accessible to students of the KZNCN on the following?

		YES	**NO**
7.1	KZNCN Policies		
7.2	KZNCN Procedures		
7.3	Student Information i.e.: (Rules and Regulations, Course Notes etc.		
7.4	Relevant Updates affecting nurse training		
7.5	Changes to Course rules and regulations		
7.6	Exam information/Dates		
7.7	Examination Results		

8. Rate each of the items below from 1 to 5 ((**1 = not at all useful** and **5 = extremely useful**) to indicate how useful it would be to have on-line access to the following information:

		Rating
8.1	KZNCN Policies	
8.2	KZNCN Procedures	

8.3	Student Information i.e.: (Rules and Regulations, Course Notes etc.	
8.4	Relevant Updates affecting nurse training	
8.5	Changes to Course rules and regulations	
8.6	Examination information/Dates	
8.7	Examination Results	

9. Please select the option which best answers your situation for each of the following:

		YES	**NO**
9.1	Does the KZNCN offer students access to on line internal (i.e. intranet) search facilities, for research purposes?		
9.2	Does the KZNCN offer students access to on line external (i.e. internet) search facilities, for research purposes?		
9.3	Does the KZNCN offer you off campus access to electronic search facilities?		

10. Indicate your agreement with the following statements:

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
10.1	It is important for me to have access to on-line internal (i.e. intranet) search facilities, for developing myself into a fully-fledged professional					
10.2	It is important for me to have access to on-line external (i.e. internet) search facilities, for developing myself into a fully-fledged					

	professional					
10.3	I think that the on-line library meets the needs of the students of the KZNCN					
10.4	I think it is important for me to have access to on-line search facilities, for assisting me in my professional development, in respect of my studies					
10.5	It is essential for me to have access to off campus electronic search facilities					

11. Indicate the frequency with which you have accessed the on-line library of the KZNDOH (KwaZulu-Natal Department of Health).**Select ONE option only.**

On a daily basis	
On a weekly basis	
On a monthly basis	
Less often than monthly	
Not at all	
I do not have access to on-line library	
I do not know about on-line library	

Computer Literacy

12. Does the KZN College /Campus, offer you any form of computer training?

Yes	No

13. Indicate your agreement with the following statements:

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
13.1	I am confident sending/receiving emails					
13.2	I am confident using the internet					
13.3	I am confident using WORD					
13.4	I am confident using EXCEL					
13.5	I am confident doing a power point presentation					
13.6	I think including computer training as part of my curriculum would prepare me for my future work environment					
13.7	I am able to use a computer to prepare assignments					
13.8	I am able to use a computer for internal and external written communication(eg: letters)					

14. **Select the <u>ONE</u> option below** that best describes your level of computer literacy:

I am unable to operate any computer package	
I am below the level of being able to function adequately, on a computer	
I can manage some computer operations, relevant to work demand	
I am competent in all packages available in the Department	
I am highly computer literate enabling functioning at a high level of computer literacy	

Support

15. Indicate the most appropriate answer:

	YES	NO
Does the KZN College /Campus offer you, as a student, Information Technology support /Help Desk?		

16. Indicate your agreement (if applicable) to the following statement:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
I find the Information Technology support /Help Desk adequate for my needs						

Teaching, Learning and Assessment communication

17. Does the KZN College of Nursing use any of the following Information Communication Technology tools to communicate with you, as a student?

		YES	NO
17.1	SMS		
17.2	Email		
17.3	Twitter		
17.4	Blogging		
17.5	Face-book		

18. Do you use any of the following Information Communication Technology tools to communicate with your fellow students?

		YES	NO
18.1	SMS		
18.2	Email		
18.3	Twitter		
18.4	Blogging		
18.5	Face-book		

19. For each of the following means of communication, indicate, by giving a score from 1 to 5, **(1 = Not at all useful** and **5 = extremely useful)** how useful you consider each of them to be, when communicating with your fellow students.

		Rating score
19.1	SMS	
19.2	Email	
19.3	Twitter	
19.4	Blogging	
19.5	Face—book	

20. For each of the following means of communication, indicate, by giving a score from 1 to 5, **(1 = Not at all useful** and **5 = extremely useful)** how useful you consider each of them to be, when communicating with your lecturers/campus administrators.

		Rating score
20.1	SMS	
20.2	Email	
20.3	Twitter	
20.4	Blogging	
20.5	Face-book	

21. Does the KZNCN offer students electronic mechanisms to allow for the following?

		YES	NO
21.1	On-line submission of assignments		
21.2	On- line testing of students		
21.3	Application for exam re-marks		
21.4	Application for special examinations		

22. Nursing students are undertaking the clinical practical requirements of the course away from the campus, for a large percentage of their training.
For each of the following items, indicate, with a score from 1 to 5 **(1 = Not at all beneficial** and **5 = Extremely beneficial)**, how beneficial the electronic application would be for you, as a student.

