



**UNIVERSITY of the  
WESTERN CAPE**

**FACULTY OF COMMUNITY AND HEALTH SCIENCES**

**USE AND ACCEPTANCE OF EDUCATIONAL TECHNOLOGIES BY ACADEMICS  
IN A SCHOOL OF NURSING IN THE WESTERN CAPE, SOUTH AFRICA.**



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## **Abstract**

Educational technology has become an integral means for communication and a way of getting information among the academics and students in the university environment.

## **Aim**

This study aims to investigate the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, South Africa (determination of educational technology use, perceived usefulness, perceived ease of use and influencing factors). The findings of the study may be used to facilitate planning for and implementation of increase use of educational technologies to enhance teaching and learning.

## **Methods**

The research design was a quantitative descriptive survey using a self-administered questionnaire. Due to small population size, all 58 academics (28 lecturers- qualified personnel to teach students conduct research and involved in administration of modules and levels) and 30 clinical facilitators- registered nurses with clinical expertise who assists students in the clinical placements were included in the study. The Technology Acceptance Model (TAM) provided the framework for the study. The study adapted an existing questionnaire developed by Kripanont in 2007. Validity and reliability of the instrument were established and pre-testing was done to validate the questions. Data was entered into SPSS version 23 and analysed using both descriptive and inferential statistics techniques.

## Results

The findings suggested that though academics use educational technology but usage was found to be low and the academics were selective in the type of technology that they use which is influenced by need, availability, duties and academic positions of such academic. This will help facilitating planning for implementation of increased use of educational technology to enhance teaching and learning.

Lecturers use educational technology for teaching and learning, while its use among the clinical facilitators is still minimal. The most commonly and frequently used devices were desktops and laptops. Low usage of smartphones for educational purpose among academics was reported. Email was the most common application used by academics for teaching and learning, followed by WhatsApp. The e-learning platform was poorly used; however, the lecturers still used it more compared with the clinical facilitators. Low usage was reported on other educational technologies included in the study. Most of the respondents reported a moderate to high experience with educational technology. More than two-thirds of the respondents used educational technology for enhancing their knowledge on current evidence of nursing, preparing for classes, preparing teaching materials, student contact and supervision and for facilitating/teaching in class. Time and institutional factors were mentioned to be important factors to consider when engaging with any educational technology. Finally, perceived usefulness, perceived ease of use and academic position were predictors of use of educational technology.

### List of acronyms and abbreviations.

HEFCE	Higher Education Funding Council for England
HEI	Higher Education Institution
ICT	Information Communication Technology
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
RSS	Rich Site Summary
TAM	Technology Acceptance Model
TENET	Tertiary Education and Research
SA	South Africa



## Keywords

- Academics
- Acceptance
- Educational technology
- Facilitating conditions
- Perceived ease of use
- Perceived usefulness
- Technology Acceptance Model
- Use
- Usage



## Declaration

I declare that “*Use and acceptance of educational technologies by academics in a school of nursing in the Western Cape, South Africa.*” is my own work, that it has not been previously submitted for any degree or examination in any University and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Ologun Rita Oluwanifesimi

Signed... 

This 23<sup>rd</sup> day of April, 2017.



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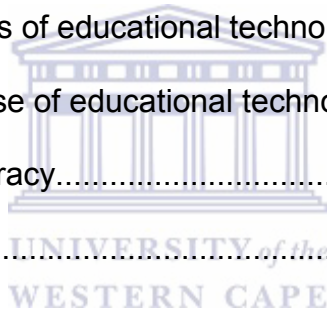
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## Chapter 1

### INTRODUCTION AND BACKGROUND OF THE STUDY

#### 1.1 Introduction

Educational technologies refer to the use of the Internet and various educational technologies used in delivering education. These include the web, smartphones, e-learning platforms, search engines, social media, databases, reference managers. This technological innovations have revolutionised educational and clinical practice environments (Agbedia, 2012). Rapid worldwide technological development and economic advancement has put unlimited investment into education (Tedla, 2012). Currently, with the growth of information, globalisation and the development of innovative technology, technology has become an important player in the teaching profession. Educators are implementers of technologies and need to have technological skills to use technology in their classrooms (Tedla, 2012; Teo, 2011). African governments as well as other countries are conscious about the significance of technology in the growth and development of a nation especially in the fields of education advancement, economic development, social alertness, cultural enhancement and political leadership (Tedla, 2012).

In these times of technological changes, higher education is positioned to adapt the widespread adoption of accepted educational technologies. In a discussion by Higher Education Funding Council for England (HEFCE) on the higher education workforce, a question was asked: “How can the educational sector be more supple at a period of change while making the best use of the ability and commitment of its people?” (Johnson, Levine, Smith, & Stone, 2010) Technology advancement was identified in making this change in the educational sector (Johnson et al., 2010). It is

argued that services offered based on technology and its advancement will transform community experience and prospects when accessing and sharing information and knowledge (Nut, 2010).

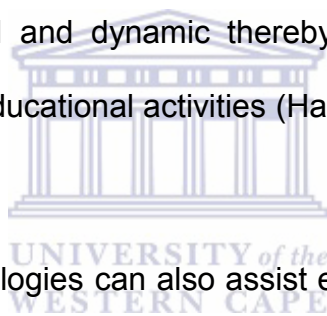
In recent times, technological developments have undergone various improvements imbued educational approaches and standards adopted by educational institutions (Skiba, 2016). These developments are based on teaching with the use of educational technologies, whether in combination with normal traditional classroom teaching or with distance education thus creating suitable grounds for the active participation of learners. Learners cease to be viewers in the educational process and are able to actively participate as their level of knowledge improves.

The use of educational technology provides for learners to be educated at their own pace; in their own environment and often allocations can be blended to suit the needs of the learner (Ragneskog & Gerdner, 2006). Additionally, educational technologies help the learners to participate in teaching and learning activities in various places if used in distance education. The use of education technologies has become important in the field of education, as these new technologies are improving networking and flexibility.

## **1.2 Background of the study**

Digital literacy is the set of competencies required for full participation in a knowledge society. It includes knowledge, skills, and behaviours involving the effective use of digital devices such as smartphones, tablets, laptops and desktop for purposes of communication, expression, collaboration and advocacy. However, educational technology as a channel for teaching-learning process has been encouraged to be used in academics' activities and these tools have their own

challenges and constraints for acceptance by users (Balash, Yong, & Bin Abu, 2011). The use of educational technology has been linked to increased efficiency, productivity, and higher educational output (Adeosun, 2010). Technology has promoted the quantity and quality of teaching, learning and research in educational institutions by the establishment of active, collaborative and attractive content and making individualised instruction possible (Adeosun, 2010). This process has the ability to increase, develop, inspire and involve students in learning activities and can help to make school experiences more interconnected and help provide authentic connections between the educational institution and the real world (Abolfazli, Sanaei, Ahmed, Gani, & Buyya, 2014; Adeosun, 2010). Therefore technologies can make the institution very well-organized and dynamic thereby creating different technology tools to help in facilitation of educational activities (Haddad & Jurich, 2002). Notion of media/digital literacy



The use of educational technologies can also assist educators to function effectively and efficiently (Johnson, Wisniewski, Kuhlemeyer, Isaacs, & Krzykowski, 2012; Kim, Kim, Lee, Spector, & DeMeester, 2013). Therefore it is of great significance that various educational technology support systems and supporting mechanisms be made available to enhance educator's use of these technologies (Johnson et al., 2012), such as email, Google scholar or other Internet sites, electronic databases (PUBMED, CINAHL, EBSCOHOST), Reference managers (Refwork, Mendeley, Endnote), Facebook, Twitter, WhatsApp, BBM, Messenger, LinkedIn, Academic sites (Research Gate, Academia), learning management system, Skype or Hangouts, video and podcasts, blogs & blogging, collaboration and brainstorming tools (Google Docs, Mindmap), Wikis, Virtual world (Second life etc.), RSS feeds, E Portfolios. It is argued that these technologies are used more often for research and administrative

purposes in higher education, and less frequently for teaching purposes (Esewe, 2013; Fiedler, Giddens, & North, 2014). For academics to efficiently embrace educational technology for instructional purpose, they need to familiarise themselves with these technologies, make use of the technology, incorporate the technology into their teaching, readjust student learning outcomes with educational technology, and eventually be transformed in their teaching practices (Eze, Adu, & Ruramayi, 2013). Any school that educational technology usage is implemented, it enables excellent teaching and active student participation in learning (Keengwe, Kidd, & Kyei-Blankson, 2009) which is assumed to be the goal of every higher institution.

This speedy development of educational technology usage for some decades now, and the surge of the integration of these technologies into education, allow the use of this technology to provide opportunities for student-centred learning settings. However, there are challenges in sub-Saharan Africa in terms of education technology use, as there is poor access to adequate Internet and different educational technologies. Many academics are hesitant toward educational technology changes and see it as a problem (Kotcherlakota, Kupzyk & Rejda, 2017) including tension in the use and adoption of Internet and educational technologies among academics (Sarkar, 2012).

It is important for nurses and nurse educators to be skilful in using the Internet and different educational technologies to get information to increase the worth and efficiency of healthcare bringing about evidenced based practice (Fiedler et al., 2014; McGonigle & Mastrian, 2014). As an outcome of these changes, these technologies in education are imperative to help productive learning, practical teaching and learning, evaluation, assessment, appropriate educational result, and the standard change of taking the library to the learner closer (McGonigle &

Mastrian, 2014). Therefore, it is important for every lecturer to effectively incorporate the various educational technologies in their work as academics, and to commit to lifelong learning, having in mind that their 'professional role modelling' to learners is part of their job as a teacher (Kukulka-Hulme, 2012) which will serve as a way of sharing experience with the students when making use of these technologies at a basic educational level as well as improving their own all round performance.

### **1.3 Problem statement**

The speedy development of educational technology usage for some decades now, and the surge of the integration of these technologies into education, allow the use of this technology to provide opportunities for student-centred learning settings. However, there are challenges in sub-Saharan Africa in terms of education technology use, as there is poor access to adequate Internet and different educational technologies. Many academics are hesitant toward educational technology changes and see it as a problem (Kotcherlakota, Kupzyk & Rejda, 2017) including tension in the use and adoption of Internet and educational technologies among academics (Sarkar, 2012). These challenges have resulted in the low adoption of these technologies in this setting, and in particular, educators in South Africa have not yet fully enjoyed the benefits of technology in line of their professions (Stoltenkamp, Kabaka, & Braaf, 2013).

Numerous studies have been carried out on technology use and uptake in South Africa but none of these have focused on acceptance of educational technology by Nursing academics and clinical facilitators in an academic institution. Using a technology acceptance model it was hypothesised that the exposure and existence of a technology does not necessarily result in its usage and accompanying success.

Therefore it was important to examine the use of technology in this setting and to assess if a technology acceptance model could be applied to the use of educational technologies among nursing academics in South Africa.

#### **1.4 Aim of the study**

The aim of the study was to investigate the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, South Africa.

#### **1.5 Objectives of the study**

1. To determine the extent of use of educational technologies among academics in a school of nursing in the Western Cape.
2. To measure the perceived usefulness of educational technologies among academics in a school of nursing in the Western Cape.
3. To measure the perceived ease of use of educational technologies among academics in a school of nursing in the Western Cape.
4. To investigate the factors that influences the use of educational technologies among the academics in a school of nursing in the Western Cape.

#### **1.6 Hypothesis**

*H1:* Educational technologies users are likely to be younger academics.

*H2:* There is an association between self-efficacy and actual usage of technology.

*H3:* There is an association between perceived usefulness, perceived ease of use and actual technology usage.

*H4:* Lecturers use educational technology more than the clinical facilitators

**Table 1: Definition of terms or key concepts**

TERMS	DEFINITIONS
Academics	<p>A fulltime member of the teaching staff of a university. It could also be any teaching staff e.g. lecturer involved in the teaching of students.</p> <p><b>Operational definition:</b> in this study, academics will include clinical facilitators, lecturers, and professors in Nursing.</p>
Educational technologies	<p>These are compositions of hardware and software used in supporting the acquisition of basic knowledge, skills and development of problem solving and critical reasoning skills, training in a wide variety of context and all sorts of informal learning for educational purposes (Ertmer &amp; Ottenbreit-Leftwich, 2010).</p> <p><b>Operational definition:</b> in this study, educational technologies refer to the use of the Internet and various educational technologies used in delivering education. These include the web, smartphones, e-learning platforms, search engines, social media, databases, reference managers.</p>
Usage of educational technology	<p>This is the way in which information communication technology is applied to teaching and learning process</p> <p><b>Operational definition:</b> In this study, usage was measured by a question which asked how often academics use educational Technologies in education.</p>
Overall use of educational technology	<p><b>Operational definition:</b> In this study, use was measured through academics' self-assessment of their usage of technology, experience in using educational technology, duration of use of educational technology, types of educational technologies used, types of activities for which educational technologies are used and intention for future educational technology use.</p>
Perceived ease of use	<p>This is the point to which one is certain that a specific educational technology is stress-free to use (Teo, 2015).</p> <p><b>Operational definition:</b> In this study, perceived ease of use was measured through questions on whether academics find educational Technologies easy to use and whether they find collaborating tools, social media, search engines e-learning platforms, tablets or iPads, smartphone easy to do their work.</p>
Perceived usefulness	<p>This is the level to which one is certain that the use of a particular educational technology can enhance ones work performance (Teo, 2015).</p> <p><b>Operational definition:</b> In this study, perceived usefulness was measured through questions on the usefulness of educational technologies to get a tasks more swiftly, enhance the quality of their work, makes it easier to do their work, is useful in their work and whether academics find collaborating tools, social media, search engines e-learning platforms, tablets or iPads, smart phone useful to do my work.</p>
Self-efficacy	<p>This is the cognitive belief that affects the behaviour of an individual when using a technology (Wu, Tennyson, &amp; Hsia, 2010).</p> <p><b>Operational definition:</b> In this study, self-efficacy was measured by whether academics can complete educational task by using educational technologies if sufficient time is available to them, whether they feel comfortable when using educational technologies on their own and whether academics can use smart technologies on their own for educational purposes.</p>
Internal facilitating conditions	<p>Internal factors are <i>inner strengths</i> and <i>weaknesses</i> which can influence educational use of technology (Teo, 2015).</p> <p><b>Operational definition:</b> In this study, internal facilitating conditions were measured using self-efficacy, language and literacy.</p>
External facilitating conditions	<p>External facilitating conditions refers to the level to which a technical and organisational infrastructure exists to support use of technology (Teo, 2015)</p> <p><b>Operational definition:</b> In this study, external facilitating condition was measured though accessibility of Internet within the university, availability of technicians, laptops</p>

and tablets/iPads to facilitate educational technology use, availability of educational technology training, availability of necessary resources, guidance or assistance to use educational technologies effectively.

Literacy            Literacy is the ability to manipulate computers; such as typing notes, writing and reading with technology (Ndlovu & Lawrence, 2012)  
**Operational definition:** In this study, literacy was measured by whether the respondents like reading, writing and typing

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## 1.7 Theoretical framework

The TAM will be adopted in this study. The TAM has been verified as a theoretical model aiding to clarify and envisage user behaviour of Internet technology (Legris, Ingham, & Colletette, 2003). The TAM model was proposed by Davis in 1989.

Davis suggested that the TAM can explain why a user accepts or rejects innovative technology and offers a foundation for finding out how external variables affects an individual's belief, attitude, and intent to use technology. Dual constructs underpin the TAM; namely perceived usefulness and perceived ease of use (Davis, 1989). The TAM proposed that the real usage of a technology system is directly or indirectly as a result of their intentions, attitude, how useful and how easy they feel the system is for them (Davis, 1989). In addition, external factors have an impact on intent and actual usage via facilitated results on perceived usefulness and perceived ease of use (Davis, 1989).

The Technology Acceptance Model is perhaps the most widely-used framework in the field of technology for measuring technology acceptance (Al-Busaidi & Al-Shihi, 2010). The Technology Acceptance Model is an effective model which is readily adapted to investigating the use and acceptance of any particular technology. The TAM was fashioned after Ajzen and Fishbein's Theory of Reasoned Action (TRA) of 1980 and was proposed by Davis in 1986. The Technology Acceptance Model has been helpful in predicting and explaining user behaviour in relation to information technology and is considered an extension of TRA (Davis, 1989). The TAM helps to



trace the relationship between different components on the framework. For example, the TAM helps to explain how attitude influences intention to use, or how external variables influence perceived usefulness and perceived ease of use (Davis, 1989). An individual's actual usage of a technology is directly or indirectly influenced by attitude, intention of the user, perceived usefulness and perceived ease of use of the technology (Davis, 1989). Other versions of the TAM have been developed such as TAM 2 which includes facilitating conditions.

The validity and reliability of the TAM constructs to predict Academics' Intention to Use the e-learning platform was tested (Alharbi & Drew, 2014). In relation to various educational technologies like e-learning platforms, the TAM has also been adopted and tested. Although the TAM is a well-known and tested theoretical framework in the field of technology, using the TAM in clarifying and predicting acceptance and use of educational technology among academics has so far received little attention given the fact that nursing is a female dominated profession.

An analysis of the TAM in understanding university students' behavioural intention to use the e-learning platform, showed that the TAM is a good theoretical tool in understanding user's acceptance of e-learning and that self-efficacy and subjective norms are important in giving an description to the fundamental process in the model (Park, 2009) and perceived usefulness of a technology stimulate users to continue using the technology.

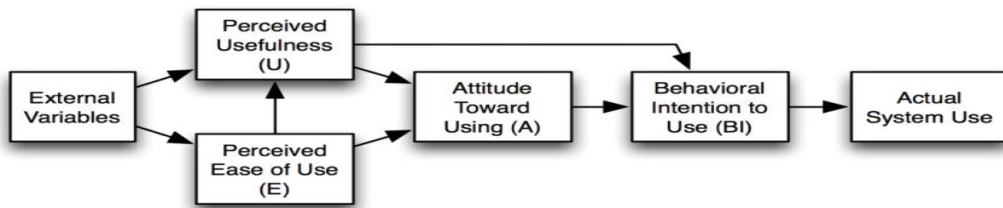


Figure 1 Technology acceptance model (TAM) by Davis (1989)

## The Constructs of TAM

These four variables (Attitudes, intention to use, Perceived usefulness (PU), Perceived ease of use (PEU) predict technology usage. Furthermore, there are external variables like gender, age, experience which also influence all these constructs. The TAM stated that perceived usefulness and perceived ease of use are important constructs when determining technology acceptance. In addition, perceived ease of use was posited to have a direct effect on perceived usefulness. Therefore, no matter how useful a technology is, users will not engage with it if perceived to be difficult to use.

The constructs in TAM and facilitating condition in TAM 2 guided this study;

*Facilitating conditions* (This was adapted from TAM 2): these are institutional support, training, resources, equipment from management and access to educational technology.

## 1.8 Significance of the study

*Significance for research:* Examining the actual use and the factors contributing to the use of the educational technology in education will assist in the prediction and the use of this technology. The study will also identify challenges being faced by academics and recommend possible solutions to the challenges and ways to assist individuals who are less inclined to use the education technology.

*Significance for practice:* The findings of the study can be used to improve the knowledge and competence of staff using educational technology, therefore, increasing transformational development in teaching and learning process and environment at nursing institutions in the Western Cape which will in turn give graduates of the institution more involvement in using this technology in their studies and continuing learning.

