

https://dspace.org/

Experience, perceptions, attitude and intention to use information and communication technology (ICT) by first year students: the case of a South African University

Malgas, Antoinette Nolwandle

2019

https://hdl.handle.net/10539/29317

Malgas, Antoinette Nolwandle, (2019) Experience, perceptions, attitude and intention to use Information and Communication Technology (ICT) by first year students :the case of a South African University, University of the Witwatersrand, https://hdl.handle.net/10539/29317

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

Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) by First Year Students: The Case of a South African University

A research submitted in fulfilment of the requirements of the degree of

Master of Education

THE UNIVERSITY OF THE WITWATERSRAND
WITS SCHOOL OF EDUCATION

by

Antoinette Nolwandle Malgas

Supervisor: Dr Reuben Dlamini

10 July 2019

Declaration

I declare that this is my own unaided work. It is submitted for the Master of Education (Med) at the University of The Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

Signed A. N. MALGAS Date: 10 July 2019

Antoinette N Malgas: Student No. 0318127x

Acknowledgements

Dr Reuben Dlamini has been a tremendous support. Thank you, Reuben for being hard but not giving up on me. You cannot imagine how much strength your support and belief has given me when I was ready to give up. I am incredibly fortunate to have someone like you in my life. I couldn't have done with without you!

Thank you to my family who believe in me without wavering.

Thank you to all my colleagues who made time to help me amid their very busy schedule, gave input, guided and encouraged me to go forward. You are the best!!!

Rafiki my friend

I just wanted to write to let you know how much I appreciate the positive influence you've had on my life. Few people have the privilege of having such a supportive and giving friend and I am beyond lucky to have you in my life. Thank you for being there for me and nudging me as well as inspiring me during this journey when I needed words of encouragement. I am eternally grateful.

Table of Contents

Contents

Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) by First Year Students: The Case of a South African University 0

Declaration 1

Acknowledgements 2

Table of Contents 3

Abbreviations 5

Abstract 6

Chapter 1. Introduction 7

1.1 Problem Statement 9

1.2 Significance of the Study 11

1.2.1 Aim of the Study 13

1.2.1.1 Objectives of the Study 13

1.3 Research Questions 15

Chapter 2: Literature Review 16

2.1 Introduction 16

2.2 Technology Distribution in the South African Schools 18

2.2.1 The types of schools or categories of schools in SA and the role of government using quintiles 21

2.2 Demand for Technology Enhanced Pedagogies 25

2.3 Digital Millennial and Digital Native Learners 27

2.4 Theoretical Framework 34

Chapter 3. Research Methodology 40

3.1 Research Design 40

3.1.1 Research Methodological Approach 41

3.2 Research Participants 44

3.3 Sampling 44

3.4 Data Collection 44

3.5 Trustworthiness and reliability of the data 49

3.6 Ethical Consideration 50

Chapter 4. Data Presentation and Analysis 51

4.1 Introduction 51

4.1.1 Students demographics 51

4.1.2 Students' experience of using digital tools before university 54

4.1.3 Students confidence in the use of technology 59
4.2 Students perceived competency in the use of technology 60
4.3. Perceived ease of use 65
4.4 Perceived usefulness 70
4.5. Students attitudes and self-efficacy towards using digital tools 74
4.6. Perceptions on the university system characteristics and facilitating conditions 77
Chapter 5. Discussion of Findings 80
Research Question 1 83
Research Question 2 87
Research Question 3 88
Conclusions 89
Limitations of the study 91
Recommendations 91
Future Research 91
References 92
APPENDICES 104
Appendix A: Consent Forms 104
School Consent Form 106
Ethical Clearance 108
Appendix B: Instruments 109

Abbreviations

ICT – Information and Communication Technology

HE – Higher Education

FYE – First Year Experience

O-Week – Orientation week

LMS – Learning Management System

PBL – Proficiency Based Learning

PC – Personal Computers

EC- Eastern Cape

KZN – KwaZulu Natal

LP - Limpopo

Abstract

It is increasingly becoming important for students to have a good command of technology for them to succeed at higher institutions of learning (Calderhead, 2011; Brown & Czerniewicz, 2010). However, there are still inequalities that exist in democratic South Africa. This may challenge the academic performance of students from various backgrounds who come to the university with a lower level of Information and Communication Technology (ICT) skills. This study investigated the first-year university students' perceptions and experience, attitude and intention to use Information and Communication Technology (ICT) to access learning at the University. Nine Thousand One Hundred and Ninety-Five (9195) first year university students were involved in the study. The researcher used a quantitative method research design, followed by qualitative findings which were used to complement the quantitative results. Even though most first-year students had a positive attitude towards the use of technology at the university, the majority of students did not feel self-efficacious in the use of personal computers (PC) and online tools. Therefore, as means to get a better understanding of each student's skill set, an ICT competency test was administered. Students who did not pass this competency test were required to attend digital literacy training. Many students lacked the confidence to even attempt the test and opted to sign up for computer literacy training. About 70 % of the students who participated in the test before training scored below the set score of 80%. The researcher and team, then provided them with Digital Skills for Students training including skill sets for the university's Learning Management System (LMS). After we trained the students, we again administered the post-test to observe if there were any changes. The post-test showed a significant average increase of 30 % in students' ICT competency skills. It, therefore, became clear that inasmuch as today's first-year university students are known as digital natives, they still require the training on digital tools for them to succeed at the university. The results also indicate that these students gained positive attitudes after acquiring digital skills for learning,

altering their perceptions of technological knowledge. The usefulness of these digital tools, as well as ease of access, are significant predictors of student's acceptance and intention to use ICT for learning.

Chapter 1. Introduction

This study addresses students from high schools entering ~~the~~ university, and other forms of Higher Education (HE) institutions, for the first time. First year students need support at the critical time of their first year because the transition from high school to university can be very difficult (Tinto, 2012). A first-year student in a new and diverse higher learning environment is confronted with many unfamiliar technical activities such as learning to use computer laboratories, libraries, accessing study materials, submitting assessments online, tight submission deadlines, etc. This may become a struggle for first years who are living away from the support of their family, friends and teachers for the first time. This is accompanied with dealing with masses of unstructured time, new ways of accessing the course information, and the learning of tools to access this information (Kennedy, Judd, Churchward & Gray, 2008). Many HE institutions, including registration, currently require students to go the online route, which means it is necessary for students to possess ICT competencies (Mdlongwa, 2012, p. 5). For instance, at the university where this study took place, students are encouraged to use online systems and on the same platform are required to fill in the online bibliography forms. For students to perform such tasks they have to possess some basic level of ICT skills.

ICT offers greater opportunities to access learning, a chance to redress inequalities and perhaps improve the quality of learning for new university entrants (Isaacs, 2007; Kreutzer, 2009; Donner & Gitau, 2009). Many of the current generation of students

entering the university are techno-savvy with social and communications technologies (Sadaf & Newby, 2012). Access to the Internet and digital technologies has already exerted a major influence on these students' ways of thinking, communicating and learning (Oblinger & Oblinger, 2005; Prensky, 2001). Therefore, to those first-year students who lack ICT skills it can be very daunting and may lead many students to high levels of anxiety, tampering with their academic performance (Levine & Donitsa-Schmidt, 1998; Simonson, Mauer, Toradi & Whitaker, 1987). Most schools in South Africa remain under-resourced, under-supplied, and over-crowded (Isaacs, 2007) which leads many students entering the university space with lack of basic ICT skills. Interestingly, "South Africa boasts of independent highly resourced schools with high rankings in a world-wide scale" (Isaacs, 2007, p. 4) however, the situation in this country shows differently. The fact that in one country exists two worlds of the poor and rich, indicates that inequalities still exist in the democratic South Africa. Every student that enters university needs digital skills to enhance learning performance, however current students entering the university are either marginally skilled or require upskilling to the very basics of ICT use. For instance, in 2019 the e-Learning division at the research site still gets from academics' queries like *I am coming across first year students who have very weak computer skills and are suffering a lot of stress because of it. I am not sure what training is available for them. If you could direct me to the right people that would be very helpful (*email to researcher, 2019*).* There is a pressing need to understand the technological experiences of first year university students to provide appropriate support in ICT skills. The aim of The First Year Experience (FYE) ICT Skills programme is to provide a bridging gap between high school and university by providing a support structure aimed at empowering and equipping first year university students with the necessary and essential skills to navigate successfully through university

1.1 Problem Statement

First-year students in a new diverse higher learning environment face various modes of learning which require fluency in the use of digital technologies (White, 2013). First-year students are expected to engage with technologies as part of their learning experiences. However, to assume that the current generation is technological savvy because they grew up in the era of rapid computer growth and access to the Internet is flawed. According to Kennedy, Judd, Churchward, Gray & Krause, (2008) "we cannot assume that being a member of the Net Generation is synonymous with knowing how to employ technology strategically to optimise learning experience in university settings" (p. 10). The widespread of the idea of net generation is erroneously interpreted to the point that first-year students are assumed to have had broadly universal ICT experience.

In the South African context, the gap in students' experiences with technology can be very wide due to the existing digital divide between schools (Coleman, 2001; Council, 2012; Mphidi, 2009; Czerniewicz & Brown, 2013; Dlamini & Na'Allah, 2015). The challenge of inequality especially in schools could be attributed to the historical past and social forces accompanied by uneven distribution of computing infrastructure and technological knowledge among teachers (Dlamini, 2018). Therefore, to assume that students' technology experience is homogenous is problematic, because in South Africa we are confronted with unprecedented unequal access to quality education, especially in under-resourced communities. The need for evidence-based understanding of students' technological knowledge is crucial especially in preparation for the contemporary classroom. Learners from well-resourced schools are likely to be computer literate at the expense of their counterparts in poor and disadvantaged schools. The World Economic Forum ranks South Africa the 37th out of 115 economies, yet most of South Africa' ICT infrastructure remains unevenly distributed and poorly linked throughout the country

(Dlamini and Na'Allah, 2015; Isaacs, 2007; Mdlongwa, 2012; Czerniewicz & Brown, 2013; Kreutzer, 2009; Kwet, 2019).

Provinces such as Eastern Cape and Limpopo are still struggling from poor ICT infrastructure than Northern Cape, Western Cape, Gauteng (DoE, 2006). The expectation for students to know how to use ICT to access, analyse, evaluate, integrate, present and communicate information; without the training in ICT skills is therefore frustrating to both academics and students. Many students enter the university without basic computer skills simply because they have not been exposed to computers at the school level, and this has implication in their performance at the university level. While studies have been conducted on the instructional use of technology in higher institutions of learning, first year university students' experience with technology is an area that still needs to be researched. Furthermore, it has been shown that those students using technology are rarely using it for educational purposes.

Once there is evidence on first-year students' technological knowledge, then research needs to be conducted in order to understand how they perceive and intend to use technology for educational purposes. This study was conducted in one of the public universities in South Africa to develop a deeper understanding of the so called 'digital native' students. Within this context, this work empirically documents first-year students ICT skills, their experiences at a university in South Africa and documents their perceptions and attitude towards ICT for academic purposes. Lastly, to understand their intention to use technology to support their studies.

As mentioned earlier, many students are moving and living away from the support of family, friends and teachers for the first time. Therefore, dealing with masses of

unstructured time, new ways of accessing information relevant to their studies and learning the tools needed to access this information may provide significant challenges (VenJohn,2008; Tinto 2012; Kennedy, Judd, Churchward, & Gray,2008). In the context of South Africa where there is uneven distribution of ICT and knowledge resources, the study determines whether the use of particular technologies everyday has any relevance with the intention to use ICT in their studies.

1.2 Significance of the Study

Academic staff are increasingly incorporating technology in day to day school and curriculum activities. Most courses now strive to incorporate information and communication technology into all aspects of the learning continuum. From 2014, in the university where the study took place all students were required to pass a computer competency test prior to attending lectures. Before 2014 it was only specific faculties like Science and Health Science that required students to have a proof of ICT skills. Other faculties had assumed students entering the university have some basic computer proficiency skills because of the Digital Natives' misconception; although they soon realised this assumption was far from reality in South Africa. There are scholars (Oblinger, 2003; Oblinger & Oblinger, 2005; Palfrey & Gasser, 2008) who claim that students born after 1982 are computer gurus, linking to notions of Digital Natives. In other context, researchers such as Kennedy, Judd, Churchward, & Gray (2008); Czerniewicz & Brown (2013) ; Czerniewicz & Brown (2005) ; Mphidi (2009) ; Calderhead (2011) argue that access to technology and usage of technological tools for educational purposes are not "one size fits all" – there are other sociocultural and economic factors at play. Also, the experience of students at the research site and their results showed otherwise because there are inequalities in our societies as mentioned by Obama (2013) that "Inequality is

the defining challenge of our time". Many students were still submitting hand written assignments and others were failing to use the learning management system to access learning resources and submit their assignments online.

It therefore became evident that all first-year students needed the training in ICT literacy. Therefore, the university's e-Learning Unit was mandated to start providing learning experiences that aimed to engage and address the needs of the first-year students entering university without ICT skills. It is in this context that this study started to ascertain the ICT skill level and students' perceptions that may lead to adoption of technology as well as their intention to use technology. Knowing students' intentions and understanding the factors that influence students' beliefs about digital literacy skills, can help academic administrators and managers to create mechanisms for attracting more students to adopt these technological learning tools (Park, 2009). This makes it necessary to conduct research to try and deal more intensively with learners' perception of, attitude towards, and intention to use digital tools for learning in higher education and beyond. The integrated theoretical framework of university students' digital tools acceptance and intention to use is based mainly on the technology acceptance model (TAM). The study tries to analyse the relationship of university students' intention to use digital tools for learning with selected constructs such as their attitude, perceived usefulness, perceived ease of use, self-efficacy of digital tools, experience and system accessibility. Hopefully this will help to develop general linear structural model of digital tools acceptance of university students that would provide the university or an educator/s with implications for better implementing digital skills. Competency-based learning (or competency-based education and training) is an approach to teaching and learning that is used in many fields and learning environments (Cheng, Wang, Yang, Kinshuk, & Peng, 2011). The findings of the study will help to improve the training of the FYE programme so that it addresses

direct technological needs of students without compromising the university's standard requirements. An understanding of students' technological experiences is vital in informing higher education policy and practice (Parsons, 2012). It is therefore possible that this study will have profound policy implications in areas of student access, equity, resource allocation and management. The teaching staff may also benefit from evidence about students' experiences with technology, particularly in knowing which technology students are likely to use for learning. Finally, the study will contribute to the myopic understanding of the concepts of digital natives and millennials especially in developing economies.

1.2.1 Aim of the Study

The aim of the study is to examine students' ICT competencies to overhaul established assumption that current students entering university are digital natives with uniform digital upbringing. Such generalization present Universities with risk of overlooking students complex mix of technological knowledge. Thus, an evidence-based understanding is vital in informing ICT teaching and learning curricula policies because this has an implication on the abilities for students to engage with technologies.

1.2.1.1 Objectives of the Study

Objectives of this study are to ascertain if the interventions applied to the first-year students using technological tools are effective. The emphasis is on the students' perceptions and their intentions to adopt technological tools for lifelong learning. Understanding why people accept or reject information and communication technology has proven to be one of the most important and challenging issues in information system research (Davis, Bagozzi, & Warshaw, 1989). Furthermore, research shows that that the variance of intent to use information technology could be explained by attitudes toward

computers that is generally, no matter how sophisticated and capable the technology may be, its effective implementation depends upon users having a positive attitude toward it (Huang & Liaw, 2005).

1.3 Research Questions

The study answered the main research question: What are the experiences, perceptions, attitude and intentions to Use Information and Communication Technology Tools by First Year University Students?

The main research question was divided into three sub-questions:

1. What are first-year students' perceptions of using digital tools?
2. What are first-year students' attitudes towards the intent of using digital tools in their academic activities?
3. Is there a relationship between first year students' intentions, experiences, attitudes and students' perceptions that leads to digital literacy skills and self-efficaciousness in the use of technology?

Chapter 2: Literature Review

2.1 Introduction

Many universities in South Africa currently look at ways to use digital tools to promote teaching and learning. In addition, academics, support staff, administrators and deliverers of e-learning need more understanding of how students perceive and react to elements of digital tools. This is along with coming up with ideas of how to most effectively apply digital tools usage to enhance teaching and learning (Park, 2009). Moreover, the knowledge of intentions of first year students and the understanding of factors that influence students' beliefs about using digital tools, can help academic administrators and managers to create mechanisms for attracting more students to adopt technology throughout their time at the university. It is thus necessary to conduct research that deals more intensively with students' perception of, attitude towards, and intention to use digital tools for university as well as post university (Park, 2009; Ertmer , 2005; Caruso & Kvavik, 2005; VenJohn, 2008; Ventakesh & Bala, 2008, Ertmer, et al., 2011). Therefore, this research seeks to understand the perceptions, acceptances and intentions to use Information and Communication Technology Tools by First Year University Students. It encompasses personal factors such as perceived usefulness, easiness, attitude, intention to use, and self-efficacy. Social factors such as subjective norm and students' previous experience with digital tools prior to university entrance are also included in the focus of this study.

Many researchers have reported that perceived usefulness and ease of use were the most significant factors affecting user intentions to use technology (Sadaf, Newby & Ertmer, 2012; Ertmer, et al, 2011). Some researchers found that generally no matter how sophisticated and capable the technology may be, its effective implementation depends upon users having a positive attitude toward it (Huang & Liaw, 2005) and found self-

efficacy to be a significant determinant of intentions and use. Other studies have reported that subjective norms (i.e. a person's behavior influenced by other people), and facilitating conditions (i.e., available resources and technology) affect the users' intentions to use computers (Park, 2009; Huang & Liaw, 2005). According to Technology Acceptance Model (TAM), the intention to use technology is the major factor that enables us to understand individual perceptions of acceptance and use of technology (Venkatesh & Bala, 2013; Venkatesh, Morris, Davis, & Davis, 2003). In the TAM model of Davis (1989, 1994) it is argued that the perceived usefulness is fundamental in determining the acceptance and use of new technology. However, these beliefs alone cannot fully explain the students' behaviors toward technology. Based on Park (2009) TAM2 is an extension of the original model to explain perceived usefulness and usage intentions including social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience. This study adopted TAM3 as the baseline model in addition to TAM.

Several studies have examined TAM as a model to explain how people adopt and use e-learning; and stated that there was a need to investigate TAM with web-based learning. The course website acceptance model was put forward and tested the relationships among perceived usefulness, perceived ease of use and intention to use with university students (Park, 2009, p. 152). The conclusion was that the model fit the collected data and that the usefulness and ease of use turned out to be good determinants of the acceptance. It could also be concluded that the use of a course website is an effective and efficient learning technology. Venkatesh, Morris, Davis, and Davis (2003) in TAM2 theorizes that "people use a mental representation for assessing the match between important work goals and the consequences of performing the act of using a system as a basis for forming judgments about the use-performance contingency (i.e., perceived

usefulness)". With regards to mental processes, a student's judgement of school tasks and their relevance (each student's perception regarding the degree to which digital tools usage is applicable to his/her success in the university learning path) undergoes a compatibility test. The understanding of the antecedents of the perceived ease of use was focused on and concluded that computer self-efficacy acts as a determinant of perceived ease of use. This is both before and after hands-on use (Park, 2009). Furthermore, the objective usability was found to be a determinant of ease of use only after direct experience with a system (Park, 2009, p. 152).

2.2 Technology Distribution in the South African Schools

Park (2009); Fry, Ketteridge and Marshall (2008); and Brenton (2009) argue that university students' participation and involvement in digital tools usage were important for successful e-learning systems. Therefore, students' acceptance behavior should be assessed, with the suggestion of using TAM as a solid theoretical model where its validity can extend to the multimedia and e-learning context.

One of the most significant factors that affect first year students experience is technological skills (VenJohn, 2008; Tinto, 2012). The lack of technological skills due to lack of access to computers prior to commencing their tertiary studies is a problem for most first year students (Thinyane, 2010). While more than 90% of secondary schools in the West have access to technology only 39,2% of schools in South Africa have at least one computer, and the remaining 60,8 % schools are without a computer for use (Isaacs, 2007; Thinyane, 2010). It is surprising that the minority of schools with access to computers do not use them for teaching and learning (Sedibe, 2011). This concurs with the Draft White Paper on e-Education (DoE, 2006) which states that less than 5% of schools in South Africa can afford internet connections and are integrating internet for

teaching and learning. This situation is alarming if learners are to be trained in the twenty first century skills, with technology at the periphery. Table 1 below indicates the distribution and use of computers in South Africa.