		Rating scale
22.1	On-line submission of assignments	
22.2	On- line testing of students	
22.3	Application for exam re-marks	
22.4	Application for special examinations	

23. Do your lecturers at the KZNCN, utilise a variety of teaching methods using information technology systems?

Yes	No

24. Which of the following teaching methods, utilising information technology, are used in your teaching environment?

		YES	NO
24.1	Power point presentations		
24.2	Smart Boards		

24.3	video conferencing		
24.4	Videos/DVDs		
24.5	Tele-health tuition		
24.6	Simulations		
24.7	On-line Presentations (e.g. You Tube)		

25. Which of the following teaching methods, utilising information technology, do you think are/would be suitable for use in your environment?

		YES	**NO**
25.1	Power point presentations		
25.2	Smart Boards		
25.3	video conferencing		
25.4	Videos/DVDs		
25.5	Tele-health tuition		
25.6	Simulations		
25.7	On-line Presentations (e.g. You Tube)		

Communication and Information Systems

26. For each of the following items, indicate, by giving a score from 1 to 5 **(1 = Not at all necessary** and **5-Essential)**, how necessary you think it is to have the item on line, to assist students:

		Rating score
26.1	Announcement of events of the KZNCN	
26.2	Necessary contact details	
26.3	Announcement of achievements	
26.4	Announcement of clinical and educational updates	
26.5	Tracking of academic progress	

27. Indicate your agreement with the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
27.1	I think as a student I am being prepared adequately for the highly technological nursing practice area					
27.2	Students would be better prepared if there was a restructuring of the current training curriculum to ensure that computer education is adequately covered					
27.3	Students would be better prepared if more access to web based searches for continuous development was encouraged					
		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
27.4	Students would be better prepared if there was benchmarking with changes and developments in the clinical area, with respect to Information Technology to ensure that nursing education is on par with these developments					
27.5	Students would be better prepared if there was benchmarking with changes and developments in the Higher education sector, with respect to Information Technology to ensure that nursing education is on par with these developments					

28. In your view, as a student of the KZNCN ,how does the current information Technology system being used at the KZNCN compare to those being used in other Higher Education Institutions in South Africa? **Select <u>ONE</u> option only.**

Lagging behind	
On a par	
More advanced	
I am unaware	

Additional Comments and suggestions you may have:

_____
_____
_____
_____
_____
_____
_____

THANK YOU FOR YOUR TIME AND EFFORT IN FILLING OUT THIS RESEARCH QUESTIONAIRE

Appendix H3

QUESTIONAIRE: ADMINISTRATIVE STAFF -KWAZULU-NATAL COLLEGE OF NURSING

USE OF INFORMATION TECHNOLOGY SYSTEMS IN THE KWAZULU-NATAL COLLEGE OF NURSING

Dear Sir/Madam, Thank you in advance for taking part in this research study.

Please note that all information will be treated confidentially, and anonymity of all participants will be ensured.

Instructions:

- Please complete all questions.
- Place a cross next to your selected response
- The questionnaire should take you approximately half hour to complete

1. **Date**: / /

Demographic Data

2.

Gender	Male	Female

3.

Age Range	Up to 30	31-40	41-50	Over 50

ACCESS:

4. As an administrative staff member of the KZNCN, which of the following equipment do you have access to in your office?:

		YES	**NO**
4.1	Desk- Top Computer		
4.2	Lap-Top Computer		
4.3	Data Projector		
4.4	Photocopying facilities		
4.5	Scanning facilities		
4.6	Printing		
4.7	Electronic Library Resource		

5. Do you have access to online facilities via:

		YES	NO
5.1	Cell Phone		
5.2	Campus Computer		
5.3	Personal Computer/Laptop		
5.4	Tablet		

6. Is there on-line information accessible to administrative staff members of the KZNCN on the following:

		YES	NO
6.1	KZNCN Policies		
6.2	KZNCN Procedures		
6.3	Student Information i.e.: (Rules and Regulations, Course Notes etc.		
6.4	Relevant Updates affecting nurse training		
6.5	Changes to Course rules and regulations		

7. Rate each of the items below from 1 to 5 (**1 = not at all useful** and **5 = extremely useful**) to indicate how useful it would be to have on-line access to the following information:

		Rating
7.1	KZNCN Policies	
7.2	KZNCN Procedures	
7.3	Student Information i.e.: (Rules and Regulations)	
7.4	Relevant Updates affecting nurse training	
7.5	Changes to Course rules and regulations	

8. Please select the option which best answers your situation for each of the following:

		YES	NO
8.1	Does the KZNCN offer administrative staff access to on line internal (i.e. intranet) search facilities, for research purposes?		
8.2	Does the KZNCN offer administrative staff access to on line external (i.e. internet) search facilities, for research purposes?		
8.3	Does the KZNCN offer you off campus access to electronic search facilities?		