Administrators of higher education institutions have an influence on academics' intention to use educational technology for teaching and learning purposes. In addition, the administrators are in charge of planning, realising and monitoring educational technology incorporation into the academic program. Therefore, the outcome of this study will be useful to them.

Finally, this study will add new information to the already existing knowledge on acceptance of educational technologies and challenges faced by academics in using these technologies for instructional purpose, especially in a developing country like South Africa.

### **1.9 Outline of thesis chapters**

**Chapter 1:** is an introduction and background to the research. It outlines the aim, objectives, hypotheses, significance and other aspects of the study.

**Chapter 2:** This is the literature review. It guides the direction of the study and commonly used educational technology tools were described together with the theoretical framework that guides the study.

**Chapter 3:** outlines the research methodology of the study which includes the research design, the research instrument validity and reliability the study setting, population, data collection procedures, data analysis and ethical consideration.

**Chapter 4:** Results of the study. These are presented in tables and graph, with clear descriptions of their meaning in the study.

**Chapter 5:** The discussions of findings in relation to the literature.

**Chapter 6:** Summary of the study, recommendations and limitations specific to the study.

### **1.10 Summary**

This chapter has made clear the main concerns that the study addressed with an introduction to the background of the problem and significance of the study. This chapter emphasised the benefits of technology in general and specifically in nursing education. The academics were identified as key subject that will be studied to find out their use and acceptance of educational technology for instructional purposes and other purposes. The objectives of the study aim to measure the perceived usefulness and ease of use of educational technologies, the extent of usage, and factors that influence the use of educational technology among academics. Three hypotheses were further tested -Educational technologies users are likely to be younger academics, association between self-efficacy and actual usage of technology, association between perceived usefulness, perceived ease of use and actual technology usage. Thereafter recommendations were made based on identified factors. The following chapter will provide a review of literature on education technology.

## Chapter 2

### LITERATURE REVIEW

#### 2.1 Introduction

Literatures on educational technology and social media as tools for enhancing teaching instructions as well as its use in education and particularly in nursing at local and international levels was discussed in this chapter. It gives the historic advancement of technology in education by reviewing previously conducted studies that looked at educational technology. These technologies were grouped and some of the available and commonly used technologies are described. Factors that influence the use of educational technology by academics are discussed, and lastly, the theoretical framework that guides the study is critically explained.

#### 2.2 Educational technology

Educational technology is an assemblage of numerous information communication technology services and resources, for educational purposes (Deore, 2012) which delivers affordances that make instructional events more diverse than teacher-led deliveries. Such affordances also include more accessible instructions by learners which are easier to manage by teachers (Morrison, Ross, Kemp, & Kalman, 2010). Various information communication technologies have been co-opted by academics into education (Veletsianos, 2012) and are being referred to as educational technologies

The Internet and educational technologies are widely used applications that provide opportunities, for both students and lecturers in higher education institutions, in supporting teaching and learning processes and making communication fast and easy (Li & Kirkup, 2007). Incorporating Internet and educational technology into

teaching in advanced education has turned out to be an imperative worldwide (Li & Kirkup, 2007). The Internet is widely used to access facts (Azizan, 2010) and unlike in the one-to-many teaching approach, these technologies give room for many-to-many communication where various intellectual ideas can be gathered promptly (Quarshie, 2012).

It is generally accepted by policymakers in the education sector that having quality access to various technologies can help individuals compete in the international economy through the creation of a skilled work force (Skiba, 2016). It was stressed that the use of these technologies in education has had productive effects in the education system, by improving teaching and learning, making innovative skills available for learners; reaching students in rural and remote regions that has poor access, improving and refining the training of academics and reducing expenses that are associated with the delivery of traditional teaching (Pendrill, 2015).

Higher education is witnessing the integration of increasingly refined technology tools in education settings, including social media tools. Understanding acceptance and use of these technology tools by both learners and instructors are of importance to the success or failure of incorporation of technology in higher education institution (Schmitt, Sims-Giddens, & Booth, 2012). According to research conducted by Venkatesh et al. (2012) on perceptions of technology use and course effectiveness, analyses showed that, for educators, the use of collaborative and constructivist methods of teaching which involves the use of educational technology is positively associated to student learning experiences.

Haddad and Jurich (2002) categorised Information Communication Technology (ICT) in education into three types, namely (1) instruments: projectors, computers

and their various hardware; (2) instructional systems: such as video conferencing, learning management system and multimedia modules; and finally, (3) dissemination like TV broadcasts, use of the web and lots more. Deciding on which medium to use and the extent of usage depends largely on what the teaching and learning objective and expected outcomes are (Adeosun, 2010). However, the main challenge has been how to make detailed use of this technology and bring out its full relevance as a tool for education and to be able to achieve a valuable knowledge inputs for educational institutions and for life-long learning (Adeosun, 2010).

### **2.3 The growth of technology in education**

Technology has turned out to be part of daily life and most education now embraces an aspect of technology mastery (Bhatti, 2010). Technology with other relevant services, can help bridge the developmental gaps in areas like health, education, gender empowerment and environmental organisation (Quarshie, 2012), though, since 1999, it has been debated that information technologies are ethnically white, western, male dominated, and that these technologies obviously entail the traditional values of the Americans in positions of verbal and practical user's standards (Collis, 1999).

Several government has introduced global investment in information communication technology to develop and improve teaching and learning in academic institutions (Nut, 2010). For instance, England government spent £2.5bn on educational technology between the years 2008–2009, similarly, the United State of America spent \$4.7 billion on higher education institutions for implementation of technology in 2009 (Nut, 2010). In spite of all the funding pumped into professional development

technology infrastructure and equipment , technology acceptance and incorporation in teaching and learning is still inadequate (Buabeng-Andoh, 2012).

Educational technologies are various collections of information communication technological tools, web-based tools that are employed in management information via electronic means for teaching and learning purpose (Tuten & Marks, 2012). Educational technology supports teaching , planning and preparation of learning and it is vital in have access to e-teaching and learning materials such as articles, journals, books, and computer-generated libraries (Adeosun, 2010).

The advancement of technology in education can be traced back to the 17th century with diagrams in textbooks which then improved to chalk boards in the 18th century, and lantern-slide and unclear projectors in the 20<sup>th</sup> century, followed by transistor and wave pictures (Esewe, 2013). In the 1950s, while tutors were looking for the best methods to make use of the technology in the classroom, programmed coaching began as the leading technology to meet educational needs (Esewe, 2013). As this progressed, there were advancements in technology mainly in the area of computers.

A variety of educational content was presented in movies and TV programming. In the mid-1990s, the development of cost effective multimedia computers, software and easy access to the Internet served as a period of change and advancement to technological improvement in education (del Campo, Negro, & Núñez, 2012). Web interactive tools like computer conferencing, emails etc. later began to be used as technological tools for educational purpose (Esewe, 2013).

All these developments and the growth of educational technology came with many benefits that cut across spheres of life and worldwide economy, which as a result



has been able to create a close network environment that helps individuals, groups of people and various organisations worldwide to share relevant views about attained knowledge and innovative discoveries on a daily basis (Esewe, 2013). The use of educational technology among student and academic has greatly increased in developed countries like United states and Australia (Sangeeta Namdev, 2012)

Technology use cuts across various areas of life, including teaching and learning. The education environs has been changing rapidly from being a old system of education to a novel and innovative approach of learning which is easier to use, as seen in online learning approaches (Colvin & Bullock, 2014). Various kinds of technology have been introduced and have influenced the education sector. Eventually, students within the 21st generation will want a more responsive, interactive and engaging academics, and possibly appraise lessons by the efficiency and frequency of significant educational technology incorporation (Dahlström, Danielsson, Emilsson, & Andersson, 2011).

#### **2.4 The Internet and educational technologies in South Africa**

The Internet in South Africa has been in existence since the first “. co.za” domain was recorded in 1992 (Johnson et al., 2010). The number of users of the Internet in South Africa has increased steadily from 2.4 million in the year 2000, with an addition of 2.6 million in 2008, and to 12.3 million in 2012, which is 34% of the population in South Africa (Johnson et al., 2010). This is the greatest penetration rate in Africa (Johnson et al., 2010). This situation is positive compared to other countries in Africa but not when compared with countries like the United State and Australia (Johnson et al., 2010). According to the Department of Education (2007), 6.4% of South Africans had access to and used these technologies, as compared

with 72.7% of Americans, showing that South Africa is still lagging behind in ICT development. However, in higher education, especially universities, most lecturers are experienced in using the Internet (Kripanont, 2007). In research conducted by Kripanont (2007), they discovered that only 0.86% of academics did not have experience in using the Internet.

African governments are planning and making efforts to ensure that technology is available for teaching and learning at all levels of education (Department of Education, 2004). These policy necessitate the provision of technological infrastructures to educational institutions at all levels. The South African government stated in the National Policy Framework for Teacher Education and Development, that their main goal is to make sure that competent academics are constantly trained, re-skilled and given the necessary Professional Development (PD) support (Department of Education, 2004). This process of training and re-skilling should include significant educational technology skills and the provision of necessary resources for students and academics across the country (Steyn, 2011).

Professional development courses in technology for several target groups such as members of staff in all Higher Education Institutions (HEIs) have been receiving attention throughout the world. Therefore, academics can gain from the professional development technology skills training, through a blended learning method (Eze et al., 2013). To this end an organisation such as Tertiary Education and Research Network of South Africa (TENET) has emerged. The main aim of TENET is to secure Internet and ICT services for South African universities, research and support academic institutions (TENET, 2013).

## **2.5 Academic use of educational technologies in higher education institutions**

The implementation of the Internet and educational technologies began over the last two decades at universities globally, and its impact has been greatly felt on people's life and education (Kripanont, 2007). An early investigation by Al-Shawi and Al-Wabil (2012) on technology adoption and usage among academia demonstrated that the academics have integrated educational technologies into teaching processes. This is in opposition to a study conducted by Al-Asmari (2005) which reported that academics are only in the early stages of adoption of technology.

One of the most influential benefits of the educational technology in higher education is its role in e-learning (Henderson, 2005). This allows students who have fixed schedules and restricted mobility to take up courses at their own convenience and to learn at different rates (Motiwalla, 2007).

The lack of technology incorporation into teaching and learning among educators in classrooms of higher education is still a concern in education today. A research study conducted in 2009 which surveyed 4,600 academic members at different universities in the United States showed that 72% of faculties used the formal course management system at least some of the time (Keengwe et al., 2009). The use of social media tools, such as Wikis, Google docs and blogs, in education dropped to between 13%-16% and almost 5% of the faculties were not using the tools at all (Keengwe et al., 2009). According to Keengwe et al (2009) technology is used more frequently for research and administrative purposes in higher education while its use for instruction purpose is very low. This is still the case with faculties on most campuses finding it difficult to keep up-to-date with the latest technologies, and

struggling to understanding how to incorporate these technologies into their teaching in meaningful ways (Deimann & Farrow, 2013).

Analysis of this survey has shown that age has a huge influence on all aspects of technology literacy and incorporation (Buckenmeyer, 2011). The older the academic member, the less likely they were to have good technology skill, and be able to use that skill to integrate technology into their pedagogy (Buckenmeyer, 2011). More so, factors like educational level and gender had little or no influence on technology use (Buckenmeyer, 2011). It was further stated in this study that, academics considered themselves skilled if they used a computer. There was no adequate reporting about the use of social media in education, except for Facebook and YouTube (Buckenmeyer, 2011). Other sites like Twitter, Pinterest, blogs, online presentation software, which are also useful in education, were not really being used (Buckenmeyer, 2011).



In another research study which aimed to examine the factors that influenced teachers' intention to use educational technology, using the TAM, their attitude was discovered to be the only construct with a significant influence on intention of educational technology use (Teo, 2015). It also mediated perceived usefulness, and perceived ease of use in explaining behavioural intention to use technology (Teo, 2015). Subjective norm and facilitating conditions also influenced intention through perceived ease of use, perceived usefulness, and attitude towards technology use. Lastly, no significant differences were found in their intention to use technology in teaching by gender and age (Teo, 2015). In support of the research above, another study on measuring and modelling how academics' perceived how usefulness ICT is for teaching and learning, Perrotta (2013) found a positive relationship between

technology use and self-efficacy, but a negative relationship to academics' age (Scherer, Siddiq, & Teo, 2015).

Considering the benefits of using technology, a research study conducted in the United Kingdom on digital technology, discovered that the majority of teachers felt that educational technology is of advantage to their teaching (Perrotta, 2013). No differences were reported on educational technology use as far as educational background gender and years of teaching experience and were concerned. It was further discovered that the most predominant use of educational technology was in preparing lessons, with only few academics using this technology for research purpose (Perrotta, 2013).

Most of the academics also reported using educational technology to work in team with their colleagues in the school and only a minority of the academics reported using educational technology to communicate with learners (Perrotta, 2013). It was concluded that academics' perceptions of the benefits of using educational technology are influenced more by external factors (institutional characteristics) as compared with internal factors (individual characteristics) (Perrotta, 2013).

## **2.6 Social media in education**

In the last past years, the development of social media has had an impact on education. Social media has come to be a way through which academics and learners can meet for academic purpose (Schmitt et al., 2012). Through the use of social media, learners can learn out of the asynchronous teaching environment, building an expert opinion, growing technological skills, and improving their capacity to professionally and visibly connect regardless of time and distance (Amerson, 2011; Schmitt et al., 2012). It provides a medium for learning, networking and collaboration that was not previously offered to academics and students (Amerson, 2011). Social

media sites such as WhatsApp, Facebook, blogs, Twitter, LinkedIn, and reference managers like endnotes are emphasised as novel approaches to sharing of knowledge and distribution and provide mutual and reasonable places to begin social media integration into nursing curricula in safe and dynamic approach (Amerson, 2011). Sites such as podcasts and virtual education world have also been suggested as platform to make education more interactive and where one can integrate various learning styles (Schmidt & Stewart, 2010).

The global growth of social media is undisputable and its integration in medical education is an innovation that merits further research (Cheston, Flickinger, & Chisolm, 2013). Social media tools help promote feedback, learner engagement, professional development and collaboration while its major challenges are privacy and security concerns and technical issues (Cheston et al., 2013).

The use of social media has increased rapidly in recent years, and several activities have been incorporated as people have incorporated which are relevant for promoting education. A study which assessed social media as instructional technology among academics, noted that most social media platforms haven't been widely embraced for instructional functions (Tuten & Marks, 2012). Which could be as a result of limited time, difficulty in adjusting to the amount of tools on the market, and perceived practical uses of the available tools (Tuten & Marks, 2012).

Social media is now being used to deliver education services with the use of various applications (Lenhart, Purcell, Smith, & Zickuhr, 2010; Robinson, 2010; Schmitt et al., 2012). It is currently being used in teaching and learning since it has the additional benefits of permitting learners to connect with academics, faculties, departments, and their learning peers learn (Robinson, 2010). Social media sites

and applications are now been incorporated into the toolboxes of academics and learners across the globe (McGowan et al., 2012). Social media has the potential to enhance learning and maybe the next step in the advancement of educational technology (Cheston et al., 2013). Social media like Facebook pedagogical affordances are still partially implemented, although different types of educational use of Facebook exploit these affordances to different degrees (Manca et al., 2016)

Nursing academics will gain advantageously in using social media platform, because this will help students to achieve better skills in professional communication and writing competencies (Lenhart et al., 2010). Though there are obstacles to incorporation of social media in nursing education, there are still excellent tools available to assist academics to incorporate social media so that it can be a useful pedagogical tool (Schmitt et al., 2012). It provides a way to bridge distance of face to face teaching space, giving a solid route for communicating with distance learners (Schmitt et al. 2012). Technological advances continue to support the progress of social media as a device for knowledge and information exchange within local, nation-wide, and international community's (Tuten & Marks, 2012). Nurses function as major knowledge brokers in healthcare systems (Robinson, 2010) therefore; nurse academics should begin to explore various methods of integrating social media into nursing curricula.

Finally, "Adoption of social networked learning in developing countries in Africa requires self-efficacy, reliable technical and administrative support, infrastructure, system interactivity, adequate budgeting and accountability, and a flexible organisational culture" (Conway, Maleko Munguatosha, Birevu Muyinda, & Thaddeus Lubega, 2011).

## **2.7 Barriers to technology uptake in education**

Park (2009) grouped factors that can influence actual usage and intention to use ICT into four categories, namely: individual context, system context, social context and organisational context. Organisational context includes relevance, system visibility, and system accessibility which can affect usage (Thong, Hong, & Tam, 2004).

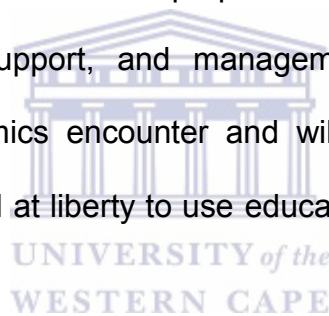
Similarly, Deimann & Farrow (2013), grouped barriers to adoption and integration of technology into: (1) institutional factors that supports joined vision and strategic plan and effective governance, clearly stated directions in terms of policy, plans and appropriate communication, continuous commitment in terms of financial incentives for continuous maintenance; (2) the academics, i.e. the characteristics of the academics as regards their readiness to embrace innovations; and (3) self-efficacy, i.e. pedagogical beliefs, culture and knowledge are all factors that contributes to technology uptake (Deimann & Farrow, 2013). Academics cannot successfully make use of educational technology in teaching and learning if they don't have the basic skills in their use. They needs training in order to work well with this technologies in the classrooms (Fiedler et al., 2014).

In a study conducted in Kenya, an examination of obstacles that affect academics' adoption of ICT, training and professional development were identified as critical factors in adoption (Chris, 2015). This is in agreement with the study conducted in Ghana on factors that encourage and/or prevent academics' use of technology in teaching and learning, where they identified the lack of educator technology skills, lack of confidence, unavailability of suitable educational software, inadequate access to educational technology, inflexible organisations, out-dated (traditional) education systems, and restrictive academic programmes (Buabeng-Andoh, 2012). Another



concern is the inadequacy in administrative, human, financial and institutional factors (Friedrich & Hron, 2011).

Compared to other sectors, education is still lagging behind in the use of technology and the implementation thereof is sluggish because of a dearth of sufficient information and the technical (Baker, Lusk, & Neuhauser, 2012). These issues are related to the perception, attitudes and motivation of the academics (Sang, Valcke, van Braak, Tondeur, & Zhu, 2011). Various challenges are being faced by academics in South Africa because there are inadequate equipment and a lack of dedication by some academics to commitment of use (Stoltenkamp et al., 2013). However, the author further stated that a proper institutional structure of resources, professional development, support, and management will help alleviate these external barriers that academics encounter and will help create an environment where they feel supported and at liberty to use educational technology (Stoltenkamp et al., 2013).



The need for academics to attain the required technical skills often necessitates extra time and effort on behalf of academics. However, academics that have been using technology from early in its existence and that have given enough time to use educational technology into their classrooms are more likely to adopt new technology, no matter how difficult it might seem (Aldunate & Nussbaum, 2013). Conversely, academics who are not users of technology and who only give little time to incorporating educational technology are most likely going to abandon these technologies at a particular point (Aldunate & Nussbaum, 2013).

Most academics in African countries do not integrate technology into their instruction as they should (Tedla, 2012). Integration depends on manipulative and non-

manipulative factors that influence the use of this technology in classroom instruction. Manipulative factors include: beliefs, skills and commitment of teachers, technology knowledge, and the availability of educational technology resources. Non-manipulative factors include age, gender, religion, educational experience, computer experience, national policy and external supports (Tedla, 2012).