Table 1: (General Household Survey 2017 STATS SA)

Place Internets accessed	Geotype	Province (per cent)									
		WC	EC	NC	FS	KZN	NW	GP	MP	LP	RSA
At home	Metro	31,3	5,9	NA	12,8	11,7	NA	16,8	NA	NA	17,4
	Urban	14,5	5,3	8,6	5,1	7,4	6,5	14,0	5,8	6,8	8,4
	Rural	12,8	0,6	3,8	1,6	1,7	0,8	12,2	2,6	0,8	1,7
	Total	25,7	3,5	7,4	6,9	7,1	3,6	16,5	4,0	2,2	10,6
At work	Metro	22,3	22,4	NA	13,8	21,3	NA	28,4	NA	NA	25,3
	Urban	19,4	11,9	17,6	11,7	20,3	11,8	25,1	11,5	17,7	16,6
	Rural	9,8	2,0	6,9	1,0	4,7	5,3	13,6	5,8	2,5	4,1
	Total	20,7	11,3	14,7	10,9	15,0	8,5	27,8	8,3	6,1	16,9
Using mobile devices	Metro	69,0	68,7	NA	67,6	55,1	NA	65,9	NA	NA	65,0
	Urban	51,5	56,4	58,5	57,5	62,0	62,7	71,0	73,1	53,3	61,5
	Rural	22,9	32,7	49,7	44,2	39,0	45,0	49,2	52,7	33,5	39,6
	Total	61,5	50,5	56,1	58,6	50,9	53,7	66,4	61,6	38,2	56,9
At Internet Cafes or education al facilities	Metro	12,0	13,9	NA	6,2	11,3	NA	21,5	NA	NA	17,2
	Urban	17,7	10,9	5,3	10,7	7,4	4,5	13,5	4,2	7,0	9,2
	Rural	4,0	1,3	1,6	5,7	5,7	6,5	2,2	6,4	3,5	4,5
	Total	13,2	7,8	4,3	8,7	8,3	5,5	20,4	5,4	4,3	11,5

Table 1 above unveils a wide digital divide between provinces and access to the computers. There's a vast difference between provinces and access to technology within South Africa i.e. urban and rural access shows a huge divide. This will possibly create two groups of learners within one education system. There will be a group of learners who can be considered "digital millennials"; particularly learners from well-resourced schools, and another group of "digital immigrant" learners. Learners from Eastern Cape (EC), KwaZulu Natal (KZN), and Limpopo (LP) will be the most vulnerable as there is no significant permeation of technology in these provinces. Truly there is disconnect between the South African schools and other developing countries (Oblinger & Oblinger,

2005 ; Palfrey & Gasser, 2008 ; Prensky, 2001a ; Czerniewicz & Brown, 2013 ; Mphidi, 2009), where learners are considered digital natives and millennials, thus learners that are proficient in using digital tools.

How universities respond to the needs of students with disadvantaged backgrounds is therefore essential. Indeed, as Scott (2011) observed, the preparedness of our higher education system to deal effectively with South Africa's contemporary realities is critical for development as well as for individuals' life chances. Currently students are required to have complex and diversified skills to function in the knowledge economy. The lack of knowledge to access information and solve problems using technology can be disempowering and disadvantageous (Kreutzer, 2009). This can make it difficult for students to cope in the higher learning environment and beyond in the world of work. For instance, a student needs to learn where the university student portal is, for them to access communication messages from their lecturers. It is important for them to learn and know how to link university email to their own personal emails, so they can access and download all important communication and not be left behind. It is also important that they know word processing for them to type and submit their assignments.

The Department of Education (DoE, 2006) recognized the need to equip students with skills to succeed in the fast and changing world economy and pointed out that university graduates ought to not just show competence in computer applications but demonstrate critical and creative mastery of digital information communication tools. DoE also posited that ICTs in education have opened new learning opportunities and provided access to educational resources well beyond those traditionally available. Therefore, teachers at all educational levels in South Africa are called to integrate technology to provide learners

with best teaching and learning experiences. However, the general social inequalities continue to plague and frame higher education (Isaacs, 2007).

HE learning environments are motivated to provide effective, malleable, convenient and accessible learning experiences to address the needs of a new generation of students entering these HE institutions. The new generation of students is expected to use technology extensively and the demand to use technology in teaching and learning, (both in and out of the classroom) is increasing (Thomas, 2008). Therefore, the equal access to the technological infrastructure and skills becomes a necessary condition so that no student is left behind.

2.2.1 The types of schools or categories of schools in SA and the role of government using quintiles

South Africa offers different types of schools such as Government schools, Private schools, Montessori schools, Waldorf schools and Home schooling. The most popular that I will focus on are government and private schools. Government schools are those schools funded in part by the state. They are managed by the principal, teachers and the school governing body, which is elected by the parents of the school. Government schools teach according to the national curriculum as set out by the National Department of Education. Schooling starts at Grade 0 (Also known as Grade R, the reception year), however, compulsory schooling starts at Grade 1 and runs through to Grade 12 (matric). The educational approach is one of inclusive education and the curriculum (known as CAPS, the Curriculum and Assessment Policy Statement) aims to allow children to apply what they learn at school in a local context in ways that are meaningful to their own lives. Government schools in South Africa differ greatly in terms of class sizes, school facilities

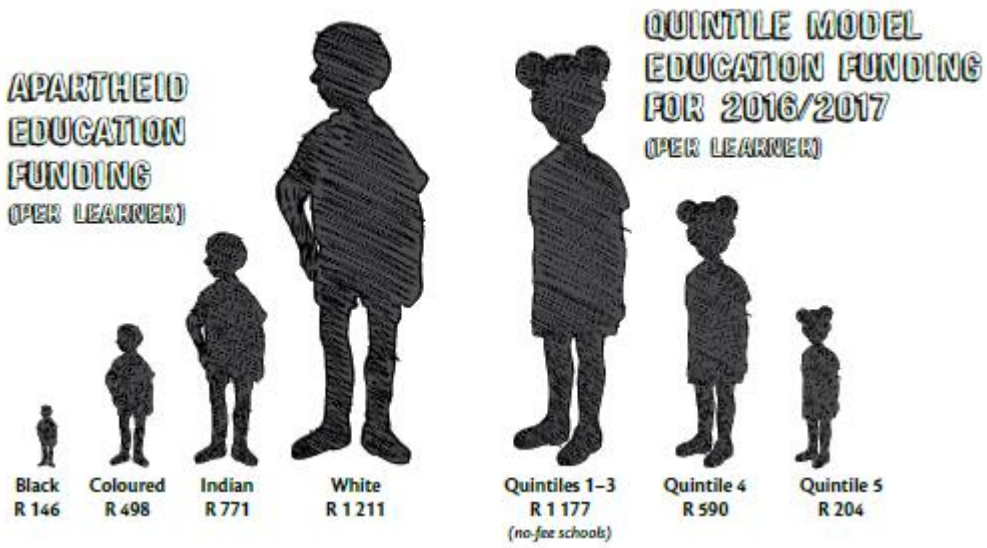
and the extramural activities offered. The average class size is roughly 30 learners to one teacher" (Pearson, 2018).

Private schools are founded and owned by specific individuals or organisations who seek to be independently and privately funded. Sometimes they seek to provide alternative approach to education in South Africa and include community schools, religious schools, international schools etc. and usually focus on small classes to give individual attention to their learners. Usually, because these schools are perceived and providing quality education, they are internationally recognised exams, so children coming from these schools are accepted worldwide for further education (Pearson, 2018).

All South African public ordinary schools are categorised into five groups, called quintiles, largely for purposes of the allocation of financial resources. Quintile one is the "poorest" quintile, while quintile five is the "least poor. According to Dass & Rinquest (2017) from the Department of Basic Education and Dlamini (2018), Schools in quintiles 1 to 3 are no-fee schools and are subsidized wholly by the government; and schools in quintiles 4 and 5 are fee-charging schools. Education researcher (Spaull, 2018) has referred to basic education in South Africa as a "two-tier" system pointing out that the first tier includes fee-charging public schools and high-fee private schools, which are well-resourced schools with high quality facilities, teachers and high exam pass rates. He further elaborates that in the second tier are no-fee public schools and low-fee private schools, which are under-resourced, with poor facilities, under-qualified teachers and low educational achievement. Spaull's research has found that learners attending fee-charging schools are two to four times more likely to qualify for university than learners attending no-fee schools. Moreover, Spaull (2018) argues that around 15% of the nation's learners find themselves in tier one, with the remaining 85% in tier two. Access to either

tier continues to be determined primarily by race and class, which is clearly incompatible with the constitutional obligation of substantive equality and redress for past racial discrimination (Spaull, 2018). Beow is a comparison diagram of the state's approach to school funding during and after apartheid.

Figure 1: A comparison of the state's approach to school funding during and after apartheid.



This diagram above shows that many of the problems that beset the South African education system today are a direct consequence of apartheid and its use of education as a tool of oppression (Dass & Rinquest, 2017; (Spaull, 2018)). The education system was segregated along racial lines, with the distribution of funding disproportionately weighted in favour of white learners, while black learners received the least funding of all race groups. This uneven distribution of school funding along racial lines meant that schools for black, coloured, and Indian learners had less money than those for white learners (Spaull, 2018). The quality of education was significantly poorer in black schools as is still the case in the Eastern Cape, Limpopo provinces (Strassburg, Meny-Gibert, & Russell, 2010; (Dass & Rinquest, 2017)).

Even after 24 years of South Africa's democracy, universities are still bombarded with the problem left by apartheid legacy as there are still no signs of improvement in several key indicators of inequality, including the racial distribution of hunger ((Devereux, 2018).
The former white schools integrated into the new, unified and non-segregated public schooling system giving rise to what was commonly referred to as 'Model C' schools. These schools were schools situated predominately in former white areas and seen as schools situated in more affluent and better resourced areas, but this Model C system has been done away with, and most of these schools are now quintile 5 schools and are able to charge school fees.

In this study, few of the participants came from model C schools and were adept in the use of technology. Majority of students, 7945 came from township schools and did not have any prior ICT skills except the use of cell phones. This is mainly due to lack of resources in their schools where they come from.

The literature on 'school attachment' or 'bonding' suggests that a positive relationship with one's school and one's school going peers plays a vital role in preventing drop-out. This relationship is influenced by factors such as educator support and peer relationships, school and classroom leadership and management, a sense of belonging, a sense of safety, extracurricular activities, and more. According to research socio-economic status is closely correlated with long periods of absence from school – in other words, that the proportion of children absent from school rises as their households' scores on the socio-economic index worsen, and vice versa (Strassburg, Meny-Gibert, & Russell, 2010, p. 25; (Dass & Rinquest, 2017).

2.2 Demand for Technology Enhanced Pedagogies

It is said that technology has radically transformed every sector of life including healthcare, construction, energy production, food production, military and retail. Therefore, since education is responsible for grooming the prospective employees of these sectors, it cannot be exempted. This is reiterated by employers who are currently looking for school leavers and graduates who are prepared to use technology in a scalable fashion to advance the industry's strategic and operational goals (Fry, Ketteridge & Marshall, Eds. - 2008). The lack of skills to use technology will in the future close doors for prestigious career opportunities and will prevent one from participating fully in the society (Fry, Ketteridge, & Marshall, Eds. 2008). Hence governments around the world are implementing eLearning programs to transform schools into ICT/technological environments. These ICT/technological environments will be an aid in which learners have access to technology, connectivity, localized digital content, and improved teaching methods. This effort from the government is accompanied by teachers' technological professional development programs and other considerations needed for success. These considerations include funding strategies, metrics/assessment and policy accompanied by the support of ICT vendors to make it happen (Thlabane, 2017). It is believed that teachers will use the technological tools to implement innovative pedagogies to meet the needs of their learners (Tinto, 2012).

Technology enhanced pedagogy established on technology equipped facilities is required to keep pace and hopefully ahead of the business sector. Technologies are seen as part of cognitive tools that learners interact and think within the construction of knowledge (Kim & Reeves, 2007; Saloman, Perkins, & Globerson, 1991; Jonassen, Carr, & Yueh, 1998). Oldfield and Herrington (2013) emphasise that "just as carpentry tools enable builders to extend their capabilities to create structures and objects that would be difficult

without them, learners can employ “cognitive tools’ to support their learning and assist in the creation of authentic products”, (p. 652). Furthermore, some writers (Potchefstroom Campus Library, 2013; Gosling, 2009; Ventakesh & Bala, 2008) anecdotally describe how impossible it would be to write without the support of the word processor as a cognitive tool.

Computers, smartphones, mobile tablets and the software applications are all examples of cognitive tools that are available to be used as a platform for knowledge creation in educational environments (Oldfield & Herrington, 2012; Ventakesh & Bala, 2008; Brenton, 2009; Jones, Ramanau, Cross, & Healing, 2010). However, Wilson (2000) warns that students do not learn directly from these tools. He adds that the role of technology in instruction is to engage learners more actively in the process of thinking and engaging with the information, which in turn facilitates the learning process. Computers can mediate cognitive processes by providing learners with the critical cognitive support to construct dynamic mental models, which in turn engage learners in deeper processing and better learning (Jonassen & Reeves, 1996). Technology helps learners to surpass the limitations of cognitive capabilities such as memory, thinking and problem-solving capabilities, and to transfer some of the low-level tasks such as calculations, storage and information retrieval to the computer (Gosling, 2009; Brenton, 2009; Ventakesh & Bala, 2008). All this support allows the learner to think more productively, and engage in important processes of articulation and reflection, which are the foundations of higher order thinking skills and knowledge construction. In the view of the above, it seems prudent for academic staff to implement technology-enriched pedagogies and to find ways of teaching their students to use technology effectively to enhance learning abilities. Rogers (2003) posits that meaningful use of technology requires learners to have three knowledge domains; awareness-knowledge or becoming aware that the technology

exists; how-to-knowledge or knowledge of how to use the technology and principles-knowledge or the underlying concepts of the technology, such as how the Internet works. Therefore, lecturers must ensure that students not only know how to use technology but also know theories for effective use of technology for learning so that the use of technology does not harm their intellectual abilities.

2.3 Digital Millennial and Digital Native Learners

The success of technology integration into classrooms is dependent on how end- users, including teachers and students accept and use digital tools (Gu, Zhu & Guo, 2013). The inability for end users to use technology can deprive users of the benefits of learning with technology. Furthermore these inabilities can create barriers and challenges to learning. The conditions where first year students were not supported in integration of digital tools for learning prior to university can be considered barriers. Providing proper support, services and tools for first year students as end users from the beginning of their univeristy course, would lead to a better understanding of the digital tools' benefits and dealing with the barriers and other factors earlier in their carrier educational journey.

Gu, Zhu, and Guo (2013); Oblinger (2003);Oblinger (2006); Oblinger, Oblinger, and Lippincott (2005) argue that current students are more knowledgeable in the use of technology than their teachers. This statement can easily put pressure on the students with inadequate computer skills especially new students to the university. Moreover, in the South African context, not every school has the resources to provide students with personal tablets or computers yet before attending the university (Brown & Czerniewicz, 2010; Corbel & Gruba, 2004; Kreutzer, 2009). Prensky (2001) uses the "digital natives" concept to describe students well versed with technology and "digital immigrants" to describe those who lack the skills or experience with technology. Today's students have

also been called the “Net Generation” and “new millennium learners” (Oblinger & Oblinger, 2005).

Millennial students (also referred to as Generation Y) are perceived as well versed in using digital tools such as mobile phones for playing games, social media, Instagram, Facebook, twitter and many more (Palfrey & Gasser, 2008; Gu, Zhu, & Guo, 2013). The engagement in the technology-rich culture is said to influence their learning (Bennet, Maton, & Kervin, 2008). Oblinger (2003); Palfrey and Gasser (2008) and Prensky (2001a, 2001b) argue that students born after 1982 display technology-influenced propensity, attitudes, beliefs and sensitivities. These authors further claim that “technology is assumed to be a natural part of these students as they use the internet for work, school and leisure. This comfort with technology often leads to a perception that the use of technology in schools is inadequate” (p. 38). Therefore, the views challenge academic learning environments to utilizes innovation in their delivery approaches.

Prensky in 2001 published a cohort of papers on a new generation of students called the ‘Digital Natives’. The basic emphasis of Prensky’s argument was that this new group of students coming into universities was fundamentally different from any that educators had seen before. He explained that Digital Natives had “spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age” (Prensky, 2001a, p. 1). Prensky maintained that the digital culture and environment in which the Natives had grown up had changed the way they think. He states that “it is now clear that as a result of this ubiquitous environment and the sheer volume of their interaction with it, today’s students think and process information fundamentally differently from their predecessors.” (p. 1). Moreover, Prensky made a bold claim suggesting that “it is very likely that our students’ brains have physically

changed – and are different from ours – because of how they grew up." (p. 1). These students have been raised in a digital environment that has shaped how they think, behave, and act. Therefore, the nature of technology usage in and out of schools and the acceptance of technology between digital natives and digital immigrants are presumably radically different (Gu, Zhu, & Guo, 2013). Many in-depth studies also found that the digital native is not necessarily an identifiable generation defined solely by age (Bennet, Maton , & Kervin, 2008; Brown & Czerniewicz, 2010) but they possess a diverse range of technology skills and preferences and their traits are situated and not shared across the entire generation (Brown & Czerniewicz, 2010; Gu, Zhu, & Guo, 2013).

Digital Natives are perceived as preferring to receive information quickly; adept at processing information rapidly; prefer multi-tasking and non-linear access to information; have a low tolerance for lectures; prefer active rather than passive learning and rely heavily on communications technologies to access information and to carry out social and professional interactions (Prensky 2001a, 2001b; Oblinger, 2003; Oblinger, Oblinger, Lippincott & Joan , 2005). Prensky (2001a) also expressed concern at an apparent lack of technological literacy among educators, labelling lecturers in higher education 'Digital Immigrants'; foreigners in the digital lands of the Net Generation and regarded the disparity between the Natives and the Immigrants as the "the biggest single problem facing education today".

This argument above has gained widespread attention in Higher Education circles. However, the premises underpinning these arguments requires closer examination before university educators set about overhauling established curricula and teaching and learning practices. These arguments are based on a general assumption that students coming into universities have had a relatively universal and uniform digital upbringing. It

is assumed that the technological experiences of students are more or less homogeneous and that most, if not all, incoming university students are Digital Natives. Not only is it assumed that these students will have had broadly universal experiences, but that they will also have a sophisticated knowledge and understanding of information and communication technologies (ICTs). These generalisations risk overlooking a more complex mix of technology-based skills, knowledge and preferences among the student population.

In my opinion, the use of technology does not always lead to reflective, critical readers and have no real focus and effect on academic learning. The way of writing a message using social media tool varies from academic writing of an assignment. The survey involving 4374 students across 13 institutions in the United States (Kvavik, Caruso & Morgan, 2004), found that the majority of respondents owned personal computers (93.4%) and mobile phones (82%), and they used them for word processing (99.5%), emailing (99.5%) and surfing the Net for pleasure (99.5%). Despite access to this technological cultural capital, Bennet, Maton and Kervin (2008) discovered that "only a minority of the students' digital natives were engaged in creating their own content and multimedia for the Web, and that a significant proportion of students had lower level skills than might be expected of digital natives". Thinyane (2010) discovered that in the South African context, about 98.1% first year university students had access to mobile phones but mostly used for calling, texting messages etc. and not necessarily for academic learning. Table 2 bellow indicates how South African learners use for technology compared to Australian learners.

Table 1: Use of Technology by South African and Australians learners (Thinyane, 2010).

Use a mobile phone ...	South Africa		Australia	
	Daily (%)	Not used (%)	Daily (%)	Not used (%)
To call people	84.7	5.2	76.2	3.4
To SMS	84.3	5.2	79.5	4.1
As an MP3 player	58.9	16.2	–	–
As a personal organiser	49.1	20.0	29.8	36.5
To take digital photos	47.5	6.0	32.2	30.1
To access web	44.2	17.7	8.1	67.8
To PCM	43.3	34.6	–	–
To send pictures	35.3	12.8	18.0	47.2
To email	26.0	43.0	7.4	75.8
To make video calls	17.0	56.1	–	–

Table 2 above shows that there is a proportion of students that are highly adept with technology and rely on it for a range of information gathering and communication activities but who are not using the same technology for academic purpose. Table 2 also reveals that there is a significant proportion of young people who do not have the levels of access or technology skills predicted by proponents of the digital native idea. The millennial generalisation seems to focus on the technically adept students which excludes or neglects those less interested and less able. In the South African context, the potential impact of socio-economic and cultural factors may be overlooked and there may be that there is as much variation within the digital native generation. Czerniewicz and Brown (2013) in their research state that "Research into South African students' digitally mediated learning and social practices revealed a subgroup termed "digital strangers," students lacking both experience and opportunities, who had barely used a computer and who did not have easy access to technology off campus".

The role that technology can play in learning is of particular importance when considering the idea of tools mediating human action (Brenton, 2009). It has to be noted that, though learners enter into intellectual partnerships with the tools, the role of technology as a cognitive tool is not meant to do the thinking for learners, but only to facilitate the thinking and learning processes (White, 2013). Computers will not directly teach content or thinking skills to students but after working in partnership with computers, the student will

internalise the way that computers think as a cognitive tool for their own use (Wegerif, 2007). Therefore, computers will not replace the teacher. Educators know which technologies students need to use and for what purposes. They select them for specific purposes in teaching and learning spaces (White, 2013). This means as much as students may be called millennials and digital natives, they still need to be taught and supported into using technology for academic learning purposes.

Digital skills and the implications of their use by students need to be learnt in a structured way to avoid difficulties for students and teachers. Students can make the most of opportunities to personalise their learning, if they have the necessary skills required in a networked world but these skills need to be learnt in a developmental and structured way (Brenton, 2009). The research, investigating the interaction between a student and a set learning task, led to the conclusion that students' approaches to the task (their intention) determined the extent to which they engaged with their subject and this affected the approaches to learning. "Learning is about how we perceive and understand the world, about making meaning and it is not a single thing; it may involve mastering abstract principles, understanding proofs, remembering factual information, acquiring methods, techniques and approaches, recognition, reasoning, debating ideas, or developing behaviour appropriate to specific situations; it is about change" (Fry, Ketteridge, & Marshall, Eds. 2008,p.8).