9. Indicate your level of agreement with the following statements.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
9.1	It is important for me to have access to on-line internal (i.e. intranet) search facilities, for improving myself in respect of my administrative function					
9.2	It is important for me to have access to on-line external (i.e. internet) search facilities, for improving myself in respect of my administrative function					
9.3	I think that the on-line library meets the needs of the administrative staff of the KZNCN					
9.4	I think it is important for me to have access to on-line search facilities, for assisting me in my career development, in respect of my personal and professional studies					

9.5	It is essential for me to have access to off campus electronic search facilities					

USAGE:

10. Indicate the frequency with which you have accessed the on-line library of the KZNDOH (KwaZulu-Natal Department of Health).**Select ONE option only.**

On a daily basis	
On a weekly basis	
On a monthly basis	
Less often than monthly	
Not at all	
I do not have access to on-line library	
I do not know about on-line library	

11. How often do you use a computer for work related purposes? **Select ONE option only.**

At least once a day	
At least once a week	
At least once a month	
Less often than once a month	
Never	

Computer Literacy

12. Does the KZN College /Campus, offer you any form of computer training?

Yes	No

13. Indicate your agreement with the following statements:

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
13.1	I am confident sending/receiving emails					
13.2	I am confident using the internet					
13.3	I am confident using WORD					
13.4	I am confident using EXCEL					
13.5	I am confident doing a PowerPoint presentation					
13.6	I think including computer training as part of my continuous skills development will be of value to me in my current work environment					
13.7	I am able to use a computer to capture students' academic records					
13.8	I am able to use a computer for internal and external written communication(eg: memorandums, letters)					

14. Select the **ONE** option below that best describes your level of computer literacy:

I am unable to operate any computer package	
I am below the level of being able to function adequately, on a computer	
I can manage some computer operations, relevant to work demand	
I am competent in all packages available in the Department	
I am highly computer literate enabling functioning at a high level of computer literacy	

Support

15. Please indicate by selecting YES or NO for the following questions, with regard to the support you receive regarding information technology systems

		YES	NO
15.1	Does the KZN College /Campus, offer you as an administrative staff member any Information Technology support /Help Desk?		
15.2	Does the KZNCN provide a budget to your Campus for the purpose of upgrading your Information technology systems on an annual basis?		

16. Indicate your agreement (where applicable) with the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
16.1	I find the Information Technology support /Help Desk adequate for my needs						
16.2	The budget for upgrading IT systems on campus is adequate						

Communication and Information Systems

17. Does the KZN College of Nursing use any of the following Information Communication Technology tools to communicate with you as an academic staff member?

		YES	NO
17.1	SMS		
17.2	Email		
17.3	Twitter		
17.4	Blogging		
17.5	Facebook		

18. Do you use any of the following Information Communication Technology tools to communicate with your colleagues within the KZNCN ?

		YES	NO
18.1	SMS		
18.2	Email		
18.3	Twitter		
18.4	Blogging		
18.5	Facebook		

19. For each of the following means of communication, indicate, by giving a score from 1 and 5, **(1 = Not at all useful** and **5 = Extremely useful)** how useful you consider each of them to be, when communicating with your colleagues.

		Rating score
19.1	SMS	
19.2	Email	
19.3	Twitter	
19.4	Blogging	
19.5	Facebook	

20. As an administrative staff member, information systems are very important in managing campus and student records. With regard to each of the following items, indicate, with a

score from 1 to 5, **(1 = Not at all beneficial** and **5=essential)** how beneficial the electronic system is.

20.1	Data base system for management of student registrations	
20.2	Management of student academic records, including application for special examinations etc.	
20.3	Recording of student disciplinary, and misconduct records	
20.4	Management of the Human Resource affairs of the campus	
20.5	Management of the Financial affairs of the campus	

21. Does the KZNCN have an on-line system to assist administrative staff with regard to the following?

		YES	**NO**
21.1	Announcement of events of the KZNCN		
21.2	Necessary contact details		
21.3	Announcement of achievements		
21.4	Announcement l updates		
21.5	Tracking of academic progress		

22. For each of the following items, indicate, by giving a score from 1 and 5 **(1 = 1 Not at all necessary** and **5=Essential)**, how necessary you think it is to have the item on line, to assist administrative staff:

		Rating score
22.1	Announcement of events of the KZNCN	
22.2	Necessary contact details	
22.3	Announcement of achievements	
22.4	Announcement of updates	
22.5	Tracking of academic progress	

23. In your view, as an administrative staff member of the KZNCN, how does the current information Technology system being used at the KZNCN compare to those being used in other Higher Education Institutions in South Africa? **Select ONE option only.**

Lagging behind	
On a par	
More advanced	
Am not aware	

Additional Comments and suggestions you may have:

_____

_____

THANK YOU FOR YOUR TIME AND EFFORT IN FILLING OUT THIS RESEARCH QUESTIONAIRE