The beliefs and skills of academic are important factors for technology to be adopted within an instructional environment (Chris, 2015). Academics need to perceive educational technology to be useful and easy to use in their teaching, before they can adopt these technology tools (Chris, 2015; John, 2015). However, academics' perceptions on the usefulness and ease of technology use are dynamic. Their perceptions change across various factors such as experience, gender and years of teaching and (John, 2015).

Due to quick advancement in technology, academics will need to participate in continuing professional development to still be relevant and develop more advance knowledge and in using educational technology (Ferguson, 2013; Fiedler et al., 2014). Professional development should be crucial in technology use for instructional purpose (Colvin & Bullock, 2014). Furthermore, technology improvement features such as price, speed of information transfer and information-processing characteristics have little or no impact on the ability to envisage whether a person decides to accept it or not. Personal characteristics such as attitudes, interest and training, and organisational support such as funding and resources have a great impact on acceptance of a particular technology (John, 2015). Academic's characteristics such as educational level, computer experiences, gender, age and teaching experience play a greater role in the use of technology. In general, nurses adopted educational technology very late, this delay was influenced by increasing

age in the profession (Robinson, 2010). In addition, lack of familiarity with technology, risks of privacy violation, cost and time, remain barriers for nurse academics in the adoption of new technology into curricula (Schmitt et al., 2012). Institutional support points to the desire for certain infrastructures to be in place, such as release time for learning new technologies and to use these technologies in their teaching, adequate support staff and resources (Huang, Huang, Huang, & Lin, 2012; Ifenthaler & Schweinbenz, 2013). When time provided for academics is limited, they often go back to what they know and use before. Therefore, their interest and enthusiasm in using this new technology begin to wane (Buckenmeyer, 2011).

Further, academics that are not confident in their skill or competency in educational technology tools are unwilling to incorporate these tools in their teaching practices (Fiedler et al., 2014; Garrison & Akyol, 2009). Change also plays a significant role in technology adoption into curriculum and instruction (Skiba, 2016). To efficiently and effectively incorporate educational technology tools in their class teachings, academics must learn and use what they have learnt in the classrooms i.e. changing the way they teach, making teaching more collaborative and constructive (Rousmaniere, 2014; Skiba, 2016). Even though, academics face various challenges in adapting technologies into teaching and learning, they also have opportunities for innovation (Cheston et al., 2013). For instance, clinical facilitation and training is no longer restricted by space, their services is moving online (Rousmaniere, 2014).

## **2.8 Conclusion**

A discussion of the literature on the types of educational technology and social media used in education and nursing education in particular was addressed in this

chapter. The chapter examined the various ways in which educational technology is used to improve teaching and learning which included supporting the traditional classroom work and its ability for enabling the sharing of knowledge. Academics and learners are able to interact and form communities locally and internationally making the world a global village. Factors that influence the use of these technologies both positively and negatively were highlighted.



## Chapter 3

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter presents the methodology used in conducting the study. It described the research design which a quantitative approach using the survey method, research setting, the study population and sampling procedure, the instrument used for data collection, the data collection technique and data analysis procedure, concept of validity and reliability and finally, the ethical issues considered during the study are also described.

#### 3.2 Research setting

This study was conducted in one of the universities that offer a nursing programme in the Western Cape. The school has academics with a range of qualifications and positions. The school is located in the Community and Health Science faculty and offers education and training in both under and post graduate levels.

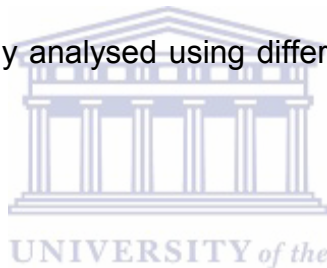
This setting was chosen purposely because the institution established a Centre for Innovative Education and Communication Technologies (CIECT), about a decade ago, to support the adoption of emerging technologies in maintaining authentic teaching and learning practices (Stoltenkamp & Siebrits, 2015). The school is also the biggest nursing school at the University and has the highest number of nursing lecturers in the Western Cape. It has the largest domiciliary nursing school in the country and offers a Bachelor of Nursing (BNurs) as its main undergraduate programme. The School further offers a Master of Nursing (MNur) and a Doctorate (PhD.) as part of its postgraduate programme. More so, it is required of nurse

educators to engage in using evidence from published journals in facilitation of learning and this required the use of this technology.

### **3.3 Research approach**

#### **3.3.1 Quantitative research approach**

This study used a quantitative research approach, using a self-administered questionnaire to test a number of hypotheses, using a structured, controlled approach that involved the collection of empirical data. This is a systematic empirical investigation of observable phenomena via statistical or computational techniques (Struwig & Stead, 2013). A quantitative research approach allows the researcher to collect data through the use of questionnaires and this data can be represented numerically and mathematically analysed using different types of statistical analysis methods (Muijs, 2010).



#### **3.3.2 Positivist paradigm**

In the quantitative research approach, the positivist paradigm goes along with the quantitative study. Positivist assumptions relate to the nature of reality to be studied and what can be measured (Creswell, 2013). The epistemology that is the nature of the relationship between researchers and the researched is that of the researcher being objective and not influencing the decision of the participants (Creswell, 2013). This was achieved through the use of a structured questionnaire. In the positivist paradigm, the methodology is a deductive process, which specifies how researchers will practically go about studying whatever they believe can be known (Creswell, 2013).

### **3.4 Study research design**

A quantitative descriptive survey research design using a self-administered questionnaire was used to investigate the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, South Africa. A descriptive study provides information about the naturally occurring status, behaviour, attitudes and or other characteristics of a particular group and in the collection of data there is no adjustment of the environment and it is not manipulated (Blanche, Durrheim, & Painter, 2006).

The survey method of data collection was chosen because using it gives an advantage of reaching a larger group of people in limited time and being able to provide respondents with some sense of anonymity and the format of collecting the data is independent of the researcher (Brink, Van der Walt, & Van Rensburg, 2006).

#### **3.4.1 Study population and study sample**

Brink et al. (2012) defines the study population as a specific group of people or subjects in their entirety who are of interest to the researcher and has the specific criteria to which results is intended to be generalised.

The accessible population was academics within a school of nursing in Western Cape. There were 58 academics in this school of nursing in the Western Cape at the time of study, 28 lecturers (qualified personnel to teach students conduct research and involved in the administration of modules at different year levels) and 30 clinical facilitators (registered nurses with clinical expertise who assists students in their clinical placements). All inclusive sampling was used and the population constituted the sample of N=58 due to the small population size. Thus all (58) lecturers were included in the study.

### **3.4.2 Procedure for data collection**

After ethical approval to conduct the study was granted, permission letter to collect data from the University and the school of nursing were sent by the researcher, via email, to the Registrar and the Head of Department respectively. Permission to collect data from both parties was granted in first week of January, 2016.

The data was collected between the months of February and March, 2016 at the beginning of a new academic year. All academics were available except one who was on sabbatical leave. Requests were also made to meet with the academics at a staff meeting, so as to be able to capture as many participants as possible.

Verbal consent was taken after a brief and thorough explanation of what the study entail to the participants. Consent forms were distributed and completed after which the questionnaire was given to each participant. Academics that were not present at the meeting and were not met at their offices were given their information sheets, consent forms and questionnaires sealed in an envelope and were given to them at later times. Follow-up visits were arranged to remind the remaining participants to complete and return the questionnaires to the researcher, which they later did. Two academics declined and gave a lack of time as the reason.

### **3.4.3 Instrument**

The study adapted an existing structured questionnaire based on a questionnaire developed by Kripanont in 2007. Permission was obtained from Kripanont via email. This tool had previously been successfully used in a survey to examine the acceptance of Internet usage among Thai academics. The tool had established previous reliability and validity with Cronbach's alpha coefficient for internal consistency  $> .70$ .



The adapted survey questionnaire consisted of six sections (A-F). Questions used a 7-point likert scale ranging from “strongly disagree = 1, quite disagree = 2, slightly disagree = 3, neutral = 4, slightly agree = 5, quite agree = 6, and strongly agree = 7 and an 8-point scale from 1=Don’t use at all, 2=Use about once each month, 3=Use a few times a month, 4=Use about once each week, 5=Use a few times a week, 6=Use five to six times a week, 7=Use about once a day and 8=Use several times a day”. This scale was used to interpret the respondents’ regularity of educational technology use. The areas covered in the questionnaire were:

- **Section A** focused on demographic information of the academics and educational technology usage background.
- **Section B** focused on usage of educational technologies.
- **Section C** focused on the predictors of perceived usefulness and perceived ease of use toward educational technology usage.
- **Section D** focused on the external variables which are factors influencing educational technology usage.
- **Section E** focused on investigating current educational technology usage in teaching and teaching related tasks of academics.
- **Section F** focused on motivations of educational technologies usage in teaching and teaching related tasks among academics.

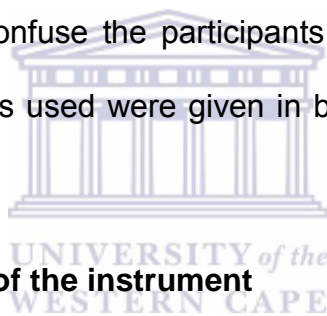
The questionnaire was written in English language and respondents were expected to indicate how frequently they use various educational technology applications.

Open-ended questions give the least control possible to capture the differences between respondents (Grove, Burns, & Gray, 2014) and are not widely used in quantitative research. The final section had an open-ended question which was intended to get respondent’s “general view” of educational technology in the school

of nursing. Though this was not widely used, this was to give room for participants to freely express themselves, so that we can get deeper understanding of their thoughts and issues concerning educational technology.

Vagueness and ambiguity which are common errors in the design process of questionnaires were reduced by including information sheet which described the purpose of the study and simple English were used in putting the questions together.

The questionnaire began seeking information on demography of respondents because demographic information can better make clear the nature of responses given. Unclear questions and technical jargon were avoided throughout the questionnaire, so as not to confuse the participants (Grove et al., 2014). Detailed explanations of technical terms used were given in bracket so that participants can give accurate response.



### **3.4.4 Reliability and validity of the instrument**

#### **Reliability**

This is when a particular method applied continually to the same object gives the same outcome every time. The reliability of a questionnaire means the dependability with which the participants comprehend, deduce and answer all the questions in the tool (Grove et al., 2014). The reliability of the instrument was improved by making sure the questions in the tool were clear and explicit. A Cronbach Alpha of the questionnaire was determined and was found to be  $> .70$  which is acceptable and indicates that the items in the concept were positively correlated to one another.

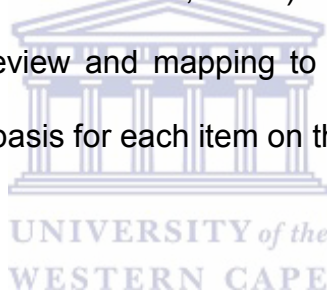
#### **Validity**

This is the degree to which an instrument measures what it is supposed to measure. Authentication efforts should be made to gather enough proof from which validity can

be inferred, using varying ways to get information helps strengthens the inferences made (Polit & Beck, 2013). There are many types of validities used to measure an instrument, for example, construct, face, content, criterion validity, though only face and content validity were determined in this study.

*Face validity:* The supervisor and a specialist in technology for education from the Physiotherapy Department at a University were consulted for their inputs and suggestions on the instrument. These experts scrutinised the questions for appropriateness and helped strengthens the face validity of the instrument.

*Content validity* is the degree to which an instrument has appropriate items for the construct being measured (Polit & Beck, 2013). Content validity was reached through extensive literature review and mapping to the theoretical framework, the TAM (Table 2), which gives a basis for each item on the questionnaire in line with the research aims and objectives.



**Table 2: Content validity**

	<b>OBJECTIVES</b>	<b>THEORETICAL FRAMEWORK:TAM</b>	<b>MEASUREMENT INSTRUMENT (Questions)</b>
3.7.1	To determine the extent of usage of educational technologies among academics in a school of nursing in the Western Cape.	Actual usage	Section B and E
3.7.2	To measure the perceived usefulness of educational technologies among academics in a school of nursing in the Western Cape.	Perceived usefulness	Section C1
3.7.3	To measure the perceived ease of use of educational technologies among academics in a school of nursing in the Western Cape.	Perceived ease of use	Section C2
3.7.4	To determine factors influencing the use of educational technologies	Internal and external factors	Section D

### **3.4.5 Pre-test of instrument**

A pre-test was conducted to ensure the reliability and stability of the instrument. Pre-testing of a questionnaire before its use in the survey is necessary in order to modify the questions included in the questionnaire based on the responses obtained from the participants included in the pre-test (Blaxter, 2010). The aim of a pre-test is to examine how feasible the study is and to identify possible errors in the instruments (Brink et al., 2006). In addition, the pre-test enabled the researcher to manage and possibly avoid any difficulties in the study's collection of data by getting an idea of possible problems and being familiar with the data before the actual study.

The researcher pre-tested the survey-questionnaire with 6 participants from the Department of Physiotherapy which is a neighbouring department in the Faculty of Community Health Sciences in this institution.

The reasons for pre-testing in another department were to avoid the sample being contaminated and so as not to reduce the sample size since the population of academics in nursing is scant. These participants were asked to complete the questionnaire and point out any difficulty they had in understanding the instructions and the questions. The pre-test respondents said they found some questions difficult to answer even though instructions given were clear. Giving example, the e-learning platform was not understood. This necessitated a change to the wording referring to "e-learning platform" in this university.

The researcher was able to have an insight of possible challenges one might come across while administering the questionnaire.

### **3.5 Data collection process**

Ethics were considered by the researcher while collecting the data. The most suitable procedure used in data collection is to distribute the questionnaires at the same time (Polit & Beck, 2013). The researcher contacted the Director of the school of nursing to obtain permission to conduct the study, via email, using the academics as participants. The researcher obtained written permission and contacted each level coordinator to inform them about the planned collection date and time (during the departmental meeting) for collection of the data. A period of time was given to the researcher during this meeting and all the academics were invited to participate in the study. The researcher verbally gave the detail about the study and then the participant information sheet was given to the individual participants, after which participants were allowed to ask questions. All ethical aspects associated with the research were explained to the participants. The researcher distributed the consent forms for participants to sign voluntarily which was followed by the distribution of the questionnaires to all who agreed to participate in the study.

To ensure a high response rate, a number of strategies were adopted, which included obtaining permission from the head of the school to address the academic members during one of the departmental meetings and personally approaching them at later times to give details about the nature of the research, both verbally and in written form, and call for their support which positively affected the response rate.

The day that the school of nursing holds scheduled meetings with the academics was suggested as the best time to meet most, if not all, the academics. This worked very well and others that were not available at the meeting were approached individually by the researcher at their offices.

The completion of the questionnaires took approximately 35 minutes. The researcher collected the consent forms together with the self-report questionnaires. The researcher kept the consent forms separate from the self-report questionnaires in a safe and lockable place to protect the information and identity of the participants. The researcher checked the questionnaires for completion and appropriateness. Other academics that were not present at the meeting were contacted individually by the researcher.

### **3.6 Data analysis**

Data was captured on receiving the questionnaires from the respondents. A check was conducted by the researcher to determine whether all the questionnaires were clear and complete. Each completed questionnaire was given a code for easy comparison against the original questionnaire during the data cleaning.

For analysis of the quantitative data, statistical package for social sciences (SPSS v 23) was used. Appropriate descriptive, parametric and non-parametric statistics were employed. All the data collected (50 questionnaires) were completed comprehensively with no incomplete sections. Data were entered into SPSS v 23 and were cleaned and re-checked for accuracy in data entry.

In this study, descriptive and inferential statistics data analysis techniques were used. Descriptive statistics is used to summarise and describe data. Descriptive statistics helps to convert and reduce large amounts of data into an organised whole that makes it possible for the readers of the research report to make sense of it (Polit & Beck, 2013). Using descriptive statistics, one is able to describe exactly what the data shows.

Analysis was done using descriptive measures to describe findings (Polit & Beck, 2013). Numerical values were assigned to the Likert Scale (1= Strongly Disagree, 2= Quite Disagree, 3= Slightly Disagree, 4= Neutral, 5= Slightly Agree, 6= Quite Agree, 7= Strongly Agree) thus calculating an average score used to ascertain which of the educational technology tools were used more regularly than others.

Due to the small sample size, this scale was later recoded into a dichotomous variable (Agree and Disagree). The 8-point scale from 1=Don't use at all, 2=Use about once each month, 3=Use a few times a month, 4=Use about once each week, 5=Use a few times a week, 6=Use five to six times a week, 7=Use about once a day and 8=Use several times a day was also recoded into daily, weekly, monthly and never use and a further recoding into a dichotomous variable (use and never use).

Chi-square analysis was used to check for association between groups for the categorical variables, appropriate parametric test (Independent Sample T-test) and non-parametric Mann-whitney (*U*) for continuous variables. Confidence interval (CI) was calculated for perceived usefulness and perceived ease of use of educational technology.

Frequency of educational technology usage was estimated per year, with responses assigned the following estimated values to convert frequency of use to a numeric variable: "don't use at all"= 0, "use about once each month"= 12 "use a few times a month"= 24 (2 times a month x 12 months), "use about once each week"= 52 (1 time x 52 weeks), "use a few times a week"= 104 (52 weeks x 2 times a week), "use 5-6 times a week"= 260 (52 weeks x 5 times), "use about once a day"= 356 (356 days x 1 time), "use several times a day"= 700 (350 day x 2 times). Two times was taken as an estimate of use per day, week or month. An estimated educational technology

usage per day was calculated based on the fact that in getting the usage per year, 52 weeksx5 days was used therefore; the daily rate was calculated using (52x5) as the denominator.

Inferential statistics was used to make inferences and to test the three hypotheses using non-parametric statistics. Bivariate analysis was used in this study to check the relationship between two variables. To ascertain the association of demographic variables with educational technology use and the level of significance was set at  $p < .05$  for a two tailed test.

Data capturing errors were reduced by consulting the supervisor of this project who has a good knowledge of statistics and gave advice on the use of the suitable data capturing techniques to reduce mistakes in the method of data analysis.

### 3.7 Ethical considerations

Approval was sort from the Senate Research Committee of the University. Permission to conduct the study was also sought from the Registrar of the University and the Director of the school of nursing. A prior meeting was held with the Director of the school of nursing who spoke to all the academics to fix a convenient date and time for data collection. This was to gain their co-operation and approval and to ensure they were well informed. In adhering to the fundamental principle of human rights, the study attended to the following:

**Respect for person:** participants were treated as autonomous agents. Informed consent and voluntary informant participation of participants (educators) was sought. Written consent was gained from each willing participant on an informed consent form. The participants were given detailed information pertaining to the study, including its type, purpose and the benefits of the study in English. No participant was pressed to partake in the study and was told of their right to withdraw from



participating in the research at any phase without any penalties, if it seemed unsafe for them in any way. The data collection was done at a convenient time for the participants (academics).

***The principle of beneficence:*** is an obligation to maximise possible benefit and minimise possible harm. Every participant has a right to protection from discomfort and harm. Potential harm was minimised by informing the participant that the research would not affect their jobs as educators and that the research was mainly for the improvement of education at the institution. Arrangement was made for referral to appropriate individuals in case participants become traumatised for any reason.