Because South Africa is such a diverse country with diverse cultures, universities in South Africa must cater for equal access to education for all students (Calderhead, 2011). Introducing technology and designing for eLearning purposes is not only the diversity among people which is of utmost importance, "it is also the diversity among available resources and technologies, subject area, methods of assessment, and capabilities of

both faculty and students to handle the technologies and their expectations from each other and from the course" (Bhattacharya & Hartnett, 2008, p. 45). Rather than a series of systems and tools, eLearning-learning is expressed here as something that happens when students learn with ICT. It may be used in distance learning courses or in campus-based courses (this latter is sometimes called 'blended' or 'mixed-mode' learning) and it is something a teacher enables students to do (Brenton, 2009). Sedibe (2011); Coleman (2001) argue that the university faces a dilemma because despite the increased ICT investment in society and education, there is also high diversity amongst learners and inequalities in the access to and use of ICT. Many university students still lack the ICT literacy needed for the completion of university tasks and assignments. All of our students deserve equal access to educational resources like academic and extracurricular programs, strong teaching, facilities, technology, and instructional materials, no matter their race, color, or national origin (Fry, Ketteridge, & Marshall, Eds.) 2008). This is also supported by the South African Constitution where it states that access to quality education is a basic right every citizen is entitled to.

Various institutions have already gravitated towards adopting blended learning as one of the approaches used for teaching and learning to offer several advantages to students, such as accessibility of information, universal connectivity, which enables the formation of communities of inquiry as well as innovative teaching and learning strategies (Van der Merwe, et al., 2015; Dlamini, 2018). However, students have their own perceptions regarding ICTs. The investigation by Czerniewicz and Brown (2013) in South African university showed a complex technological students' habitus, with a lack of access and limited practices in relation to computers. This gap that exists between the current millennium students and their peers is a fact that can be easily observed in the university. This very gap will be the focus of the current investigation, the purpose of which is to

guide the university to reconsider both the methodology and content appropriate when educating first year students with ICT integration, both in and outside of institutional settings.

2.4 Theoretical Framework

The study used the Adapted Technological Acceptance Model (TAM3) as a guiding theory to understand first year university students' perceptions, acceptance and intent to use technology for learning. This model has been used in many studies (Venkatesh & Bala, 2013; Davis, Bagozzi, & Warshaw, 1989; Davis, 1993; Ventakesh, Morris, Davis, & Davis, 2003) seeking to understand the users' perceptions and intentions to use technology. This study tries to provide evidence-based understanding about the extent and nature of the barriers to ICT usage from the perspective of technology acceptance, which can be defined as the users' intention and/or the actual usage of technology.

Ventakesh and Bala (2008) argue that the receptiveness of an individual to accepting and adopting technology can be divided into distinct categories, namely, the perceived ease of use (PEU) and the perceived usefulness (PU) of the technology. These categories are interrelated and they all can influence someone's attitude towards using technology distinctly. The PEU and the PU of technology are also influenced by other factors such as experience and the external factors which may have an effect self-efficacy. The argument is based on the expectation that experience will moderate the effect of perceived ease of use on behavioural intention such that the effect will be weaker with increasing experience. These constructs are explained below.

Perceptions of Usefulness

Perceived Usefulness (PU) is the degree to which a person believes that using a particular system would enhance his or her job performance (Venkatesh, Morris, Davis, & Davis, 2003). To this study, perceived usefulness (PU) is defined as the extent to which a student believes that attaining the computer skills and using the system will enhance his/her learning performance in academic studies. Users' acceptance of technology was predicted from their internal beliefs and attitudes on their usage, which was measured with perceived usefulness and perceived ease of use in the technology acceptance model (TAM) (Davis, 1989; Venkatesh et al., 2003). Usefulness is one of the most strong predictors of the actual use of technology in this study. According to Ventakesh & Bala (2008), PU is influenced by other factors, including "individual differences, system characteristics, social influence, and facilitating conditions" (p. 276).

Individual difference - includes personality and/or demographics (e.g., traits or states of individuals, gender, and age) that can influence individuals' perceptions of perceived usefulness and perceived ease of use. As this study seeks to understand first year student's technology usage in and prior to university, the construct of individual difference is necessary in the model. Based on the research and the interpretation of the individual level factors of technology usage from (Bandura,1997; Sam, Othman, & Nordin, 2005) the personal factors include computer self-efficacy and personal innovativeness with technology. Self-efficacy is defined as the belief in one's capability to perform a particular behaviour, it influences decisions about what behaviours to undertake, how much effort it entails, and what emotional responses would be produced (Park, 2009; Gu, Zhu, & Guo, 2013). It is widely recognized as one of the explanatory factors that influence end users'

IT usage (Donner & Gitau, 2009; Davis, Bagozzi, & Warshaw, 1989) and individual innovativeness pertains to the degree to which an individual is willing to try out any new information technology (Agarwal & Prasad, 1998). In Gu et. al. quoting Lewis et al., 2003; Thompson et al., 2006, computer self-efficacy and personal innovativeness have been empirically verified as the most proximate influence on an individual's cognitive interpretation of information technology, associated with positive technology use.

System characteristics - are those noticeable features of a system that can help individuals develop favourable (or unfavourable) perceptions regarding the usefulness or ease of use of a system.

Social influence - captures various social processes and mechanisms that guide individuals to formulate perceptions of various aspects of an IT. Only when the IT application meets the task requirements of users will it have a positive impact on their performance and the assumption of is that users accept technology due to its potential benefits, such as performance improvement, regardless of their attitude (Venkatesh & Bala, 2013; Park, 2009; Gu, Zhu, & Guo, 2013).

From the social psychology viewpoint, the dominant social factor is a kind of social norm defined as the "perceived social pressure to perform or not to perform a behaviour" (Ajzen, 1991). In Gu et.al. (2013) it is mentiomed that there has been empirical verification that the perceived social influence from referent others has a significant positive influence on individual beliefs about the usefulness of technology and that social influence positively and significantly affects ICT utilization. Venkatesh et al., (2003) extensions to the TAM also introduced social norm as an important construct related to beliefs about the usefulness of technology thus the construct of social factors is part of our research model to take consideration of both in and prior university ICT usage.

Facilitating conditions - represent organizational support that facilitates the use of an IT.

Perceived Ease of Use (PEU) is "the degree to which a person believes that using the system will be free of effort "(Ventakesh & Bala, 2008). Perceived ease of use (PEU) in this study implies the extent of ease associated with the use of the system based on face to face training offered by the FYE ICT skills programme. The study assumes that with increasing hands-on experience with the system students will be skilful to navigate the system with ease and thus developing a positive attitude towards the use of the system. Perceived ease of use is an initial hurdle for some individual students, however, once individuals get accustomed to the system and gain hands-on experience with the system, the effect of perceived ease of use on behavioural intention will recede into the background (Venkatesh & Bala, 2008). In addition, as students identify the likely benefits in a new technology, they will tend to use it, and as they share their experiences, others who find it intriguing, will go for it.

Ventakesh and Bala (2008) mention five determinants influencing ease of use. Three of these determinants which are relevant to this study are explained bellow.

- *Perception of External Control* - The degree to which an individual believes that organizational and technical resources exist to support the use of the system (Venkatesh et al., 2003).
- *Computer Anxiety* - The degree of "an individual's apprehension, or even fear, when she/he is faced with the possibility of using computers" (Venkatesh, 2000, p. 349).
- *Computer Self-Efficacy* - The degree to which an individual believes that he or she has the ability to perform a specific task/job using the computer.

Attitude refers to "an individual's positive or negative feelings (evaluative affect) about performing the target behaviour" (Venkatesh, Morris, Davis, & Davis, 2003). To my study

attitude is defined as *student's intent of acceptance/rejection in using digital tools to perform academic work*.

In line with TAM3 model this study presupposes that:

1. Perceived Ease of Use construct will help to understand from the students view how easy or difficult are the technological tools and skills covered by the FYE training program.

2. Perceived Usefulness will help to understand how useful students find the technological tools and skills they have been introduced to by the FYE program

3. Attitude/Acceptance construct will help to understand if students have developed positive attitudes toward the use of the technology after going through the FYE program.

4. Self-efficacy construct will help to determine how independently and self-efficaciously students feel after going through the FYE training program.

Figure 1 below is the diagrammatical representation of the original TAM3 Model from which our edited version derives

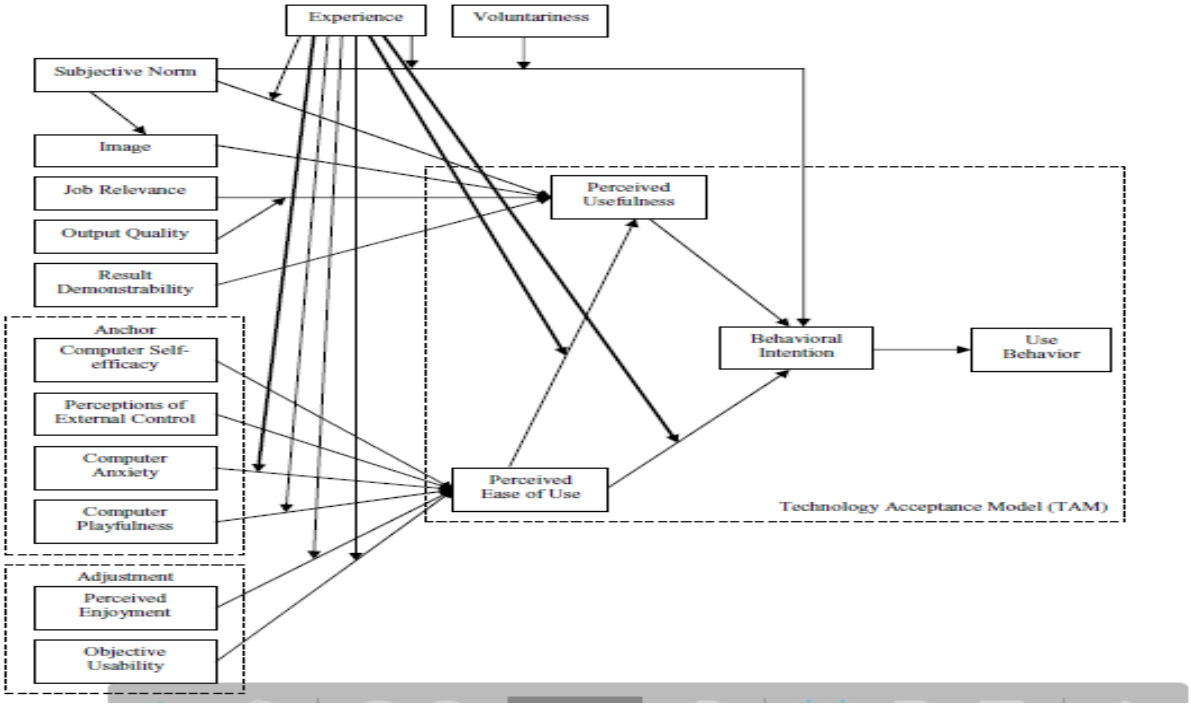


Figure 2: Venkatesh & Bala (2008) TAM3 Original Model

This study focuses on the 4 constructs namely: Experience, Perceptions, Attitude and Intention to use Information and Communication Technology (ICT). These constructs have determinants such as system characteristics, facilitating conditions (which are determinants of perceived usefulness and perceived ease of use); as well as attitudes and self -efficacy towards using digital tools. Below is the diagrammatical representation of the adapted TAM3 model for this study.

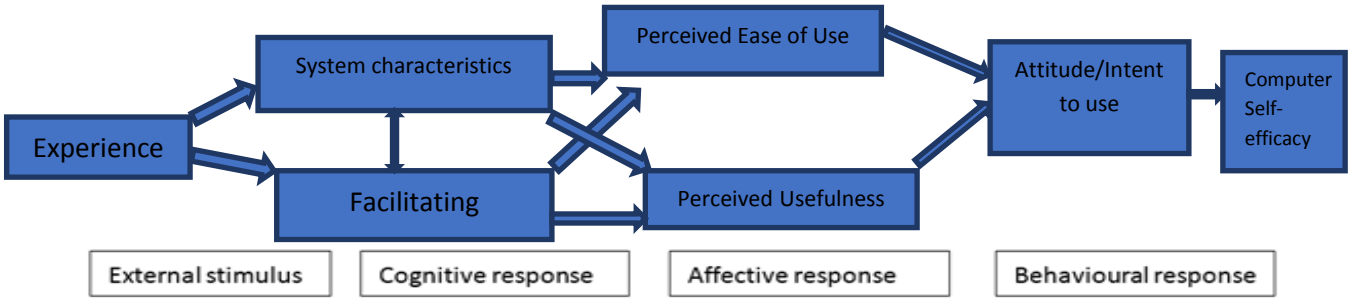


Figure 3: Adapted from Ventakesh & Bala, 2008

Chapter 3. Research Methodology

3.1 Research Design

The study is a case study of first year university students entering the University for the first time. Case study research design involves close examination of people, topics, issues, or program (de Marrais & Lapan, 2004). The study used both qualitative and quantitative approaches to ensure a rich data collection and deeper understanding and explanation of the experiences at stake (Muijs, 2010). The study also used Davis's (1989) User Technology Acceptance Model, a framework that has been used in many studies (Ventakesh & Bala, 2008; Davis, Bagozzi, & Warshaw, 1989; Davis, 1993) to predict the acceptance and use of new innovation. The case is studied because it uniquely uncovers new and unusual interactions, events, explanations, interpretations, cause and effects connections (de Marrais & Lapan, 2004; (MacMillan & Schumacher, 2010). In this regards this study focussed on the technological experience of students who are called digital natives and millennials, a generation which is said to be tech-savvy and different from generations that came before. The aim was to understand their experience with technology to design a training program that would meet their needs. The study was guided by three research questions:

1. What are first-year students' perceptions of using digital tools?
2. What are first-year students' attitudes towards the intent of using digital tools in their academic activities?
3. Is there a relationship between first year students' intentions, experiences, attitudes and students' perceptions that leads to digital literacy skills and self-efficaciousness in the use of technology?

3.1.1 Research Methodological Approach

To collect the data that answered the research questions above the study employed quantitative and qualitative data collection approaches. Both approaches were used to emphasise the reliability of the findings through data triangulation. Muijs (2010); Carr (1994) describe quantitative research as 'explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics).' The data collected in quantitative research are hard and numerical and the strength of producing the numbers as data is that this demonstrates an ordered system, an approach that can be viewed as being necessary in university settings (Carr, 1994). Qualitative data has been used to facilitate the assessment of the quantitative data and shed new light on qualitative findings (Johnson, Onwuegbuzie, & Turner, 2007).

In contrast, the soft data collected in qualitative research is used to identify and account for any different cases to provide an illuminating picture of the subject, with great attention often given to pointing out intricate details (Carr, 1994). Baxter and Jack (2008) explain qualitative research approach as a "methodology that provides tools for researchers to study complex phenomena within their contexts and when the approach is applied correctly, it becomes a valuable method for research to develop theory, evaluate programs, and develop interventions". The study took place in a university setting where first year students could be found during the orientation week in order to share their lived experiences with technology. Students were also visited in the computer laboratories during the training in technological skills in order to have deeper understanding of their experiences with technology.

The Study Setting The study took place in the university labs, with facilitators, students' ambassadors (tutors) helping with the training material, queries, support etc. Facilitators were responsible for training the tutors (student ambassadors) so they could train their fellow students. This process consisted of 4 facilitators and 150 ambassadors. Of these ambassadors, there was 1 group leader out of 25 groups and other members would support each session; taking turns to train. Proficiency-based learning (PBL) or proficiency-based education and training approach was used. This PBL approach focused on students' development and demonstration of desired learning outcomes. Students not only gain the skills, abilities and knowledge required in an area of study, but more importantly those necessary to be successful in the university, career and real life. Proficiency-based learning is designed to identify and address gaps in order to provide equitable learning opportunities for each and every student (Pace & Worthen, 2014). Clear expectations for learning were stated in this course. Proficiencies based on transferable skills and standards adopted by the university included explicit, measurable, learning targets aimed at empowering students. The learning outcomes were laid out to emphasize proficiencies that include application and creation of knowledge, along with the development of important skills and dispositions. Students' progress was measured and supported using meaningful assessments and a learning experience for students. Students were able to receive timely, differentiated support and feedback based on their individual learning needs and they also showed advancement upon demonstrating proficiency. Students' voice is critical to improving our offerings and their choices were embedded in the assessment options. Using students' ambassadors (tutors as train the trainer) and peer mentorship allowed for students to take ownership of their learning and assessment.

Technology can often bring shy learners out of their shells. So, instead of sharing out loud,

a quiet student can post a thought in an online discussion or a shared document, which both allows other students to get that person's input as well as slowly boosting the learner's confidence in his or her own ideas. In an unfamiliar territory like the university, computers can also make collaboration easier. Though it might seem mundane, students' social development means that communication between students and teachers can be difficult, and technology can ease that tension. Technology also has the power to close the learning gap in that it gives educators the option of further differentiating their teaching, allowing students to work at their own pace. If students are conducting online research, they have a wealth of resources to use, from the simplistic to the complicated. This course allowed for teachers to adjust requirements and recommendations based on students' abilities. This course and technological tools used gave facilitators opportunities to get tools with which to track student growth, meaning they can further personalize education. By having students submit work online or take formative assessments that provided instant responses, enabled facilitators to quickly adjust lessons to student needs. The use of LMS was well received by the students and the students were quick to encourage the lecturers to use this platform.

Cheng et al. (2011, p. 1318) articulates that e-learning design literature "suggests that learner control of learning and customization of learning experiences will meet learners' needs and preferences and improve learners' satisfaction and motivation [to continuing using such platforms]." Thus, using the various digital tools and these approaches in this course, learners were able to learn to construct or build new knowledge and identify learning needs deserving of attention. Cheng et al. (2011) asserted that lack of consideration for learners' perceptions and attitudes toward e-learning systems have led to unsuccessful design and implementation of such initiatives. These researchers based their research study on using the term "perceived individual learning support", which they showed had a significant effect on intention to use e-learning applications.

3.2 Research Participants

The study involved 9195 registered first year university students from 2014 to 2018. Of the 9195 students, 5980 were female and 3215 males. They all took part in the pre-assessment tests and also underwent training immediately after the orientation week. All the participants were enrolled in 5 faculties: Humanities, Engineering, Science faculty, Health Science faculty and from Commerce, Law and Management faculty.

3.3 Sampling

The study employed a purposive sampling strategy (McMillan & Schumacher, 2010) in order to select students transitioning from Matric to the university for the first time. Because all first-year students were required by the university to partake in the ICT training program prior to attending the first lecture, the eLearning division which coordinated the training program helped in identifying the participants that met the study criteria. It also assisted in inviting them to participate in the study. All these 9195 first year students were invited to participate (and participated in tests and training) responded positively to the invitation (i.e. filling the response forms).

3.4 Data Collection

The study employed multiple data collection tools including surveys, pre-test, observations and post-test to appreciate the complexity of the study and to ensure the reliability of the findings.

- **Surveys**

A survey is “a means of gathering information, usually through self-reported using questionnaires or interviews” (deMarrais & Lapan, 2004). Surveys are frequently used in quantitative studies but currently many social sciences disciplines are also using them to collect self-reports on participants’ attitudes and behaviours (deMarrais and Lapan, 2004).

Therefore, this study used survey questionnaires to collect the information on the experience with technology, perceptions, attitudes towards technology and intentions to use technology by first year university students. The questionnaire comprised four main sections: demographic information (6 questions), access to hardware and connectivity (4 questions with 17 items), experience with using technology-based tools (Computer: 6 questions Mobile phones: 5 items) and intentions to use technology-based tools in their academic work (35 items). Questions differed, some were Likert Scale Questions, some were open ended questions, some were Multiple choice questions and others were Rank Order Scaling Questions etc. Nine Thousand One Hundred and Ninety-Five (9195) copies that were handed were returned. The study also used online survey in addition to hard copy questionnaires, which were issued to students during the orientation week. Therefore, students had an option to complete the questionnaire and return it in immediately or to complete it online in their own time and space. However, all participants chose the questionnaire over the online survey.

- **Pre-Tests**

All the 9195 students were given options to take part in the pre-tests to ascertain their own skills proficiency. Whilst the 6635 took the test, 2560 upfront requested to be signed up for Digital Skills training. From the 6635, some of the students confessed that they had no prior skills but decided to attempt the test even though they also put down their names for training. The data from the survey indicated that students although called digital natives had diversified technological experiences. So, a pre-test was administered to ascertain the ICT competency levels of the participants. Students were asked to strictly consider the test as an informational mechanism designed to capture their skills level and in no way, would it affect their grades in the university. Some students were even afraid to touch the computer and opted to apply for the Digital Skills training program without

attempting to take the pre-test. They claimed they had no prior experience with personal computers. The test covered a variety of technologies including hardware and software, word processing, spreadsheet, presentation software and internet. The types of questions included multiple-choice questions, fill in the blanks, match cases, essays type questions etc. The pre-test results were anonymously shared with the eLearning Division and different faculties. This resulted in the faculties demanding the eLearning division to design an appropriate Digital Skills training program for students who may want to improve their ICT skills.

- **Observation**

Direct observation of participants is used in qualitative research to provide first-hand experience and to generate exploratory information by spending ample time with the participants in their natural setting (deMarrais & Lapan, 2004). This data collection method allows the researcher to record and document things participants might have omitted or were unwilling to share during interviews or through surveys (McMillan & Schumacher, 2010). Based on the faculties' request as it has been explained in the previous section, students were trained from as early as two weeks immediately after the orientation week. The training included but not limited to the use of Learning Management System (Sakai LMS), Virtual Training online course, MS Word, MS Excel, Accessing and experiencing university student's portal (Self-service options, Students' email; Password Reset and Turnitin software). Therefore 9195 students from 2014 till 2018 were observed for two weeks each year in the ICT training venues and followed by three weekends' sessions amounting to five weeks. There were five training venues, to which each venue had two research assistants assigned. There were two venues over the following training weekends, with 10 ambassadors on each venue and 2 research assistants. Using the observation

schedule, research assistants recorded how students used the technological tools, how they interacted with the content of the training, the tutors' assistance, indicators of being self-efficacious and anxiety symptoms. The research assistants stood behind them not to disrupt the training process. Learners who did not give the consent to be observed sat in unobserved rows in the training venues.