***The principle of justice:*** was maintained by guaranteeing participants the right to fair selection, treatment, privacy and concealment. Dignity and respect of the participant was secured. There was fairness in the selection of the study participants. On no account was any academic prevented from participating in the study. All academics took part in the study regardless of their religion, age, social standing, sex, years of teaching and organisational affiliations or other academic achievements.

***Anonymity:*** To protect their identity participants were not required to indicate their names on the questionnaire and their identities were not disclosed as regard their participation in the study. Only code numbers were allocated to the questionnaire so that the participant could not be connected to their responses.

***Confidentiality:*** This is the management of information given by participants which must not be communicated with anyone without consent of the participants. Consent forms were not collected together with the completed questionnaires. All the

completed questionnaire have been kept in a secure place under lock and key until the communication of the results to the public and will be destroyed after five years. Only the researcher and the supervisor will be able to access the data.

Finally, results of this study will be published in a recognised journal and a peer review journal. Reports from this research will be shared with all lecturers who participated in the research before the dissemination of its findings.

### **3.8 Conclusion**

This chapter gave the descriptions the methodology used in carrying out the study. It described the setting in which the study was undertaken at a school of nursing in the Western Cape. The population was described as all the academics (lecturers and clinical facilitators) of the school that had accepted to take part in the study while the sample is those who had completed and returned the questionnaire.

A quantitative descriptive survey research design was used which included an open-ended question. A questionnaire which was developed by Kripanont in 2007 to “examine the acceptance of Internet usage among Thai academics”, was adapted and refined was used. A pre-test was carried out to identify any inappropriateness in the tool and was further refined based on feedback from the pre-tested participants.

Permission to conduct the research was obtained from the University’s Senate Higher Degrees Committee as well as from the Director of the school of nursing in the Western Cape, South Africa. Contact was made with the Director of the school of nursing and with each level coordinator to make arrangement for the handing out and collection of the completed questionnaires. The research data was captured and the data was analysed using the SPSS version 23. The researcher also discussed

the observed ethical principles of the study. The next chapter presents the study findings.



## Chapter 4

### RESULTS

#### 4.1 Introduction

The purpose of the study was to investigate the use and acceptance of educational technology by academics in a school of nursing in the Western Cape, South Africa and to describe the factors that influence the use of educational technology. The results of this study are presented in four sections based on the objectives using the TAM:

1. To determine the extent of usage of educational technologies among academics in a school of nursing in the Western Cape.
2. To measure the perceived usefulness of educational technologies among academics in a school of nursing in the Western Cape.
3. To measure the perceived ease of use of educational technologies among academics in a school of nursing in the Western Cape.
4. To investigate the factors that influences the use of educational technologies among the academics in a school of nursing in the Western Cape.

Section 1 describes the sample realization and a description of the respondents. Section 2 describes the main outcome of the TAM, namely overall usage of educational technology (Objective 1). Section 3 focuses on the factors that may influence the use of educational technology (Objectives 2, 3 and 4) and includes Perceived Ease of Use, Perceived Usefulness and the internal and external facilitating conditions. The last section presents the findings of the hypothesis which sets out to test associations between various factors that may influence educational technology use.

## 4.2 Sample realisation

The population of the study were all the academics at a nursing school at a University in the Western Cape, South Africa. At the time of the survey there were a total of 58 academics employed by the school, with 30 being clinical facilitators and 28 being academic teaching staff (lecturers and professors). A total of 58 questionnaires were handed out to all the academics in the school of nursing. A total of 50 questionnaires were completed - a response rate of 86.2%. Two participants declined to take part in the study because of time, one participant was on sabbatical leave and the remaining five participants were unavailable for follow-up. Of the 50 respondents, 24 (48%) were clinical facilitators, 26 (52%) were lecturers with a response rate of 85.7% and 86.7% respectively. Four (8%) of the lecturers were professors, although one of the professors made a mistake in the selection of “academic position” by selecting the “doctorate” option, it was correctly captured as professor. Due to the different roles of the academic staff and clinical facilitators, the results are presented separately throughout for these two groups and differences tested with chi-square test where relevant.

### 4.2.1 Demographics of respondents

Most of the respondents were female (46, 92.0%) with only four being male (4, 8.0%). This predominance of females was present in both the clinical facilitators and lecturers, with 23 (95.8%) and (88.5%) respondents respectively being female ( $X^2=0.9$ ,  $p=.337$ ) (Table 2). More than half of the respondents were older than 40 years of age (30, 60.0%), 20 (66.7%) of these being lecturers. Twenty respondents (40.0%) were younger than 40 years with 14 (58%) of 20 being facilitators. These differences in age groups in the two categories of academics were significant ( $X^2=6.5$ ,  $p=.011$ ) (Table 3).

**Table 3: Demographic profile of respondents**

Demographics	Total (N=50)	Clinical supervisor (n=24)	Lecturer (n=26)	Test	p-value
Gender	(n, %)	(n, %)	(n, %)		
Male	4 (8.0%)	1 (4.2%)	3 (11.5%)	$\chi^2 = 0.9$	.337
Female	46 (92.0%)	23 (95.8%)	23 (88.5%)		
Age group					
Young < 40	20 (40.0%)	14 (58.3%)	6 (23.1%)	$\chi^2 = 6.5$	.011*
Older 41+	30 (60.0%)	10 (41.7%)	20 (76.9%)		
Qualification					
PGD	9 (18.0%)	9 (37.5%)	0 (0.0%)	$\chi^2 = 30.8$	.001*
BSc.	13 (26.0%)	13 (54.2%)	0 (0.0%)		
MSc.	21 (42.0%)	4 (16.7%)	17 (65.4%)		
PhD	7 (14.0%)	0 (0.0%)	7 (26.9%)		

*Chi-square Test (or Fisher Exact Tests where appropriate). \*Significant at  $P < .05$*

Among the respondents, there was a difference between the clinical facilitators and the lecturers in terms of qualifications. All of the lecturers reported having postgraduate qualifications with either a Masters (17, 65.4%) or a PhD (7, 26.9%). The profile was significantly different with clinical facilitators with only 4 (16.7%) reporting having a Masters' qualification and most of them having undergraduate qualifications (Diploma (9, 37.5%) or a Bachelor's Degree (13, 54.2%) ( $\chi^2 = 30.8$ ,  $p = .001$ ).

#### 4.3 Reported use of educational technology

Use of educational technology was the first objectives of the study and the main outcome of the theoretical framework for technology acceptance, the TAM. Use of educational technology was measured through respondent's self-assessment using several variables:

- Actual usage and experience in using educational technology;
- The duration of use of educational technologies;
- The types of educational technologies used (devices and applications);
- The types of activities for which educational technologies were used; and

- Intention for future educational technology use was measured.

### 4.3.1 Self-assessment of educational technology use

Self-assessment of education technology use was measured through actual reported use of technology (frequency and duration), experience and intention to use.

#### 4.3.1.1 Actual usage

When asked how often they used educational technologies in education, all 50 (100%) of the respondents stated that they used technology in education, with the most respondents reported the most frequent use as weekly (31, 62.0%). Only 13 respondents (26%), of which 4 (16.7%) were clinical facilitators and 9 (34.6%) were lecturers, reported that they use educational technology daily (Table 4). In calculating an estimated average use of educational technology per year, educational technology was estimated to be used 241.7 ( $\pm$  268.6) times a year out of a possible 700. There was a significant difference in estimated average usage between clinical facilitators (175.4  $\pm$ 244.4 times a year) and lecturers who reported and estimated average of 302.9 times per year ( $\pm$ 279.9) ( $U=187$ ,  $=.012$ ) (Table 4).

The estimated average duration of education technology use in years was 6.5 years ( $\pm$ 3.6) with a range between 1-20 years. There was a significant difference between clinical facilitators and lecturers, with lecturers reporting longer use (7.5  $\pm$ 4.1 years) as opposed to clinical facilitators (5.4,  $\pm$ 2.6 years) ( $U=2.2$ ,  $p=.030$ ) (Table 4).

**Table 4: Overall use of educational technology**

Frequency of use (n, %)	Total (N=50)	Clinical facilitator (n=24)	Lecturers (n=26)	Test	p-value
Monthly	6 (12.0%)	5 (20.8%)	1 (3.8%)	$\chi^2=4.6$	.103
Weekly	31 (62.0%)	15 (62.5%)	15 (61.5%)		
Daily	13 (26.0%)	4 (16.7%)	9 (34.6%)		
Estimated average times of use per year (mean ( $\pm$ ))	241.7 ( $\pm$ 268.6)	175.4 ( $\pm$ 244.4)	302.9 ( $\pm$ 279.9)	$U=187$	.012*
Duration of use in years (mean ( $\pm$ ))	6.5 ( $\pm$ 3.6)	5.4 ( $\pm$ 2.6)	7.5 ( $\pm$ 4.1)	$U=-2.2$	.030*

*Chi-square Test (or Fisher Exact Tests where appropriate), Mann-whitney (U). \*Significant at  $p < .05$*

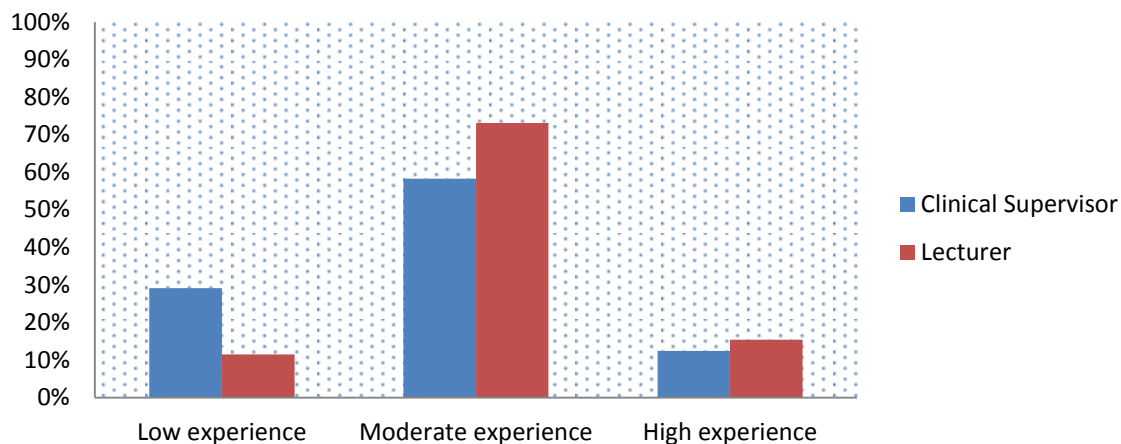
#### 4.3.1.2 Experience in educational technology

Respondents were asked to rate themselves subjectively in terms of their own perceived level of experience in educational technology. Two-third of the respondents (33, 66.0%) rated themselves as having moderate experience with educational technology, 10 (20.0%) rated themselves as having low experience and only 7 (14%) rated themselves as having high experience (Figure 1). There were no significant differences between lecturers and clinical facilitators (Table 5).

**Table 5: Experience of educational technology use**

Self-assessment about using educational technology n (%)	Total (N=50)	Clinical facilitator (n=24)	Lecturers (n=26)	Test	p-value
Low experience	10 (20.0%)	7 (29.2%)	3 (11.5%)	$\chi^2=2.4$	.298
Moderate experience	33 (66.0%)	14 (58.3%)	19 (73.1%)		
High experience	7 (14.0%)	3 (12.5%)	4 (15.4%)		

*Chi-square Test (or Fisher Exact Tests where appropriate). Significant at  $p < .05$*



**Figure 2: Self rated level of experience**

#### 4.3.1.3 Reported intention to use education technology

In measuring the intentions of using educational technology, respondents were asked whether they thought they were currently using technology enough, not enough or too much and whether they will use it in the future. Over two-thirds of the respondents (34, 68.0%) reported that they often did not use educational technology enough, while only 15 respondents (30.0%) reported that they used educational



technology enough and only one respondent reported using it too much. No significant differences were found between the lecturers and clinical facilitators ( $X^2=1.1$ ,  $p=.610$ ). (Table 6)

**Table 6: Use educational technology enough**

Level of agreement	Total (N=50)	Clinical facilitator (n=24)	Lecturer (n=26)	Test	p-value
Not enough	34 (68.0%)	17 (70.8%)	17 (65.4%)	$X^2=1.1$	.610
Enough	15 (30.0%)	7 (29.2%)	8 (30.8%)		
Too much	1 (2.0%)	0 (0.0%)	1 (3.8%)	$X^2=2.3$	.131
Intention to use educational technology more in the future	45 (90.0%)	20 (83.3%)	25 (96.2%)		

*Chi-square Test (or Fisher Exact Tests where appropriate). Significant at  $p<.05$*

The majority of the respondents (45, 90%), 20 (83.3%) of the clinical facilitators and 25 (96.2%) of the lecturers, indicated a strong intention to use educational technology in all types of work in the future ( $X^2=2.3$ ,  $p=.131$ ).

#### 4.3.2 Type of educational technologies used

In assessing the types of educational technologies used by respondents, both technology devices and applications were assessed. Devices included in the survey were desktops, laptops, smartphones and tablets with the most frequently used device was desktops. This was followed by laptops (45, 90%), smartphones (39, 78%). There was a significant difference in the use of laptops between the groups with most (19, 79.2%) of the clinical facilitators and all lecturers (26, 100%) reporting use ( $X^2=6.0$ ,  $p=.014$ ). Tablets had the least reported usage, with only 16 (32%) of the respondents reported using it (Table 7).

Applications reported being used were: email, Google scholar, electronic databases, the e-learning platform, WhatsApp, Facebook, reference managers, academic sites, Skype or Hangout, collaboration brainstorming tools, LinkedIn, video, podcasts, Twitter, Wikis, blogs, E-Portfolio, Rich Site Summary (RSS) feeds and virtual worlds. The frequency of use of applications was measured in two ways: Firstly, actual use

(Table 7) and secondly an estimated frequency of use per year (Table 8) and, for common applications, use per day.

The most frequently used application was email. All (50, 100%) respondents reported using email (an estimated average use of 593.8 ( $\pm$  219.5) times a year or at least 2 – 3 times a day), followed by Google scholar (48, 96%), electronic databases (43, 86%) and the e-learning platform (41, 82%). (Table 7)

There was a significant difference in the use of the different applications between the groups (Table 6). For example, in measuring the use of electronic databases, only 17 (70.8%) of the clinical facilitators, compared to all lecturers (26, 100%) reported using these applications ( $X^2=8.8$ ,  $p=.003$ ). A similar trend was found in the significant difference between clinical facilitators and lecturers for the use of the e-learning platform, with (15, 62.5%) of the clinical facilitator and all lecturers (26, 100%) reporting use ( $X^2=11.9$ ,  $p=.001$ ). The least used applications were virtual education worlds, such as Second Life with only (8, 16%) respondents indicating use, followed by RSS feeds (10, 20%), E-Portfolio (14, 28%) and blogs and blogging (14, 28.0%). (Table 7)

**Table 7: Type of technologies used**

Variables (n, %)	Level of usage			Test	p-value
	Total (n=50)	Clinical facilitator (n=24)	Lecturer (n=26)		
<b>Devices</b>					
Desktop	47 (94.0%)	21 (87.5%)	26 (100%)	$X^2=3.5$	.063
Laptop	45 (90.0%)	19 (79.2%)	26 (100%)	$X^2=6.0$	.014*
Smart phone	39 (78.0%)	17 (70.8%)	22 (84.6%)	$X^2=1.4$	.240
Tablet	16 (32.0%)	7 (29.2%)	9 (34.6%)	$X^2=0.2$	.680
<b>Applications</b>					
Email	50 (100%)	24 (48.0%)	26 (52.0%)		
Google scholar	48 (96.0%)	22 (91.7%)	26 (100%)	$X^2=2.3$	.133
Electronic databases	43 (86.0%)	17 (70.8%)	26 (100%)	$X^2=8.8$	.003*
e-learning platform	41 (82.0%)	15 (62.5%)	26 (100%)	$X^2=11.9$	.001*
WhatsApp	40 (80.0%)	19 (79.2%)	21 (80.8%)	$X^2=0.1$	.887
Facebook	34 (68.0%)	15 (62.5%)	19 (73.1%)	$X^2=0.6$	.423

Variables (n, %)	Level of usage			Test	p-value
	Total (n=50)	Clinical facilitator (n=24)	Lecturer (n=26)		
Reference manager	32 (64.0%)	16 (66.7%)	16 (61.5%)	$\chi^2=0.1$	.706
Academic sites	32 (64.0%)	13 (54.2%)	19 (73.1%)	$\chi^2=1.9$	.164
Skype or Hangout	25 (50.0%)	10 (41.7%)	15 (57.7%)	$\chi^2=1.2$	.258
Collaboration	24 (48.0%)	11 (45.8%)	13 (50.0%)	$\chi^2=0.1$	.768
brainstorming tools					
LinkedIn	23 (46.0%)	10 (41.7%)	13 (50.0%)	$\chi^2=0.4$	.555
Video and podcasts	18 (36.0%)	10 (41.7%)	8 (30.8%)	$\chi^2=0.6$	.423
Twitter	17 (34.0%)	7 (29.2%)	10 (38.5%)	$\chi^2=0.5$	.488
Wikis	15 (30.0%)	8 (33.3%)	7 (26.9%)	$\chi^2=0.2$	.621
Blogs & blogging	14 (28.0%)	6 (25.0%)	8 (30.8%)	$\chi^2=0.2$	.650
E-Portfolio	14 (28.0%)	4 (16.7%)	10 (38.5%)	$\chi^2=2.9$	.086
RSS feeds	10 (20.05)	3 (12.5%)	7 (26.9%)	$\chi^2=1.6$	.203
Virtual world	8 (16.0%)	2 (8.3%)	6 (23.1%)	$\chi^2=2.0$	.155

*Chi-square Test (or Fisher Exact Tests where appropriate). \*Significant at  $p < .05$*

#### 4.3.3 Estimated usage of applications

As all academics reported using email (50, 100%), it was the most frequently used application with an estimated average use of 660 times ( $\pm 144$ ) a year among the lecturers and 522 times ( $\pm 265$ ) per year for clinical supervisor. An average daily use of email of 2.5 times ( $\pm 2.6$ ) per day with use among Clinical facilitators and lecturers being 1.0 time ( $\pm 1.08$ ) and 1.5 times ( $\pm 1.53$ ) per day respectively was reported. This was followed by WhatsApp, the messaging application, with an estimated average use of 410 times ( $\pm 326$ ) per year. The average daily use of WhatsApp was approximately 2.0 times ( $\pm 1.9$ ) per day with use among Clinical facilitators and lecturers being 1.0 time ( $\pm 0.8$ ) and 1.0 times ( $\pm 0.8$ ) per day respectively. Usage of the rest of the applications was much lower (Table 8).

Google scholar was used on average 371 times ( $\pm 289$ ) per year followed by e-learning platform with an estimated average use of 243 times ( $\pm 278$ ) per year. Rich site summary (RSS) feeds were the least used, with an estimated average use of 20 times ( $\pm 100$ ) per year. There were some significant differences between the two groups, with lecturers reporting much higher use per year for the following: email (lecturers 660 ( $\pm 144$ ) times vs. clinical facilitators 522 ( $\pm 264$ ) times per year ( $U=231$ ,

$p=.024$ ). similarly, reported use of the e-learning platform was 344 times ( $\pm 280$ ) per year among lecturers compared to 134 times ( $\pm 235$ ) per year among clinical facilitators ( $U=130, p<.001$ ) only (Table 8).

**Table 8: Application estimated use per year (Values approximated)**

Variables	Total (50)	Clinical facilitator (24)	Lecturers (26)	Test	$p$ -value
Email M (SD)	594 ( $\pm 220$ )	522 ( $\pm 264$ )	660 ( $\pm 144$ )	$U=231$	.024*
WhatsApp	410 ( $\pm 326$ )	435 ( $\pm 325$ )	435 ( $\pm 325$ )	$U=287$	.588
Google scholar	371 ( $\pm 289$ )	316 ( $\pm 297$ )	422 ( $\pm 279$ )	$U=237$	.130
e-learning platform	243 ( $\pm 278$ )	134 ( $\pm 235$ )	344 ( $\pm 280$ )	$U=130$	<.001*
Facebook	237 ( $\pm 291$ )	214 ( $\pm 302$ )	258 ( $\pm 284$ )	$U=277$	.479
Electronic databases	121 ( $\pm 155$ )	104 ( $\pm 164$ )	136 ( $\pm 148$ )	$U=217$	.059
Reference manager	96 ( $\pm 166$ )	101 ( $\pm 176$ )	91 ( $\pm 159$ )	$U=306$	.905
Academic sites	92 ( $\pm 164$ )	77 ( $\pm 129$ )	107 ( $\pm 191$ )	$U=255$	.250
Twitter	64 ( $\pm 160$ )	37 ( $\pm 101$ )	89 ( $\pm 199$ )	$U=274$	.375
LinkedIn	61 ( $\pm 149$ )	24 ( $\pm 56$ )	96 ( $\pm 195$ )	$U=257$	.239
Skype or Hangout	60 ( $\pm 136$ )	49 ( $\pm 109$ )	70 ( $\pm 158$ )	$U=263$	.302
Video and podcasts	58 ( $\pm 153$ )	93 ( $\pm 204$ )	26 ( $\pm 73$ )	$U=276$	.415
Wikis	56 ( $\pm 155$ )	71 ( $\pm 168$ )	43 ( $\pm 144$ )	$U=287$	.541
Collaboration tools	46 ( $\pm 141$ )	73 ( $\pm 196$ )	22 ( $\pm 52$ )	$U=310$	.966
Blogs & blogging	40 ( $\pm 123$ )	42 ( $\pm 109$ )	38 ( $\pm 137$ )	$U=295$	.668
E-Portfolio	40 ( $\pm 139$ )	35 ( $\pm 143$ )	44 ( $\pm 138$ )	$U=247$	.108
RSS feeds	20 ( $\pm 100$ )	34 ( $\pm 143$ )	7 ( $\pm 21$ )	$U=276$	.310

*Chi-square Test (or Fisher Exact Tests where appropriate), Independence sample T-test. \*Significant at  $p<.05$*

#### 4.3.4 Reported current educational technology use in teaching/teaching-related tasks and in other work

The reported current use of educational technology, for the key tasks at the university - namely teaching and learning, research and administration, were measured by asking respondents to rate their level of usage of educational technology in these activities. For teaching and learning 36 (72.0%) of the respondents reported using educational technology for enhancing their knowledge of nursing, followed by using it for preparing for classes (35, 70%) and preparing teaching materials (35, 70%). Two-thirds of the respondents reported using technology to facilitate student contact and supervision (34, 68.0%) and facilitating/teaching in classes (33, 66.0%). Only 29 (58.0%) of the respondents reported using the e-learning platform for facilitating teaching. Significant differences

were found between the groups for all of the teaching and learning activities (Table 9).

**Table 9: Current teaching and research use of educational technologies**

Teaching and Learning	Level of agreement			Test	p-value
	Total (N=50)	Clinical facilitator (n=24)	Lecturer (n=26)		
Enhancing my knowledge on current evidence of nursing.	36 (72.0%)	14 (58.3%)	22 (84.6%)	t=4.3	.039*
Preparing for classes.	35 (70.0%)	12 (50.0%)	23 (88.5%)	t=8.8	.003*
Preparing teaching materials.	35 (70.0%)	11 (45.8%)	24 (92.3%)	t=12.8	<.001*
Student contact and supervision	34 (68.0%)	12 (50.0%)	22 (84.6%)	t=6.9	.009*
Facilitating/teaching in classes.	33 (66.0%)	11 (45.8%)	22 (84.6%)	t=8.4	.004*
E-learning platform for facilitating/ teaching	29 (58.0%)	7 (29.2%)	22 (84.6%)	t=15.8	<.001*
<b>Research</b>					
Searching information for my research.	42 (84.0%)	17 (70.8%)	25 (96.2%)	t=6.0	.015*
Enhancing personal knowledge on current evidences in my field.	40 (80.0%)	17 (70.8%)	23 (88.5%)	X <sup>2</sup> =2.4	.119
<b>Administration</b>					
Assist administrative tasks	43 (86.0%)	19 (79.2%)	24 (92.3%)	X <sup>2</sup> =1.8	.181

*Chi-square Test (or Fisher Exact Tests where appropriate), Independence sample T-test. \*Significance at p<.05*

The current educational technology use for research was reported with 42 (84.0%) respondents agreeing that they use educational technology for searching information for their research. There was a significant difference between clinical facilitators and lecturers with more lecturers reporting use (25, 96.2%) as opposed to clinical facilitators (17, 70.8%). This was closely followed by use of educational technology for enhancing personal knowledge on current evidences in their field with 40 (80%) respondents reporting use for this purpose with no difference between the two groups.

In measuring the administrative use of educational technology, respondents were asked whether they used educational technology to assist with administrative tasks. Forty-three (86%) respondents reported use for this purpose and no significant difference was found between clinical facilitators and lecturers (X<sup>2</sup>=1.8, p=.181).

#### 4.4 Factors that influence the use of educational technology

Factors that influence the use of educational technology was measured using several constructs based on the TAM, namely: perceived usefulness (PU) of educational technology, perceived ease of use (PEU) of educational technology and facilitating conditions (internal and external factors) influencing use.

##### 4.4.1 Perceived usefulness of educational technology

The first factor in the TAM is the perceived usefulness (PU) of educational technology. PU was measured through the level of agreement with statements on the perceived usefulness of technologies that are available for management of teaching and learning activities in this particular setting. In addition, an overall perceived usefulness score was calculated (Table 10).

The overall average score for perceived usefulness was 51.5 ( $\pm 11.4$ ) out of a total score of 70 [95% CI -9.1-3.8]. Overall, no significant difference was found in the perceived usefulness score between the two groups ( $t=.417$ ) with the average perceived usefulness being 50.2 ( $\pm 11.8$ ) for the clinical facilitators and 52.8 ( $\pm 11.1$ ) for the lecturers.

Most of respondents (40, 80%) agreed that “*using educational technologies enhance the quality of their work*”; “*makes their work easier to do than manual*”, “*useful in their work*” and “*find search engines useful to do their work*”. Only a few of the respondents (11, 22%) agreed that “*using educational technologies enabled them to accomplish tasks more quickly*” ( $X^2=3.5$ ,  $p=.063$ ), with only eight (33.3%) clinical facilitators and three (11.5%) lecturers agreeing with this statement. Even though there was low reported usage of e-learning platform, a considerable number of respondents (38, 76%) found the e-learning platform useful for their work (Table 10).

There was a significant difference between the groups ( $X^2=5.1$ ,  $p=.024$ ) with more lecturers (24, 92.3%) finding search engine useful to do their work as compared with (16, 66.7%) of clinical facilitators (Table 10). Lastly, less than half of the respondents (20, 40%) found tablets/iPads useful for their work.

**Table 10: Perceived usefulness of educational technology**

Tasks	Level of agreement			Test	p-value
	Total (N=50)	Clinical facilitators (n=24)	Lecturers (n=26)		
I find search engines useful to do my work	40 (80.0%)	16 (66.7%)	24 (92.3%)	$X^2=5.1$	.024*
Using educational technologies enhances the quality of my work.	40 (80.0%)	17 (70.8%)	23 (88.5%)	$X^2=2.4$	.119
Using educational technologies makes it easier to do my work than manually.	40 (80.0%)	17 (70.8%)	23 (88.5%)	$X^2=2.4$	.119
I find educational technologies useful in my work.	40 (80.0%)	17 (70.8%)	23 (88.5%)	$X^2=2.4$	.119
I find e-learning platform useful to do my work	38 (76.0%)	16 (66.7%)	22 (84.6%)	$X^2=2.2$	.138
I find a smartphones useful to do my work	27 (54.0%)	13 (54.2%)	14 (53.8%)	$X^2=0.0$	.982
I find collaborating tools (Google Drive etc.) useful to do my work	26 (52.0%)	10 (41.7%)	16 (61.5%)	$X^2=2.0$	.160
I find tablets/iPads useful to do my work	20 (40.0%)	12 (50.0%)	8 (30.8%)	$X^2=1.9$	.166
I find social media (Facebook) useful to do my work	13 (26.0%)	8 (33.3%)	5 (19.2%)	$X^2=1.3$	.256
Using educational technologies enables me to accomplish tasks more quickly. (n, %)	11 (22.0%)	8 (33.3%)	3 (11.5%)	$X^2=3.5$	.063
<b>Perceived usefulness score m (±)</b>	<b>51.5 (±11.4)</b>	<b>50.2 (±11.8)</b>	<b>52.8 (±11.1)</b>	<b>t=-.819</b>	<b>.417</b>

*Chi-square Test (or Fisher Exact Tests where appropriate), Independence sample T-test. \*Significant at  $p<.05$*

#### 4.4.2 Perceived ease of use (PEU) of educational technology

Respondents were asked to rate their perceptions of the ease of using a range of educational technologies. The average PEU score was 51.6 (±12.7) out of a total score of 70 [95% CI -3.2 -11.2]. No significant difference was found between the groups but it is important to note that the average perceived ease of use score for lecturers was lower 49.7 (±13.1) compared with the clinical facilitators 53.7 (±12.1) (Table 11).

Classifying the responses, most of the respondents (39, 78.0%) found it easy to become skilful in using the Internet, followed by 37 (74%) of the respondents who rated general educational technologies easy to use. The e-learning platform was also one of the technologies that many respondents (35, 70%) reported easy to use. The responses from the groups was approaching significance ( $X^2=2.9$ ,  $p=.084$ ) in only one activity, with 58.3% of clinical facilitators compared to 80% of lecturers perceiving that the e-learning platform was easy to use. Though use was reported to be low, almost half (26, 52%) of the respondents rated tablets/iPads and social media easy to use.

**Table 11: Perceived ease of use of educational technology**

Variable	Level of agreement			Test	p-value
	Total (N=50)	Clinical facilitators(n=24)	Lecturers (n=26)		
I find it easy for me to become skilful in using the Internet technology.	39 (78.0%)	18 (75.0%)	21 (80.8%)	$X^2=0.2$	.623
I find educational technologies easy to use.	37 (74.0%)	18 (75.0%)	19 (73.1%)	$X^2=0.0$	.877
I find the e-learning platform easy to use	35 (70.0%)	14 (58.3%)	21 (80.8%)	$X^2=2.9$	.084
Learning to use educational technologies is easy for me (n, %)	34 (68.0%)	18 (75.0%)	16 (61.5%)	$X^2=1.0$	.308
I find it easy to use educational technologies to do what I want to do.	34 (68.0%)	18 (75.0%)	16 (61.5%)	$X^2=1.0$	.308
I find search engines easy to use	32 (64.0%)	14 (58.3%)	18 (69.2%)	$X^2=0.6$	.423
I find a smartphone easy to use	30 (60.0%)	17 (70.8%)	13 (50.0%)	$X^2=2.3$	.133
I find collaborating tools (Google Drive etc.) easy to use	28 (56.0%)	12 (50.0%)	16 (61.5%)	$X^2=0.7$	.412
I find a tablet/iPad easy to use	26 (52.0%)	15 (62.5%)	11 (42.3%)	$X^2=2.0$	.153
I find social media easy to use	26 (52.0%)	14 (58.3%)	12 (46.2%)	$X^2=0.7$	.389
<b>Perceived ease of use M (SD)</b>	<b>51.6 (12.7)</b>	<b>53.7 (12.1)</b>	<b>49.7 (13.1)</b>	<b>t=1.1</b>	<b>.273</b>

*Chi-square Test (or Fisher Exact Tests where appropriate), Independent t-test (t). Significant at  $p<.05$ .*

#### 4.5 Facilitating conditions for technology acceptance

Facilitating condition includes internal factors and external factors which can increase uptake and use of educational technology.



#### 4.5.1 Internal factors influencing educational technology usage

Internal factors are *inner strengths* and *weaknesses* which can influence the use of technology. These factors were measured using questions on self-efficacy and literacy.

*Self-efficacy.* Self-efficacy was measured in the following ways: How comfortable respondents reported they were using this technology; whether they could complete educational task using the technology, if enough time is available to them; whether they can use smart technology on their own for educational purposes; and whether intention to contact students could motivate them to use educational technology.

Most of the respondents (42, 84.0%) indicated that they could complete educational tasks by using educational technologies if they have a lot of time. Similarly, 41 (82.0%) of the respondents indicated they feel comfortable when using educational technologies on their own and 40 (80.0%) of the respondents indicating that intentions to contact student's motivated them to use educational technology".

There was a significant difference between the groups with more lecturers (24, 92.3%) reporting that they were motivated to use educational technology because of their intention to contact students, as opposed to the fewer numbers (16, 66.7%) of clinical facilitators ( $X^2=5.1$ ,  $p=.024$ ).

Two-third of the respondents indicated that they could use smart technologies on their own for educational purposes (31, 62.0%). There was a significant difference between the groups with 19 (79.2%) of the clinical facilitators in agreement as opposed to only 12 (46.2%) of lecturers ( $X^2=5.8$ ,  $p=.016$ ) (Table 12).

**Table 12: Self-efficacy and literacy of educational technology**

Self-efficacy	Level of agreement			Test	p-value
	Total (N=50)	Clinical facilitators (n=24)	Lecturers (n=26)		
I can complete educational task by using educational technologies if I have a lot of time. (n,%)	42 (84.0%)	20 (83.3%)	22 (84.6%)	$\chi^2=0.0$	.902
I feel comfortable when I use educational Technologies on my own. (n,%)	41 (82.0%)	19 (79.2%)	22 (84.6%)	$\chi^2=0.2$	.616
Strong intention for student contact	40 (80.0%)	16 (66.7%)	24 (92.3%)	$\chi^2=5.1$	.024*
I can use smart technologies on my own for educational purposes.	31 (62.0%)	19 (79.2%)	12 (46.2%)	$\chi^2=5.8$	.016*
<b>Literacy</b>					
I like reading	39 (78.0%)	17 (70.8%)	22 (84.6%)	$\chi^2=1.4$	.240
I like writing and typing	35 (70.0%)	15 (62.5%)	20 (76.9%)	$\chi^2=1.2$	.266

*Chi-square Test (or Fisher Exact Tests where appropriate). \*Significant at  $p < .05$*

*Literacy:* Literacy was measured by whether the respondents like reading, writing and typing. The majority of respondents (39 78.0%) reported that they like reading while 35 (70.0%) of the respondents reported that they liked both writing and typing. There were no significant differences found between the two groups ( $\chi^2=1.4$ ,  $p=.240$  and  $\chi^2=1.4$ ,  $p=.266$  respectively).

#### 4.5.2 External factors influencing educational technology usage

External factors are outside influences that can impact the ability of a person to achieve a goal. The external factors influencing technology acceptance was measured using the South African and university context characteristics that could impact usage of educational technology.

Respondents were asked to rate the influence of language often viewed as an obstacle to using educational technology. Most of the respondents (44, 88.0%) indicated that although South Africa is a multi-lingual country, language is not an obstacle to searching, reading and responding to emails (Table 13).

In considering Internet access, this was not reported as a barrier to technology acceptance. Just over half of the respondents (26, 52%) reported that they use the Internet at home and that they use a wireless connection, thus making it the most used type of Internet connection. This number was followed by 16 (32%) respondents using 3G/4G connections and 7 (14%) respondents reported using broadband. No significant difference were found between the groups ( $\chi^2=1.0$ ,  $p=.329$ ). (Table 13)

#### **4.5.2.1 University factors influencing technology acceptance**

Several factors were considered in assessing the influence of the university characteristics, namely: the availability and accessibility of necessary resources access to the Internet within the university, the availability of effective guidance in the use of educational technology, the availability of assistance to respondents when faced with difficulties while using educational technology and the availability of devices such as laptops and tablets/iPads.

Examining the factors above, most of the respondents (46, 92%) reported agreed they can access the Internet very quickly within the University and that the availability of technicians (43, 86%) and the availability of educational technology training (43, 86%) motivated them to use educational technology. Most of the respondents (41, 82.0%) indicated that they could complete any task using educational technology if they had sufficient time (Table 13).

**Table 13: External factors influencing educational technology acceptance**

Context (South Africa) (n, %)	Level of agreement			Test	p-value
	Total (N=50)	Clinical facilitators (n=24)	Lecturers (n=26)		
Language as an obstacle to:					
Using educational technologies for searching English language websites.	44 (88.0%)	20 (83.3%)	24 (92.3%)	$\chi^2=1.0$	.329
Using educational technology when I read information from English language databases.	44 (88.0%)	20 (83.3%)	24 (92.3%)	$\chi^2=1.0$	.329
Using educational technology when I read and respond emails in English language.	44 (88.0%)	20 (83.3%)	24 (92.3%)	$\chi^2=1.0$	.329
Main source of Internet access at home					
Wireless	26 (52.0%)	11 (45.8%)	15 (57.7%)	$\chi^2=1.9,$	.587
3G/4G mobile	16 (32.0%)	9 (37.5%)	7 (26.9%)		
Broad band	7 (14.0%)				
<b>Context (university) (n, %)</b>					
Accessibility of internet within the university	46 (92.0%)	21 (87.5%)	25 (96.2%)	$\chi^2=1.3$	.260
Availability of technicians	43 (86.0%)	20 (83.3%)	23 (88.5%)	$\chi^2=0.3$	.602
Availability of educational technology training	43 (86.0%)	20 (83.3%)	23 (88.5%)	$\chi^2=0.3$	.602
I can complete any task using educational technology if I have a lot of time.	41 (82.0%)	20 (83.3%)	21 (80.8%)	$\chi^2=0.1$	.814
Availability of necessary resources	38 (76.0%)	15 (62.5%)	23 (88.5%)	$\chi^2=4.6$	.032*
Guidance is available to me to use educational technologies effectively.	34 (68.0%)	13 (54.2%)	21 (80.8%)	$\chi^2=4.0$	.044*
A specific person (or group) is available for assistance with educational technologies when difficulties are experienced.	31 (62.0%)	12 (50.0%)	19 (73.1%)	$\chi^2=2.8$	.093
Information technologies such as laptops and tablets/iPads are available to facilitate educational technology use	29 (58.0%)	10 (41.7%)	19 (73.1%)	$\chi^2=5.1$	.025*

*Chi-square Test (or Fisher Exact Tests where appropriate), \*Significant at  $p < .05$*

The majority of the respondents (38, 76%) reported that the necessary resources were available for them to effectively use the technology. There was a significant difference between the groups with only 15 (62.5%) of the clinical facilitators, as compared with (23, 88.5%) of lecturers agreeing with the statement ( $\chi^2=4.6$ ,  $p=.032$ ). Two-third of respondents (34, 68.0%) indicated that guidance was available to them to effectively use educational technologies.