- **Training Evaluation forms**

At the end of each training session trainers gave students the evaluation forms designed to capture students' perceptions about the training program, the perceived usefulness of the program, the challenges encountered and students' intentions to use the skills learned for academic learning. Trainers shared this information with the research assistant and this helped to illuminate the data collected with other instruments.

- **Post Test**

A post-test was administered to 9195 students after the training to ascertain the improvement in ICT skills after students had received the training. Pre/Post-tests were used as assessment tools for measuring the preparedness and performance of first year students. The design covered all of the topics which a student will be required to know and understand in their studies in the university. Whilst students are expected to take the pre-test at the beginning of a semester, they are not expected to know the answers to all of the questions. However, students are expected to utilize previous knowledge to at least answer generic questions. When taking the same test called a post-test at the end of training, students are expected to answer more questions correctly based on an increase in knowledge and understanding.

There was no much difference between the content of the pre-test and the post tests. Some students also indicated that even though they passed the tests, they had guessed so decided to attend training to gain more knowledge in digital skills. The post-test indicated an improvement of at least 30 % in the test results. This was compared to information from the evaluation forms to see if there were some disparities between self-reports and the test results.

3.5 Data Analysis

The data was analysed using qualitative and quantitative techniques. Qualitative data analysis as described by Lewins, Taylor and Gibbs (2010) is "the range of processes and procedures where after collecting data we turn it into some form of explanation, understanding or interpretation of the people and situations we are investigating (p.1)". During data analysis the researcher breaks the data into fragments to discover interesting things in the data and to assign 'codes' to them, based on topic or theme (Seidel, 1998). To analyse the data collected through qualitative instruments, I categorized data into codes and then the codes were categorised into themes. Five themes, namely: *Experience with technology, Students' Intent to use technology for lifelong, Ease of use and Usefulness, Attitude,* facilitating conditions emerged from the analysis of qualitative data. The codes that have been applied to the data then act as sorting and collection devices.

Quantitative data analysis was used to heighten qualitative methods to their deserved prominence and, at the same time to demonstrate that quantitative methods can and should be utilized in complementary fashion (Jick, 1979). The researcher ran descriptive statistical analysis to describe basic features of the data in a study and provide simple summaries about the sample and the measures; and Kendall rank correlation was used.

Kendall rank correlation is a non-parametric test that measures the strength of dependence between two variables (Stephanie, 2018). This was used because there were two groups of samples (pre- and post-tests).

3.5 Trustworthiness and reliability of the data

In Shenton (2004), trustworthiness is explained as ensuring credibility. It is described as "concerned with the extent to which the findings of one study can be applied to other situations". Trustworthiness addresses dependability, an issue of reliability, by employing techniques to show that, if the work were repeated, in the same context, with the same methods and with the same participants, similar results would be obtained (p.64). It is taking steps to help ensure as far as possible that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher (Jick, 1979).

The study used multiple data collection tools, including qualitative and quantitative data collection instruments. This allowed the data to be triangulated. Triangulation in research is the use of more than one approach to researching a question and its objective is to increase confidence in the findings through the confirmation of a proposition using two or more independent measures (Heale & Forbes, 2013). This approach combines two or more rigorous approaches such as qualitative and quantitative to provide a more comprehensive picture of the results than either approach could do alone. In addition, the study used ten trained research assistants for observation of students during the training to minimize the level of bias. The findings of the study were presented in multiple research seminars and the input from these seminars helped to refine the data analysis and interpretation. The final report was also sent to an editor.

3.6 Ethical Consideration

Before the data collection process, I sought and obtained permission from the university to conduct the study in the university premises. I also sought and obtained the research clearance from the School of Education. This was to ensure that my research does not infringe the right of participants. Participation in the study was voluntary. Therefore, during the orientation week students were given the information forms that explained the nature of the study and the informed consent forms. Participants were given the information forms and the informed consent forms for them to give or decline their participation in the study. They were also informed of their right to withdraw from the study at any time. Confidentiality and anonymity were ensured by using pseudonyms instead of participants' real names. No name of the institution or research participant was used in all writings about this study. In order to minimise the inconvenience for participants, the online survey was created so that participants can complete it any time and from place that was convenient to them. Permission to observe participants in the training was sought before any attempt to access the training venue.

After completion of the project, raw data will go to the supervisor and be destroyed within 3 to 5 years. The final report on the project will be submitted to the university and will only be used for study purposes.

Chapter 4. Data Presentation and Analysis

4.1 Introduction

In this chapter, I focus on the presentation and analysis of data. Presentation is guided by research questions:

What are the Perceptions, Acceptance and Intention to Use Information and Communication Technology Tools by First Year University Students?

The main research question was divided into three sub-questions:

1. What are first-year students' perceptions of using digital tools?
2. What are first-year students' attitudes towards the intent of using digital tools in their academic activities?
3. Is there a relationship between first year students' intentions, experiences, attitudes and students' perceptions that leads to digital literacy skills and self-efficaciousness in the use of technology?

Analysis was guided by TAM3 Model. Five themes emerged from surveys as well as direct observation instruments, and these are:

1. Students' experience of using digital tools before university
2. Students perceptions of usefulness in using digital tools for learning
3. Students' perceptions of how easy it is to use digital tools for learning
4. Students attitudes and self-efficacy towards using digital tools
5. University system characteristics and facilitating conditions

4.1.1 Students demographics

Participants were first-year university students with or without prior computer skills and between 17 and 21 years of age. The participants included students from different

demographic groups in terms of gender, race, nationality, type of residence, which probably increases the replicability of the study to other contexts.

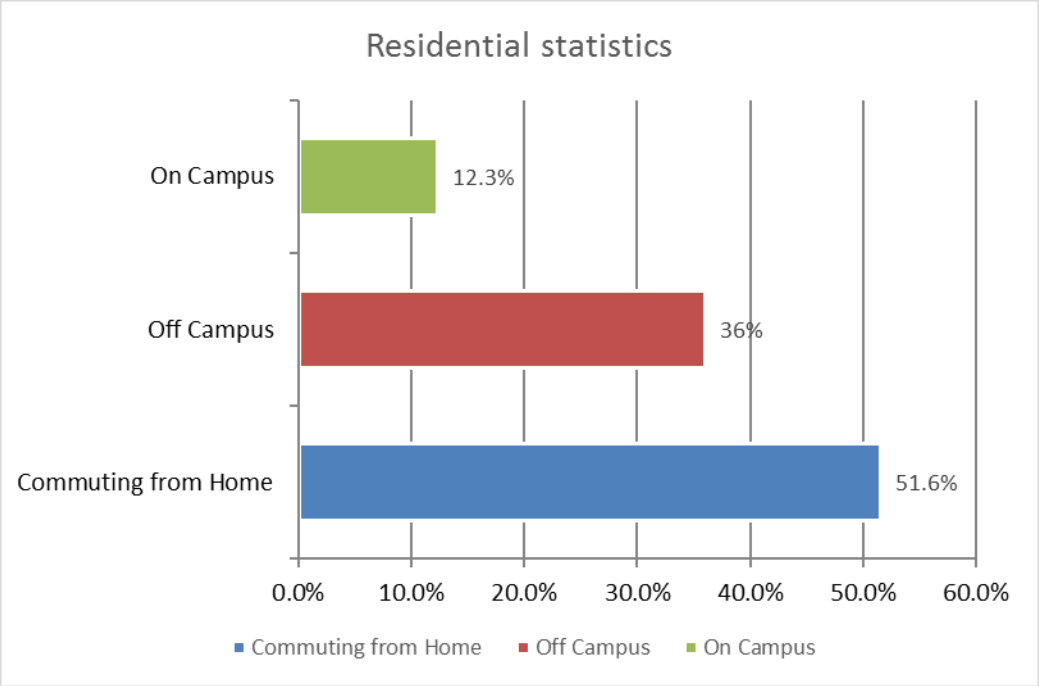


Figure 3: Students distribution according to their residences

12,3% used on-campus residences, 36% of students had secured space in off-campus accommodation, and 51,6% who were not able to afford on-campus and off-campus accommodation were commuting from home to attend lectures. Being from African descent and disadvantaged communities, black students who were the majority of the student participants could not afford on campus and off-campus accommodation. They commuted from home e.g. Soweto.

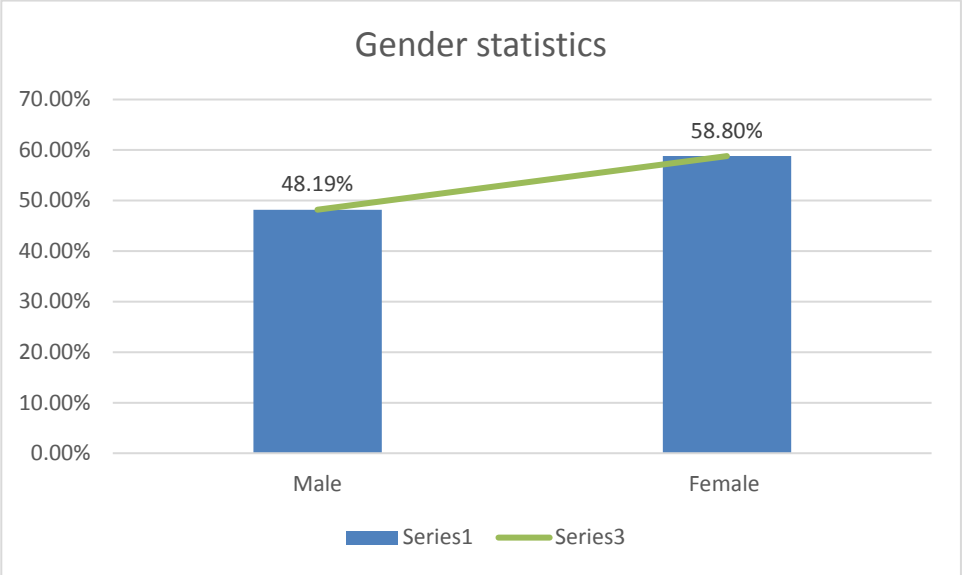


Figure 4: Gender Distribution

Majority of student participants were females, they represented 58, 8% of the total population. According to research done by Schlosser (2008) a higher percentage of girls in a classroom lowers the amount of classroom disruption and fosters a better relationship between pupils and their teacher, a study of the data suggests.

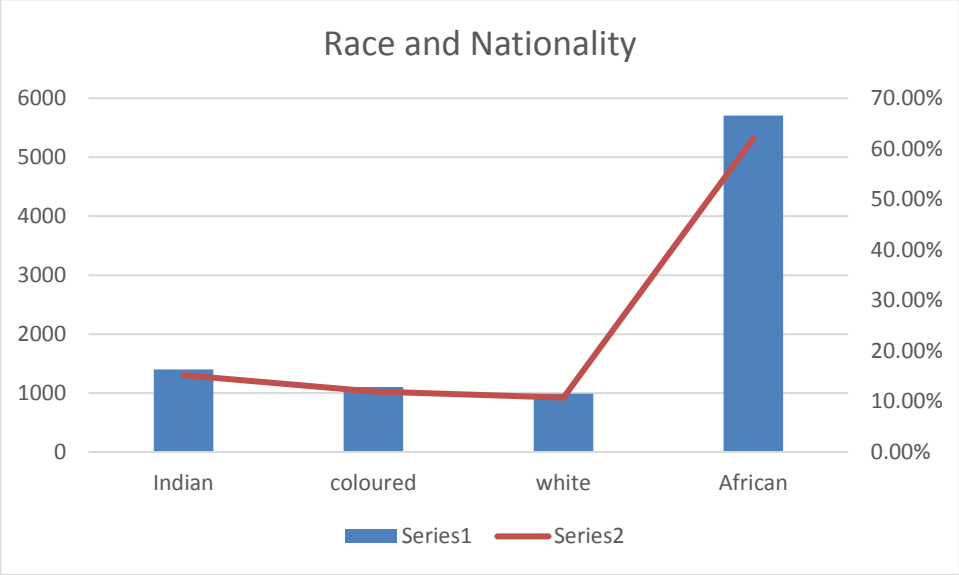


Figure 5: Race Distribution

62% of student participants were black. Figure 5 helps to understand Figure 3.

The purpose of demographics was to understand the characteristics of student participants, to assist in the planning of the training to ensure that all students, especially those from disadvantaged background and who commuted from home were

accommodated. The ICT upskilling sessions were scheduled during day times that were less inconveniencing to them.

4.1.2 Students' experience of using digital tools before university

4.1.2.1 Access

A survey was used to collect information on students' experiences of using different ICT tools before coming to the university. Tools that were covered by the survey included computers, mobile phones with and without connectivity, email facility, internet modern or 3G card. Students were also asked to indicate how often they used the various digital tools and their experience with the tools (from novice to advance).

The data from the survey indicated that 26.88% (2472) students had access to personal computers (laptop and Desktop Computer), 72.15% (6635) had access to Mobile phone with internet access and email functionality (e.g. Modem/3G Card); and only 0.96% (88) had access to Mobile phone without internet access. Table 2 bellow indicates the number of students who had unrestricted access to digital tools and the internet.

Table 2: Students access to computers and internet

Hardware	Access
Laptop/PC/Mobile phones/Desktop Computer	26.88%
Mobile phone with internet access and email functionality	72.15%
Reliable Internet connection (e.g. Modem/3G Card)	72.15%
Mobile phone without internet access	0.96%

Based on Table 2 above, it is easy to assume that many students had experience with various technological tools and generally it is easy to think these students were more digitally capable. Even though these students seem to have high access to digital technology tools, many students did not have a clear understanding of how courses could or should use technology to support their learning. Their prior experience allowed them to access social media, communicate with parents, and google research to complete some assignments. But mostly they indicated that they used the technology for personal use such as making phone calls, social media such as WhatsApp, Facebook and for downloading videos. Prior access to computers did not mean students knew how to create knowledge for academic learning, students still relied to a great extent on their lecturers for guidance.

4.1.2.2 Prior Experience with technology

Many comments from the students showed that despite their familiarity with personal technologies, students lacked skills in using technology to help them learn. Students overestimated their ability to find and evaluate information online. They mostly referred to using Google for researching information. When students were asked about their experience in using digital tools, many stated: *I have researched most of my assignments on google*. Students normally prefer sites like Wikipedia over academic online resources, hence they need to be taught about university standards. Many others stated that: *I just watch movies and play games*; *used it for surfing the net for school stuff, social networking, downloading apps, music and stuff*"; *Barely, only when instructed at an institution like Saturday classes.*

Figure 6 below indicates students experience with different ICT tools before coming to university:

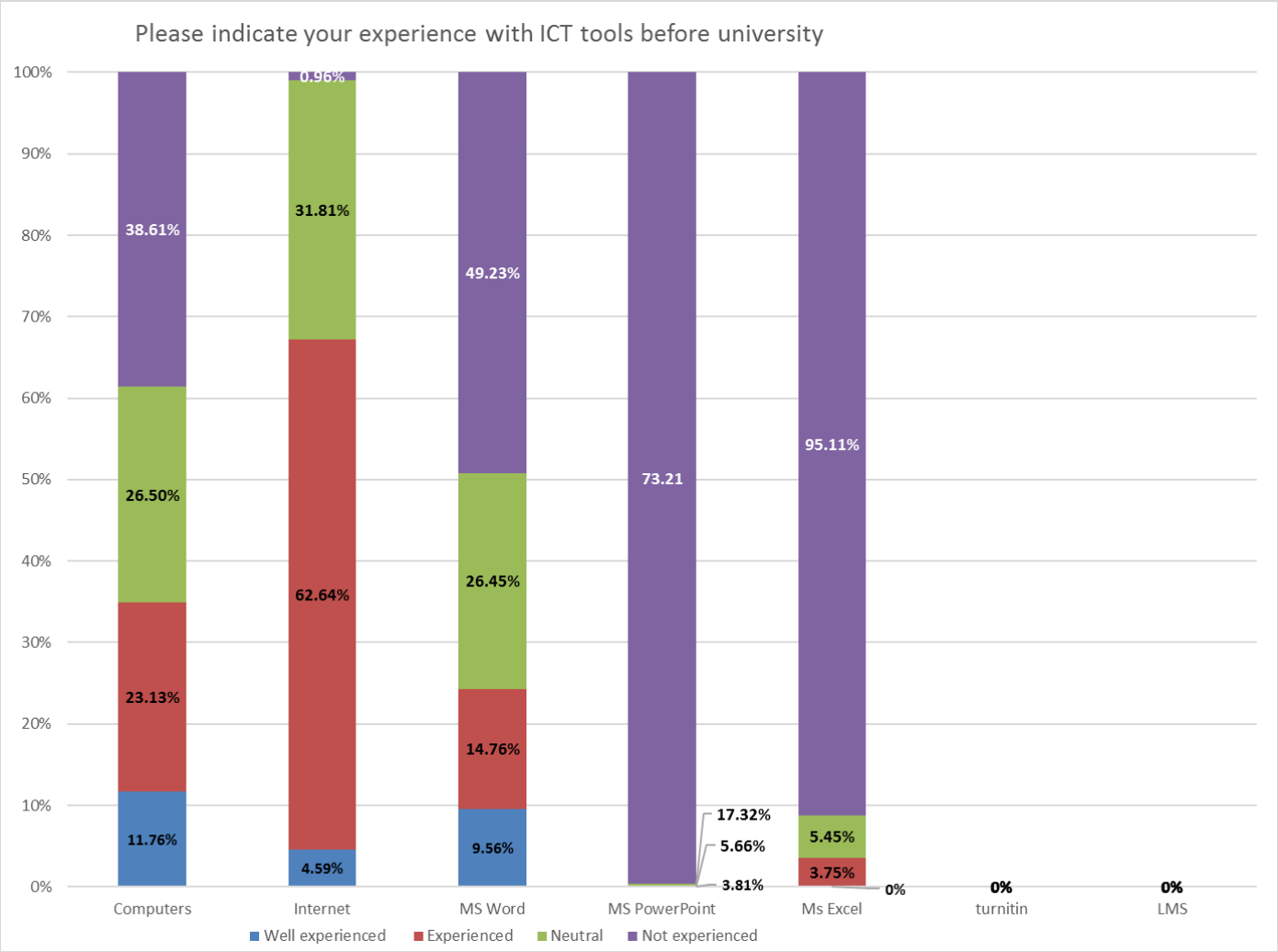


Figure 6: Students' Prior Experiences with ICT Tools

Prior experience with computer operations

Regarding prior experience with computers, 11.76% students indicated that they were well experienced, 23.13% indicated they were just experienced, 26.50% indicated neutral and 38.61% indicated not experienced with computers.

Prior Experience with the Internet

4.59% of students indicated they were well experienced, 62.64% indicated they were experienced, 31.8% indicated they were neutral whilst 0.96% students claimed they have not had experience with the internet. Most students were experienced with the use of internet. It could be that they gained familiarity with internet because connectivity is a prerequisite for them to access social media.

Experience using Microsoft Word

On using Microsoft Word, 9.56% indicated that they were well experienced in using MS Word, 14.76% indicated they were experienced, 26.45% indicated they were neutral and 49.23% indicated they were inexperienced. The majority of students indicated to have had access to personal computers, therefore it is surprising that they did not have experience with using Microsoft word, which is the main application software used on personal computers. It could be that students used personal computers to play games or to watch videos.

Experience using Microsoft Excel

0 Students indicated that they were not very experienced in using MS Excel whilst 3,75% indicated they were experienced, 5.45% indicated they were neutral and 95.11% indicated that they had no experience with MS Excel. It is very clear that most students did not have the skill in the use of excel, although this is a necessary skill needed in many courses at the university, especially in mathematics, science and engineering studies.

Experience using Microsoft PowerPoint

3.81% Students indicated that they were very experienced in using PowerPoint, 5.66% indicated they were experienced, 17.32% indicated they were neutral and 73.21% indicated they were not experienced. Despite PowerPoint being the most application software lecturers use to present the content, majority of students did not have the experience of how to use it.

Students were then asked in the survey instrument whether they used computers before coming to university. Most students had reported themselves as having at least touched or possessed computers for at least more than a year before coming to the university,

hence it was easy to assume that they used the same technology to complete school work. However, what I found interesting was that, despite having some level of access, many students had not used technology for school work. The following were some of the comments we received.

Hardly ever. Most lessons were face to face and included printed out notes

No I didn't use it

I never used it

Many referred to using their devices for surfing the net, social media, communicating with family and friends and doing some school research. Very few mentioned using internet café a lot for doing school work. White students and very few African students commented that they have used laptops, desktop computers as well as tablets at both school and home. They used them to do research for both school and personal purposes. Others reported that they used devices to play games and downloading music. What I found interesting was the number of students (6723) who still acknowledged that they have not/never used their devices for school before coming to university.

The findings in the section above do not support the statement that all millennial youth are well versed in using digital tools for learning. Clearly almost 95% of students have access and some experience with technology but not for completely for academic learning and knowledge. Therefore, the training in digital skills was organised in order to equip them with relevant technological skills and to offer students time to become familiar with the new tools before expecting them to tackle academic tasks. The comments received when students played with the tools unveiled uncertainties even for students who had claimed they had experience using personal computers. For instance, some of the comments from the students were:

Everything is new and still confusing;

Some of us are intimidated by computers because we do not have experience for using them;

I have learnt a lot since I did not use computers before.