Again, a significant difference between the groups with only (13, 54.2%) of clinical facilitators as compared with (21, 61.8%) of lecturers agreeing with the statement

( $\chi^2=4.0$ ,  $p=.044$ ). More than half of the respondents (29, 58.0%) agreed that information technologies such as laptops and tablets/iPads are available to facilitate educational technology use but there was a significant difference between the groups with 10(41.7%) of clinical facilitators agreeing with the statement as compared with 19 (73.1%) of lecturers ( $\chi^2=5.1$ ,  $p=.025$ ).

#### **4.6 Factors that may predict educational technology usage**

In considering the internal and external factors, the study had three hypotheses of educational technology use which were tested, namely:

*H1:* Educational technologies users are likely to be younger academics.

*H2:* There is an association between rated self-efficacy and actual usage.

*H3:* There is an association between perceived ease of use and usefulness and actual usage.

##### **4.6.1 Educational technologies users are likely to be younger academics**

To test the hypothesis whether there were associations between usage of educational technology and age, usage was defined as the measure of overall actual usage of educational technology as measured by question A6 (At present, overall how often you use educational Technologies?) in the tool. Associations were then tested using the academic positions as classification (clinical facilitators and lecturers) as these were indicative of younger and older academics (Table 14).

**Table 14: Association between age and actual usage of educational technology**

Age (years)	Clinical facilitators M(SD)	Lecturers M(SD)	Test	p-value
30-39 years	24.7(10.5)	30.3(6.9)	U = 25.5	.179
40-49 years	15.3(5.73)	22.5 (7.3)	U =14.5	.065
50 years up	16.5(5.0)	25.9 (8.0)	U=1.0	.079
Total	20.9(9.7)	25.9(7.8)	$\chi^2=5.5$	.019*

*Association between age and actual usage were tested using Chi-square Test (or Fisher Exact Tests where appropriate), and non-parametric Mann-whitney (U) test. \*Significant at  $p < .05$ .*

Younger respondents (30-39 years) were found to use educational technology more as compared with older respondents. This was influenced by position as clinical facilitators, who were significantly younger, reported lower usage compared to the lecturers. Age/academic position was identified as positive predictor of educational technology use.

#### **4.6.2 Association between self-efficacy and actual usage**

Standard regression was used to assess the ability of self-efficacy to predict the actual usage of educational technology. A preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. After entry of the scales, the total variance explained was 29.5%. A strong positive correlation ( $R^2=.295$ ,  $p < .09$ ) was found (Figure 3) and 29.5% of the variation in actual usage is explained by self-efficacy. Self-efficacy was identified as a predictor that could be used to predict actual usage of educational technology

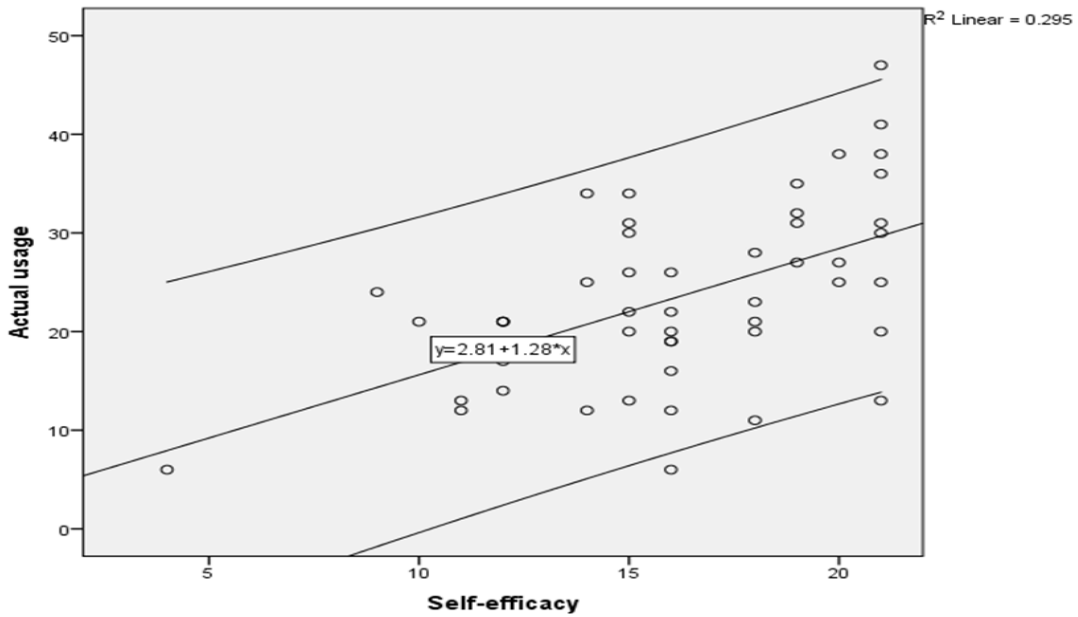


Figure 2 Association between self-efficacy and actual usage

#### 4.6.3 Perceived ease of use, perceived usefulness and actual usage

To test H3: The relationship between perceived ease of use, perceived usefulness and actual usage, standard regression was used to test the correlation between PEU and PU and then was followed by a full standard multiple regression to assess the ability of the independent variables (Perceived ease of use, perceived usefulness and demographic variables) to predict actual usage of educational technology. There was a strong correlation between perceived ease of use and perceived usefulness ( $R^2 = .559$ ,  $p < .001$ ), with 55.9% of the variation in usefulness being explained by perceived ease of use (Figure 3)

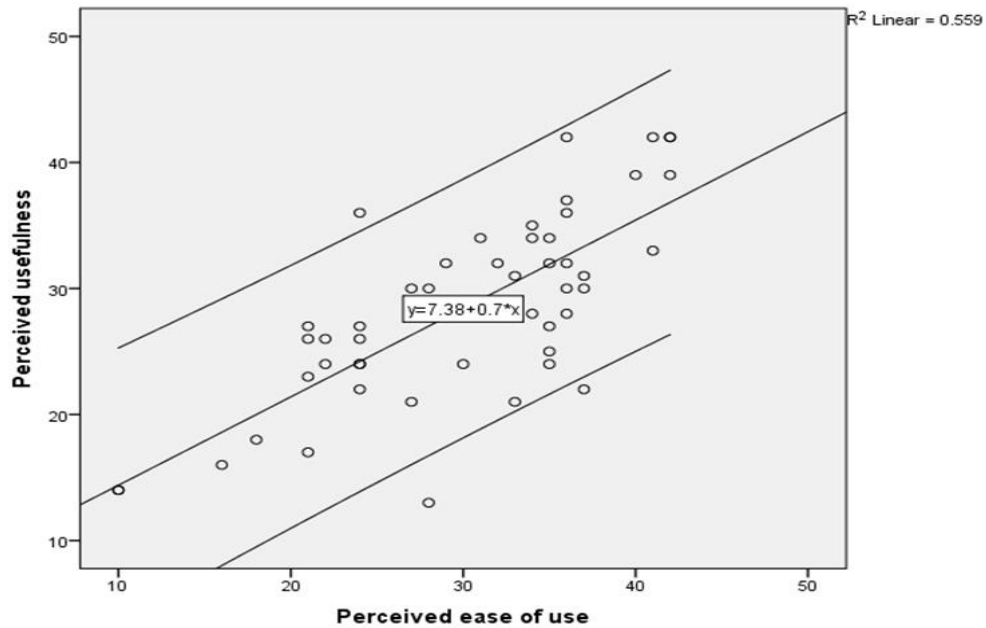


Figure 3 Correlation between perceived ease of use, usefulness and actual usage

#### 4.6.4 Testing the application of the TAM in this setting

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity and two prediction models were tested.

**Model 1:** This model included only perceived usefulness (PU) as a predictor actual usage. This model was statistically significant ( $R^2=.368$ ,  $p<.001$ ) with 36.8% of change in actual usage being explained by perceived usefulness. Perceived usefulness makes the largest and only unique contribution ( $Beta= .426$ ,  $p= <.001$ ) to actual usage.

**Model 2:** The second model included perceived ease of use, perceived usefulness and the significant demographic variable (academic position and self-efficacy). This model successfully explained 56% of the variance in actual usage ( $R^2=.559$ ,  $p<.001$ ) as predictor of actual usage. Three control measures were statistically significant,



with academic position recording a higher beta value, making the largest unique contribution ( $\beta = 5.62$ ,  $p = .006$ ) as compared with perceived ease of use ( $\beta = 0.40$ ,  $p = .036$ ) and perceived usefulness ( $\beta = 0.39$ ,  $p = .049$ ) (Table 15)

**Table 15: Association between Actual usage, PEU, PU and academic position**

Model 2	Unstandardised coefficient			
	Beta	Std.error	Test ( <i>t</i> )	<i>p</i> -value
Actual usage (constant)	-8.376	5.075	-1.650	.106
Perceived usefulness	.395	.196	2.022	.049*
Perceived ease of use	.400	.185	2.162	.036*
Academic position	5.624	1.956	2.875	.006*

*Association between actual usage, perceived usefulness, perceived ease of use and academic position were tested using standard multiple regression. Significant at  $p < .05$  two tailed*

### Summary of the chapter

This chapter described the results of the study in detail as guided by the theoretical framework for the study. The study identified the key findings that are discussed further in the next chapter.



## Chapter 5

### DISCUSSION OF RESULTS

#### 5.1 Introduction

This chapter discusses the results in the context of published literature. In the process of investigating the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, the following factors that can influence use based on the TAM were considered: the perceived usefulness, perceived ease of use, facilitating conditions, and potential applications and availability of these technologies for teaching and learning purposes. This chapter will present the findings using the TAM theoretical framework to discuss the following objectives:

1. To determine the extent of usage of educational technologies among academics in a school of nursing in the Western Cape.
2. To measure the perceived usefulness of educational technologies among academics in a school of nursing in the Western Cape.
3. To measure the perceived ease of use of educational technologies among academics in a school of nursing in the Western Cape.
4. To investigate the factors that influences the use of educational technologies among the academics in a school of nursing in the Western Cape.

#### **5.2 The extent of usage of educational technologies among academics in a school of nursing in the Western Cape.**

##### **5.2.1 Low overall use and experience of educational technology**

Firstly, the study found low usage of educational technology by academics in that only a-quarter of the of the respondents reported frequent use of educational technology compounded by significant differences in use between lecturers and

clinical facilitators. Though technology is often proposed as a possible option to replace traditional clinical facilitation (Dickens, 2010), a concern was the very low reported usage by clinical facilitators. This limited use of educational technology among clinical facilitators may be due to a lack of knowledge on the best type of programme to use and how to use it for technology-mediated supervision (Perera-Diltz & Mason, 2012).

The findings of this study are in contrast with the findings from the Kripanont (2007) study which examined Internet usage by academics in Thailand. Kripanont (2007) reported that 61.5% of academics use internet technology several times a day. It is noted though that this difference might be due to the difference in measuring educational technology use versus Internet use. In terms of comparing our findings with usage of educational technology by academics in Africa and developing countries, Our study confirmed the low technology usage in these settings as was reported that 57% of the academics who teach in “smart” classrooms do not use educational technology on a daily basis (Hennessy, Harrison, & Wamakote, 2010). This is also supported by research that though ICT has a lot of potential , educators may not necessarily use it in teaching (Tezci, 2009). This is a concern as numerous studies have shown that though most students feel that technology is an important aspect of learning (Beckman, Bennett & Lockyer, 2014; Butz, Stupnisky & Pekrun, 2015; Lai & Hong, 2015; Wang et al., 2014) only 33% of the academics in this study reported that technology is fully incorporated into teaching and learning.

A second finding of the study was that academics reported moderate experiences in educational technology but usage was still low though clinical supervisor had both little experience and low use. Webster et al. (2003) corroborated that as we found in

that computer usage is influenced by academic qualification, nursing position, age and years of teaching experience.

The findings on experience were similar to those reported in a study by Esewe (2013) who reported that the years of experience is not significantly associated with technology use. Most of studies however present a contrasting view. Wastiau et al. (2013) identified experience as a relative function of usage of digital technology. John (2015) in a study on the integration of information technology in higher education also found that prior experience in technology use can influence the increased use of a technology.

### **5.2.2 Use of technology devices**

The usage of computer devices in this study was similar to international reports on usage of computer devices (Bhalla, 2013; Güzel, 2011). Consistent with the notion that access to technology is widespread, almost all academics showed a preference for desktops and laptops, though the usage of laptops in clinical supervisors was low. Tablets/iPads were the least preferred device and hardly any usage of these was reported.

There may be at least three explanations for these findings. Firstly, most lecturers have their own personal office with personal desktop computers in each of these offices. The job descriptions for lecturers require extensive use of computers as part of their roles to teach and conduct research. This is in agreement with the findings from a study conducted by Oshinaike and Adekunmisi (2012) on computers and multimedia tools used by university nurse educators who found that laptops were the most used technology followed by desktops and mobile technology. Baker et al. (2012) further supported these findings stating that the majority of the educators

owned laptops and cell phones. He found that although laptop ownership was quite common among academics and students, academics are much more likely to own a desktop. However, no studies were found on the difference between the clinical facilitators and lecturers in the use of laptops.

Clinical facilitators spend several hours per day in the skills laboratory and on the wards. Most of these sessions do not require the use of a computer and the only access to computers is at the school. Clinical supervisors normally are contract positions and are not routinely allocated laptops as these cannot be secured in settings off campus. The low use of tablets could be a direct reflection of cost but also the fear of using new technology. Lack of commitment, perception of benefits and costs of the innovation may affect academic's perceptions and use of innovative technology (Fiedler et al., 2014).

In this research, findings show that there is an inconsistency in the usage of smartphones and tablets/iPads as educational technology with only 54% and 40% of the respondents respectively, perceiving them to be useful for their work as academics. Therefore, the low frequency of use of smartphones and tablets/iPads might be as a result of cost or academics not integrating their use for educational purposes. It could also be as a result of limited memory, small screen sizes, small keyboard and low speed for data entry into the devices (Abolfazli et al., 2014; Al-Hawamdeh, 2004; Page, 2014).

### **5.2.3 Use of applications**

The five most frequently used applications were email, WhatsApp, Google Scholar, e-learning platforms and Facebook. These findings are expected as email which is one of the first forms of digital technology, is the most readily available and

commonly used among academics. However, applications such as virtual teaching environments such as Second Life, Skype video conferencing, and web-based online educational software seem to be used less, maybe due to lack of knowledge, limited time, cost and unavailability, time constraints, expense and or (Rousmaniere, 2014), but may actually be a better platform for technology-mediated clinical facilitation.

A major concern which emerged from the study was the low usage of e-learning platforms especially in lecturers who are required to use these in the teaching of all theoretical programs. Only 58% of the respondents reported using the required university e-learning platform for facilitating and or teaching. Applications such as e-learning platforms and electronic databases were not frequently used, compounded by significant difference in usage between the lecturers and clinical supervisors. This could be influenced by the lack of a required formal teaching and research components as part of the responsibilities of clinical facilitators, difficulty in integrating the technology into the curricula, lack of technical support, and most importantly that clinical supervisors might not yet appreciate the role of this technology in their duties (Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011).

This is supported by a study conducted on the integration of e-learning platform into Academic Programmes in South African Universities which reported that lecturers do not always use a Learning Management System (LMS) and when they do, they often ignore existing functionalities and create their own, that are often confusing and make it harder for students to follow (Chipps, Kerr, Brysiewicz, & Walters, 2015; Mlitwa, 2010). It is encouraging to note that the problems associated with e-learning adoption can be decreased with fast and easy access to e-learning resources,

adequate technical support and facilitation both online and in the clinical area (Bromley, 2010).

Social media sites such as WhatsApp and Facebook are now essential in the nursing profession and education. In international context (Ferguson, 2013; Pimmer, Linxen, & Gröhbiel, 2012; Schmitt et al., 2012) regular usage of social media sites to reflect on work-related experiences was low. In this study the social media applications had a relatively low frequency of use for educational purpose except for WhatsApp and Facebook. This could possibly be due to a perception that social media should not be used for academic and clinical purposes and issues about the possible distraction of those devices in an educational setting (McBride, LeVasseur, & Li, 2015). Another reason for this can be due to the risk often associated with the use of these applications; they include lack of privacy, confidentiality, problems with authentication, identity and intellectual property theft (Leitch and Warren, 2009).

#### **5.2.4 Educational technology use for teaching and learning**

Innovative technologies are penetrating almost all fields of education. Various studies have reported academics using technology to develop lesson plans, prepare teaching material, get relevant information, update subject knowledge and teaching skills, preparing test questions, simulations, games and assignments (Bhalla, 2013; Fiedler et al., 2014; Güzel, 2011; Puhek, Perše, Perše, & Šorgo, 2013; Šorgo, 2013). Our research study reinforced these findings with more than two-thirds of the respondents reporting using educational technology for enhancing their knowledge of nursing, preparing for classes, preparing teaching materials, student contact and supervision and for facilitating teaching in class. This was further supported by a study on technological innovation in nursing education, where they found that faculties were accepting and supportive of innovation because it facilitated and

enhanced their teaching experiences and presented chances to teach in a contextual manner, allowing students to gain a comprehensive view of the patient, thereby bringing teaching to life (Fiedler et al., 2014).

In our study, there was again a statistically significant difference between clinical facilitators and lecturers in the usage of educational technology for enhancing knowledge of nursing, preparing for classes, preparing teaching materials, student contact and supervision, facilitating teaching in classes and for facilitating teaching on the e-learning platform. This could be because the clinical facilitators are not directly linked to classroom teaching compared to lecturers who have to include technology as they operate in a blended learning environment (Charles, Graham, Wendy Woodfield & Harrison, 2012).

However, the fact that close to one-third of the academics, most of whom are clinical facilitators, do not use educational technology for teaching and learning is an indicator that possibly they do not have the technology at their disposal and or are unskilled or fearful to use the technology. Adoption and integration of innovative educational technologies requires the collaboration of many groups, including academics, clinical facilitators administrators, students and technical support (Colvin & Bullock, 2014). Kotcherlakota, Kupzyk and Rejda (2017) reported in their study that academics are unwilling to integrate educational technology into the pedagogy because it is stressful and challengeable. This concern made the American Association of Colleges of Nursing (2008) suggest that doctoral education for advanced nursing practice competency should include the use of technology and informatics (NLNAC, 2008).



### **5.2.5 Educational technology usage for research purpose**

Almost all the respondents reported using educational technology when searching for information for their research and for enhancing personal knowledge of nursing. It is evident from this study that academics have adapted themselves towards the goal of the university by using educational technology more for research and administrative tasks (than for teaching and learning). This is encouraging as it is in line with the university aims to be a more research oriented university in the future. There was however again a statistically significant difference between the groups in this respect, which is related to the different roles of lecturers and clinical facilitators and the fact that clinical facilitators are not required to do research. From this, it can be inferred that academic qualification/position and the associated roles and tasks are directly related to the use of technology for any different purposes.

### **5.3 Factors that influences the use of educational technology**

In the context of the theoretic framework the TAM, acceptance and adoption of a technology depends on the perceptions of its usefulness, and perception of its ease of use (Davis, 1989). As this study has shown, although a numbers of academics are integrating educational technology into teaching and learning, many are still very unwilling to use these technologies and adjust their teaching and learning strategies (Balash et al., 2011). In this study, factors that influence the use of educational technology were measured using several constructs based on the TAM, namely: facilitating conditions (internal factors external factors), perceived usefulness and perceived ease of use.