4.1.3 Students confidence in the use of technology

Before training, 75% of students had reservations about using digital tools. Many expressed fear and anxiety especially doing the university tasks:

I hope I will gain the knowledge of using computer confidently, how to get into the internet and how to search for university content;

I am anxious to learn how to access relevant information on the internet i.e. journal articles and do my assignments confidently;

I need to gain more knowledge and confidence on essay writing and other tasks so I can manoeuvre around a computer software without getting stuck or lost.

Some of the students expressed that they are computer illiterate and lack the confidence to perform university tasks:

I want to be computer literate and explore my computer skills confidently because I was struggling with using computer at school;

I lack computer experience necessary to do school work and I hope to gain confidence to be more computer efficient for my school work.

After training 100% of students expressed confidence in accessing digital resources to use for university tasks and performing required tasks. The following are some of their comments:

The training on computer skills helped me to be confident in completing my assignments;

These wonderful opportunities of learning basic computer skills equip us with confidence to embark on the new learning journey that requires computer skilled people;

I learned a lot about the technological devices and gained more confidence in computer skills;

It was amazing and the introduction to using MS Word, email, MS PowerPoint etc.

I would say it was awesome! Very educational seeing I had not taken CAT at high school level so now I can confidently do my school work.

Some comments suggest a significant improvement in students' confidence to use ICT tools in academic activities. Initially these students did not have any prior technological knowledge because they came from communities where technology is not a cultural capital:

The computer session is helpful and gives previously disadvantaged students confidence to keep up with University required standards;

The computer skills training has been phenomenal as I now can operate a computer confidently and perform my school tasks - I am no longer scared of a computer.

We are all different backgrounds and I am glad we do not generalise and assume everyone knows how to get into certain programs and confidently use the computers.

From these comments stated above, all students despite their cultural background seem to have obtained skills to induce confidence for performing tasks on their own.

4.2 Students perceived competency in the use of technology

At the beginning of the semester when training course was conducted, majority of the students reported that they had used computers only minimally whilst some few reported themselves as upskilled. Perhaps it is because students were not clear about the university expectations of digital tools usage. Factoring in the time it takes for students to

develop new ICT skills, we made no assumptions about their familiarity with specific technologies. We clearly communicated our expectations about how students will access and use online resources and the kinds of resources are academically valued. This was to help students re-evaluate themselves on whether they possess the skills or need help to be trained so they can be upskilled.

Pre-test

Pre- and post-test instruments were used to measure changes in students' ICT competences because of the training they received. The pre-test was administered before the training intervention and the scores were recorded. The test items included computer components, Ms Word, Ms Excel and Turnitin.

The pre-test results indicated that 2108 students passed the computer components test with ease while 7087 students scored below the required mark, which was 80%. The mark was set this high to establish the correct targeted students for training. Many students previously were embarrassed to accept that they do not have computer skills and so they lied about their skills only to be discovered later by the lecturers during assignments submissions. So, to prepare the students for university requirements, we had to set up higher standard or pre-assessment as well as training afterwards and the tests varied from easy and simple to a bit difficult.

345 students passed Ms Excel whilst 8850 got less than 80% required mark.

Regarding Ms Word, 870 students scored well whilst 8325 students scored lower than 80%, which was the mark required to pass the test.

Lastly, 2074 students responded well to questions that tested their understanding of the Turnitin tool whilst 7121 students scored less than the required mark. Turnitin is an antiplagiarism tool integrated with Sakai Learning Management System. The test required students to upload Ms Word document into turnitin to generate the turnitin report and to then interpret it. These statistics and the diagram show that very few students were capable to use these digital tools. They were able to complete tasks successfully and upload documents to LMS.

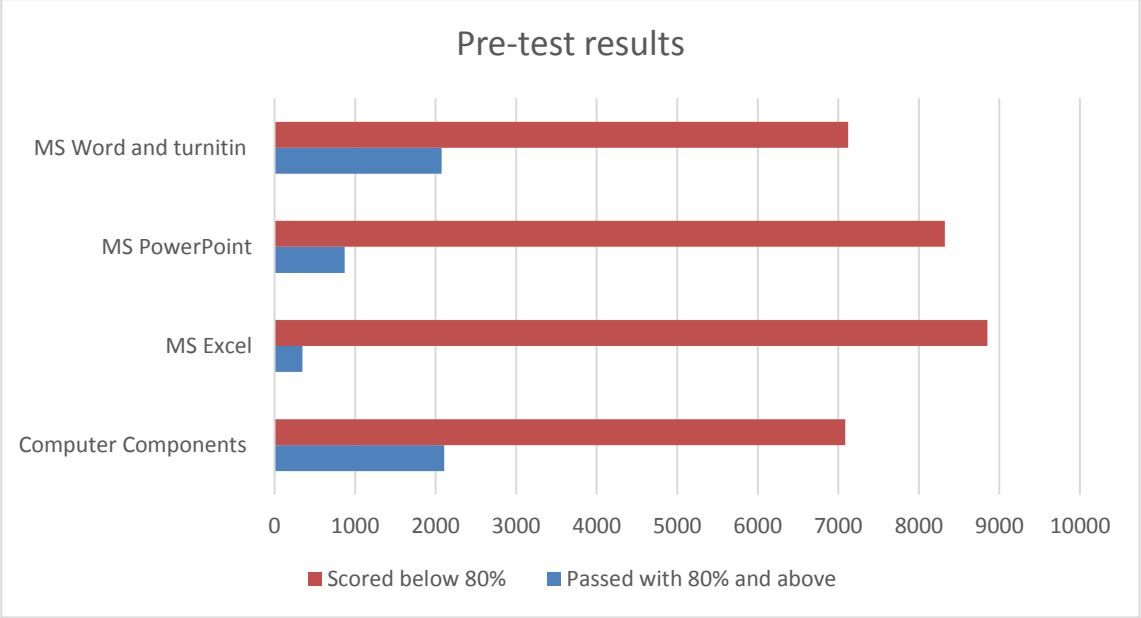


Figure 7: Pre-test results showing students' marks

In Ms Word and turnitin tests, 77.44% students scored below 80% required mark whilst 22.56% scored above 80%. In MS PowerPoint, 90.53% whilst only 9.46% scored above 80%. In MS Excel, 96.25% students scored below 80% whilst only 3.75% scored above 80%. Computer components test had 77.07% students who scored below required 80% score whilst only 22.93% scored above 80%. It seems as much as students had access to digital tools before entering the university, the actual knowledge of using them for learning was very low.

Post -test

After the intervention (training course sessions), almost 95% of students felt confident in using the digital tools and 5% wanted to learn more. These 95% were able to perform all the tasks required, uploaded documents and followed the questions proficiently. The chart below shows some major improvement on how students used technological tools for learning.

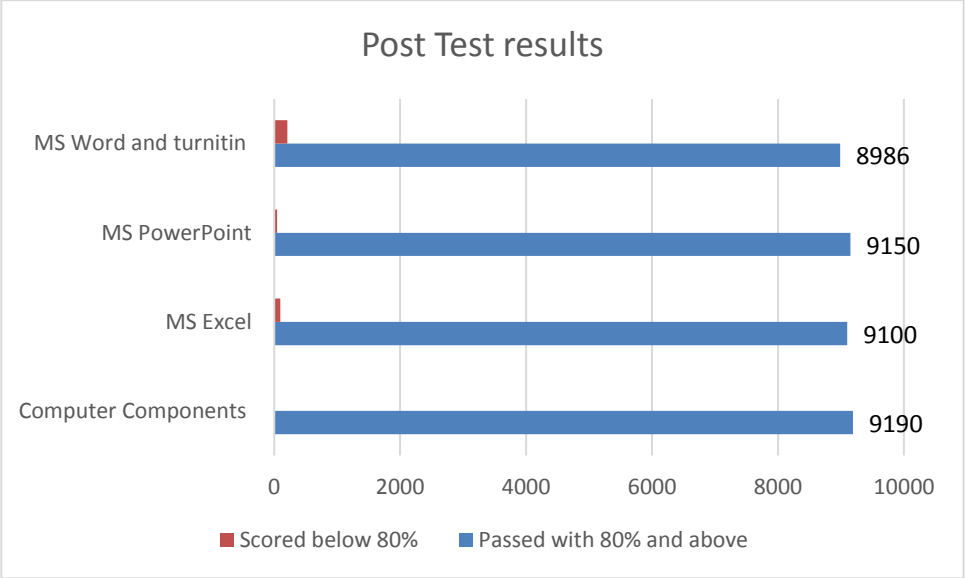


Figure 8: Post-test results showing students' marks

On all post-test items, students scored above 80%. Some of the comments were: “I feel confident now about my proficiency in computer skills and have learnt new things that I was not sure of before”.

9190 students scored above 80% on computer components and only 5 failed. This 5 indicated that they needed more time to master the skill. The following is how they stated it;

I think there should be more time allocated for the program so that we can do more examples

98.97% students scored above 80% and felt confident in the use spreadsheet. Their comments indicate high level of confidence and commitment to use the spreadsheet in their academic endeavour:

I now don't need to spend time trying to figure out how to do something in Excel. I think I will be more productive in my studies;

MS Excel training and testing was comprehensive and robust, and I learned many things I never knew they existed;

I was humbled by the training and testing of digital tools especially MS Excel. I honestly believe that learning these tools has helped me to master my studies and will help with furthering my future career.

1.03% students who scored less than 80 % commented that the Humanities courses such as Art, Languages, and Philosophy- they are taking do not require the use of spreadsheet. They therefore had no interest in learning how to use the spreadsheet tool.

On MS PowerPoint 99.51% passed the test and felt confident using the tool whilst only 0.27% students scored less. These latter students commented that they would prefer to learn InDesign tool rather than MS PowerPoint as they used it more in the Fine Arts class.

99.73% students felt confident in using MS Word as well as uploading their work into turnitin and interpreting the turnitin report. This was most exciting as many students indicated the ability to use Ms Word will help them to be more productive and to achieve their career ambitions. The following were some of their comments:

MS Word makes it easy for me to insert all the important features for my assignments, cite and reference easily;

I intend to write a book, and I feel confident that I can do so now with MS Word;

MS Office training and testing gave me the confidence. I no longer have to ask people how to complete a task with Ms Word.

4.3. Perceived ease of use

There was evidence in this study from the survey and direct observation instruments that there was poor support for some students to make effective use of technologies for learning prior to university entrance. Students were still insufficiently competent and confident with digital technologies for learning, despite evidence that they had access to the digital tools. It was clear from students' responses that there is a need to engage and motivate students to develop their digital literacies. The students perceived using technological tools as easy and very useful however, one must first learn and know to use these tools for learning else it is disadvantageous to those without experience.

Computer Components

Prior to the intervention, on the ease of use using computers with regards to computer components (hardware and software) 74.3% of students struggled with operating digital tools for learning. Some of their comments were:

I struggled to perform required course tasks because I did not do any IT course before university, I just used my phone for internet services";

I did not take proficiency test – I was frustrated because of minimal computer skills so I have enrolled for face-to-face training as I still can't use the computer;

I need some more training because I still have minimal knowledge of using computers;

On the basis of those who do not know how to use computers, not everyone knows keyboard and shortcuts;

I felt like students from disadvantaged backgrounds were excluded who have not had the luxury of working on computers;

IT is growing globally but it must be ensured that all learners are computer literate enough to perform all required tasks.

Some students associated the computer tools with experience: *digital tools are effective if you know how to use it and convenient to use when you have access.*

These comments above point to the frustration and anxiety of students without digital skills prior to university entrance. However, after training, 99% were able to perform the task they found difficult earlier and commented: *I learned more than I expected, and I was happy to learn how to login to a computer and new skills even though at first this was very intimidating*.

Some comments were more directed on how the digital tools make it easier for students to perform school work and access information on the internet:

Digital tools make it *more convenient to learn*; *I approve of using computers for learning, it's an efficient and easy way to access information*;

Digital tools are beneficial for research and assignments instead of still using pen and paper for studying;

It's necessary in the modern growing world of technology for digital tools to be more accessible because they are efficient way to access information on the internet.

Some students' comments acknowledge the broken barriers in accessing digital tools: *learning the use of computers makes learning better and allow for more information accessing in libraries especially for the previously disadvantaged students from the rural areas with no internet access*.

MS Word

On the issue of using MS Word, 74.3% of students struggled using some of the features in MS Word and some even struggled saving the document to the desktop or My documents folder. Some of the comments were: *I found Word was very difficult because I am not familiar with using it and I was never exposed to turnitin*.

Before intervention

In the issue of turnitin for possible plagiarism, some of the comments were:

I find it frustrating to use turnitin to check for possible plagiarism because of my limited computer skills;

I find it very useful to check my own work using turnitin but I still need more training to use it effectively;

I find it very difficult but useful to learn MS Word for good writing skills, including using reference list and citation, which will help me for lifelong learning.

After training

Comments were:

Word is a very important resource to use in this modern day and age as it provides ways to use information to express research;

Program is useful to gain computer skills necessary for academic course work;

I intend to use MS Word as a word processor because a high competent essay writing demands good writing skills including spell check and grammar, formatting, good fonts, referencing and citation which I need beyond my academic years;

Providing training on needed skills was a good transition into the university;

I believe turnitin is a very useful tool which I would like to use lifelong to check my work especially my research work; *turnitin gives me independence to understand my own writing and interpret the scores, and properly cite the sources I have used to avoid plagiarism*.

Based on these comments, it seems that the intervention affected students' perceptions of ease of use positively. Students found using turnitin software both easy to use and very useful.

MS Excel

On MS Excel, 99% of all students commented that they found it difficult to use spreadsheets until after training course. Before training many comments were: "*I hope to learn and gain knowledge on how to use the spreadsheet for schoolwork"; "I need more time to learn Excel"; "I found MS Excel test difficult whilst Hardware & Software as well MS Word questions were easier"; "The provision of examples before taking the test was very useful".*

After training 99% of students commented that:"

I am now comfortable to use the required tools to complete academic work using spreadsheet and Word;

I now understand how useful MS Excel is because it is a quick and efficient way to gather the data together and analyse it";

I now understand that the knowledge of MS Excel and using it is important for me since it is the most useful tool for collecting the data that is relevant to financial information, and it is even be more useful to me because I will be learning more when I do programming;

Excel allows me to build various great charts including pie charts, clustered column charts and graphs which helps me visualize my data.

The students' comments above show that there is a strong support for using these technologies and tools to assist with university studies from the vast majority of students. It also indicates that the intervention positively affected students' perceptions of ease of use

MS PowerPoint

100% of students commented that they loved and enjoyed presentation training.

Before training at least 35% of students commented that they know PowerPoint but would love to learn more. Students commentated that MS PowerPoint was interesting in that students loved the animations, designing presentation, organizing slides, adding images, timing the slides. PowerPoint made them relax because it was fun and working in groups to discuss and present own topics made it even more exciting.

Email and Internet comments were:

I find it useful and easy to forward all my communication to my personal email; I feel that email is a good communication tool and will always use it beyond my studies and thus important to know and understand;

Writing an email is not just communicating, it requires full attention and professionalism during university and beyond in the world of work.

The students' comments in this category show a very strong support for using these technological tools to assist with university studies from the vast majority of students. It also indicates that the intervention positively affected students' perceptions of ease of use

Leaning Management System

95% of students found the use of LMS very useful. The comments about LMS were:

I feel confident finding information in the e-learning System;

I have no difficulty accessing and using an e-learning system in the university and find it helpful to access online content;

In order for me to prepare for future job, it is necessary to take e-learning courses;

E-learning would increase academic productivity, improve my learning performance because it makes it easier to access course content for studying.

Face to face training and demonstrations promoted usefulness and ease to do course work thus positive attitude towards self-efficacy.

Such comments seem to indicate that those who struggled with using digital tools for learning had less or no prior experience before university entrance. However, it appears as if the intervention helped students with ease of use. The comments indicate a change in how they perceive using and accessing information using digital tools.

4.4 Perceived usefulness

The perceived usefulness items asked student to rate from 1 to 4 (1 being 'not useful' and 4 being 'very useful') how useful it was to learn the digital tools to complete the 4 computer tasks.

100% of the students expressed positive comments regarding the usefulness of digital tools in their higher learning especially using LMS, MSWord with turnitin and MS PowerPoint. In the scale, most students were scoring between 3 and 4. Students believed that the use of digital tools in their formal learning would be useful, pleasant, and helpful for organizing their learning, easy to use, and would increase their educational productivity. Comments were: “digital tools give me an ability to not only read but to also interpret media”; “digital tools make it possible to use data and create images, presentations”; “I find digital tools very useful in enabling me to effectively evaluate and apply new knowledge gained from training environment.”.

The students formed their perceptions of the usefulness of digital technologies in their formal learning based on their experiences of the use of such technologies in their personal lives as well as the use of these technologies in informal learning. Comments were: “I can now solve problems using digital technologies such as mobile phone in my education”; “I will use digital technologies in my education frequently during my university studies”; “I can use my mobile phone to connect to Wi-Fi, access course material anytime and anywhere in the university”.

The results suggest that the participants had positive perceptions of the use of digital tools in their university learning.

Computer components

100% Students responded positively to the item that specified that the use of digital technologies in formal education is useful:

Learning to use digital tools would help me increase my academic productivity;

Ability to access and operate technological tools anytime would help me improve my learning performance;

Knowledge of digital tools make it convenient to study course content.

The students' comments above show that there is a strong support for using digital technologies to assist with university studies and it also indicates that the intervention positively affected students' perceptions of usefulness**.**

MS Excel

Findings show that 95% of students found MS Excel useful. Students reported that they found utilising spreadsheet tool as crucial for their studies:

Using MS Excel and presenting data using charts is like telling a story in a visual way";

I find using MS Excel beneficial especially when I do research part of the course to enter data"; *It is useful for me to know this tool since it is the basis of my studies in programming;*

This technological tool is useful for collecting and entering the data for research purposes;

Excel allows me to build various great charts including pie charts, clustered column charts and graphs which helps me visualize my data;

Excel is very useful as it allows me to easily perform various calculations, to use formulas across various cells which would take time if done manually.

In my findings, the 5% commented that they found MS Excel interesting but hard to learn but also not necessary to learn because of the choice of their courses.

Leaning Management System

The results showed that perceived usefulness was a significant predictor of students' acceptance of e-learning. 100% of students found the use of LMS very useful. The students had confidence in using computers; enjoyed using a range of tools within the e-learning platform and they believed in the usefulness of e-learning in their education. When asked what purpose they used the LMS for, the students´ leading reasons were to gain university study information (95.3%): *the LMS communication tool integrated with my personal email account makes it useful to get notification/s from the lecturers*; *I find LMS very useful in accessing resources and content needed for my studies*. For the preparation of exams, for tests and downloading material (92.5%): *LMS is very useful to practise for my exams and tests because my lecturers post the practise tests on the LMS*; *I find it useful to immediately see my results in the LMS during practise, so I can be ready for my exams/ tests*. Another leading reason for using LMS was around Assignments: *Writing assignments and uploading to LMS, checking for possible plagiarism and interpreting my turnitin score is very useful to build my confidence in essay writing for educational purposes*.

The social learning tools such as Forums and Chat tools were also seen as useful, important and enjoyable by the students. For the online discussions and teamwork with other students on study issues, students used most preferably emails (95% "often" or "very often"). This was followed by Chat tool (74%) and the lowest ranked of these tools were discussion forums (27%).

Such comments seem to indicate that those who struggled with using digital tools for learning had less or no prior experience before university entrance. However, it appears as if the intervention helped students with clarity of digital tools usefulness. The comments

indicate a change in how they perceive using and accessing information using digital tools.

4.5. Students attitudes and self-efficacy towards using digital tools

Responses from students regarding their attitudes and self-efficacy towards using digital tools indicate that students understood the university requirements for integrating ICT skills. In the questionnaire they were asked to indicate if they believe digital tools are to be used in and beyond university. They were asked to indicate their attitude towards:

- Ability to use computer to create documents, spreadsheets (e.g. using Word, PDFs, Excel)
- Ability to use online learning content - access a learning portal (e.g. a 'Course' or 'Learning Management System')
- Ability to use various multimedia to learn e.g. PowerPoint
- Attitude towards using the internet to access web-based services
- A mobile phone (Tablet/Smartphone) to access web-based information or services
- A mobile phone to send or receive email

In this digital age, it is imperative to introduce students as early as possible to the technologies they will use in the university and beyond. Moreover, supporting students in using their own devices and services; involving students in decision making about technology and learning; embedding digital literacies into the curriculum and rethinking graduate traits for a digital age is the best way to get first years to endure through university. These strategies help do away with the risk that students leave university equipped with the right qualifications for their chosen

career because without the tools and understanding they need to thrive in the connected, globalised digital world of today they are doomed to fail.

Under the topic - Extensively for lifelong learning and keeping up with rapidly changing technology the Pie chart below displays their attitude towards university recommended digital tools.

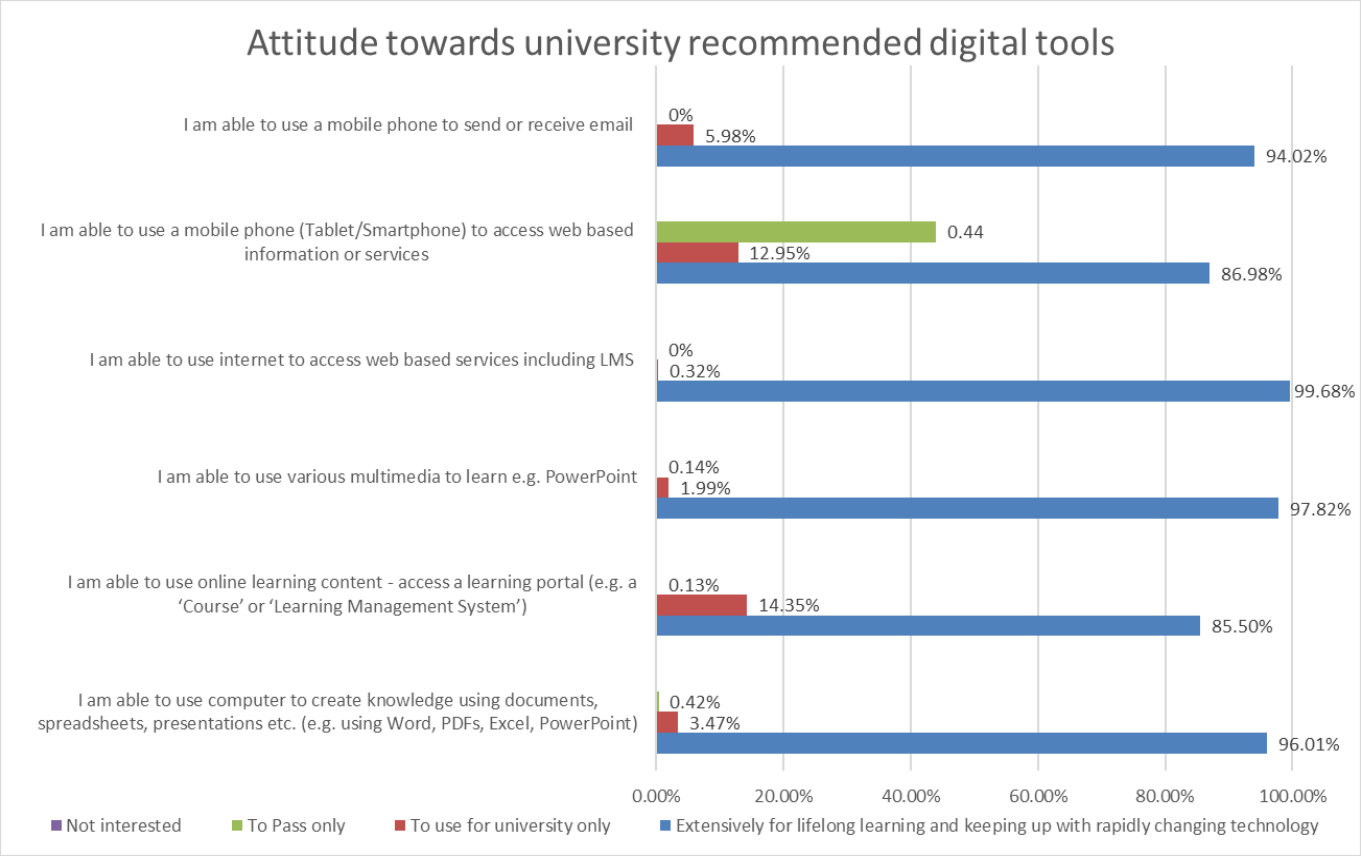


Figure 9: Students attitude towards university recommended digital tools

Under the same lists, they were asked to identify whether they want to learn digital skills:

- To use for university only
- To pass only
- Not interested

The responses are very interesting in that very few claimed they are not interested in acquiring good digital skills for university and beyond in the world of work.

The results showed that computer knowledge and skills and attitudes towards the use of computer in education had significant and positive relationships with students' perceptions of computer technology. For students, the integration of simple and sophisticated digital technologies in their education has the possibilities to empower students through enhancing their learning; increase the students' motivation; build the students' self-confidence in learning; promote collaborative and active learning; provide them with different types of educational resources; promote lifelong learning; and help students become independent (self-efficacious) learners. The diagram below shows the students' perceptions towards self-efficacy in using digital tools:

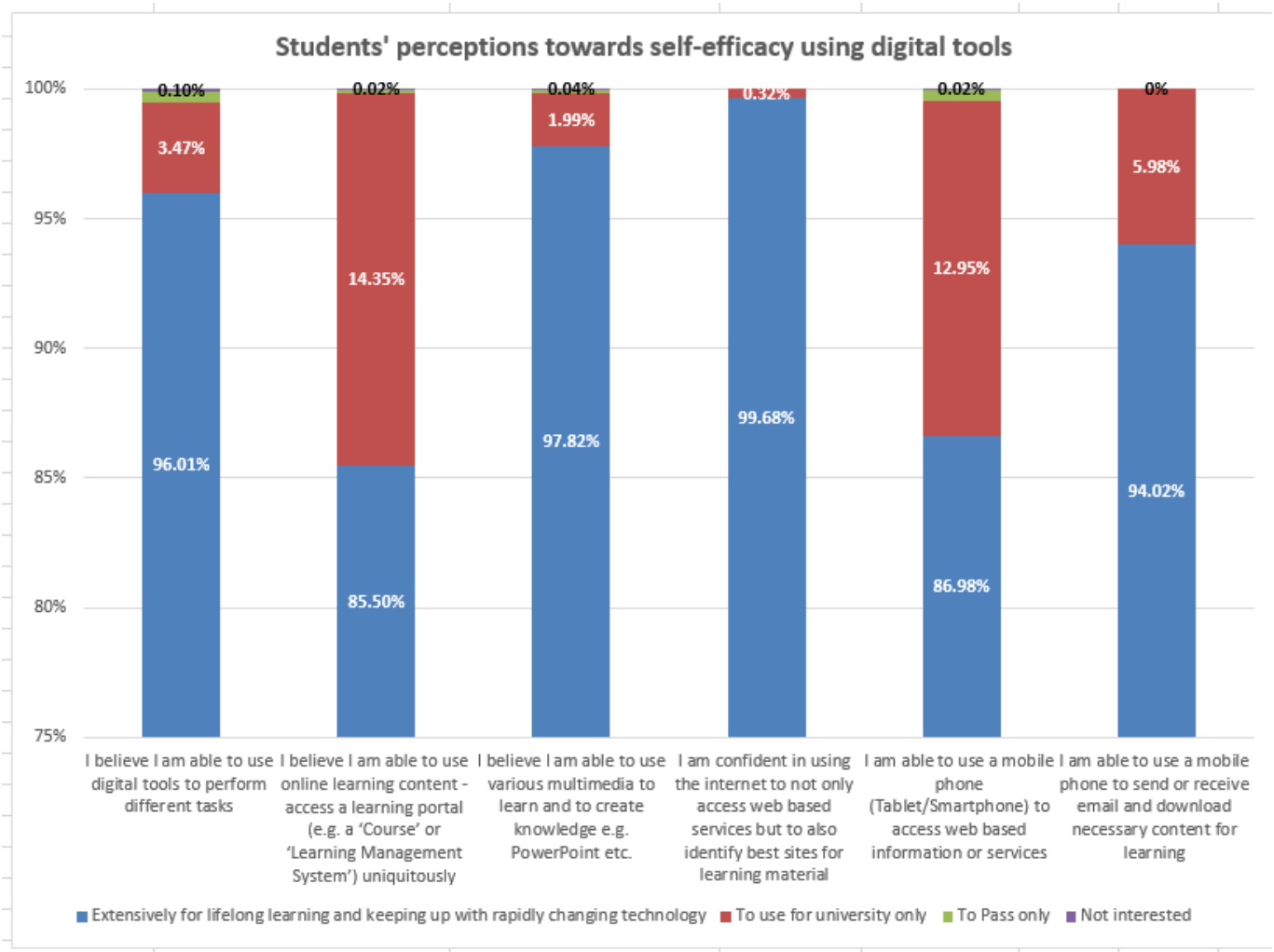


Figure 10: Students' perception towards self-efficacy in using digital tools.

4.6. Perceptions on the university system characteristics and facilitating conditions

Table 5: Below is the table with university system characteristics

System characteristics - are those noticeable features of a system that can help individuals develop favourable (or unfavourable) perceptions regarding the usefulness or ease of use of a system.

University system characteristics	Students' comments and perceptions in using available university system digital tools
Provision of Digital Skills training and more information during orientation.	*I found the provision of Digital Skills training and more information during orientation useful.* *This in digital skills was Great.* *Training in digital skills helps improve learning performance* *Training increased my academic productivity* *Training in digital skills makes it easier to study course content*
Introduction to LMS sessions	100% of students commented that ability to access LMS and using it leads to efficient communication from their lecturers. Some students expressed that knowledge of LMS access and operating helps them get content timeously. Many expressed confidence in using the LMS anywhere and anytime and even discussing important issues and queries with peers and lecturers on line and getting valuable feedback.
University email	100% of students found easy access to students' portal for communication from lecturers and coordinators.

	Integration of university email with personal email which students can use on their mobile phones for academic communication was expressed as very useful by students.
Turnitin tool (to avoid plagiarism)	100% Students expressed the usefulness of being able to check own assignments and interpret scores on their own before submitting for marking. They expressed the satisfaction of ability to do own research, cite and reference on their own and referred to turnitin as lifelong useful.

Table 5: The university system characteristics

Facilitating conditions

Facilitating conditions refer to "the degree to which a student believes that an organizational and technical infrastructure exists to support use of the system". Students were asked to give a brief summary about their experience with Proficiency testing and training. 100% of students perceived availability of resources needed to help them learn as good facilitating conditions.

Students commented that they were confident in using the resources and tools provided by the university to support their learning: *I have the resources and have gained the knowledge of how to access content necessary for my learning and coursework*"; LMS used in the university *is compatible with other computer applications that I use for my coursework*.

Some students reported about the support of the instructors and staff available to support their learning experience: *The instructor is available for assistance with difficulties that are related with the system; "it is encouraging to have specific people available for assistance with system difficulties.*

Students expressed value in accessing the online information they need, in a direct and organized manner: *I can login wherever I am to the eLearning platform via my smartphone/ tablet and can submit assignments or complete university related tasks*; *Enough guidance and instruction were provided for the use of the system*.

Students reported understanding the importance of simply getting access to the online modules they need and absorb the knowledge in a fraction of the time: *Taking online exams/ quizzes, participating in interactive scenarios and simulations, and watching eLearning videos that highlighted complex processes or tasks was very helpful part of facilitation*.

The university encourages the use of Sakai LMS tool as a platform for online teaching and learning. Benefits of this tools are many but the training on how to use it effectively for both staff and students is vital especially for the new incoming students. Pre- and Post-tests were placed in this platform as one of the ways to introduce it to the new students.

Facilitating conditions had a significant influence on actual usage of digital tools and experience had significant influence on new students.

Chapter 5. Discussion of Findings

This study of first year university students' Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) holds significant implications for the South African higher education sector. At a time of increasing interest in the attributes of the supposed Digital Natives, it is important for universities to ensure that decision making about how to enhance the learning experiences of incoming university students using technology is both evidence based and empirically informed (Tinto, 2012; Kirkwood & Price, 2005; Kennedy, Judd, Churchward, & Gray, 2008; VenJohn, 2008). It matters that higher institutions keep returning to the question of who the student is, that we are privileged to teach. This is so students may benefit from the knowledge that comes with learning from and alongside students from different class, race and ethnic backgrounds but also from other countries (Jansen, 2018; Dlamini, 2018).

The results of this study reflect the lack of homogeneousness in the incoming first year student cohort with regards to technology and a potential 'digital divide' between students within a unit of a single year level. Interestingly, the same results are seen in the research conducted in Australia by Kennedy, Judd, Churchward, & Gray (2008) as well as Brown & Czerniewicz (2010) in South Africa. While some students have embraced the technologies and tools of the 'Net Generation', this is by no means "one size fits all" student experience. When one moves beyond engrained technologies and tools (e.g. computers, mobile phones, WhatsApp), the patterns of access to, use of and preference for a range of other technologies show considerable variation. These findings run are contrary to the key assumptions underpinning Prensky's (2001a) construct of the Digital Natives. As mentioned in this study introduction, the level of technological diversity revealed shows that whilst some of incoming university students possess a core set of technology-based skills, beyond those few a high number of students

need more attention to keep up with technological tools. Spaull (2018) wrote that there are "two types of school systems [in South Africa], largely split along historical-school-system and socioeconomic lines". Our students come from different socioeconomical and racial backgrounds. However, efficacious teaching is about much more than technology-led instruction or teaching innovations in the classroom; it is about powerful teaching that engages student minds, develops criticality, stirs social and intellectual discomfort, and prepares those who seek learning to become comfortable with uncertainty (Jansen, 2018, p. 4).

In South Africa, even the news is currently buzzing with a lack of youth employment opportunities that has left many graduates sitting at home frustrated. The university students need "job readiness" by the end of their studies and not "job training" for success (Gantz, 2013; Dlamini & Na'Allah, 2015).

The value of ICT proficiency in common, frequently required skills is increasing and the focus on real-world tasks like communication, integration and presentation (CIP) skills is becoming overwhelmingly desirable in high-growth, high-wage occupations (Gantz, 2013). These skills capabilities foster both a well-rounded student and a student whose skills will be in demand in our future economy (p.1). Moreover, in his speech (Park M. , 2015) emphasised the importance of digital access saying: "Digital access is becoming as much an equity issue inour society as access to water and electricity". This strong argument is that ICT integration has strong social and economic benefits including increased academic performance, work opportunities and success, access to relevant information, improved quality of life etc. Furthermore, (Fan, 2016) the World Bank Director reported that the benefits of rapid digital expansion have been skewed towards the wealthy, skilled, and influential around the world, who are better positioned to take advantage of the new technologies. This is further echoed by (Dlamini & Na'Allah, 2015); (Dlamini, 2018; Kwet, 2019; Fry, Ketteridge, & Marshall, Eds.,2008) that the digital technologies are not just transforming the world but their potential for reducing poverty and accelerating

growth is enormous. However, access to technology, on its own, is insufficient to reduce poverty, if it is not backed by reforms in the business environment, skills development, and good governance (Dlamini, 2018; Fan, 2016, Kwet, 2019; Czerniewicz & Brown, 2013).

The choice of TAM3 model for this research is justified by the fact that the aim was to see whether the first-year students perceived digital tools for learning as important, accepted and intended to use these digital tools self-efficaciously for learning. Findings from this study established that engaging in a pre-assessment followed by a three -week cross-cultural digital skills development project increased students' confidence as well as their perceived value for using digital tools for learning. Although students began the course with some personal familiarity with digital tools (e.g. Facebook, WhatsApp chat, Internet google), they had few, if any, previous experiences considering how these tools might be used in the classroom. In addition, even though students were generally aware of the applications tools available (e.g., Word, Excel, PowerPoint) they were no experienced in using them for higher education settings. The digital skills project run by the university opened students' eyes to the great variety and number of tools available. More importantly, by using these tools themselves, students gained both the confidence and knowledge needed to explore other tools in the future. The World Bank agrees and supports the retraining and educating of today's workers and argue that this is crucial in preventing skills mismatch, mass unemployment and growing inequality" (The World Bank, 2018). The university thus plays a big role in producing well rounded graduates, well versed to compete in the world with proficient ICT skills.

Research Question 1

What are first-year students' perceptions and experience of using digital tools?

Table 1 provides relevant data of students' perceptions and computer experience from the survey that was submitted by the participants. Most students were Africans (5705), followed by the Indians (1400), Coloureds (1100), and White (990); with 58.80% females and 48.19% males.

The table below derived from the chi-square descriptive tests shows that the students see the link between prior digital tools experience and usage for learning in higher education. The relationship between digital tools and those who were well experienced is highly positive, followed by those who were neutral i.e. not sure where they fit and the last variable is the ones who were experienced. This leads to accepting that there is statistically significant strong relationship between students' prior experience with digital tools and technological tools in the higher learning environment.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Experiences	4	2.5000	1.29099	1.00	4.00
Digital_tools	4	2.5000	1.29099	1.00	4.00
Well_expe	4	683.0000	353.94444	350.00	1081.00
Usefulness	4	2441.0000	2307.93226	520.00	5760.00
Technological_tools	4	2346.7500	553.14999	1593.00	2925.00

Table 1: Predictors: (Constant), Perceived experience of digital tools; b Dependent Variable: attitude

Well experienced	Experienced	Neutral	Inexperienced
p>0.05 = .260	p>0.05 = .243	p>0.05 = .243	p>0.05 = .243

There was a strong positive significance between race (African Indian, Coloured and White) and attendance with p- value of p=.213 and a positive significance between gender (male and female) of p =.157. A strong relationship of .961 = p>.05 existed between students' experience

with digital tools prior to commencing the university however this does not necessarily relate to students' experience using the tools for academic learning. However, the students' attitude changed once they were introduced via training on how to use these tools for academic learning.

In the South African history of apartheid, white people have always been occupying the higher positions in the division of labour and African people occupying the bottom positions, coloured and Indian people filled intermediate positions (Seekings & Nattrass, 2005). Mostly a high percentage of African workers were employed in unskilled work (90%), 8% percent in semiskilled work, and only 2 percent in skilled work (p.65). Furthermore," among white people, in

complete contrast, 1% percent were employed in unskilled work, 6 % in semiskilled work, and 93% percent in skilled work" (Seekings & Nattrass, 2005, p. 65) whilst "Coloured workers occupied a clear intermediate position: 30% in unskilled work, 48% percent in semiskilled work, and 15% in skilled work. Post 1994 apartheid period, inequality was being driven increasingly by the growing gap in incomes within the African population as some benefited from upward occupational mobility and rising wages while others found themselves unemployed and increasingly marginalised within the labour market. Even recently in the Eastern Cape there is still a huge gap when it comes to educational tools. Some students entering the university are coming from these disadvantaged backgrounds.

It is that even post-apartheid era, South African households are rich or poor according primarily to the number and earnings of wage earners, and earnings in turn depend overwhelmingly on education and skill. What is striking about inequality in South Africa in the decade following the end of apartheid is the number of continuities from the preceding decade. The changes that take place are the continuations of changes that were evident before 1994. The

unemployment still grows, the informal and smallholder agricultural sectors remained stagnant, and the ranks of the poor are still swelling. Inequality still remains as high as ever, if not higher, even if interracial differentials have declined (Calderhead, 2011; Council, 2012; Corbel & Gruba, 2004; Czerniewicz & Brown, 2005; DoE, 2006; Isaacs, 2007; Lundall & Howell, 2000; Mphidi, 2009; Seekings & Nattrass, 2005). The enduring legacy of past discrimination, especially in public education persists, apartheid has ensured that many black households remain in deep poverty and most are poor because they or their prospective breadwinners are unemployed and many of the unemployed are still so the disadvantaged in the labour market as to warrant identification as a discrete underclass (Seekings & Nattrass, 2005; Spaull, 2018).

Students Experience and Perceived Usefulness in using digital tools before university entrance

There was a significant positive relationship after the intervention between perceived usefulness in using digital tools before university entrance. Constraints such as inexperience, fear, anxiety or stress related to the use of a computer, the knowledge about using application software as well as the experience in using digital tools for academic learning do not affect students' perceptions. According to many researchers, there is a statistically significant relation between "perceived ease of use" and "perceived usefulness**"** (Davis, Bagozzi, & Warshaw, 1989; Davis, 1993; (Lai, 2017; (Venkatesh & Bala, 2008; Landry, Griffeth, & Hartman, 2006) and it is also the case in this study. Both Phi and Cramer's tests show the strength of association between the variables as very strong:

Correlations

			Digital_tools	Very_useful	Slightly_useful	Neutral	Not_useful_at_all
Kendall's tau_b	Digital_tools	Correlation Coefficient	1.000	.122	-.248	-.129	.
		Sig. (2-tailed)	.	.656	.384	.664	.
		N	10	10	10	9	10
	Very_useful	Correlation Coefficient	.122	1.000	-.340	-1.000**	.
		Sig. (2-tailed)	.656	.	.284	.	.

Figure 5.1: Predictors: (Constant), Perceived Usefulness; b Dependent Variable: attitude

Students' Perceived Ease of Use in digital tools for learning

The perceived ease of use was the main concern of those who answered the questions. We sampled 9195 students and evaluated whether the number of students who lacked computer skills before the assessments was equal to the number of students who were skilled after training. The data analysed using a Kendal Tau coefficient test showed that p value of >.522 as statistically significant at 0.01 level (2 tailed) with a standards deviation of .707 as shown in the table below. This Tau coefficient is suggesting a strong relationship between the training and confidence rankings. Both Phi and Cramer tests of the strength of association show that the strength of association between the perceptions of ease of use and training variables is very strong.

Research Question 1

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Scores	2	1.50	.707	1	2
Computer_components	2	4597.5000	3520.68466	2108.00	7087.00
Ms_Excel	2	4597.5000	6013.94317	345.00	8850.00
MS_PowerPoint	2	4597.5000	5271.48105	870.00	8325.00
MS_Word	2	4597.5000	3568.76792	2074.00	7121.00

Figure 5.2: Pre-Test statistics of Ease of Use and Confidence

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Scores	2	1.50	.707	1	2
Computer_components	2	4597.5000	6494.77579	5.00	9190.00
Ms_Excel	2	4597.5000	6367.49656	95.00	9100.00
MS_PowerPoint	2	4597.5000	6438.20724	45.00	9150.00
MS_Word	2	4597.5000	6206.27622	209.00	8986.00

Figure 5.3: Post-Test Statistics of Ease of Use and Confidence in using digital tools

Research Question 2

What are Students' Perceived attitudes and self-efficacy towards using digital tools?

Looking at the data in the table below, the data analysed using a Kendall's Tau correlation as significant at the 0.01 level showed the results of highly positive correlation between self- efficacy and attitude when it comes to using digital tools for lifelong learning followed by passing but no correlation between self- efficacy and using tools for university only.