#### **5.3.1 Perceived usefulness of educational technology**

Successful adoption of an innovation requires recognising the benefit, commitment to use the innovation and a strongly perceived added value which outweighs various

confounding variables associated with its adoption (Fiedler et al., 2014). Overall, this study showed that the perceived usefulness of educational technology was high (73.6%). This is similar to respondents in a study by Rocker who also reported that perception of usefulness of educational technology was high (78.9%) compared with a score of between 60% and 70% reported (Röcker, 2009). These findings stand in a strong contrast to a study from Kotcherlakota, Kupzyk & Rejda (2017) who reported in their study that academics are hesitant to integrate educational technology for teaching processes, because it is stressful and challengeable and thus not useful.

Academics reported that they have not fully appreciated the importance of technology and social media in their work as only a few of the academics agreed that using educational technologies enable them to accomplish tasks more quickly. Like the use of mobile devices, this can also be associated to the research component of lecturers' jobs since mobile devices now have the potential for use as research instruments (Tomlinson et al., 2009). Mobile technology has great prospects for improving and supporting education and the way it is delivered, it is a new development that is fast gaining acceptance because its popularity has extended into the field of education (Sheng, Siau, & Nah, 2010).

Most the respondents found search engines useful tools in doing their work, the different between clinical facilitators and lecturers in this regard is significant ( $p=.024$ ). Similarly, two-thirds of the respondents also reported that they found the e-learning platform easy to use. However, as discussed earlier, reported use of this technology was very low.

### **5.3.2 Perceived ease of use of educational technology**

Academics in general report a high score for ease of use (PEU) and the average overall rating regarding the perceived ease-of-use of educational technology is mean=51.6 which is (73.7%). Perceived ease of use has been shown to influence perceived usefulness (Davis, 1989). When academics feels a particular technology is useful and easy to use, these feelings strengthen their intentions to use the technology and in the long run actual usage (Teo, 2015). Our study has shown that is also the case, for example less than half of the respondents find social media easy to use for educational purpose with only 26% reporting using it.

Perceived ease of use can be used to predict perceived usefulness of educational technology. In this study, a strong positive correlation was found between ease of use and usefulness of technology with most of the variation in usefulness being explained by perceived ease of use. This finding is supported by Cheng (2013) who found in his study that the effects of perceived usefulness, and perceived ease of use on intention to use were significant and directly influenced the actual usage of participants. Further support for this finding came from ŠUmak, HeričKo, & PušNik, 2011; Tarhini, Hone, & Liu (2015) who discovered that the perceived usefulness perceived ease of use are predictors of actual usage. However one study on classroom instruction in the United States, concluded that perceived usefulness and perceived ease of use were not found to significantly influence academics readiness to accept and use technology (Cleveland, 2014).

### **5.3.3 Internal factors influencing educational technology acceptance**

Other factors identified in the TAM that may contribute to technology acceptance are the internal factors of age, e-literacy and self- efficacy.

According to Ndlovu and Lawrence (2012) e-literacy starts with the ability to manipulate computers; such as typing notes, writing and reading with technology, which he called the first level of knowledge. This study shows that most of the respondents reported liking reading; writing and typing which shows a high level of e-literacy among the academics and this should influence their future use of educational technology.

Age is a significant factor that influences computer use (Hsu, Hou, Chang, & Yen, 2009) and older nurses might be more unwilling to accept new innovative technologies (Putzer & Park, 2010). An evolving crisis issue in nursing schools is the average age of academics being older than 51 years (Kotcherlakota, Kupzyk & Rejda, 2017). Researchers reported that older workforces often report a lower usage of technology compared with younger workforces who are likely to have grown up with a greater exposure to these technological devices (Chege, 2014; Kotcherlakota, Kupzyk & Rejda, 2017; Veenhof, Clermont & Sciadas, 2005). Academics in the nursing profession tend to be older and tend to have longer periods of experience in use of computers and other technologies. This leads to a contrary finding in this study, which showed that most of the respondents, being older academics, especially lecturers, showed higher use of technology than the younger respondents (mainly clinical supervisors). This may be due to the fact that lecturers has more access to educational technology use

All the age groups made use of the technology. Respondents (30-39 years), both lecturers and clinical supervisors, were found to use educational technology more compared with older respondents. However, overall usage for clinical facilitators, who in general were younger than lectures, were lower than lecturers and this was confounding age analysis. Therefore, in this study, we used academic positions

(clinical facilitators and lecturers) as a classification to test prediction of use instead of age. Academic position was thus identified as a major predictor in the use of educational technology.

Teachers' self-efficacy toward technology usage is also an important factor in assisting successful classroom technology adoption and integration (Gu, Zhu, & Guo, 2013) and a lack of self-efficacy hinders use of technology (Al-Azawei & Lundqvist, 2015). Self-efficacy is the cognitive belief that affects the behaviour of an individual when using a technology (Wu, Tennyson, & Hsia, 2010). High self-efficacy can increase usage of educational technology in teaching and learning and can be used to predict actual usage of educational technology. This is in alignment with Vannatta and Nancy (2004) who identify factors that influence educational technology usage among academics. They discovered that academics with high self-efficacy and willingness to change were more likely to use technology in the classroom.

Lee and Tsai (2010) also found that more experienced and older academics have lower levels of self-efficacy and academics with more experience of using technology (including for instruction) had higher levels of self-efficacy. In this study, high self-efficacy was reported. Most of the respondents indicated that they could complete educational tasks by using educational technologies and were comfortable when using educational technologies on their own and they were able to use educational technology on their own.

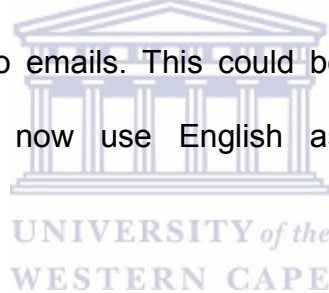
### **5.3.4 External factors influencing educational technology usage**

Other factors identified in the TAM that may contribute to technology acceptance are the external factors of language, access to the Internet, university support, technical

infrastructure and lack of time. Though educational technology usage was moderately low, no strong external influence on technology acceptance was found except for the lack of time and availability of technical infrastructure.

In considering the influence of language on educational technology use, the fact that classrooms in South Africa have a wide variety of cultural and linguistic differences, making academics to face various educational challenges (Jantjies & Joy, 2016). The use of multiple languages affecting the content used in the technologies are important factors affecting learning in the country (Jantjies & Joy, 2015).

Although South Africa is a multi-lingual country, the findings of this study indicate that language is not an obstacle for academics in searching information, for reading information and responding to emails. This could be because most of the higher institutions in South Africa now use English as their official language for communication.



A second external influencing factor that can influence the use of educational technologies is access to the Internet. Access to Internet, plays a vital role in the teaching, research and learning process (Kumar & Kaur, 2006). It enhances the quality and effectiveness of instruction and improves the delivery of education for teachers and it enables a variety of beneficial applications for teachers (Lenhart et al., 2010). Findings from this study show that the use of the Internet has increased as all academics have at least one means of accessing the Internet at their disposal, while other academics have Internet access available at both work and home. Wireless connection is the most commonly used means of access among academics. The availability of Internet gives room to make use of these technology for educational purposes without the constraint of place (Schwanen & Kwan, 2008)

i.e. academics can use educational technology to prepare teaching materials at a convenient time and place; they can find ready-made scenarios to support and facilitate their teaching (Schmitt et al., 2012). This was further supported by a report on the impact of broadband on education which stated that educators use the Internet to access information on the web to be able to enhance curricula, improve teaching methods, and participate in online professional development programmes and complete administrative tasks (Belo, Ferreira, & Telang, 2010).

A third factor that may influence the use of educational technologies was the availability of university support. Various studies have established that the adoption of educational technologies was mostly dependent on the internal or institutional (external) support of educational institution (Bhattacharjee & Hikmet, 2008; Putzer & Park, 2010), the training and mentoring of staff (Balash et al., 2011) and sustained teachers' professional development (Kim et al., 2013). Most of the respondents confirmed that they can access the Internet very quickly within the university and that the availability of technicians and training motivates them to use educational technology. This should encourage greater use of the technology, which is not yet seen in the institution.

A fourth factor was the influence of time on use and the lack of time available to spend on learning new technologies. There is a positive association between technology achievement and time devoted to learning and using technology (Vannatta & Nancy, 2004). Tuten and Marks (2012) reported that barriers to adoption of social media as educational technology include limited time. Time is a very important factor to consider when engaging with any technology. My findings support this as most of the respondents reported that they can complete any task using educational technology if they have sufficient time. Also, Schmitt and Lilly (2012), in

their study, found that the constraints of time serve as a barrier for the Nursing academics in the adoption of new technology into their curricula. When academics have only a limited amount of time to integrate technology, they often go back to their old ways of teaching.

The last external factor considered was the availability of technical infrastructure. This is an essential condition for the use of technology (Ifenthaler & Schweinbenz, 2013). A significant difference was recorded between the clinical facilitators and the lecturers in the availability of devices such as laptops and tablets/iPads to them at the school. This makes it clear that available educational technology is more accessible to the lecturers in the School of Nursing than the clinical facilitators. This could affect the ability of clinical facilitators to utilise the technology appropriately. In conclusion, a properly organised structure of resources, professional support and governance will help alleviate the external barriers that academics may come across and will assist in creating an atmosphere where they feel supported and free to use new technologies for enhancing their teaching and learning strategies (Fiedler et al., 2014).

#### **5.4 Testing the application of the TAM in this setting**

In testing the TAM model, i.e. all the influencing factors influencing potential educational technology use, this study confirmed the TAM model and found that perceived ease of use, perceived usefulness and academic position(external variable) are the significant influences on actual usage of educational technology. This is in strong alignment with numerous studies that has tested the TAM and agreed that external variables, PEU and PU are strong predictors of actual technology usage (Chipps & Jarvis, 2016; Holden & Karsh, 2010; Teo, 2011).



## 5.5 Summary

Based on the objectives that were set and hypothesis to be tested, this study found that the academics use educational technology but this use was low compared with the published literature. However, there was a significant association between perceived usefulness, perceived ease of use and actual usage, which is influenced by the academic positions. The next chapter presents the conclusions of the research findings and outlines recommendations from the study.



## Chapter 6

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Introduction

Academics are under pressure to improve teaching and learning outcomes for an increasingly large and varied number of learners (Hénard & Roseveare, 2012). Moreover, learners are not being effectively prepared for the job markets of the 21st century that require an exceptional set of critical thinking and technological skills that are not being developed in learners currently (Kukulska-Hulme, 2012). At this crucial time, educational technologies are essential to thoroughly transform an obsolete paradigm and improve the quality of educational outcomes. In this context, the study has illustrated the following key findings.

#### 6.2 Key findings

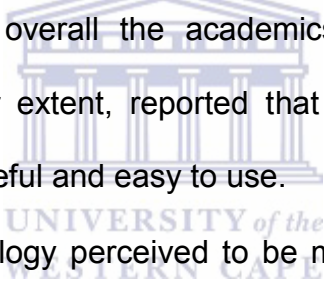
The study set out to establish whether lecturers in this school of nursing are using educational technology and whether they believe educational technology to be useful and easy to use for teaching and learning. This was done to firstly determine the extent of use of educational technologies (Objective 1):

- Most academics reported moderate experience of educational technology use with only a few academics reporting high levels of experience. However, overall use of educational technology was low, especially for clinical facilitators.
- Mixed usage was reported on devices and technologies which reflected the overall technology acceptance which was moderate. The most commonly and frequently used devices were desktop computers and laptops with low usage of smartphones and iPads for educational purpose reported among academics. Email was the most common application used by academics for teaching and

learning, followed by WhatsApp and the e-learning platform was poorly used. However, almost all academics intend to use educational technology to a greater degree in the future.

- Adequate use of educational technology, especially for clinical facilitators was low. This was evident in the differences in use of laptops, eLearning and overall frequency of use of any technology. Various factors such as access and availability of technical support possibly contributed to these differences though this should be further investigated .

The second and third objectives were to establish whether academics perceive educational technology useful and easy to use. The study found that:

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- The study found that overall the academics, both lecturers and clinical supervisors to a lesser extent, reported that they believe that educational technology was both useful and easy to use.
  - The educational technology perceived to be most useful and easiest to use was email while social media like Facebook was perceived not to be useful for educational purpose
  - A strong positive correlation between perceived ease of use and perceived usefulness of educational technology was found.

The final objective set out to test the influencing factors on predicted use of educational technologies, using the TAM as the theoretical framework:

- The following internal factor was found to be related to educational usage, namely age as measured through academic position. Though factors of literacy and self-efficacy were found to be important in influencing educational

technology usage. Most respondents reported themselves to have high levels of literacy and self-efficacy and were not predictive of educational usage.

- Similarly, though educational technology usage was moderately low, no strong external influence on educational technology usage was found except for the lack of time and availability of technical infrastructure.
- In testing the TAM, the main predictors of usage of educational technologies was therefore found to be academic position (as a proxy for age) and perceptions of ease of use and usefulness of educational technology.

### 6.3 Limitations

The study has several limitations.

*Sample bias:* There are three examples of sample bias present in this study. The first limitation is the fact that data was drawn from only one school of nursing. While the assumption is that all schools of nursing in the Western Cape have similar educational contexts, a sample of one university limits the generalisations that can be made from the data gathered and the conclusions reached in the study. This researcher therefore recommends that further studies should be conducted in other schools of nursing, if an overall perspective of educational technology acceptance in the Western Cape is to be achieved.

The small sample size in this study (n=50) could also contribute to inability to generalize the findings of the study. More so, the number of respondents was low for inferential analysis and it is recommended that this analysis is repeated with bigger samples in a future study. Lastly, gender could not be used for classification in this study because only four male respondents participated in the study.

*Response bias:* Based on the fact that the data were self-reported, there is the possibility that some respondents may have given a socially acceptable response

due to their position as academics in the same school in which the study was conducted. This possible bias may have resulted in an over-reporting of actual usage of educational technology (Polit & Beck, 2012). Also the effect of high rating in one respondent (an older senior academic) was an outlier in terms of high usage, which may have skewed the data toward the age and academic position findings in this study.

*Instrument/Measurement bias:* Poor metrics in measuring use and usage of educational technology might have resulted in either overrating or underrating measures of usage. In addition, some of the applications were not defined in sufficient detail in the questionnaire (Lane, 2010) which could have resulted in some questions being misunderstood and consequently could have resulted in inaccurate responses by the respondents. It would have been helpful to ask respondents if they have smartphones and or tablets/iPads, in order to determine if it was their lack of access to this smart technology was what resulted in their low usage of it and their perception of its usefulness for educational purposes.

Another instrument bias was that attitude towards the use of educational technology, a newer component in revised TAMs, was not directly measured. Though this is seen as a limitation, the responses on usage infer that there is a positive attitude towards educational technology use. However, future research in this area should include measures of attitude.

A last limitation is that the study being only a mini-thesis used only a quantitative method that involved the use of a questionnaire to get participants' responses based on a specific set of options. Mixed methods of research which involve both qualitative and quantitative methods are recommended for future research. In addition, we were unable to compare our findings to other studies due to a lack of

information in the literature on acceptance of educational technology among clinical facilitators. We anticipate that our initial findings will provide this reference point for future researchers.

#### **6.4 Recommendations**

Success in adoption of an innovative technology calls for “well-organised, communicated, and coordinated efforts” which should include long-term commitment from the institution for the most innovative ideas to become concrete. The amount of time available and the type of support to be supplied needs to be taken into account when incorporating any new technology (Fiedler et al., 2014).

Based on this study, the following recommendations are made to improve the use and acceptance of educational technology among academics in nursing schools in South Africa.



##### **6.4.1 Recommendations for nursing institutions**

- Nursing institution should give academics adequate time to integration innovative technology into their pedagogy (Buckenmeyer, 2011) When the time allowed is inadequate or limited, academics often resort to using what they are already familiar with and their interest and eagerness in making use of first-hand pedagogical approaches using technology will, therefore wane (Liu, Maddux, & Johnson, 2004)
- Nursing institution should provide continuous access to needed resources, including physical resources and timely technical support, are important factors contributing to technology adoption (Kotcherlakota, Kupzyk, & Rejda, 2017). Therefore, institutions should continue to ensure that sufficient

resources and technical support to encourage use of new technologies. This should include laptops and iPads to lecturers and clinical supervisors.

- Appropriate, on-going and timely professional development in educational technology must be made available (Ertmer & Ottenbreit-Leftwich, 2010) in group and individual formats. Clinical facilitators should also be provided adequate training and have access to sufficient facilities to help them to fully integrate educational technology with teaching and learning.

#### **6.4.2 Recommendations for nursing education**

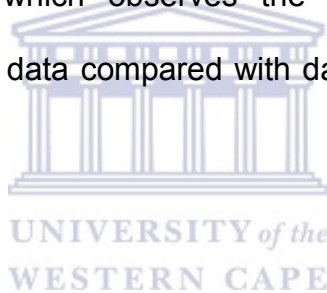
- The possibility of using smart technology (smartphones and tablets/iPads) should be explored as they offer portability and easy access to online curricula (Archibald, Macdonald, Plante, Hogue, & Fiallos, 2014) especially for clinical facilitators for whom a plethora of clinical applications are available.
- A review of nursing education curricula should be conducted and all nurse educators should be trained in the use of educational technologies as part of the core curriculum
- A communications policy at school level which endorses and requires the use of technology, together with education, support and mentoring of junior academics by senior ones is recommended to encourage the use of educational technology.

#### **6.4.3 Recommendations for future research**

After a critical analysis of the study, further on-going research is needed to gain a better understanding of academics experiences with the use of educational technology for its successful adoption in the future (Fiedler et al., 2014) and to increase the amount of literature that currently exists on clinical facilitators'

acceptance and use of educational technology, particularly in South Africa. Future research opportunities recommended by researcher are as follows:

- To extend the generalizability of the findings from this study, future research with different user groups (e.g. other schools of nursing from different institutions) should be undertaken.
- Further research should be done on why there is low usage but good perception of use a qualitative exploration of factors contributing to usage may provide information on this issue.
- Future work on accurate quantitative metrics of measuring actual usage of different technologies which observes the actual technology usage will provide a more reliable data compared with data collected from self-reported usage.



## 6.5 Conclusion

The study investigated the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, South Africa. The findings suggested that though academics use educational technology and generally had high levels of technology acceptance, actual usage was found to be low and the academics were selective in the type of technology that they use.

Consequently, with the advancement of technology in our society, the need for academics to use educational technology cannot be over-emphasised. Academics need to anticipate the on-going development of innovative technologies and should be seen as drivers of the feasibility, acceptability, and outcomes of technology integration in education of nurses. Advancing innovations in educational technology remains a long-term trend and reflects the role of the university in fostering



innovation, creativity and critical thinking (Skiba, 2016) and contributing to the on-going quality of competent nurse graduates.