The variables that contribute the greatest influence and positive impact on attitude towards usability of digital tools for learning as indicated by perceived experience show a regression coefficient of 0.961. It means students have a positive attitude toward the use of digital tools even before exposed to formal digital training. After they are exposed to training experience on how the digital tools are used within the higher learning environment, this leads to even more attitudinal change towards self-efficacy. This is in line with many previous researches such as (Brown & Czerniewicz, 2010; Czerniewicz & Brown, 2013; Calderhead, 2011; Gantz, 2013; Ertmer, et al., 2011; Tinto, 2012; (Ventakesh, Morris, Davis, & Davis, 2003) who conducted research on students's first year experiences with digital tools. The acceptance of the use of digital tools for academic activities among students at the Higher Education showed that the biggest variable affecting attitudes toward the use of internet among students is its perceived usefulness.

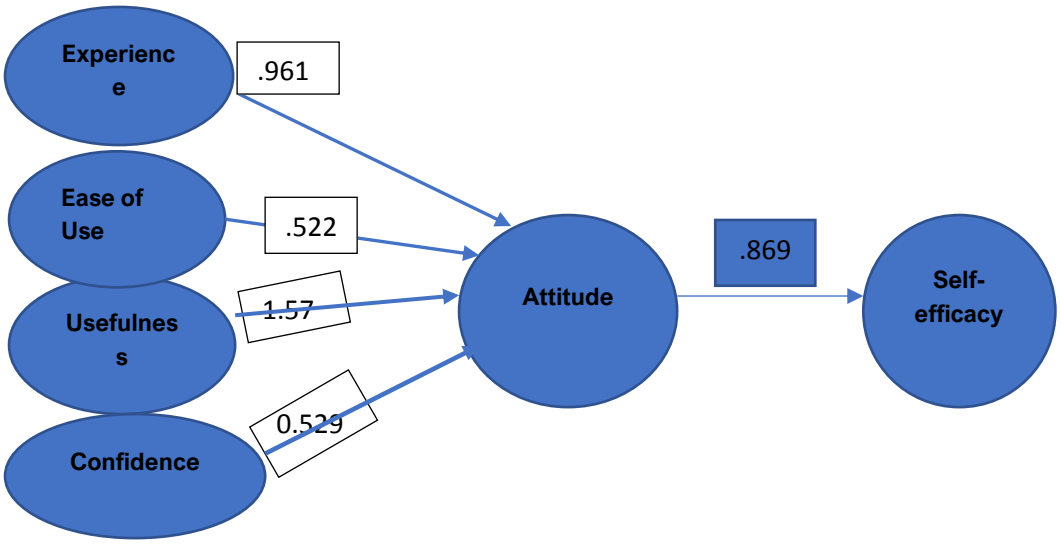
Students' main goal is to pass but clearly, they also understand the value of using tools beyond the university as critical. A strong relationship between Attitudes of students and usage of digital tool and self-efficacy is a very strong one at .869 which relates to the fact that students' attitudes are necessary to accept digital tools experience and gain self-efficacy as per research by (Fishbein & Ajzen, 1975; VenJohn, 2008; Caruso & Kvavik,

2005; Corbel & Gruba, 2004; Czerniewicz & Brown, 2005; Fry, Ketteridge, & Marshall, Eds.) 2008; Ertmer, 2005; Gantz, 2013).

I have also used both Phi and Cramer tests of the strength of association and they also show that the strength of association between the perceptions of ease of use, training and self-efficacy (a variable which emerged after the students' attitudes changed from confusion, insecurity and anxiety) variables is very strong. Students' attitudes changed, and statistics show that students were the able on their own, to use digital tools to perform different tasks, access online content ubiquitously, use various multimedia to learn and to create knowledge e.g. PowerPoint etc. as well as confidence in using the internet to not only access web-based services but to also identify best sites for learning material.

Research Question 3

Is there a relationship between first year students' intentions, experiences, attitudes and students' perceptions that leads to digital literacy skills and self-efficaciousness in the use of technology?



The results showed that the students initially had a positive perception regarding the experience of using digital tools before the university. Their attitude towards the perceived ease of use and confidence are almost close which suggests that the students' confidence in using digital tools is closely related to the digital tools' ease of use. The

statistics showed that the experience, ease of use and confidence are positive variables towards acceptance of the digital tools in finding them useful and changing attitude. It seems when the attitude has been changed positively, students are then able to perform academic tasks all by themselves without needing guidance. This is in accordance with previous studies supporting that attitude and experience with the digital tools affects students' participation towards self-efficacy. There is no one size fits all but intervention is needed to help and guide students, so they can attain self-efficacy in using digital tools (Brown & Czerniewicz, 2010; Ertmer, et al., 2011); (Dlamini & Na'Allah, 2015); Fishbein & Ajzen,1975; Calderhead, 2011; Gantz, 2013; Gosling, 2009; Hirtz, Harper, & Mackenzie, 2008; Isaacs, 2007; Kennedy, Judd, Churchward, & Gray, 2008;Heyman & Carolissen, 2011; Kreutzer, 2009; Levine & Donitsa-Schmidt, 1998).

Differences between men and women suggest that acceptance and perception of using digital tools are not confined to gender however the statistics show that for now it is more Africans who attended the interventions and needed more upskilling.

Conclusions

The approach to the integration of ICTs into university curricula need to consider that any technological integration should be pedagogically driven not just about "clicks". Educators, educational developers with expertise in both existing and emerging technologies need to take hands-on position in this respect. Against the backdrop of this principle, educators and administrators ought to look to the evidence about what technologies students have access to and what their preferences are. It is easy to make assumptions about what students know – and are likely to know but the universities and their staff are required to look to the evidence to inform both policy and practice. As university teachers it is essential to be attuned to the always changing and often diverse characteristics of our first-year student cohorts. Evidence of who our students are, must

remain an important factor in informing how we use the array of technological tools at our disposal to design rich and engaging learning experiences for all students.

It is true that I omitted some of the questions in this research that ask students more in-depth questions such as how they think technologies need to be used in university settings. More research needs to be conducted to determine the specific circumstances under which students would like their experiences of technologies to be adapted as "learning technologies".

Nonetheless, the general message of diversity among students means that there are a selection of tools and technologies for which use and access border on being both universal and uniform. Students rely heavily on computers for study and for listening to music; almost all have mobile phones for calling and texting families and others; they regularly use the Internet for information gathering, email and instant messaging. In addition, the clear majority want to use the web to search for information for their university studies, to access university services and to use a portal as a gateway to learning material. The study thus was to a certain point relevant to the students' needs to ascertain the areas of growth in the on-going study.

Limitations of the study

This study involved a large number of students in a 5-week project entrenched within an introductory educational technology course. Thus, generalizability is limited to similar students in similar courses. The study could have included specific provinces where students come from to ascertain exact locations and the impact of the students' experiences from those areas. There are also costs implications when it comes to off campus students compared to the on campus who have access to Wi-Fi; a factor that was not explored in this study.

Recommendations

Additional survey items could be included that query students' confidence for working with other advanced technological tools.

Future Research

Students; ambassadors played a big role in training other students. Peer mentorship plays a big role in the retention of first-year students and their academic success, as articulated in the Guide to Being an Extraordinary Student published book (Lelosa , et al., 2017). This book is a collection of tertiary students' experiences, written by students from various universities in South Africa to inspire other students. The future research may empirically show us if this initiative is really impactful.

Finally, we did not gather data from the specific provinces in South Africa; and the inclusion of tutors' voices on what more tools can benefit students is important. The students' ambassadors (tutors) and their voices will be included in future research efforts.

This study has not covered the costs incurred by the students in using data outside the university (i.e. off campus) for academic work. In the future it would be important to look not only on access but the costs of data in using digital literacies on making technology and knowledge more affordable and accessible to the less affording.

References

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information. Information System Research, 9(2), 204–215.

Ajzen, F. M. (2007). I 1975 Belief, attitude, intention, and behavior: An introduction to theory and research. MA: Addison-Wesley., 50, 179−211.

Allan, J. (1996,2006). Learning outcomes in higher education. Studies in Higher Education, 21(1), 93-108.

Ally, M. (2008). The Impact of Technology on Education. Education for a Digital World, 57-66.

Atherton, J. S. (2009). Learning and Teaching; Reflection and Reflective Practice. Retrieved November 20, 2017, from https://sites.google.com/site/eportfoliohow/reflection-1

Bandura, A. (1977a). Psychological Review: Self-efficacy: Toward a unifying theory of behavior change., 84, 191 - 215.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Baxter, P., & Jack, S. (2008, December). Qualitative Case Study Methodology: Study Design and implementation for Novice Researchers. The Qualitative Report, 13, 544-559. Retrieved from http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf

Baxter, P., & Jack, S. (2008). The Qualitative Report. Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers, 13(4), 544 - 559. Retrieved from http://nsuworks.nova.edu/tqr/vol13/iss4/2

Bennet, S., Maton , K., & Kervin, L. (2008). The ‘digital natives’ debate: A critical review ofthe evidence. British Journal of Educational Technology, 39(5), 775-786. doi:doi:10.1111/j.1467-8535.2007.00793.x

Bhattacharya , M., & Hartnett, M. (2008). Chapter Abstracts: Addressing Diversity. Education for a Digital World.

Bhattacharya, M. (2006). Introducing Integrated EPortfolio Across Courses in a Postgraduate Program in Distance and Online Education. In R.C. Sharma &S. Sharma (Eds.). Cases on Global E-learning Practices:Successes and Pitfalls. Chapter 7. Hershey, PA:Idea Group.

Bhattacharya, M., & Hartnett, M. (n.d.). Addressing Diversity in Design of Online Courses. Education for a Digital World, 41-49.

Biggs, J. (1999). Teaching for quality learning at university. Buckingham, UK: Society for Research in Higher Education/Open University Press.

Biggs, J. (2003). Teaching for quality learning at university . Buckingham,UK: Open University Press.

Brenton, S. (2009). E-Learning: An introduction. In H. Fry, S. Ketteridge, & S. Marshall, A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice. Third Edition (pp. 85 - 98). Routledge.

Brown, C., & Czerniewicz, L. (2010). Debunking the “digital native”: Beyond digital apartheid, towards digital democracy. Journal of Computer Assisted Learning, 26(5), 357 – 369.

Brownlee, J., Walker, S., Lennox, S., Exley, B., & Pearce, S. (2009). Higher Educ. The first year university experience: using personal epistemology to understand effective learning and teaching in higher education, 599-618. doi:DOI 10.1007/s10734-009-9212-2

Calderhead, V. (2011). DRAFT: The Right to an ‘adequate’ and ‘equal’ education in South Africa:An analysis of s. 29(1)(a) of the South African Constitution and the right to equality as applied to basic education. 1-51.

Carr, L. T. (1994). The strengths and weaknesses of quantitative and qualitative research: what method for nursing? Journal of advanced nursing, 20(4), 716-721.

Caruso, J., & Kvavik, R. (2005). ECAR study of students and information technology: Convenience, connection, control, and learning. EDUCAUSE.

Cheng, B., Wang, M., Yang, S. H., Kinshuk, & Peng, J. (2011). Acceptance of competency-based workplace e-learning systems: Effects of individual and peer learning support. Computers & Education(57), 1317–1333.

Coleman, E. M. (2001, March 2- 3 MARCH). Speeches & statements: MPUMALANGA PROVINCIAL POVERTY SUMMIT. Retrieved May 14, 2013, from South African Government Information: http://www.info.gov.za/speeches/2001/0103051145a1002.htm

Colorafi, K. J., & Evans, B. (2016). Qualitative descriptive methods in health science research. HERD: Health Environments Research & Design Journal. 9(4), 16 - 25.

Corbel, C., & Gruba, P. (2004). Teaching computer literacy. Teaching with new technology series: Why do we teach computer literacy?, 1-55.

Council, E. C. (2012, June). EASTERN CAPE DEVELOPMENT REPORT. Eastern Cape Development Indicators, 1-61.

Czerniewicz , L., & Brown, C. (2013). The habitus of digital “strangers” in higher education. British Journal of Educational Technology, Vol 44 (1), 44–53. doi:10.1111/j.1467-8535.2012.01281.x

Czerniewicz, L., & Brown, C. (2005). Access to ICTs for teaching and learning: From single artefact to inter-related resources. International Journal of Education and Development using ICT [Online], 1(2), 42 - 56.

Dass, S., & Rinquest, A. (2017, Feb). Retrieved from Basic Education Rights Handbook – Education Rights in South Africa – Chapter 7: School Fees: http://section27.org.za/wp-content/uploads/2017/02/Chapter-7.pdf

Davis, F. D. (1993, March). International Journal of Man-Machine Studies. User Acceptance of information technology:system characteristics, user perceptions and behavioral impacts., 38(3), 475–487.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models, 35(8), 982-1003.

Delich, P., Kelly, K., & McIntosh, D. (2008). Emerging Technologies in E-learning. Education for a

Digital World, 5-22.

Delich, P., Kelly, K., & McIntosh, D. (2008). The Impact of Instructional Technologies:Emerging Technologies in e-Learning. Education for a Digital World. Advice, Guidelines, and Effective Practice from Around the Globe, 1-516.

deMarrais, K., & Lapan, S. S. (2004). Foundations for research. Methods of Inquiry in.education and. Social Sciences.

deMarrais, Kathleen & Lapan, D. Stephen . (2004). Foundations for Research: Methods of Inquiry in Education and the Social Sciences. London: Lawrence Erlbaum Associates.

Demir, K. (2006). Rogers’ Theory of the diffusion of innovations and online course registration. Educational Administration, 12(47), 386-392.

Devereux, S. (2018, August 27). Academic rigour, journalistic flair. Retrieved from THE CONVERSATION. eDUCATION: http://theconversation.com/south-africas-university-students-face-a-crisis-nearly-a-third-go-hungry-102053

Dlamini, R. (2018). A Multi-Site Study of ICT Pedagogical Practices in Schools: The South African Case. In Society for Information Technology & Teacher Education International Conference (pp. 2139-2154).Association for the Advancement of Computing (AACE).

Dlamini, R., & Na'Allah, D. (2015). In South Africa International Conference on educational Technologies.Beyond Policies and Programs: Contextualizing ICT Integration in South African Schools, 162.

DoE. (2006). DoE White Paper 7.qxd: White Paper on e-Education. Transforming Learning and Teaching through Information and Communication Technologies (ICTs)(26762), 1- 44.

Donner, J., & Gitau, S. (2009). New Paths: Exploring Mobile-Centric Internet Use in South Africa. "Mobile 2.0: Beyond Voice?". Pre-conference workshop at the International Communication Association Conference, (pp. 1-21). Chicago, Illinois.

Draganidis, F., & Mentzas, G. (2006). Competency-based management: A review of systems and approaches. Information Management &Computer Security. 14, 51–64.

Ertmer, P. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? Educational Technology Research and Development, 53 (4), 25–39.

Ertmer, P. A. (2003). Transforming teacher education: Visions and strategies. Educational Technology Research and Development, 51(1), 124 – 128.

Ertmer, P. A., Newby, T. J., Liu, W., Tomory, A., Yu, J. H., & Lee, Y. M. (2011). Students' confidence and perceived value for participating in cross-cultural wiki-based collaborations. Educational Technology Research and Development, 59(2), 213-228.

Fan, Q. (2016, May). The World Bank. Retrieved from Digital Technologies Have Spread Rapidly, But Digital Dividends Have Lagged Behind, says New World Bank Report.

Fernandez, C. A. (2011, May 3). LIVESTRONG.COM. Retrieved September 27, 2013, from LIVESTRONG.COM. THE LIMITLESS POTENTIAL OF YOU: http://www.livestrong.com/article/98672-differences-between-state-anxiety-/

Fishbein, M. A., & Ajzen, I. (1975). Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley, 1-520. Retrieved from http://people.umass.edu/aizen/f&a1975.html

Fry, H., Ketteridge, S., & Marshall, S. (Eds.) 2008). A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice. Third Edition. Routledge.

Gantz, J. F. (2013). SKILLS REQUIREMENTS FOR TOMORROW'S BEST JOBS: Helping Educators Provide Students with Skills and Tools They Need. WHITE PAPER, 1 - 24.

Gardner, J. N., & Gardner, J. (2012). (Eds.) Assessment and learning. Sage. Sage.

Gayol, & Schied. (1997). The organization of learning and engagement of learners through educational technologies is essential to pedagogy , 1-141.

Gosling, D. (2009). Supporting student learning. In H. Fry, S. Ketteridge, & S. Marshall, A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice. Third Edition (pp. 1-544). Routledge.

Gu, X., Zhu, Y., & Guo, X. (2013). Meeting the" digital natives": Understanding the acceptance of technology in classrooms. Journal of Educational Technology & Society, 16(1), 392 - 402.

Heale, R., & Forbes, D. (2013). Understanding triangulation in research Evidence-Based Nursing. 16:98.

Health Promotion – Principles and practice in the Australian context. (2007). Australian and New Zealand Journal of Public Health, 31, 388 - 389. doi:doi:10.1111/j.1753-6405.2007.00097.x

Herrington, J., Reeves, T. C., Oliver , R., & Woo, Y. (2002). Designing Authentic Activities in Web-based Courses. Designing authentic activities for web-based courses. In: World Conference on ELearning in Corporate, Government, Healthcare, and Higher Education (ELEARN).

Heyman, L., & Carolissen, R. (2011). South African Journal of Higher Education. The concept of first generation student in the literature:Implications for South African higher education, 25(7), 1378-1396.

Hidden Curriculum. (2014, August 26). Retrieved September 10, 2014, from In S. Abbott (Ed.), The Glossary of Education Reform.: Retrieved from http://edglossary.org/hidden-curriculum

Hirtz, S., Harper, D. G., & Mackenzie, S. (2008). ADDRESSING DIVERSITY. Education for a Digital World:Advice, Guidelines, and Effective Practice from Around the Globe, 1-504.

Huang, H. M., & Liaw, S. S. (2005). Exploring users' attitudes and intentions toward the web as a survey tool. Computers in human behavior, 21(5), 729-743.

Isaacs, S. (2007). ICT in Education in South Africa. SURVEY OF ICT AND EDUCATION IN AFRICA: South Africa Country Report, 1- 29. Retrieved November 30, 2017, from http://www.academia.edu/799842/Ict_in_education_in_south_africa

Jackson, R. L., Drummond, D. K., & Camara, S. (2007). Qualitative research reports in communication. What is qualitative research?, 8(1), 21-28.

Jansen, J. D. (2018). Address to the Academic Council of Stanford University:On the 50th Anniversary of the Faculty Senate. The Case for the Academic Senate: Stellenbosch University, 1 - 6.

Jick, T. D. (1979). Mixing Qualitative and Quantitative Methods: Triangulation in Action. Administrative Science Quarterly. 24(4), 602 - 611. doi:10.2307/2392366

Johnson, R. B., Onwuegbuzie, A. J., & Turner , L. A. (2007). Toward a Definition of Mixed Methods Research. Journal of Mixed Methods Research, 1(2), 112 - 133.

Jonassen, D. H., & Reeves, T. (2004). Learning with Technology: Using Computers as Cognitive Tools. In D. H. Jonassen (Ed.), Handbook of Research on Educational Communications and Technology.

Jonassen, D. H., Carr, C., & Yueh, H. P. (1998). Computers as mindtools for engaging learners in critical thinking. TechTrends, 43(2), 24-32.

Jones, C., Ramanau, R., Cross, S., & Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university? Computers & Education, 54(3), 722-732. doi:https://doi.org/10.1016/j.compedu.2009.09.022

Joseph, L. (2017). The adoption and diffusion of computing and Internet technologies in historically Black colleges and universities. Ph.D. thesis, Walden University. Retrieved from https://www.learntechlib.org/p/124748/

Kennedy, G. E., Judd, T. S., Churchward, A., & Gray, K. (2008). First year students' experiences with technology:Are they really digital natives? Australasian Journal of Educational Technology, 24(1), 108-122.

Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S. J., . . . Churchwood, A. (2007). The Net Generation are not big users of Web 2.0 technologies: preliminary findings. In R. Atkinson, C. In R. Atkinson, C.McBeath, S. Soong & C. Cheers (Eds.),Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, 517-525.

Kim, B., & Reeves, T. C. (2007). Reframing research on learning with technology: in search of the meaning of cognitive tools. . Instructional Science(35), 207-256.

Kirkwood , A., & Price, L. (2005). Learners and learning in the twenty-first century: what do we know about students' attitudes towards and experiences of information and communication technologies that will help us design courses? Studies in Higher Education, 30(3), 257-274. Retrieved from Learners and learning in the twenty-first.

Kolikant, Y. B.-D. (2010). Digital natives, better learners? Students' beliefs about how the Internet influenced their ability to learn. Computers in Human Behavior, 26, 1384–1391.

Kreutzer, T. (2009). Generation mobile: online and digital media usage on mobile phones among low-income urban youth in South Africa. University of Cape Town, Cape Town. 1-21.

Kvavik, R. B. (2005). Convenience, communications, and control: How students use technology. In D. Oblinger & J. Oblinger (Eds.), Educating the Net Generation EDUCAUSE.(pp. 7.1-7.20).http://www.educause.edu/educatingthenetgen/.

Kwet, M. (2019). Digital colonialism: US empire and the new imperialism in the Global South. Race & Class. 1 - 24. doi:https://doi.org/10.1177/0306396818823172

Lai, P. C. (2017). The Literature Review of Technology Adoption Models and Theories for the Novelty Technology. Journal of Information Systems and Technology Management, 14(1), 21-38.

Landry, B., Griffeth, R., & Hartman, S. (2006). Measuring Student Perceptions of Blackboard Using the Technology Acceptance Model. Decision Sciences. Journal of Innovative Education, 4, 87-99. doi:http://dx.doi.org/10.1111/j.1540-4609.2006.00103.x

Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge, UK: Cambridge University Press.

Leedy, P. D., & Ormrod, J. E. (2010). Practical research: Planning and design. Saddle River, NJ: Pearson Education, Inc.

Lelosa , J., Maifo, M., Mokalapa, T., Kgatle, M., Gama, S., & Hans, T. (2017). *A guide to being EXTRAORDINARY STUDENT. A collection of tertiary students' experiences.* Benoni, Johanesburg: Club Readership.

Levine , T., & Donitsa-Schmidt, S. (1998). Students' Computer Use, Confidence, Attitudes, and Knowledge: A Causal Analysis. Computers in Human Behavior, 14(1), 125-146.

Lewins, A., Taylor , C., & Gibbs, G. R. (2010). Online QDA. Retrieved May 14, 2013, from What is Qualitative Data Analysis (QDA)?: onlineqda.hud.ac.uk/Intro_QDA/what_is_qda.php

Lundall, P., & Howell, C. (2000). Computers in Schools:Education Policy Unit, University of the Western Cape and the International Development Research Centre. A national survey of Information Communication Technology in South African schools, 1-203.

Maurer, M. M. (1994). Computer Anxiety Correlates and What They Tell Us: A Literature Review. Computers in Human Behavior, 10(3), 369-376.

McCoy, R. (2001). Computer competencies for the 21st century information systems educator. Information,Technology, Learning, and Performance Journal, 19 (2), 21-35.

McMillan, J. H., & Schumacher, S. (2010). Research in education. Evidence-based inquiry. New Jersey: Pearson Education.

Mdlongwa, T. (2012). AISA Policy Brief. Africa Institute of South Africa(80), 1-8.

Mphidi, H. (2009). Digital divide and e-governance in South Africa. Unpublished paper presented at Research, Innovation and Partnerships, . Tshwane, South Africa.

Muijs, D. (2010). Doing quantitative research in education with SPSS. Sage.

O'Reilly , D., & Kelly, K. (2008). Assessment and Evaluation. Education for a Digital World, 213-244.

Oblinger, D. (2003). "Boomers, Gen-X and Mellenials. Understanding the new student". Educause, 1(1), 38-47.

Oblinger, D. (2006). Listening to what we're seeing. Keynote Paper presented at ALT–C 2006.

Oblinger, D., & Oblinger, J. (2005). Is it age or IT: first steps towards understanding the net generation. In D. Oblinger & J. Oblinger (Eds), Educating the Net generation, 2.1–2.20.

Oblinger, D., Oblinger, J. L., & Lippincott, J. K. (2005). "Educating the Net Generation". Retrieved November 8 , 2017, from https://digitalcommons.brockport.edu/bookshelf/272

Oldfield, J., & Herrington, J. (2013). Augmenting learning reality: iPads and software as cognitive tools. In H. Carter, M. Gosper and J. Hedberg (Eds.). Electric Dreams Proceedings Ascilite Conference 2013 Sydney, (pp. 652-656).

Pace, L., & Worthen, M. (2014). Agency of Education; Revised 2017. What is proficiency-based learning?, 1-8.

Palfrey, J., & Gasser, U. (2008). BORN DIGITAL. New York: Basic Books, A Member of the Perseus Books Group.

Park, M. T. (2015, May 6). State of the City Address, Delivered by the Executive Mayor. Executive Mayor, 6 May 2015.

City of Johannesburg, Gauteng, South Africa.

Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. Journal of Educational Technology & Society, 12(3), 150-162.

Parsons, D. (2012). Innovations in Mobile Educational Technologies and Applications. Hershey PA, USA: IGI Global.

Pearson. (2018, December 20). Pearson. Retrieved from Smartkids: Education in South Africa. Schools in South Africa: https://www.smart-kids.co.za/schools-south-africa

Perkins, D. N. (1991). Educational Technology:Technology Meets Constructivism: Do They Make a Marriage, 18-23.

Potchefstroom Campus Library. (2013). Writing Assignments: North-West University:. 1 - 21. Retrieved from library.nwu.ac.za/.../files/documents/report-writing.pdf

Prensky, M. (2001). On the Horizon. Digital Natives, Digital Immigrants., 9(5).

Prensky, M. (2001a, October). Digital Natives, Digital Immigrants. On the Horizon, 9(5), 1- 6.

Prensky, M. (2001b). Digital natives, digital immigrants, part II. Do they really think differently? On the Horizon, 9(6), 1– 6.

Raddon, A. (n.d.). College of Social Science: Generic Skills Training for Research Students. Early Stage Research Training:Epistemology & Ontology in Social Science Research, 1-14.

Rogers, E. (1995). Diffusion of innovation (4th ed.). . New York: The Free Press.

Rogers, E. M., Singhal, A., & Quinlan, M. M. (1999). Diffusion of innovations. An integrated approach to communication theory and research. New York: Routledge.

Sadaf, A., & Newby, T. J. (2012). Exploring factors that predict preservice teachers' intentions to use Web 2.0 technologies using decomposed theory of planned behavior. Journal of Research on Technology in Education, 45(2), 171-196.

Saettler, P. (2004). The Evolution of American Educational Technology. GreenwiCh: Information Age Publishing, Inc.

Saloman, G., Perkins, D. N., & Globerson, T. (1991). Partners in cognition: Extending human intelligence with intelligent technologies. Educational Researcher. 20(3), 2-9.

Sam, H. K., Othman, A. A., & Nordin, Z. S. (2005). Computer Self-Efficacy, Computer Anxiety and Attitudes toward the Internet: A study amongst Undergarduates in Unimas. Educational Technology & Society, 8(4), 205-219.

Sam, H. K., Othman, A. E., & Nordin, Z. S. (2005). Computer Self-Efficacy, Computer Anxiety, and Attitudes toward the Internet: A Study among Undergraduates in Unimas. Educational Technology & Society, 8 (4), 205-219.

Sam, H. K., Othman, A. E., & Nordin, Z. S. (2005). Educational Technology & Society. Computer Self-Efficacy, Computer Anxiety, and Attitudes toward the Internet: A Study among Undergraduates in Unimas, 8(4), 205-219.

Scalise , K., & Gifford, B. (2006). Computer-Based Assessment in E-Learning:A Framework for Constructing "Intermediate Constraint" Questions and Tasks for Technology Platforms. The Journal of Technology, Learning, and Assessment, 4(6), 1-45.

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1996). The Assessment of Optimistic Self-Beliefs: Comparison of the German, Spanish, and Chinese Versions. To appear in: Applied Psychology: An International Review. Retrieved from http://web.fu-berlin.de/gesund/gesu_engl/lingua5.htm

Sedibe, M. (2011). Inequality of Access to Resources in Previously DisadvantagedSouth African High Schools. J Soc Sci, 28(2), 129 - 135.

Seekings , J., & Nattrass, N. (2005). Class, Race, and Inequality in South Africa. Michigan, United States of America: Library of Congress Cataloging-in-Publication Data.

Seidel, J. (1998). Qualitative Data Analyisis. The Ethnograph v5 Manua, Appendix E.

Seymour, L. F., & Fourie, R. (2010). ICT literacy in Higher Education: Influences and Inequality, 1-6.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. Education for information, 22(2), 63 - 75.

Simonson, M., Mauer, M., Toradi, M., & Whitaker, M. (1987). Development of a standardised test of computer literacy and a computer anxiety index. Journal of Educational Computing Research, 3(2), 231-247.

Smith, H., Quinn, A., & Kelly, N. (2015). Digital apprehension and first year university students. 931-939.

Spaull, N. (2018, August 20). The Emperor's New Clothes – (reading and the 4th Industrial Revolution in SA). Retrieved from Nic Spaull: https://nicspaull.com/

Star, C., & McDonald, J. (2007). Embedding Successful Pedagogical Practices: Assessment Strategies for a Large, Diverse, First Year Student Cohort. International Journal of Pedagogies and Learning, 3(2), 18-30.

Stephanie. (2018, June 11). StatisticsHowto.com: About. Retrieved from Statistics How To: http://www.statisticshowto.com/kendalls-tau/

Strassburg, S., Meny-Gibert, S., & Russell, B. (2010). Left unfinished. Access to Education in South Africa. Temporary absence and drop-out from South African schools, 2, 1 - 55.

Suchman, L. (1987). Plans and situated actions: The problem of human machine. Commentary by Daniel L. Schwartz & Taylor Martin. Representations that Depend on the Environment: Interpretative, Predictive, and Praxis Perspectives on Learning, 1 - 22.

Sun, P.-C., Tsai, R. J., Finger, G., Chen, Y.-Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation. Science Direct: Computers & Education, 50, 1183–1202.

Tam, M. (2000). Constructivism, Instructional Design, and Technology: Implications for Transforming Distance Learning. Educational Technology & Society, 3(2). Retrieved from http://www.ifets.info/journals/3_2/tam.html

Tapscott, D. (1998). Growing up digital: the rise of the Net generation. New York: McGraw-Hill.

Tapscott, D. (1999). Educating the Net generation. Educational Leadership, 56(5), 6–11.

Tapscott, D. (2008). Grown up digital: How the Net generation is changing your world. . New York: McGraw-Hill.

Tel Aviv University. (2008, January 12, 2019). Keep Boys And Girls Together In The Classroom To Optimize Learning, Research Suggests. Retrieved from from www.sciencedaily.com/releases/2008/04/080411150856.htm

Tella, A. (2006). The Impact of Self-Efficacy and Prior Computer Experience on the Creativity of New Librarians in Selected Universities Libraries in Southwest Nigeria. Library Philosophy and Practice, 8 (2), 1-12.

The World Bank. (2018). An Assessment of Drivers, Constraints and Opportunities. OVERCOMING POVERTY AND INEQUALITY IN SOUTH AFRICA., 1 - 148.

Thinyane, H. (2010). Are digital natives a world-wide phenomenon? An investigation into South African first year students' use and experience with technology. Computers & Education, 55 , 406–414.

Thlabane, S. A. (2017). Enhancing the Quality of Education Provision in Gauteng. GDE-LEKGOTLA Adopting ICT Perspective in Education Through operation Phakisa, 1 - 239.

Thomas, P. Y. (2010). Chapter 3: Learning and Instructional Systems Design. Towards developing a web-based blended learning environment at the University of Botswana, Doctor of educationdissertation, University of South Africa., 181-290.

Thomas, R. R. (1995). A diversity framework. In M. M.Chemers, S. Oskamp & M. A. Costanzo (Eds.), Diversity in organizations: new perspectives for a changing workplace (pp. 245-263). Thousand Oaks: Sage Publications.

Tinto, V. (2012). The International Journal of the First Year in Higher Education. Enhancing student success: Taking the classroom success seriously., 3(1), 1 - 8.

Tinto, V. (2012). The International Journal of the First Year in Higher Education. Enhancing student success: Taking the classroom success seriously , 3(1), 1-8. doi:10.5204/intjfyhe.v2i1.119

Van der Merwe, A., Bozalek, V., Ivala, E., Nagel, L., Peté, M., & Vanker, C. (2015). Blended learning with technology. Universities South Africa., 1-5.

VenJohn, A. (2008). Research for First Year Experience. Prepared by Angella VenJohn For Counseling Department:Comprehensive Approach to Enhancing Student Success in the First Year, 1- 4.

VenJohn, A. (2008). Comprehensive Approach to Enhancing Student Success in the First Year: Prepared by Angella VenJohn. Research for First Year Experience, 1 - 4.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions.Decision Sciences, 39(2), 273-315.

Venkatesh, V., & Bala, H. (2013). TAM 3: Advancing the technology acceptance model with a focus on interventions. Manuscript in preparation.

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly(27), 425-478.

Ventakesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions.Decision Sciences, 39(2), 273–315.

Ventakesh, V., & Bala, H. (2008). Decision Sciences:Technology Acceptance Model 3 and a Research Agenda on Interventions, 39(2), 273–315.

Ventakesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003, September). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27 No. 3, pp.(3), 425-478.

Vygotsky, L. S. (1986). Thought and language. A. Kozulin.

Wegerif, R. (2007). Talk Around Computers: Expanding the Space of Reflection. In: Dialogic Education and Technology. Computer-Supported Collaborative Learning. Vol. 7. Springer, Boston, MA, 187-218.

Wertsch, J. (1998). Mind as Action. New York: Oxford University Press.

White, G. K. (2013). Digital fluency: skills necessary for learning in the digital age., 1-13.

Wits University. (2000-2013). First Year Experience. Retrieved June 30, 2017, from First Year Experience: https://www.wits.ac.za/students/first-year-experience/

Yates , G. R., & Chandler, M. (1991). The cognitive psychology of knowledge: Basic research findings and educational implications. Australian Journal of Education, 35, 131-153.

Zimmerman, B. J. (2000). Self-efficacy: an essential motive to learn. Contemporary Educational Psychology, 25, 82–91.

APPENDICES

Appendix A: Consent Forms

Information Sheet: Students

DATE:

Dear Learner

My name is Antoinette N Malgas and I am a Master's in Education student in the School of Education at the University of the Witwatersrand.

I am doing research on **"Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) by First Year Students: The Case of a South African University"**

My investigation involves the information gathered in these FYE ICT Skills sessions that you are attending so we can improve for the benefit of all first-year students in your position, the following years.

I was wondering whether you would mind if participating in this research by filling in the pre-assessment, post-assessment questionnaires. I need your help to make it easy for first year students in bridging the gap between high school and university by providing a support structure aimed at empowering and equipping first year university students with the necessary and essential skills to navigate successfully through university.

Remember, this is not a test, it is not for marks and it is voluntary, which means that you don't have to do it. Also, if you decide halfway through that you prefer to stop, this is completely your choice and will not affect you negatively in any way.

I will not be using your own name, but I will make one up so no one can identify you. All information about you will be kept confidential in all my writing about the study. Also, all collected information will be stored safely and destroyed within 3-5 years after I have completed my study.

If you are under 18 your parents have also been given an information sheet and consent form.

I look forward to working with you!

Please feel free to contact me if you have any questions.

Thank you

SIGNATURE

NAME : Antoinette N. Malgas

ADDRESS : CLTD, West Campus Wits University

EMAIL : antoinette.malgas@wits.ac.za

TELEPHONE NUMBERS : 0658482136

Consent Form: STUDENTS' Questionnaire

Please fill in the reply slip below if you agree to fill in a question and answer sheet. I will use this sheet for my study called: "**Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) by First Year Students: The Case of a South African University"**

Permission for questionnaire

My name is: _____

I agree to fill in a question and answer sheet for this study. YES/NO

I know that Antoinette N Malgas) will keep my information confidential and safe. YES/NO

I know that I don't have to answer all the questions and can decide to stop the activity at any time. YES/NO

Sign_____ Date_____

Contact person: Antoinette N. Malgas - (Antoinette.malgas@wits.ac.za)

NAME: Antoinette

ADDRESS:

Antoinette Malgas: CLTD (Centre for Learning, Teaching and Development)

Gate no. 9 West Campus, Enoch Sontonga Road, CLTD Unit, Braamfontein, Johannesburg, 2050 • Private Bag 3, Wits 2050, South Africa

Tel: +27 11 717-7175 • E-mail: email: Antoinette.malgas@wits.ac.za • Website: https://www.wits.ac.za/admintest/teaching/professional-development-for-academics/cltd/

School Consent Form 24 April 2017

Dear Madam

I am a Master of Education Degree student at Wits School of Education who is currently registered at the University of the Witwatersrand. I would like to seek your permission to carry out a case study research in the University of Witwatersrand, in the field of Information and Communication Technology in Education (ICTiE). The title for my research is: "**Experience, Perceptions, Attitude and Intention to Use Information and Communication Technology (ICT) by First Year Students: The Case of a South African University".**

The Digital skills Project serves as an intervention strategy to improve students' performance by using ICT integration into the university teaching and learning strategies. Its effectiveness will be evaluated at a later stage based on the results of this research. The framework can be adopted by the rest of the university, Students Development and Learning Unit and the Department of eLearning, Support and Innovation to further develop means of assisting student learning and performance in the university.

It is the concern of the FYE (First Year Experience) project in the university that the first-year students participating in the Digital Skills training later on maximise the use of digital technologies to enhance their performance in learning as demanded by the academic learning environment. The tools used in different sessions are mostly used to help these students know how and where to access learning material and to acquire the skills necessary to empower and equip them for their learning experience in this university. This entails accessing the Learning Management System (Wits-e), typing and submitting online assignments prescribed by the university lecturers' standards, participating in collaborative tools for discussions, downloading hand outs and guidelines on how to maximize learning skills as well as knowing how to use spread sheets and do presentations. These skills are crucial to the first-year students' performance.

This research is concerned with students coming from disadvantaged schools where ICTs were not used for learning purposes. These students generally have difficulty in operating computers to perform basic tasks in the university and according to some lecturers they tend to underperform in their courses. This research seeks to find out the extent to which the ICT course offered by the First Year Experience project in the university impacts on the performance of these first-year students.

If permission is granted, the current learners from 'disadvantaged backgrounds' participating in the project will voluntarily participate in the study. They are presently attending the four-week training sessions taught by myself and other CLTD staff members in partnership with the Students Development and Leadership Unit (DLU). The pre-assessment, post-assessment questionnaires will be provided online and at the end of all four sessions all participating students will be informally assessed to evaluate if learning occurred. The instruments used will be analysed and a report be made available to Development and Leadership Unit (DLU) management and the Directors of CLTD Unit in the university for further evaluation and improvisation of tools used and impacting students' performance. The data collected will be discarded after five years.

I intend carrying out the research from the first semester as soon as consent has been granted from all involved. In order to protect your school and the participant's confidentiality, student's names will not be revealed in the presentation of this report. The students targeted will be asked for their willingness to participate throughout the duration of the study. I will also assure them that their participation in this research is voluntary and they may withdraw their involvement at any time without any penalty.

I promise that I will make this report available to you for scrutiny before it is published should you wish and present you with a copy on its publication.

I would be grateful if you would sign and return the slip below at your earliest convenience.
I enclose two copies of this letter. Please keep one for your files.

Yours sincerely

_____

Antoinette N Malgas
Office Number: 011 717 7175 Cell Number: 0658482136
Email address: antoinette.malgas@wits.ac.za

I, _____ (Dean of Students) give my permission for Antoinette N Malgas to undertake her research in the university and in the classroom sessions of the First Year Experience (FYE) project running over four-week sessions, who will participate in her study.

_____ _____

Dean of Students Signature Date

_____

Dean of Students Name

Ethical Clearance

Wits School of Education



27 St Andrews Road, Parktown, Johannesburg, 2193 Private Bag 3, Wits 2050, South Africa. Tel: +27 11 717-3064 Fax: +27 11 717-3100 E-mail: enquiries@educ.wits.ac.za Website: www.wits.ac.za

10 November 2016

Student Number: 0318127X

Protocol Number: 2015ECE054M

Dear Antoinette Malgas

Application for ethics clearance: Master of Education

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate, has considered your application for ethics clearance for your proposal entitled:

The Perception, Acceptance and Intention to Use Information and Communication Technology Tools by First Year Students: The Case of Wits University

The committee recently met and I am pleased to inform you that **clearance was granted.**

Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

MMaseko

Wits School of Education

011 717-3416

cc Supervisor - Dr Reuben Dlamini

Appendix B: Instruments

Perceived Experience:

Please indicate your experience with:	Well experienced	Experienced	Neutral	Not experienced
Computers				
Internet				
MS Word				
MS PowerPoint				
Ms Excel				
Turnitin				
LMS				

Perceived Ease of Use

How would you rate the ease of use for each of the following items based on your experience with student portal				
	Very easy	Easy	Somewhat difficult	Difficult
Accessing e-Learning platform and content				
Accessing student email, Password Reset, Self-Service link and using them				
Accessing Application software such as MS Word and using it				
Accessing Application software such as MS Excel and using it				
Accessing Application software such as MS PowerPoint and using it				
Accessing Turnitin and using it				

Perceived Usefulness

In a scale of 1 - 5 (1 being Very Useful and 5 Not useful at all) How useful do you believe these digital tools are, for digital learning in university?	Not useful at all	slightly useful	Neutral	Very useful
Use Sakai LMS for learning activities				
Submit and receive assessments online				
Access online audios, videos				
Create and present knowledge using various multimedia for my studies				
Download online audios and videos for my studies				
Use MS Word to submit assignments using Sakai LMS				
Use MS Excel to capture my research and present data visually as part of my studies				
Using turnitin to help me become a better writer and avoid plagiarism				
Internet to search for information				
Competent Knowledge of hardware and software computer components				

Perceived Confidence

Which attributes do you think are important for students to successfully integrate ICT tools in their learning	Please rank the following according to how you perceive them as important, from the most important to the least important out of scale of 1-5 (1 being the most important)				
	1	2	3		5
To feel confident in using technology to operate computer functions with ease					
Ability to operate computer functions with ease					
Ability to use online learning content					
Ability to use various multimedia tools to learn					

Perceived Self-efficacy

My view on the usage of the digital tools is:	Extensively for lifelong learning and keeping up with rapidly changing technology	To use for university only	To Pass only	Not interested
I believe I am able to use digital tools to perform different tasks				
I believe I am able to use online learning content - access a learning portal (e.g. a 'Course' or 'Learning Management System') ubiquitously				
I believe I am able to use various multimedia to learn and to create knowledge e.g. PowerPoint etc.				
I am confident in using the internet to not only access web-based services but to also identify best sites for learning material				
I am able to use a mobile phone (Tablet/Smartphone) to access web-based information or services				
I am able to use a mobile phone to send or receive email and download necessary content for learning				