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# APPENDICES



## Appendix A

### Ethical clearance certificate



UNIVERSITY of the  
WESTERN CAPE

#### DEPARTMENT OF RESEARCH DEVELOPMENT

10 December 2015

#### To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:  
Ms RO Olugun (School of Nursing)

Research Project:	Use and acceptance of educational technologies by academics in a school of nursing in the Western Cape.
Registration no:	15/7/251

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read 'P. Josias'.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

Private Bag X17, Bellville 7535, South Africa  
T: +27 21 959 2988/2948 . F: +27 21 959 3170  
E: [pjosias@uwc.ac.za](mailto:pjosias@uwc.ac.za)  
[www.uwc.ac.za](http://www.uwc.ac.za)

A place of quality,  
a place to grow, from hope  
to action through knowledge

## Appendix B

### Permission to conduct research



**STUDENT  
ADMINISTRATION**   
Administration Building, 1<sup>st</sup> Floor  
ashaikjee@uwc.ac.za, mamos@uwc.ac.za  
021 959 2110

4 January 2016

Dear Ologun Oluwanifesimi

**RE: PERMISSION TO CONDUCT RESEARCH AT THE UNIVERSITY OF THE WESTERN CAPE**

As per your request, we acknowledge that you have obtained all the necessary permissions and ethics clearances and are welcome to conduct your research as outlined in your proposal and communication with us.

Please note, that while we give permission to conduct such research (i.e. interviews and surveys) staff and students at this University are not compelled to participate and may decline to participate should they wish to.

Should you require any assistance in conducting your research in regards to access to student contact information please do let us know so that we can facilitate where possible.

Yours sincerely

A handwritten signature in black ink, appearing to read "A. Shaikjee".

DR AHMED SHAIKJEE  
MANAGER: STUDENT ADMINISTRATION  
OFFICE OF THE REGISTRAR

## Appendix C

### Permission letter to the University

University of the Western Cape,  
Faculty of Community and Health  
Sciences,  
School of Nursing,  
Private Bag X17,  
Bellville, 7535,  
South Africa.  
Tel: +27617378520  
E-mail: 3572024@myuwc.ac.za  
Date: 22/12/2015

The registrar,  
University of the Western Cape,  
South Africa.

Re: Permission to collect data

I hereby request for your permission to collect data for my thesis from nursing academics in this University. I am currently a registered Master's student with student number 3572024 in the Department of Nursing at University of the Western Cape. As part of the requirement to complete this program, I will be conducting a study titled "Use and acceptance of educational technology among academics at a University in the Western Cape".

I attach with this letter my research proposal and ethics approval letter from the senate research committee. Your assistance will be highly appreciated. A Copy of this permission has been forwarded to the head of the school of Nursing in this institution.

Sincerely,



OLOGUN O.R



## Appendix D

### Permission letter to the Head of School

University of the Western Cape,  
Faculty of Community and Health  
Sciences,  
School of Nursing,  
Private Bag X17,  
Bellville, 7535,  
South Africa.  
Tel: +27617378520  
E-mail: 3572024@myuwc.ac.za  
Date: 22/12/2015

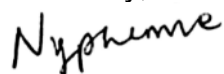
Head of Department,  
School of Nursing,  
University of the Western Cape,  
South Africa.

Re: Permission to collect data

I hereby request for your permission to collect data for my thesis from nursing academics in this University. I am currently a registered Master's student with student number 3572024 in the Department of Nursing at University of the Western Cape. As part of the requirement to complete this program, I will be conducting a study titled "Use and acceptance of educational technology among academics at a University in the Western Cape".

I attach with this letter my research proposal and ethics approval letter from the senate research committee. Your assistance will be highly appreciated. A Copy of this permission has been forwarded to the registrar of the institution.

Sincerely,



OLOGUN O.R

## Appendix E

### Approval letter from Head of School



## UNIVERSITY OF THE WESTERN CAPE SCHOOL OF NURSING

Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-9592274, Fax: 27 21-9592271*

E-mail: kjooste@uwc.ac.za

### PERMISSION LETTER

4 January 2016

**Student Oluwanifesimi**

**Title of Research Project related to Educational technologies**

You are granted permission to conduct your study at the School of Nursing.

You have to arrange the data collection with the appropriate level coordinator(s) for a convenient time. During this phase you have to adhere to the ethical principles outlined in your study.

I wish you success with your studies.



Prof K Jooste

Director

School of Nursing

## Appendix F

### Information sheet



## UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2271, Fax: 27 21-959 2274

E-mail: 3572024@myuwc.ac.za

AUGUST 2015

### INFORMATION SHEET

**Project Title: *USE AND ACCEPTANCE OF EDUCATIONAL TECHNOLOGIES BY ACADEMICS IN A SCHOOL OF NURSING IN THE WESTERN CAPE.***

#### **What is this study about?**

This is a research project being conducted by OLOGUN RITA. O with student number: 3572024 at the University of the Western Cape. We are inviting you to participate in this research project because you are one of the academics (lecturer) of this particular institution. The purpose of this research project is to examining the actual use and the factors contributing to the use of the educational technologies. This will assist to predict the use of this technology and serve as a tool to understand the factors that influence usage behaviour of academics.

#### **What will I be asked to do if I agree to participate?**

If you agree to participate in the study, you will be asked to complete the handed out questionnaire that will take 30minutes to complete at your own time in the office or at home and have it returned in a closed envelope that will be provided. Then the researcher will save the submitted survey under lock and key for five years after the result have been published. Only the researcher and the supervisor will have access to the data collected.

#### **Would my participation in this study be kept confidential?**

To ensure your confidentiality, all the personal information and responses in the questionnaire will be kept confidential in a secured place for five years after the result of the research have been published. The Questionnaire and other data collected will remain anonymously numbered to prevent linking the responses with your personal identification in order to maintain confidentiality; the researcher will not mention your names or the institution in the publication of the research findings. Identification codes will be used only on data forms and password protected computer files will be used.

#### **What are the risks of this research?**

There may be some risks from participating in this research study. All human interactions and talking about self or others carry some amount of risks. We will nevertheless minimise such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

**What are the benefits of this research?**

This research is not designed to help you personally, but the results may help the investigator learn more about the use and acceptance of this technology so as to help the institution in proper development of e- learning and to assist individual who are less inclined to using this technology.

**Do I have to be in this research and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

**What if I have questions?**

This research is being conducted by OLOGUN RITA. O from the school of Nursing at the University of the Western Cape. If you have any questions about the research study itself, please contact OLOGUN RITA. O at: School of Nursing, University of the Western Cape.

Phone number: 0617378520,

E-mail: [3572024@myuwc.ac.za](mailto:3572024@myuwc.ac.za) and the supervisor: Prof. Jennifer Chipps

University of the Western Cape

[jchipps@uwc.ac.za](mailto:jchipps@uwc.ac.za)

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Prof. Karien Jooste  
Head of Department  
University of the Western Cape  
Private Bag X17  
Bellville 7535  
[Kjooste@uwc.ac.za](mailto:Kjooste@uwc.ac.za)

Prof José Frantz  
Dean of the Faculty of Community and Health Sciences  
University of the Western Cape  
Private Bag X17  
Bellville 7535  
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This research has been approved by the University of the Western Cape's Senate Research Committee. (REFERENCE NUMBER: *to be inserted on receipt thereof from SR*)

## Appendix G

### Consent form



## UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-959 2271, Fax: 27 21-959 2274*

E-mail: 3572024@myuwc.ac.za

### CONSENT FORM

**Title of Research Project:** Use and acceptance of educational technologies by academics in a school of nursing in the Western Cape.

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

**Participant's name:**

**Participant's signature**.....

**Date:** .....

## Appendix H

### Sample questionnaire

#### EDUCATIONAL TECHNOLOGY ACCEPTANCE SURVEY

##### SECTION A: BACKGROUND OF YOUR EDUCATIONAL TECHNOLOGY USAGE

**Educational technologies** refers to the use of various technologies to deliver the education, such as the web, smartphones, ikamva, search engines, social media, databases, reference managers etc. The aim of this study is to investigate the use and acceptance of educational technologies by academics in a nursing school in the Western Cape, South Africa.

Please answer TICK only one answer for the following questions.

A1. How long have you been using the technology in education (years)? .....

A2. Academic position

a	Clinical supervisor	b	Lecturer	c	Senior lecturer	d	Associate Professor	e	Professor
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A3. Educational level

A	Bachelor Degree	b	Master Degree	c	Doctoral Level	d	Other (please specify)..... .....
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A4. Gender                    [a] Male                    [ b ] Female

A5. Age                        [a] 20-29 years            [ b ] 30-39years [c] 40-49 years [d ]50 years up

A6. At present, overall how often do you use educational Technologies in education? (Please Tick only one answer)

1	Don't use at all	2	Use about once each month	3	Use a few times a month
4	Use about once each week	5	Use a few times a week	6	Use five to six times a week
7	Use about once a day	8	Use several times a day		

A7. What is your self-assessment about using these educational Technologies? (Please tick only one answer)

1	Low experience	2	Moderate experience	3	High experience
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A8. Currently, do you think that you use the educational Technologies enough or not enough or too much? (Please tick only one answer)

1	Not enough	2	Enough	3	Too much
---	------------	---	--------	---	----------

A9. What Internet access method do you use at your home in doing your work? (Please check tick only one option)

a	Broadband	b	3G/4G mobile	c	Wireless	d	Other (please specify).....
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##### SECTION B: ABOUT YOURSELF (Please check tick only one answer)

**B1. In general, please rate to the extent to which you agree with each statement below regarding your habit of reading and writing/typing. (Please check only one option for each statement below)**

1= Strongly Disagree    2 = Quite Disagree    3 = Slightly Disagree 4=Neutral    5=Slightly Agree    6= Quite Agree    7=Strongly Agree							
1. I like reading.	1	2	3	4	5	6	7
2. I like writing/typing.	1	2	3	4	5	6	7
3. I can complete any task using educational technologies if I have a lot of time	1	2	3	4	5	6	7
4. I can complete any task using educational technologies if I can call for help	1	2	3	4	5	6	7

**B2. Since the main language of educational technology is English and South Africa is a multi-lingual country; please rate to what extent you agree with each statement below regarding whether our multi-language is an obstacle for you in using educational technology.**

**(Please check  only one option for each statement below)**

1=Strongly Disagree 2= Quite Disagree 3= Slightly Disagree 4=Neutral 5=Slightly Agree 6= Quite Agree 7=Strongly Agree							
1. It is not an obstacle for me in using the educational technology when I search information from English Language Websites.	1	2	3	4	5	6	7
2., It is not an obstacle for me in using this technology when I read information from English Language Databases e.g. e-Journals, PubMed, Ebscohost.	1	2	3	4	5	6	7
3. It is not an obstacle for me in using this technology when I read and respond emails in English Language.	1	2	3	4	5	6	7

**B3. A number of educational Technologies are available for use in your academic position? Please indicate how frequently you use the following technologies**

1=Do not use at all 3=Use a few times a month 5=Use a few times a week 7=Use about once a day	2=Use about once each month 4=Use about once each week 6=Use five to six times a week 8=Use several times a day								
1. Laptop		1	2	3	4	5	6	7	8
2. Desktop		1	2	3	4	5	6	7	8
3. Smart Phone		1	2	3	4	5	6	7	8
4. Tablet		1	2	3	4	5	6	7	8

**B4. Please indicate how frequently you use the following applications**

1=Do not use at all 3=Use a few times a month 5=Use few times a week 7=Use about once a day	2=Use about once each month 4=Use about once each week 6=Use five to six times a week 8=Use several times a day								
1. Email		1	2	3	4	5	6	7	8
2. Google scholar or other Internet sites		1	2	3	4	5	6	7	8
3. Electronic Databases (PUBMED, CINAHL, EBSCOHOST etc.)		1	2	3	4	5	6	7	8
4. Reference managers (REFWORK, MENDELEY, ENDNOTE)		1	2	3	4	5	6	7	8
5. Facebook		1	2	3	4	5	6	7	8
6. Twitter		1	2	3	4	5	6	7	8
7. WhatsApp or BBM or Messenger		1	2	3	4	5	6	7	8
8. LinkedIn		1	2	3	4	5	6	7	8
9. Academic sites (Research Gate, Academia)		1	2	3	4	5	6	7	8
10. UWC ELearning Sites (iKamva)		1	2	3	4	5	6	7	8
11. Skype or Hangouts		1	2	3	4	5	6	7	8
12. Video and Podcasts		1	2	3	4	5	6	7	8
13. Blogs & Blogging		1	2	3	4	5	6	7	8
14. Collaboration and Brainstorming tools (Google Docs, Mindmap etc)		1	2	3	4	5	6	7	8
15. Wikis		1	2	3	4	5	6	7	8
16. Virtual world (Second life etc)		1	2	3	4	5	6	7	8
17. RSS feeds		1	2	3	4	5	6	7	8
18. E Portfolios		1	2	3	4	5	6	7	8

**SECTION C: PERCEIVED USEFULNESS AND PERCEIVED EASE OF USE TOWARD EDUCATIONAL TECHNOLOGIES**

Please rate the extent to which you agree with each statement below.  
(Please check ✓ the most appropriate option for each statement below)

1= Strongly Disagree 2= Quite Disagree 3=Slightly Disagree 4=Neutral 5=Slightly Agree 6=Quite Agree 7= Strongly Agree							
<b>C. PERCEIVED USEFULNESS about educational technology.</b>							
1. Using educational Technologies enables me to accomplish tasks more quickly.	1	2	3	4	5	6	7
2. Using educational Technologies enhances the quality of my work.	1	2	3	4	5	6	7
3. Using educational Technologies makes it easier to do my work than manually.	1	2	3	4	5	6	7
4. I find the educational Technologies useful in my work.	1	2	3	4	5	6	7
5. I find a smart phone useful to do my work	1	2	3	4	5	6	7
6. I find tablets or ipads useful to do my work	1	2	3	4	5	6	7
7. I find UWC ELearning Sites (iKamva) useful to do my work	1	2	3	4	5	6	7
8. I find search engines useful to do my work	1	2	3	4	5	6	7
9. I find social media (Facebook) useful to do my work	1	2	3	4	5	6	7
10. I find collaborating tools (Google Drive etc) useful to do my work	1	2	3	4	5	6	7
<b>C2. PERCEIVED EASES OF USE about using educational Technologies for educational purpose.</b>							
1. Learning to use the educational Technologies is easy for me.	1	2	3	4	5	6	7
2. I find it easy to use the educational Technologies to do what I want to do.	1	2	3	4	5	6	7
3. I find it easy for me to become skillful in using the Internet.	1	2	3	4	5	6	7
4. I find the educational Technologies easy to use.	1	2	3	4	5	6	7
5. I find a smartphone easy to use	1	2	3	4	5	6	7
6. I find a tablet or Ipad easy to use	1	2	3	4	5	6	7
7. I find UWC ELearning Sites (iKamva) easy to use	1	2	3	4	5	6	7
8. I find search engines easy to use	1	2	3	4	5	6	7
9. I find social media (Facebook etc.) easy to use	1	2	3	4	5	6	7
10. I find collaborating tools (Google Drive etc) easy to use	1	2	3	4	5	6	7

**SECTION D: FACILITATING CONDITIONS AND SELF-EFFICACY TOWARD EDUCATIONAL TECHNOLOGY USAGE. Please rate the extent to which you agree with each statement below. Please check ✓ only one option for each statement below**

1=Strongly Disagree 2=Quite Disagree 3=Slightly Disagree 4= Neutral 5=Slightly Agree 6= Quite Agree 7=Strongly Agree							
<b>D1. FACILITATING CONDITIONS within your University about using educational Technologies.</b>							
1. The resources necessary (e.g. computer hardware and software, Communication network etc.) are available for me to use the technology effectively.	1	2	3	4	5	6	7
2. I can access the Internet very quickly within my University.	1	2	3	4	5	6	7
3. Guidance is available to me to use educational Technologies effectively.	1	2	3	4	5	6	7
4. A specific person (or group) is available for assistance with the educational technologies when difficulties are experienced.	1	2	3	4	5	6	7
5. Information technologies such as laptops and tablets are available to facilitate educational technology use	1	2	3	4	5	6	7
<b>D2. PERCEIVED ABILITIES (SELF-EFFICACIES) about using educational Technologies</b>							
1. I feel comfortable when I use educational Technologies on my own.	1	2	3	4	5	6	7
2. I can complete educational task by using educational Technologies if I have a lot of time.	1	2	3	4	5	6	7
3. I can use smart technologies such as smart phones or tablet on my own for educational purposes.	1	2	3	4	5	6	7



**SECTION E: CURRENT EDUCATIONAL TECHNOLOGY USAGE IN YOUR WORK**

1=Strongly Disagree    2= Quite Disagree    3=Slightly Disagree 4=Neutral    5= Slightly Agree    6=Quite Agree    7=Strongly Agree							
<b>E1. CURRENT EDUCATIONAL TECHNOLOGY USAGE in teaching and teaching-related tasks.</b>							
1. I use educational technologies when preparing for classes.	1	2	3	4	5	6	7
2. I use educational technologies when facilitating/teaching in classes.							
3. I use the UWC e-learning site IKamva for facilitating teaching (e.g. on-Line syllabus, lectures, notes, tutorials, tests, quizzes, and providing grade etc.)	1	2	3	4	5	6	7
4. I use educational technologies for preparing teaching materials.	1	2	3	4	5	6	7
5. I use educational technologies for enhancing my knowledge on current evidence of nursing.	1	2	3	4	5	6	7
6. I use educational technologies (Email, chat rooms, Skype) for student contact and supervision	1	2	3	4	5	6	7
<b>E2. CURRENT EDUCATIONAL TECHNOLOGIES USAGE IN OTHER WORK.</b>							
1. I use educational technologies for searching information for my research.	1	2	3	4	5	6	7
2. I use educational technologies to assist administrative tasks (e.g. searching information to assist administrative tasks, email to help accomplishing administrative tasks.)	1	2	3	4	5	6	7
3. I use educational technologies for enhancing personal knowledge on current evidences in my field.	1	2	3	4	5	6	7

**SECTION F: HOW TO MAKE FULL USE OF THE EDUCATIONAL TECHNOLOGY IN WORK**

Please rate the extent to which you agree with each statement below. (Please check  only one answer for each statement)

1=Strongly Disagree    2=Quite Disagree    3=Slightly Disagree 4=Neutral    5=Slightly Agree    6=Quite Agree    7= Strongly Agree							
F1. I intend to use educational technology more in all type of my work (e.g. teaching, teaching related-tasks, research, administrative tasks, etc.) in the future.	1	2	3	4	5	6	7
<b>F2. Motivations to make full use of the educational technologies in your work.</b>							
1. If technicians are available in helping me as an academic when I have difficulties; it would motivate me to make full use of the Educational technologies in my work.	1	2	3	4	5	6	7
2. If updated educational technology trainings are available when necessary for academics; it would Motivate me to make full use of the technology in my work	1	2	3	4	5	6	7
3. If good facilities (e.g. good computer hardware and software, good communication Network etc.) are available to support educational technology usage, it would motivate me to make full use of the Educational Technologies in my work.	1	2	3	4	5	6	7
4. My strong intention for student contact will motivate me to make full use of Educational technology in my work.	1	2	3	4	5	6	7

Any other comments

.....

Thank you for your time and corporation.

If you have any inquiry regarding this questionnaire survey, please contact

jchipp@uwc.ac.za and 3572024@myuwc.ac.za

**Appendix I**

**ENGLISH LANGUAGE GRAMMAR EDIT**

**This is to certify that the attached titled**

**THE USE AND ACCEPTANCE OF EDUCATIONAL  
TECHNOLOGIES BY ACADEMICS IN A SCHOOL OF NURSING  
IN THE WESTERN CAPE, SOUTH AFRICA**

**prepared and submitted by**

**OLOGUN RITA OLUWANIFESIMI  
Student Number: 3572024**

**has gone through an English language grammar edit  
carried out by Duncan Harford.**

12/01/2017

**DATE**



**SIGNATURE**